John Ellen

Elements in Fruits and Vegetables from Areas of Commercial Production in the Conterminous United States

---

GEOLOGICAL SURVEY PROFESSIONAL PAPER 1178

Elements in Fruits and Vegetables from Areas of Commercial Production in the Conterminous United States

By HANSFORD T. SHACKLETTE

GEOLOGICAL SURVEY PROFESSIONAL PAPER 1178

A biogeochemical study of selected food plants based on field sampling of plant material and soil

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1980

UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, *Secretary*

GEOLOGICAL SURVEY

H. William Menard, *Director*

Library of Congress Cataloging in Publication Data
Shacklette, Hansford T.
Elements in fruits and vegetables from areas of commercial production in the conterminous United States.
(Geological Survey Professional Paper 1178)
Bibliography: p. 28
Supt. of Docs. no.: I 19.16:1178
1. Vegetables—United States—Composition. 2. Fruit—United States—Composition. 3. Vegetables—United States—Soils—Composition. 4. Fruit—United States—Soils—Composition. 5. Biogeochemistry—United States. 6. Fruit-culture—United States. 7. Truck farming—United States. 8. Soils—United States—Composition. I. Title. II. Series: United States Geological Survey Professional Paper 1178.
SB320.6.S52 641.3'5'0973 80-607141

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

CONTENTS

ILLUSTRATION

TABLES

ELEMENTS IN FRUITS AND VEGETABLES FROM AREAS OF COMMERCIAL PRODUCTION IN THE CONTERMINOUS UNITED STATES

By HANSFORD T. SHACKLETTE

ABSTRACT

The mean concentrations of 27 chemical elements in eight kinds of fruits and nine kinds of vegetables were estimated from field collections within 11 areas of commercial production. Water-content and ash-yield measurements permitted the element concentrations to be expressed on fresh-, dry-, and ash-weight bases. A three-level sampling design was used; and estimates were made of the chemical variation in the produce from among the areas, among fields within each area, and between sites within fields. Most significant variation was found to be among areas: concentrations of some elements in some kinds of produce were found to vary tenfold. Soils in which the produce grew were sampled also, and analysis revealed strong differences among areas that are attributed, from place to place, to cultivation practices, contamination by pesticides, or pollution, as well as to climate and underlying geology. In general, little relationship was found between total element concentration in the soil and in the produce that could be assigned to natural causes, but where the soils are highly contaminated the levels of the contaminating element were found to be high in the produce.

The concentrations of elements in fruits and vegetables generally differ least in the macronutrients potassium, phosphorus, magnesium, and sulfur that are essential for plant growth. Trends in concentrations of the micronutrients boron, copper, iron, and zinc are similar but not as pronounced as those of the macronutrients. The concentrations of the nonnutritive nontoxic elements barium, cobalt, lithium, titanium, and zirconium tend to have greater ranges than do those of the nutritive elements. Concentrations of elements generally considered toxic to organisms exhibit erratic distributions among areas and kinds of produce, and a wide range of values is indicated.

INTRODUCTION

The chemical elements in food plants are of interest primarily because these plants constitute the major source of essential elements (excluding oxygen and hydrogen) in human nutrition (Underwood, 1971); lesser amounts of these elements are derived from water, soil and rocks, and air. The elements contained in the plants may be consumed directly in vegetables and fruits, or indirectly in meat and milk from animals that have eaten the plants. Numerous studies have been made of the elements in man's total diet, and analyses of many food plants are given in the reports of the studies. A lack of uniformity among these studies exists, however, in sampling techniques, methods of analyses, kinds of plants sampled, and bases used for reporting element concentrations. Inadequate, or no, descriptions of the origins of the samples further reduce the usefulness of many reports.

A National Research Council report (Morrison and others, 1974, p. 92) stated, "no systematic study has been made of sampling of fruits and vegetables for trace elements. More attention has been paid to food processing and its effect on changes in trace element composition of fruits and vegetables."

The effects of processing on the element content of food plants cannot be determined unless reliable bases are available for estimating the typical concentrations of the elements that are in the edible portion of the plants as they grow in the field. Regulations governing allowable increases or decreases of element content caused by processing food should take into account not only the concentrations of elements of interest characteristic of the different food plants, but also the variation in chemical composition of the plants among the areas of commercial production throughout the country.

Some fruits and vegetables are consumed that have had little or no processing; therefore, the introduction of extraneous elements is minimal, and only the elements acquired by the plants while growing in the field are generally present. Yet the sources and concentrations of elements in these, as well as in other, food plants may be greatly different among areas where the plants are grown, as influenced by factors of soil chemistry, agricultural practices, climate, and the extent to which environmental pollution affects the produce. Plant species react differently to these influences on element content because of their genetic control of growth processes and characteristics. If the edible parts of the plant are leaves and stems, atmospheric pollution may considerably influence the kinds and concentrations of elements in these parts. If roots or tubers are used for food, the elements in the soil may exert the greatest effect, whereas if fruits are the edible portion, only the elements that can be readily transported from the roots to the fruit are likely to be greatly influenced by differences in geochemical environments.

Quarterman (1973, p. 171) stated, "The amount of a particular trace element in a plant food can depend on the species of plant, the breed or strain, and which part of the plant is eaten. It can also depend on the season of the year and the climate, on the soil type and pH, the proximity of other plants, manuring and various forms of contamination." These factors may differ greatly among regions of foodplant production; therefore their influence creates an interest in determining the presence and extent of regional variation in the elemental composition of fruits and vegetables.

The chemical composition of fruits and vegetables is of interest to the growers of produce because it can be used as an index of the nutritional status of the plants. Some large-scale commercial operations make frequent analyses of the plants during the growing season for as many as eight elements; deficiencies in elements that may affect yield or market quality are determined and are promptly corrected by soil or foliar applications of the deficient elements. Analyses are commonly made of leaf or stem tissue, but may also use fruit tissue. In addition, visible symptoms of specific element deficiencies may be used to initiate corrective measures. The data on elemental composition of food plants given in reports of these practices are of limited usefulness in establishing baseline values to be applied to problems of human nutrition, because the emphasis in these reports is on plant nutrition or pathology. These reports include, however, maximum concentrations of certain elements in the plants, concentrations that are potentially toxic to humans. Examples of comprehensive studies of this type include those of Goodall and Gregory (1947), Chapman (1966), and Kenworthy (1967).

The emphasis in fruit and vegetable growing is on an adequate yield of produce that is of acceptable market quality to return a profit to the grower. Quality in this context is measured by the ability of the produce to withstand harvesting, processing, and marketing operations, and to be adequate in such factors as color, flavor, and texture. The nutritional value of the produce generally is given only minor, or no, consideration, although Beeson (1957, p. 258) pointed out, "The term 'crop quality' means both marketable quality and nutritional quality of a crop* * *. Nature has not always combined two aspects of crop quality in one package, and man has seldom improved matters in his efforts to breed plants and manage soil so as to produce crops that are both attractive and high yielding." A task force of the Food and Drug Administration (Miller, 1974) proposed monitoring the content of two elements, magnesium and calcium (along with protein; vitamins A, B6, and C; thiamin; riboflavin; and niacin) in nine food crops. It would seem to be of equal or greater importance to monitor some other elements that, for man, are obtained principally from food plants—copper, for example.

In a paper giving quantitative data on the occurrence in plant tissue of 71 of the 94 naturally occurring elements, 46 elements were reported in measurable concentrations in the edible portion of food plants (Shacklette and others, 1978). The mean concentrations, deviations, and observed ranges of 30 elements in many vegetables were reported by Connor and Shacklette (1975), who gave element values for the material actually analyzed, whether it consisted of plant ash or dry plant material. Extensive tables giving element concentrations in many food plants were published by Beeson (1941), Monier-Williams (1949), and Diem (1962); and although the data in these reports generally based the concentrations on dry weight of the plant material, values based on fresh weight occur at places. Only the report by Diem gave the water content of the material that was analyzed.

The absence of clearly stated bases for calculating element concentrations in samples of foods and other biological materials is a deficiency in many published reports, and for these one can only assume which bases were used (that is, fresh weight, dry weight, or ash weight) by judging the kind of material analyzed and the magnitude of the concentrations that were reported. The use of various bases for expressing element concentrations in organic materials was discussed by Goodall and Gregory (1947) and is also discussed later in this report.

The elemental composition of a variety of foods from tropical plants was given by Duke (1970) in an ethnobotanical report on some Central American Indians. Many reports of the elements in foods have been published by U.S. Government agencies, including the Department of Agriculture handbooks (for example, see Watt and Merrill, 1950, which gives both water and ash contents of the food plants that were analyzed). Most of these reports include only the major and minor nutritive elements.

The concern with environmental contamination has resulted in many publications which include food-plant analyses for toxic elements. In a report on toxicants occurring naturally in foods, Underwood (1973) provided some background ranges in values for the trace elements aluminum, arsenic, iron, copper, molybdenum, zinc, manganese, selenium, lead, tin, cadmium, mercury, chromium, fluorine, and iodine in a variety of foods of plant origin. Other reports consider fewer elements, often only one, as illustrated by those of

Williams and Whetstone (1940), for arsenic; Warren (1967) and Egan (1972), for lead; Kropf and Geldmacher-v.Mallinckrodt (1968) and Shacklette (1972), for cadmium; and Garber (1968), for fluorine. An outline of element toxicities to plants, animals, and man (Gough and Shacklette, 1979) reported poisonous levels of 23 elements that are of general environmental concern, although food plants were not specifically emphasized.

D. J. Wagstaff, J. F. Brown, and J. R. McDowell stated in a paper presented at the Fourth Biennial Veterinary Toxicology Workshop held at Logan, Utah, June 22, 1978, "Ubiquitous natural elements such as arsenic could never have been fully prevented from occurring in foods at low concentrations. The total quantity of toxic metal in a food can be viewed as being composed of three portions which originate from different sources. First, that which is the natural background, second, that originating from environmental pollution, and third, that which is added during food processing or marketing. The most significant environmental and food processing contamination sources have been identified and are being controlled. However, present information is neither sufficiently detailed nor accurate to support definitive apportionment of all toxic metals in food into these three source groups." One objective of the present report is to provide background or baseline levels of element concentrations in the edible parts of certain food plants as they are commercially grown in this country.

One approach to evaluating the elemental composition of foods, including those of plant origin, is the "market basket" method of obtaining samples for analysis. In this method samples of the desired products are obtained by purchase from retail food stores at different locations throughout the country without particular consideration of the origin of the produce. The U.S. Food and Drug Administration (1972) has carried out such a program in which selected chemical elements as well as other constituents of the samples were determined. Another study (Shacklette and others, 1978) used similar methods of sampling, but limited the analyses to determining the concentrations of arsenic, cadmium, chromium, cobalt, copper, fluorine, lead, mercury, molybdenum, nickel, selenium, and zinc in apples, bulb onions, cabbage, carrots, cucumbers, dry beans, head lettuce, oranges, potatoes, snap beans, and sweet corn. The mean concentrations and ranges of concentrations that were reported provide an estimation of the levels of these elements in the produce obtained from retail stores in the states of Arizona, California, Colorado, Georgia, Illinois, Louisiana, Maine, North Dakota, Virginia, and Washington.

Relatively few comprehensive reports are available in which the concentrations of elements in fruits and vegetables are related to those of associated soils. Beeson (1941) gave an extensive account of the effects of different soils on the mineral content of cultivated plants. Most of these comparisons considered only the major plant nutrient elements in field crops, not in fruits and vegetables, although the concentrations of many elements in food plants were listed. Each of the many agricultural studies of the soil supply of essential and toxic elements generally considered one, or a few, of the elements in relation only to crop yield—not to the chemical composition of the crop.

A study of home gardens in Georgia revealed few or no consistent correlations of concentrations of 16 elements in blackeyed peas, cabbage, corn, green beans, and tomatoes with the total (not the "available") concentrations of the same elements in the soils where the vegetables grew (Shacklette and others, 1970). The problems of determining the availaility to plants of the elements in soils are inherent in the complex relationships of soil chemistry and the physiological processes characteristic of different plants. Quarterman (1973, p. 175) stated, "No simple relationship has been found between the amount of a particular element in the soil and the amount which is absorbed by plants." Allaway (1968) reviewed methods by which agricultural technology can modify the routes and extent of trace element movements. He pointed out that plants will grow normally when they contain levels of some elements that are too low for the growth or health of the animals eating the plants. The elements he reported were chromium, cobalt, copper, iodine, manganese, selenium, and zinc. At the other extreme, the plants will grow despite levels of cadmium, lead, molybdenum, and selenium that are toxic to animals. Conversely, plants will die with levels of arsenic, beryllium, fluorine, iodine, nickel, and zinc that are tolerated by animals. In general, and certainly for some elements, the best measure of the availability of soil elements to plants is obtained by chemical analysis of the plant as it is grown in the field.

The principal objective of the present study was to evaluate the concentrations of elements having particular nutritional or environmental significance that occur in fruits and vegetables entering major commercial channels and, therefore, are widely available in retail outlets. The samples were collected from plants as they grew in the fields before they had been commercially harvested and processed for sale; they were prepared for analysis in a manner that enabled their element concentrations to be expressed on the fresh-weight, dry-weight, and ash-weight bases. The sampling design permitted comparisons of element contents to be made between kinds of produce, regions of production, fields within regions, and samples within fields, and also allowed the extent of variance attributable to combined sample preparation and laboratory analysis to be estimated. The elemental compositions of the soils that supported the food plants were also determined. Cereal grains, soybeans, sugarcane, and sugar beets were not sampled, for although they contribute greatly to the diet, they are so extensively altered by processing prior to consumption that the food product derived from them was expected to be greatly different in chemical composition from field collections of the original produce.

All fruits and vegetables considered in this report are cultivated varieties (properly termed "cultivars," abbreviated "cv.") of species that have been long in cultivation. The wild progenitors of some cultivars are not know for certain; and the problems of taxonomy, origin, and evolution of many food plants are complex (Pickersgill, 1977). Some of the herbaceous cultivars in commercial use are called "hybrids," generally meaning that the cultivar is the F_1 (first filial) generation resulting from the crossing of two inbred cultivars of the same species. Other hybrids are only selected products of crosses between two cultivars that are sufficiently homozygous ("pure") to be economically propagated from seed. A few hybrids result from crosses between natural (that is, "wild") species. Other cultivars, especially among fruit trees, shrubs, and vines, originate spontaneously as natural somatic ("sports") or genetic mutations and are heterozygous for the desired characteristics; they, therefore, must be vegetatively propagated by rooting cuttings or by grafting.

The complexities of nomenclature resulting from the diverse origins of fruit and vegetable cultivars, and the continual introduction of new cultivars developed by plant-breeding institutions, have made the identification of some cultivars very difficult, therefore impractical, in field studies of the kind reported herein.

The terminology used in this report follows that in general use in this country, which does not always correspond to scientific usage. The two major categories of food plants that were sampled, fruits and vegetables, are distinguished on the basis of long-established custom. For example, the edible product of a tomato plant is ordinarily considered to be a vegetable, but technically it is a fruit—moreover, it is a berry. The sweet and juicy products of trees, shrubs, and vines are designated as fruits, but there are some exceptions to this definition of fruits, as, for example, strawberries and olives. Another pecularity of vernacular usage is that some dry beans, such as lima beans, are called vegetables and are considered horticultural products, whereas soybeans are referred to as a field crop and are, therefore, considered to be agronomic products. In some published crop reports, potatoes and dry beans are classified as field crops, and cantaloupes and watermelons are listed as vegetables rather than as fruits. In this report the food plants are classified rather arbitrarily as either fruits or vegetables, and their common and scientific names are given in a later section. The term "produce" refers principally to fresh fruits and vegetables that are offered for sale.

A. T. Miesch suggested this study, and his assistance in sampling design and statistical treatment of data is greatly appreciated. I acknowledge with gratitude the invaluable assistance of Josephine G. Boerngen in processsing the large amount of data generated in the study. Jessie M. Bowles is thanked for help with sample preparation and sorting. Thanks also are expressed to R. J. Ebens, J. R. Keith, and James Scott, who assisted in the field work, and to the following County Agricultural Agents of the Cooperative Extension Service, who provided suggestions for selecting areas where the desired produce was grown: Harvey Beltner, Donald A. Chaplin, A. H. Karcher, Jr., Keith S. Mayberry, Raymond C. Nichols, Robert S. Pryor, and Norman J. Smith. The cooperation of the many growers who gave permission to sample produce and soils on their property is also appreciated. This study could not have been accomplished without the U.S. Geological Survey chemists who analyzed the samples; their names follow: James W. Baker, D. A. Bickford, Willis P. Doering, Johnnie Gardner, Patricia Guest, Thelma F. Harms, Claude Huffman, Jr., Lorraine Lee, Violet Merritt, H. T. Millard, Jr., Harriet G. Neiman, Clara C. S. Papp, James A. Thomas, Michele L. Tuttle, J. S. Wahlberg, and William J. Walz.

SAMPLING LOCALITIES

Counties were chosen as the largest sampling units because information on agricultural production is based on political units, and because agricultural agents of the Cooperative Extension Service, U.S. Department of Agriculture, are assigned to counties. The criteria used for selecting counties in which to sample fruits or vegetables were (1) production of significant quantities of produce that entered commercial distribution as fresh, dried, canned, or frozen food; (2) production of a wide range of food plants, as appropriate for the climatic zone in which located; and (3) wide geographic distribution of counties. As a starting point in this selection, the National Atlas (U.S. Geological Survey, 1970) was consulted to locate counties having high production of fruits and vegetables. The selection was narrowed to counties for which production data indicated that sampling several kinds of produce was possible. Letters of inquiry were then sent to the county agricultural agents in each of these counties, briefly outlining the proposed study and asking for information on the present status of horticultural production in the county. Most agents responded to the inquiry, and the final selection of counties in which to sample was influenced by their replies.

The counties in which sampling was conducted are listed and characterized below in the chronological order in which they were visited (fig. 1). The soil descriptions given are from U.S. Soil Conservation Service (1970).

BERRIEN COUNTY, MICHIGAN

Produce was sampled September 11-14, 1972. This county has long been an important center of fruit production, having a favorable climate because of the moderating effect of Lake Michigan. The principal horticultural crops recorded in 1964 were apples, peaches, grapes, plums, strawberries, tomatoes, snap beans, and sweet corn. The peach crop in 1972 was destroyed by late spring frosts. The sandy soils near Lake Michigan are classified as Order Entisols (no pedogenic horizons), Suborder Psamments (textures of loamy fine sand or coarser), Great Group Udipsamments (containing easily weatherable minerals, never moist as long as three consecutive months). The inland soils, on which most fruit trees are grown, are classified as Order Alfisols (medium to high in bases, gray to brown surface horizon, subsurface horizon of clay accumulation); Suborder Udalfs (soils usually moist, but during the warm season some horizons may be intermittently dry for short periods), Great Group Hapludalfs (subsurface horizon of clay accumulation relatively thin; or only a brownish-colored stain marks the horizon). No irrigation was observed in this county. The following kinds of produce were sampled: fruits—apples, cantaloupes, grapes, pears, and plums; vegetables—cabbage, corn, cucumbers, eggplant, peppers, snap beans, and tomatoes.

WAYNE COUNTY, NEW YORK

Produce was sampled September 18-21, 1972. The moderating effect of Lake Ontario on the climate has made this county a favorable fruit-growing center. Apples, cherries, and peaches are the major fruit crops, although pears, grapes, and plums are also grown. Snap beans, dry beans, and potatoes are the principal vegetable crops. The large food-processing plants are closely related to the crops of the region. Low hills of glacial drift, separated by valleys of alluvial material and scattered peat and muck deposits, characterize the landscape. The soils are, in general, classified to Great Soil Group like those of eastern Berrien County, Michigan. The peaty soils are used to grow potatoes and peppermint. No irrigation was observed in the county. The following kinds of produce were sampled: fruits—apples, grapes, peaches, pears, and plums; vegetables—potatoes, dry beans, and snap beans.

CUMBERLAND COUNTY, NEW JERSEY

[Samples of apples and sweet corn were obtained near the Cumberland County line in Gloucester and Salem Counties, respectively]

Produce was sampled September 24-28, 1972. This county lies partly in the coastal plain, characterized by low local relief of Quaternary terraces and alluvial embayments; but the central and northern parts of this county and of Salem County, and all of Gloucester County, are underlain by upper Tertiary rocks and have somewhat greater relief. The proximity of these counties to Delaware Bay and the Atlantic Ocean results in a mild climate well suited to horticulture. The Rutgers University Research Farm, devoted to horticultural development, and Seabrook Farms, where pioneering work in the frozen food industry was done, are located in Upper Deerfield Township of Cumberland County.

Soils of most croplands are classified as Order Ultisol (low in bases, have subsurface horizons of clay accumulation); Suborder Udults (usually moist and relatively low in organic matter in the subsurface horizons); and Great Group Hapludults (have either a subsurface horizon of clay accumulation that is relatively thin, a subsurface horizon having appreciable weatherable minerals, or both). Numerous shell fragments were found in some of the fields that were sampled; these fields lie on the upper terraces of the coastal-plain sediments.

The principal fruits grown are peaches and apples; strawberries are a minor crop. A wide variety of vegetables is produced, with major production of tomatoes and snap beans and lesser amounts of potatoes, green peas, sweet corn, cabbage, cucumbers, lettuce, potatoes, and sweet corn. The following kinds of produce were sampled: fruits—apples; vegetables—cabbage, cucumbers, lettuce, potatoes, snap beans, and sweet corn.

PALM BEACH COUNTY, FLORIDA

Produce was sampled January 29-31, 1973. This county is entirely underlain by Quaternary deposits

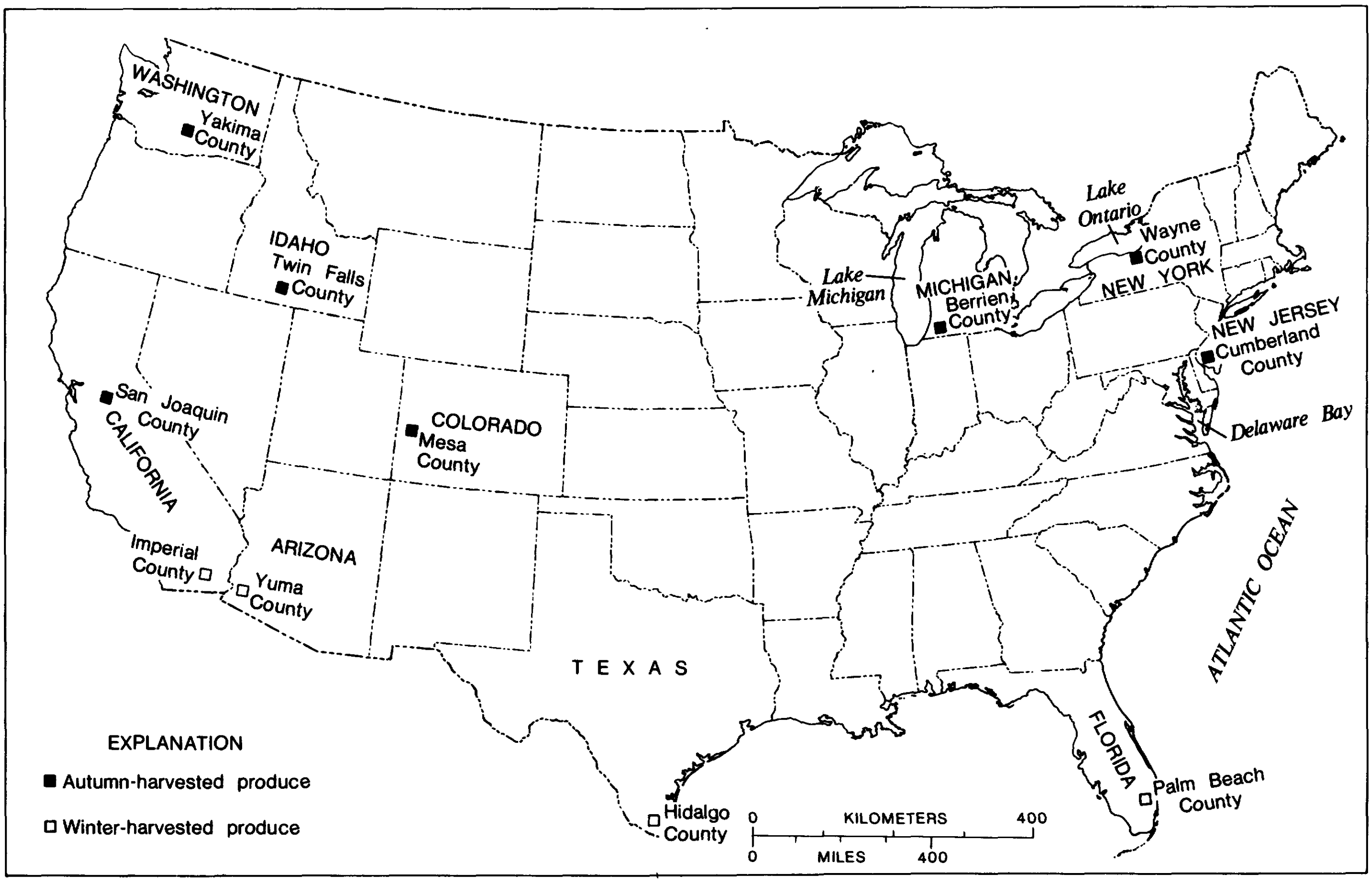

FIGURE 1.—Location of counties where fruits and vegetables were sampled.

(Vernon and Puri, 1964) composed of limestones, shells, clays, and sands. The coastal part is marked by beach terraces of sand and has low relief, whereas most of the county is nearly level and is part of the vast Everglades swamp. Parts of this swamp have been drained, and the deep, highly organic soil now constitutes excellent land for vegetable production. Numerous drainage canals and ditches divide the land into large flat fields, some of which are planted in sugarcane. No irrigation was observed in this county.

The soils of the sandy terraces are classified as Order Entisols (soils without pedogenic horizons); Suborder Aquents (soils either permanently wet or seasonally wet, have mottled or gray colors); Great Group Psammaquents (textures of loamy fine sand, or coarser). The soils of the flat lands south and east of Lake Okeechobee are classified as Order Histosols (wet peat and muck soils). Further classification is based only on the degree of organic-matter decomposition; the soils here have plant residues that are moderately to highly decomposed. The deep organic deposits shake or "vibrate" when walked on; and, since they were drained, oxidation of the organic material has caused a gradual lowering of the land surface.

Citrus fruits (oranges, grapefruit, and lemons) are the only fruits grown commercially. A very large variety of vegetables is produced, including beans, cabbage, celery, Chinese cabbage, corn, endive, escarole, lettuce, parsley, peppers, potatoes, radishes, squash, and tomatoes. The three vegetables produced in greatest quantity in 1971-72 were yellow sweet corn, 10,156 carloads; celery, 8,372 carloads; and tomatoes, 3,510 carloads (Robert S. Pryor, County Extension Director, written commun., 1973). The produce of this county is shipped mostly as fresh fruit and vegetables, processed foods being limited to citrus concentrates. The following kinds of produce were sampled: fruits—grapefruit and oranges; vegetables—Chinese cabbage, endive, lettuce, parsley, snap beans, sweet corn, and tomatoes.

HIDALGO COUNTY, TEXAS

Produce was sampled February 6-7, 1973. This county generally has a mild winter climate and frosts are uncommon, but a January frost had killed the less resistant vegetables such as tomatoes, peppers, and cucumbers just before this area was sampled. Irrigation is required for the culture of all fruits and vegetables. The county is underlain by Quaternary deposits of the Lower Rio Grande Valley and the Gulf Coastal Plain. The soils of the lowland near the Rio Grande River are classified as Order Mollisols (black, friable, organic-rich surface horizons high in bases); Suborder Ustolls (Mollisols of semiarid regions; intermittently dry for a long period, or have subsurface horizons of salt or carbonate accumulation); Great Group Haplustolls (subsurface horizon high in bases but without large accumulations of clay, calcium carbonate, or gypsum). Soils of the northern one third of the county are classified as Order Entisols (without pedogenic horizons), Suborder Psamments (Entisols that have textures of loamy fine sand or coarser), Great Group Ustipsamments (contain easily weatherable minerals; intermittently dry for long periods during the warm season).

The county leads Texas counties in the production of cabbage, cantaloupes, carrots, citrus, cucumbers, broccoli, lettuce, onions, and sweet corn, having 63,900 acres in vegetables alone (A. H. Karcher, Jr., County Agricultural Agent, written commun., 1971). In addition to the production listed above, lettuce, potatoes, spinach, tomatoes, and watermelons are also commercially grown. The following kinds of fruits and vegetables were sampled: fruits—grapefruit and oranges; vegetables—cabbage, carrots, lettuce, and onions.

IMPERIAL COUNTY, CALIFORNIA

Produce was sampled March 2-4, 1973. Most crops of this county are grown on the large plain of Imperial Valley that is below sea level and is irrigated with water from the Colorado River. The climate is warm and dry, and crops are grown in all months of the year. Soils in the valley are composed of silt and clay deposited by flooding of the Colorado River, and soils fringing the valley were largely derived from eolian sands. The valley soils are classified as order Entisols (soils without pedogenic horizons); Suborder Orthents (loamy or clayey, with a regular decrease in organic matter content with depth); Great Group Torriorthents (Orthents that are never moist as long as three consecutive months).

Imperial County is among the most productive agricultural counties in the United States. The major vegetable crops in 1970-71 were asparagus, cabbage, cantaloupes, carrots, cucumbers, lettuce, onions, squash, tomatoes, and watermelons. Of these crops, lettuce was greatest in quantity (444,000 tons) and had a value of $44,795,000 (Imperial County Board of Supervisors, 1971). Citrus crops are limited to relatively few acres in this county, and the agricultural agent advised sampling these crops in the Coachella Valley of adjacent Riverside County. The following produce was sampled: fruits—grapefruit and oranges; vegetables—asparagus, cabbage, lettuce, and carrots.

YUMA COUNTY, ARIZONA

Produce was sampled March 6, 1973. The area from which samples were collected is recently reclaimed desert land in the general vicinity of Hyder. The cultivated land surface is nearly level, is generally free of stones, and is irrigated with ground water. The water is warm as it comes from the wells and, by flowing through ditches in the citrus groves, gives some protection from the occasional frosts. When sampled, however, the groves showed some frost damage to lemon and orange trees, but little or no damage to grapefruit trees. Anhydrous ammonia is injected into the irrigation water at the wellhead.

The soils are classified as Order Aridisols (with pedogenic horizons low in organic matter and never moist as long as three consecutive months), Suborder Argids (with a horizon of clay accumulation), Great Group Haplargids (with a loamy horizon of clay accumulation and with or without alkali). Many citrus groves have been planted recently, and trees in these groves had not reached fruiting age when the area was sampled. Grapefruit and oranges are the principal fruits grown and were the only fruits sampled, although lemons, tangerines, and plums are also grown. No vegetable crops were observed in the area.

TWIN FALLS COUNTY, IDAHO

Produce was sampled September 3-5, 1973. The deep canyon of the Snake River marks the northern boundary of this county, and water from the river enables crops to be grown in this desert area that is underlain by volcanic rocks. Along the river, calcic soils low in organic matter form a narrow band on a plateau that widens to the west and south until terminated by an abrupt higher plateau having soils richer in organic material. The calcic soils are classified as Order Aridisols (usually dry soils with pedogenic horizons, low in organic matter); Suborder Orthids (Aridisols with accumulations of calcium carbonate, gypsum, or other salts more soluble than gypsum, but having no horizon of clay accumulation); Great Group Calciorthids (Orthids with a horizon in which large amounts of calcium carbonate or gypsum have accumulated). The more organic soils of the higher plateau are classified as Order Mollisols (soils with nearly black, organic-rich surface horizons and high base supply); suborder Xerols (Mollisols found in climates with rainy winters but dry summers; soils continually dry for long periods in summer), Great Group Agerixerolls (having a relatively thin subsurface horizon of clay accumulation or only a brownish-colored stain to mark this horizon).

The plateau along the river formerly produced apples and other fruits, but most of these orchards have been abandoned. Sweet corn, dry beans, snap beans, and potatoes are now produced in this area. Extensive plantings of potatoes have been developed on the plateau to the south as irrigation was extended to his very dry area. The vegetables sampled were dry beans, snap beans, sweet corn, and potatoes.

YAKIMA COUNTY, WASHINGTON

Produce was sampled September 7–10, 1973. This county was reported to rank first among counties of the State in value of all agricultural products, and was also first in fruit and vegetable production. It led all counties in the United States in apple and pear production (Washington State Department of Agriculture, 1964). The horticultural crops are produced on the broad alluvial plains and terraces that lie adjacent to the Yakima River and its tributaries and are irrigated with water from these streams. The county has a continental climate which is hot and dry in the summer and relatively mild and moist in the winter. The principal soils used for fruit and vegetable growing are alluvial soils of fine silty and sandy loams mixed with fine volcanic ash. Fruit production is centered on the higher terraces where spring frost damage is reduced, whereas vegetables and some specialized crops (hops and mint) are grown on the lower lands.

Soils of the Yakima Valley are classified as Aridisols (soils with pedogenic horizons, low in organic matter, usually dry), Suborder Orthids (having a horizon of clay accumulation with or without alkali); Great Group Haplargids (having a loamy horizon of clay accumulation). The principal fruits grown are apples, apricots, berries, cherries, grapes, peaches, and plums. Vegetables, ranked in order of number of acres in production, are sweet corn, asparagus, green peas, tomatoes, cantaloupes, rutabagas and turnips, watermelons, onions, carrots, lettuce, cucumbers, and spinach. Food processing constitutes an important industry in the county, and some crops are sold both as fresh and as canned or frozen produce. The following kinds of produce were sampled: fruits—apples, American and European grapes, peaches, pears, and plums; vegetables—potatoes and tomatoes.

SAN JOAQUIN COUNTY, CALIFORNIA

Produce was sampled September 14–17, 1973. The principal agricultural lands lie in the alluvial plain of the San Joaquin River, where a large variety of fruits and vegetables, as well as other crops and livestock, is produced. The horticultual crops are sold both as fresh and as processed foods. Rainfall amounts are usually low, occurring mostly in winter; therefore, irrigation is necessary for most crops. Azonal loamy or clayey alluvial soils predominate along the river; these soils are classified as Order Entisols (soils having no pedogenic horizons); Suborder Orthents (loamy or clayey, and having a regular decrease in organic-matter content with depth); Great Group Xerorthents (Orthents in climates with rainy winters but dry summers; continually dry for long periods during the warm season). Adjacent, but higher, areas have soils that are high in bases and have clayey horizons. These soils are classified as Order Alfisols (medium to high in bases, with gray to brown surface horizons and subsurface horizons of clay accumulation); Suborder Udalfs (soils usually moist, but may be intermittently dry in some horizons); Great Group Hapludalfs (soils with subsurface horizon of clay accumulations that is relatively thin, or having only a brownish-colored stain to mark this horizon). A small area at the northwestern tip of the county has wet organic soils; this area was not sampled.

The fruits that are grown include apples, apricots, cherries, grapes, nectarines, olives, peaches, pears, plums, and strawberries. Of these fruits, grapes and cherries are among the county's 10 leading crops in value. Tomatoes and asparagus are also among these leading crops; and, in addition, snap beans, lima beans, cabbage, carrots, cauliflower, sweet corn, cucumbers, lettuce, melons, onions, peas, peppers, potatoes, pumpkins, squash, sweet potatoes, beets, and spinach, listed in order of quantity that is produced, are commercially grown (Stipe and Jones, 1972). The following kinds of produce were sampled: fruits—European grapes, peaches, and pears; vegetables—cucumbers, dry beans, and tomatoes.

MESA COUNTY, COLORADO

Produce was sampled September 22–24, 1973. This area is one of the few in the Rocky Mountain region in which occurs significant production of fruits and some vegetables; total production here, however, is small compared to that of other areas that were sampled. The cultivated lands lie along the Colorado and Gunnison Rivers and tributary streams where water is available for irrigation. Field crops and vegetables are grown in the low alluvial soils, and fruits are mostly on higher ground. The soils are classified as Order Entisols (soils without pedogenic horizons) but fall into two Suborders, Fluvents and Orthents. The Fluvents (Entisols having organic-matter content decreasing irregularly with depth; formed in loamy or clayey alluvial deposits) are further classified to Great Group Torrifluvents (never moist as long as three consecutive months). Soils of Suborder Orthents (loamy or clayey Entisols that have a regular decrease in organic-matter content with depth) are further classified as Torriorthents (never moist as long as three consecutive months). The following produce was sampled: fruits—apples, peaches, pears, and plums; vegetable—dry beans.

METHODS OF SAMPLING PLANTS AND SOILS

SAMPLING DESIGN

Only one trip to each area of food-plant production was practical because of restrictions of time and resources. Organization of the sampling plan, therefore, required first an estimate of the major harvest times for the several areas to be sampled in order to maximize the opportunity of obtaining different kinds of produce during the one visit to each area. Autumn harvest was selected as the most important harvest for the northern localities, the spring and early summer crops being generally less important. This selection, however, eliminated the berry crops, cherries, and some early summer vegetables from the sampling targets in the northern areas. In the southern localities the harvest is spread more uniformly throughout the year, particularly in areas where several crops of a vegetable can be grown in a single year. The tree fruit crops are more seasonal, being generally harvested during the winter months; therefore the winter harvest season was selected for the southern localities (fig. 1), although the hazard of frost damage occurs at this season.

Counties in eleven areas of fruit and vegetable production were selected for sampling (fig. 1). Within each area the sampling plan required the selection of five fields in which a particular crop was grown. This selection was based on a general reconnaissance of the area before sampling was begun, often with the recommendations of the county agricultural agent as guides, in order to locate potential sampling targets for each kind of produce. Formal random selection of fields was seldom possible: some fields had already been harvested; some were not yet mature; and, for some, permission to sample could not be obtained, generally because the owner of the land could not be located. Fields were sampled, therefore, as the opportunity arose.

Within each field (or grove, orchard, vineyard, or plot), two sites were selected for sampling produce by quartering the field into successively smaller units by drawing lots until a sampling site (variously defined as a single tree, a vine, a clump, or a row) was chosen. At this site an adequate sample of the fruit or vegetable was collected. Duplicate samples of produce were collected at about 10 percent of the sites, as dictated by a randomization procedure developed before field work was begun by generating a block of random numbers from 1 to 1,000 and ordering them into numerical sequence by a computer program. As sites were sampled they were numbered consecutively, and at the site whose sequential number corresponded to the next sequential random number a duplicate sample of plant material was obtained. These duplicate samples were collected in order to determine the variance in geochemical properties within a site. Soil was sampled at only one field within each area for each type of produce.

After all samples had been dried and pulverized, about 10 percent of the samples (45) were split (divided into approximate halves), again selecting by random numbers generated similarly, but not identically, to the random numbers described above. This procedure enabled an estimation of laboratory and analytical error to be made by a comparison of the analytical values reported for each pair of samples.

All prepared samples of plant material and soils, including field duplicates and laboratory splits, were arranged in a randomized order that was unknown to the analysts and were then submitted to the analytical laboratories. This procedure minimizes the effects of variable operator bias and analytical drift on interpretation of the data.

The hierarchical organization of sampling the kinds of produce can be outlined as follows:

- Two to five areas, depending on the produce (counties in 10 different States)
  - Five fields per area
    - Two randomly selected sites per field
      - Duplicate samples at 45 randomly selected sites
        - Laboratory splits of 45 randomly selected samples.

The duplicate samples at 45 sites and the 45 laboratory splits did not include all kinds of produce that were studied because of their random selection from the entire lot of sites and samples. Analyses of these samples, therefore, provide general estimates of chemical variation and sampling error within sites, and laboratory error in sample preparation and analysis.

SAMPLING TECHNIQUES

SPECIES OF PLANTS SAMPLED

It was not possible to sample the cultivar of a species at all sampling localties where the species was cultivated, because the cultivars that are grown commercially in a particular area are those that are especially adapted to the climate, cultivation practices, and market preferences of the area. Although some studies have shown that different cultivars of certain species differ in concentrations of particular elements in edible parts of the plants, other studies have found only slight, or no, differences among cultivars of other species. (See discussion by Beeson, 1941.) If differences do exist among some cultivars sampled in this study, the summary data given for certain elements in a fruit or vegetable in a locality and in the United States will be biased to an unknown extent. From an overall dietary viewpoint, however, if these differences exist they probably are of minor importance, assuming that the produce actually sampled is representative of these foods as consumed by a large percentage of the population.

The common and scientific names of species, and the names (if known) and numbers of cultivars (cv.) that were sampled, are given for each locality in the list that follows. Field replicate samples, if collected, are included. The areas are listed in order of sampling.

FRUITS

American grape, *Vitis labruscana* Bailey. The species name is a horticultural name for the group of cultivars originating from a wild grape, *V. labrusca* L., that is native to North America. Cultivars included in this group are Concord, Catawba, Niagara, and others. These cultivars can be distinguished from those of the European grape (*V. vinifera* L.) by the "skin" on the berry easily slipping from the pulp within, whereas the skin adheres to the pulp in the European species. Berrien County, Mich.—cv. Concord, 12. Wayne County, N.Y.—cv. Niagara, 7; Catawba, 2. Yakima County, Wash.—cv. Concord, 10. These grapes are eaten fresh and are also processed as juice, preserves, and wine.

Apple, *Pyrus malus* L. Two groups are recognized, summer harvested and autumn harvested; the following samples were of autumn-harvested cultivars. Berrien County, Mich.—cv. Russet, 1; cv. Stayman (also called Stayman Winesap), 9. Wayne County, N.Y.—cv. Greening, 6; cv. Golden Delicious, 4. Gloucester County, N.J.—cv. Red Delicious, 6; cv. Greening, 2. Yakima County, Wash.—cv. Red Delicious, 6; cv. Standard Delicious, 4. Mesa County, Colo.—cv. Red Delicious, 10.

Cantaloupe, *Cucumis melo* L. Cantaloupe is classified in some production reports as a vegetable. It was sampled only in Berrien County, Mich.—cv. unknown, 2. It was not found with mature fruits in other areas when sampling was conducted.

European grape, *Vitis vinifera* L. This grape has been in cultivation in Europe and Asia Minor since ancient times. Two groups are recognized within this species, table grapes and wine grapes, depending on the principal use of the fruit. Only cultivars commonly known as table grapes were sampled; some of these, however, are also used in wine making. The European grape is commercially grown in this country mostly in the Pacific Coast States, principally in California. Yakima County, Wash.—cv. Thompson Seedless, 5 (a very sweet grape that is also dried and used as raisins); cv. Black Mahukka, 4; cv. Palomino, 2. San Joaquin County, Calif.—cv. Tokay, 10.

Grapefruit, *Citrus paradisi* Sw. Two principal groups were recognized in the trade, the red- or pink-pulp cultivars and the yellow-pulp cultivars. Fruits in both groups are eaten fresh, canned, or used as frozen juice concentrate. Palm Beach County, Fla.—cv. Marsh Seedless, 10. Hidalgo County, Tex.—cv. Ruby Red, 8; cv. unknown (yellow pulp), 10. Riverside County, Calif.—cv. unknown (yellow pulp), 10. Yuma County, Ariz.—cv. Ruby Red, 9; cv. unknown (yellow pulp), 1.

Orange, *Citrus sinesis* Osbeck. Most commercial oranges are cultivars of this species. The King orange (generally sold as fresh fruit) is, however, a cultivar of *Citrus nobilis* Lour. The Mandarin orange, usually sold as canned fruit of oriental origin, is *Citrus nobilis* var. *deliciosa* Sw. All samples are cultivars of the *Citrus sinensis* species, of which two groups, fresh-fruit cultivars and juice cultivars, are recognized in the trade according to the predominant use of the fruit. Palm Beach County, Fla.—cv. Valencia, 11. Hidalgo County, Tex.—cv. Valencia, 10. Riverside County, Calif.— cv. Valencia, 10. Yuma County, Ariz.—cv. Valencia, 11.

Peach, *Prunus persica* Batsch. Two groups are recognized, freestone and clingstone, the first having flesh that separates easily from the stone, in contrast to the adhering flesh of the second. Although both kinds are canned, the clingstone with its firmer flesh is more commonly processed in this manner. Clingstone cultivars are not usually sold as fresh fruits, except some early-season kinds. Most commercial peaches are yellow-flesh cultivars, but white-flesh cultivars are grown to a limited extent for pickles or are sold as fresh fruit. Wayne County, N.Y.—cv. Early Elberta (freestone), 5; cv. Elberta (freestone), 2; cv. Hale (freestone), 2. Yakima County, Wash.—cv. Hale (freestone), 10. San Joaquin County, Calif.—cv. Halford (clingstone), 10.

Pear, *Pyrus communis* L. Pears are sold fresh and canned, and for both uses the fruit of the Bartlett cultivar is the most important. The cultivar Kieffer, generally used canned or preserved, is supposed to be a chance hybrid of the Bartlett cultivar and the Chinese sand pear, *Pyrus serotina* Rehd. Berrien County, Mich.—cv. Bartlett, 7; cv. Kieffer, 3. Wayne County, N.Y.—cv. Bartlett, 7; cv. Seckel, 2; cv. Bosc, 2. Yakima County, Wash.—cv. D'Anjou, 10. San Joaquin County, Calif.—cv. Bartlett, 10. Mesa County, Colo.—cv. Bartlett, 12.

Plum, *Prunus domestica* L. The large purple plums, often partly freestone, that are eaten fresh, canned, or dried as prunes, belong to this European species, as does the Green Gage cultivar that is commonly used fresh, but occasionally is canned. The yellow and red plums sold as fresh fruit generally are cultivars of an Asiatic plum, *Prunus salicina* L., or are hybrids of this plum and some American species such as *Prunus americana* Marsh, *Prunus hortulana* Bailey, and others. Damson, the small purple plum used largely for preserves, is considered here as a *Prunus domestica* cultivar, although some writers assign it to *Prunus institia* L. All plums reported here are cultivars of the European species. Berrien County, Mich.—cv. Stanley, 4; cv. Bluefree, 2; cv. Damson, 4. Wayne County, N.Y.—cv. Stanley, 10. Yakima County, Wash.—cv. Italian, 11. Mesa County, Colo.—cv. Italian, 10.

VEGETABLES

Asparagus, *Asparagus officinalis* L. Asparagus was sampled in only one locality, Riverside County, Calif.—cv. unknown, 10. Although it is extensively grown in Yakima County, Wash. and San Joaquin County, Calif., the harvest period of this vegetable generally is March to May, and these counties were not visited during this period.

Cabbage, *Brassica oleracea* var. *capitata* L. Two color types are recognized, the common green cabbage which was sampled, and the red cabbage. Cabbage cultivars are assigned to three groups on the basis of time of maturation: early (having either pointed or spheroid heads), midseason (generally having spheroid heads), and late (having spheroid or flattened-spheroid heads). Only spheroid (commonly called "round")-head cultivars were sampled. The group of cultivars having crinkled leaves that is designated savoy cabbage was not sampled. Commercially, cabbages are classified as either fresh or processing kinds, the latter being made up as sauerkraut. Berrien County, Mich.—cv. unknown, 3. Cumberland County, N.J.,—cv. unknown, 2. Hidalgo County, Texas—cv. unknown, 12. Imperial County, Calif.—cv. unknown (a processing kind), 11.

Carrot, *Daucus carota* L. Carrots are classified commercially as fresh market or processing, depending on the method of marketing. All samples were cultivars having long taproots. Hidalgo County, Texas—cv. unknown, 10. Imperial County, Calif.—cv. unknown, 11.

Chinese cabbage, *Brassica pekinesis* (Luor.) Ruprecht. Chinese cabbage was found only in Palm Beach County, Fla.—cv. unknown, 3.

Cucumber, *Cucumis sativus* L. Cultivars are grouped into slicing and pickling kinds, the former being generally longer and larger than the latter. Fruits of slicing cultivars are sometimes pickled either when young and small, or when more mature and larger. Small pickles of this species may be sold as gherkins; this name, however, is more properly applied to *Cucumis anguria* L., the West Indian gherkin, which has fruits that are spiny and 2-4 cm long. Berrien County, Mich.—cv. unknown, 10. Cumberland County, N.J.—cv. unknown, 2. San Joaquin County, Calif.—cv. unknown, 10.

Dry beans, *Phaseolus vulgaris* L. Many cultivars of beans have originated, principally by natural mutations, from this species. Those grown for their dry seeds form a group that is distinguished from the cultivars having pods that are edible when immature (snap beans), although seeds of both types can be eaten as dry beans. Most production reports classify dry beans as field crops rather than as vegetables. Wayne County, N.Y.—cv. Red Kidney, 7; cv. Yellow Eye (used in canned soups and "pork and beans"), 4. Twin Falls County, Idaho—cv. Light Red Kidney, 4; cv. Red Kidney, 2; cv. Pinto, 4. San Joaquin County, Calif.—cv. Red Kidney, 11. Mesa County, Colo.—cv. Pinto, 10.

Endive, *Cichorium endivia* L. Endive is a leafy salad vegetable of minor commercial importance. Palm Beach County, Fla.—cv. Green Curled, 2.

Eggplant, *Solanum melongena* L. Only the large, ovate, purple-fruited kinds are commonly grown in this country. Berrien County, Mich.—cv. unknown, but probably an F_1 hybrid of the Black Beauty type, 3.

Lettuce, *Lactuca sativa* var. *capitata* L. Head lettuce, the only kind sampled, is by far the most important kind produced commercially, although leaf, curled, cos, and romaine cultivars are widely grown. Cumberland County, N.J.—cv. "659," 10. Palm Beach County, Fla.—cv. Iceberg type, 10. Hidalgo County, Tex.—cv. Iceberg type, 10. Imperial County, Calif.—cv. Iceberg type, 10.

Onion, *Allium cepa* L. Only the type grown for bulbs was sampled, although young plants of the bulb type are at places thinned from the rows and sold as green or bunched onions, while the remaining wider spaced plants are left to produce bulbs. Some cultivars, in contrast, do not form bulbs of marketable quality and are grown for sale only as bunching onions. Hidalgo County, Tex.—cv. unknown (white skin type), 10.

Parsely, *Petroselinum crispum* (Mill.) Nym. Although considered a vegetable of minor commercial importance, Palm Beach County produced 331 railroad carloads in 1971-72 (R. S. Pryor, County Agricultural Agent, written commun., 1972). Palm Beach County, Fla.—cv. Curled, 2.

Pepper, *Capsicum frutescens* var. *grossum* Bailey. These peppers are the large-fruited types commonly called bell peppers, sweet peppers, and pimiento peppers that are green when young but turn bright red when mature. Berrien County, Mich.—cv. California Wonder, 2.

Potato, *Solanum tuberosum* L. This potato is often called Irish or white potato to distinguish it from sweet potato, *Ipomea batatas*(L.) Poir. Some production reports classify potatoes as a field crop rather than as a vegetable. The many commerçially grown cultivars are of two kinds, russet and red. Russet cultivars that are large and elongated are designated in the trade as baking potatoes. Wayne County, N.Y.—cv. unknown (russet type), 11. Cumberland County, N.J.—cv. unknown (russet type), 11. Twin Falls County, Idaho—cv. unknown (russet baking type), 10. Yakima County, Wash.—cv. unknown (red type), 5; cv. unknown (russet type), 6.

Snap bean, *Phaseolus vulgaris* L. Commercial usage favors this common name rather than green bean or string bean. Cultivars are of two types, the green pod and the yellow pod or wax. Berrien County, Mich.—cv. unknown (green type), 2. Wayne County, N.Y.—cv. unknown (green type), 11. Cumberland County, N.J.—cv. unknown (green type), 11; cv. Yellow Wax, 2. Palm Beach County, Fla.—cv. unknown (green type), 10. Twin Falls County, Idaho—cv. Sprite (green type), 10.

Sweet corn, *Zea mays* var. *rugosa* Bonaf. Most commercially grown cultivars of sweet corn are F_1 hybrids, and field identification of these cultivars is not practical. They are of two types, yellow and white, the former being more widely grown as hybrids related to the Golden Bantam cultivar. Berrien County, Mich.—cv. unknown (yellow), 5. Salem County, N.J.—cv. unknown (yellow), 4; cv. Silver Queen (white), 7. Palm Beach County, Fla.—cv. unknown (yellow), 10. Twin Falls County, Idaho—cv. unknown (yellow), 11.

Tomato, *Lycopersicum esculentum*Mill. The two commercial groups of tomatoes are shipping (for eating as fresh fruits) and processing. Mechanized harvesting has led to the development of fruits, especially of processing cultivars, that are thick skinned, firm, and spherical to cylindrical in shape. Berrien County, Mich.—cv. unknown (shipping), 10. Cumberland County, N.J.—cv. unknown (shipping), 3. Palm Beach County, Fla.—cv. Floridel (shipping), 10. Yakima County, Wash.—cv. unknown (processing), 12. San Joaquin County, Calif.—cv. unknown (processing), 11.

COLLECTION AND PREPARATION OF SAMPLES

Samples at a site were subjectively sampled from the tree, vine, or row of produce with the intent of obtaining samples representative of the produce as it is selected for marketing or processing. Factors used in the selection included degree of maturity, size, shape, freedom from large blemishes, and coloration, as appropriate for the kind of produce being sampled. The fruit and vegetables were placed in plastic bags at the collection site in order to reduce loss of their field moisture content; at the end of the same day they were prepared as for eating or cooking (but were not cooked), and the prepared samples were weighed to 0.1 g. Samples were then heat-sealed in thick polyethylene bags, packed in ice chests to reduce spoilage, and as soon as possible shipped by air mail to the Denver laboratories where they were frozen and held until drying could be started.

Methods used to prepare the various kinds of samples are listed below:

FRUITS

American grape. Bunches washed and drained, berries removed from stems, skins and seeds included in sample.

Apple. Fruit washed and drained, fruit peeled, core removed, fruit sliced.

Cantaloupe. Fruit peeled, seeds removed, flesh sliced and cubed.

European grape. Fruit washed and drained, fruit cut open, seeds removed.

Grapefruit. Fruit peeled, segments separated and cut into pieces, seeds discarded.

Orange. Fruit prepared the same as for grapefruit.

Peach. Fruit peeled, seed (pit) removed, fruit sliced.

Pear. Fruit peeled, core removed, fruit sliced.

Plum. Fruit washed and drained, seed (pit) removed, fruit sliced.

VEGETABLES

Asparagus. Stalks washed and drained, cut into segments; tough stalks discarded.

Cabbage. Outer leaves removed and discarded; firm head washed and drained, then sliced.

Carrot. Leafy tops removed; root washed, drained, peeled, sliced.

Cucumber. Fruits washed and drained, not peeled, sliced.

Dry bean. Seeds removed from dry pods and winnowed to remove foreign material; molded or imperfect seeds discarded.

Endive. Leaves washed and drained, cut into pieces.

Eggplant. Fruit peeled and sliced.

Lettuce. Heads washed and drained, outer leaves removed to firm head, head sliced.

Onion. Tops, roots, and dry leaf bases removed; bulb sliced.

Parsley. Leaves washed and drained.

Pepper. Fruits washed, seeds and their supporting tissues removed, fruit sliced.

Potato. Tubers washed and drained, peeled, sliced.

Snap bean. Pods washed and drained, stems and tips removed, pods broken into pieces.

Sweet corn. Shucks (husks) and silks (styles) removed, grains cut from the cob (rachis), cob discarded.

Tomato. Fruits washed and drained, sliced.

In the preparation laboratory, the plastic bags containing the frozen individual samples were opened wide and placed in shallow aluminum pans which were put into an electric oven that had circulating air held at a temperature of 38–40° C. By following this procedure, the samples were prevented from contacting the aluminum pan. Several days later the samples that appeared dry were removed from the oven and weighed to 0.1 g. They were then returned to the oven where they remained 1 day, then they were weighed again. This process was continued until no further loss in weight occured; the dry samples were then sealed in polyethylene bags. Leafy samples (for example, lettuce and cabbage) and those with a high starch content (for example, potatoes and corn) dried to a constant weight in 3–5 days, whereas samples with a high sugar content (peaches and grapes), rich in colloids (cucumbers), or with a high water content (tomatoes) required as much as 2 weeks of drying to attain a constant weight.

The dried samples were pulverized or shredded in a Waring blender[1] that had a glass canister and stainless steel blades. The blender was cleaned after grinding each sample, either by blowing it out with compressed air or by washing it, as necessary. Certain randomly selected samples, as described earlier, were divided into two parts; then all ground samples were placed in covered cardboard cartons. After grinding the plant materials the particles were of a size that would pass through a screen with apertures of 1.3 mm.

SOILS

A sample of soil was collected at each site where produce was sampled by digging to the lower limit (usually 15–20 cm from the surface) of the plow zone, then taking a composite sample of the soil that was removed. The soil had been cultivated at all sampling sites; therefore, there had been some mixing of soil horizons in zonal soils. The samples were placed in manila soil envelopes and allowed to dry at ambient air temperatures until they were finally dried in the laboratory at 38–40° C. A Nasco–Asplin soil grinder equipped with a ceramic mortar, ceramic screw-type grinding head, and stainless steel screen was used to gently break up the soil aggregates and to separate and discard large roots and soil material (mostly gravel) larger than 2 mm. The fine material was then ground in a vertical Braun pulverizer using ceramic plates set to pass 80 mesh. The samples were then arranged in a random sequence and submitted to the laboratory for chemical analysis.

[1]Use of brand names in this report is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

ANALYTICAL METHODS USED

PLANTS

A part of each dried and pulverized sample of fruits and vegetables was burned to ash in a furnace which was slowly heated from room temperature to 500° C, and the weight percent of ash produced from the dried material was recorded. The ash was used for analysis by the emission spectrographic method (Neiman, 1976) and for the determination of cadmium, cobalt, zinc, sodium, lithium, calcium, potassium, and phosphorus using methods described by Harms (1976). Dried plant material was used for analysis of arsenic, mercury, selenium, and total sulfur. The methods of analysis used for determining the various elements in the plant material, and the lower limit of determination, are given in table 1.

SOILS

For analysis by emission spectroscopy, a 10-mg aliquot of each soil sample was mixed with 20 mg of a sodium carbonate-graphite mixture (1 percent Na), then packed into a shallow crater electrode and burned for 2 minutes in a direct current arc. The resulting spectra were recorded on a photographic plate which was developed and visually compared to reference standards. The preparation of these standards and the method of reporting values were described by Neiman (1976). Procedures used for the analysis of soil samples by atomic absorption, X-ray fluorescence, and certain methods other than emission spectroscopy were described by Huffman and Dinnin (1976) and Wahlberg (1976). Millard (1975) described the delayed neutron technique used for determining thorium and uranium concentrations in soils. All methods used for determining the various elements in soils, and the lower limits of determination, are listed in table 2.

STATISTICAL PROCEDURES USED IN EVALUATING DATA

Frequency distributions of the analytical data as received from the laboratory, in units of weight percent or parts per million, show large positive skewness. In order to achieve frequency distributions more nearly symmetrical and closer to the normal form, the original data were transformed to logarithms. Many of the elements were analyzed by a semiquantitative spectrographic method for which the concentrations were reported in geometric brackets; log transformation also overcomes some of the effects of this method of reporting on evaluation of the data (Miesch, 1967).

The geometric mean is the appropriate measure of central tendency for a lognormal distribution and provides a "characteristic" value for the element in the sampling media. The geometric mean is estimated as the antilog of the arithmetic mean of the logs. A measure of variation is given by the geometric deviation, which is the antilog of the standard deviation of the logs. About two thirds of the area under the lognormal distribution curve lies in the range $GM \div GD$ to $GM \times GD$, where GM is the geometric mean and GD is the geometric deviation. The confidence interval about the geometric mean, the geometric error (GE), can be estimated from

$$GE = 10^{(t \log GD \sqrt{N})}, \qquad (1)$$

where t is Student's t and N is the number of values on which the geometric mean is based. Where t is selected at the 0.05 probability level, the population geometric mean has the expected range $GM \div GE$ to $GM \times GE$, with 95 percent confidence (Shacklette and others, 1970).

Because of the insufficient sensitivity of some analytical methods, some elements were not detected in measurable concentrations in many samples of plant tissue or soil. This deficiency resulted in some values being reported as "less than" (<) a specified limit. Such data are said to be censored, and the means and deviations were computed using the procedures devised by Cohen (1959) and applied to geochemical data by Miesch (1976). Some of the data for a particular element in a plant or soil sample was so severely censored that Cohen's technique was unreliable or impossible, and the mean is listed in the tables that follow only as "less than" a stated limiting value. The estimated means of censored data are commonly below the stated lower limit of determination, as given in tables 1 and 2.

The total chemical variation within any one type of produce has been viewed as the sum of three components: (1) the variability among the widely separated areas, (2) the variability among fields within an area, and (3) the variability due to all other causes including natural variability within fields and variability that arises from sample preparation and analysis. The corresponding analysis-of-variance model is

$$X_{ijk} = \mu + \alpha_i + \beta_{ij} + \gamma_{ijk},$$

where μ is the grand mean concentration for all areas, α_i is the difference between μ and the mean for the ith area, β_{ij} is the difference between $\mu + \alpha_i$ and the mean for the jth field in the ith area, and γ_{ijk} is the difference between $\mu + \alpha_i + \beta_{ij}$ and the log analytical value for the

TABLE 1.—*Summary of methods used for analysis of plants and plant ashes and approximate lower limits of determinations*

Element	Method	Sample weight (g)	Lower limit (ppm)
	Dry material of sample		
As------	Atomic absorption (arsine generation)	1	0.05
Hg------	Flameless atomic absorption----------	1	.01
Se------	2, 3-diaminonaphthalene--------------	2	.005
S, total	Turbidometric------------------------	.5	100
	Ash of sample		
Ag------	Emission spectroscopy----------------	0.01	1
Al------	------------------do-----------------	.01	150
B-------	------------------do-----------------	.01	50
Ba------	------------------do-----------------	.01	3
Ca------	Atomic absorption--------------------	.05	100
Cd------	------------------do-----------------	.5	.2
Co------	------------------do-----------------	.5	1
Cr------	Emission spectroscopy----------------	.01	1.5
Cu------	------------------do-----------------	.01	1
Fe------	------------------do-----------------	.01	10
Ga------	------------------do-----------------	.01	10
K-------	Atomic absorption--------------------	.05	100
La------	Emission spectroscopy----------------	.01	70
Li------	Atomic absorption--------------------	.05	4
Mg------	Emission spectroscopy----------------	.01	20
Mn------	------------------do-----------------	.01	1
Mo------	------------------do-----------------	.01	7
Na------	Atomic absorption--------------------	.05	25
Ni------	Emission spectroscopy----------------	.01	10
P-------	Colorimetric-------------------------	.05	100
Pb------	Emission spectroscopy----------------	.01	20
Sn------	------------------do-----------------	.01	10
Sr------	------------------do-----------------	.01	10
Ti------	------------------do-----------------	.01	5
V-------	------------------do-----------------	.01	15
Y-------	------------------do-----------------	.01	20
Yb------	------------------do-----------------	.01	2
Zn------	Atomic absorption--------------------	.05	10
Zr------	Emission spectroscopy----------------	.01	20

[1]From Harms (1976) and Neiman (1976).

TABLE 2.—*Summary of methods used for analysis of soils and approximate lower limits of determinations*

Element	Method	Sample weight (g)	Lower limit (ppm)
Ag-----	Emission spectroscopy-----------------------	0.01	0.5
Al-----	X-ray fluorescence spectrometry-------------	.8	2,600
As-----	--------------------do---------------------	.5	.1
B------	Emission spectroscopy-----------------------	.01	10
Ba-----	--------------------do---------------------	.01	2
Be-----	--------------------do---------------------	.01	1
C,total	Induction furnace-gasometric----------------	.25-.40	500
Ca-----	X-ray fluorescence spectrometry-------------	.8	710
Ce-----	Emission spectroscopy-----------------------	.01	200
Co-----	--------------------do---------------------	.01	3
Cr-----	--------------------do---------------------	.01	1
Cu-----	--------------------do---------------------	.01	1
F------	Fluorine specific-ion electrode-------------	.1	400
Fe-----	X-ray fluorescence spectrometry-------------	.8	350
Ga-----	Emission spectroscopy-----------------------	.01	5
Ge-----	X-ray fluorescence spectrometry-------------	.8	.1
Hg-----	Flameless atomic absorption-----------------	.1	.01
K------	X-ray fluorescence spectrometry-------------	.8	250
La-----	Emission spectroscopy-----------------------	.01	30
Li-----	Atomic absorption---------------------------	1	5
Mg-----	--------------------do---------------------	1	600
Mn-----	Emission spectroscopy-----------------------	.01	1
Mo-----	--------------------do---------------------	.01	3
Na-----	Atomic absorption---------------------------	1	740
Nb-----	Emission spectroscopy-----------------------	.01	10
Nd-----	--------------------do---------------------	.01	50
Ni-----	--------------------do---------------------	.01	2
Pb-----	--------------------do---------------------	.01	10
Rb-----	Atomic absorption---------------------------	1	20
S,total	X-ray fluorescence spectrometry-------------	.8	800
Sc-----	Emission spectroscopy-----------------------	.01	5
Se-----	X-ray fluorescence spectrometry-------------	.8	.1
Si-----	--------------------do---------------------	.8	2,300
Sn-----	--------------------do---------------------	.8	.1
Sr-----	Emission spectroscopy-----------------------	.01	5
Th-----	Neutron activation-delayed neutron technique	6-10	1
Ti-----	X-ray fluorescence spectrometry-------------	.8	300
U------	Neutron activation-delayed neutron technique	6-10	.1
V------	Emission spectroscopy-----------------------	.01	7
Y-----	--------------------do---------------------	.01	10
Yb-----	--------------------do---------------------	.01	1
Zn-----	Atomic absorption---------------------------	1	10
Zr-----	Emission spectroscopy-----------------------	.01	10

[1]From Millard (1976), Huffman and Dinnin (1976), Neiman (1976), and Wahlberg (1976).

kth sample from the jth field in the ith area. The corresponding variance components are:

$$\sigma_X^2=\sigma_\alpha^2+\sigma_\beta^2+\sigma_\gamma^2$$

and were estimated by standard techniques (for example, Bennett and Franklin, 1954) from data on as many as 20 to 50 samples of each produce type (two to five areas, five fields per area, and two samples per field). Tables 46–62 give estimates of σ_X^2 and of σ_α^2, σ_β^2, and σ_γ^2 as percentages of σ_X^2 for 16 kinds of produce.

Each estimate of σ_γ^2 in tables 46–62 contains variance caused by sample preparation and analysis and by the sampling procedure, as well as variance in plant chemistry over the field. Thus,

$$\sigma_\gamma^2=\sigma_\delta^2+\sigma_s^2+\sigma_a^2,$$

where σ_δ^2 is the variance among sampling sites within a field, σ_s^2 is the variance within sites (sampling variance), and σ_a^2 is the variance caused by sample preparation and analysis. The components σ_s^2 and σ_a^2 were estimated from data on, respectively, the duplicate samples taken at 10 percent of the sites and the duplicate analyses made on 10 percent of the samples. Both the duplicate samples and the sample splits for duplicate analysis were randomly interspersed with the other samples and were entirely unknown to the analysis. The variance component, σ_a^2, was estimated as s_a^2 from

$$s_a^2=\frac{\sum_{i=1}^{n}(X_{1i}-X_{2i})^2}{2n}, \qquad (2)$$

where X_{1i} is the measured concentration (or log concentration) in the ith sample and X_{2i} is the corresponding values for the second split of the same sample. The same equation was used to estimate $\sigma_s^2+\sigma_a^2$, using the analyses of the two samples from the ith sampling site as X_{1i} and X_{2i} and the estimate of σ_s^2 was then obtained by subtraction of σ_a^2. The final estimates of σ_s^2 and σ_a^2 are given in table 3.

The estimate of σ_s^2 and σ_a^2 are composite estimates that pertain to all types of produce. Composite estimates were obtained for reasons of economy and because the analytical variance components, at least, are not expected to differ among produce types.

The variance components in table 3 can be used to partition the "between sites" variance components given in tables 46–62. The "between sites" components include variance caused by (1) natural chemical variation among plants between sites within fields, (2) natural variation within sampling sites, and (3) variation in the data caused by sample preparation and analytical procedures. An example of the partitioning, for aluminum in American grapes (table 46), is as follows:

Source of variation	Absolute variance	Percentage variance
Between sites	0.06170	46
Within sites	0.01980 (table 3)	15
Analysis	0.04206 (table 3)	31
Total	0.12356	92 (table 46)

The total absolute variance (0.12356) within sites was derived as 92 percent of the total variance for American grapes (0.13430, table 46). The between-sites variance corrected for variance within sites and for analytical procedures (0.06170) was then derived by difference. These results indicate that 31 percent of the total variance in the data on aluminum in American grapes is caused by the sample-preparation and analytical procedures. They also indicate that plants within a sampling site tend to be relatively uniform in aluminum, and so the chances of large sampling errors are minimal. The greatest amount of natural varation—variation in the plants as opposed to variation in the data—appears to be between sampling sites within fields, which forms 46 percent of the total variance in the data and 67 percent of the total variance less the variance due to analysis.

For reasons of economy, only one sample of soil was taken from each field in which produce was sampled. This prohibited estimation of the distribution of variance within areas; whether the within-area variances are predominantly between fields, between sampling sites within fields, or caused by laboratory procedures is unknown. The analysis of variance model for the study of the soils is:

$$X_{ij}=\mu+\alpha_i+\beta_{ij},$$

where X_{ij} is the measured concentration (or log concentration) in the jth sample from the ith area, μ is the grand mean for all areas, α_i is the difference between μ and the mean for the ith area, β_{ij} is the difference between $\mu+\alpha_i$ and the value for the jth sample from the ith area. The corresponding variance components are

$$\sigma_X^2=\sigma_\alpha^2+\sigma_\beta^2$$

and are tabulated in tables 100–116.

TABLE 3.—*Components of variance in composition between samples from within a sampling site and between analyses of the same sample*

[Variance components calculated on data transformed to logarithms, except as noted. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Variance components: Between samples, n = 90 (45 pairs)	Variance components: Between analyses n = 90 (45 pairs)	Total variance
Al	0.01980	0.04206	0.06186
B	.00011	.01175	.01186
Ba	0	.05810	.02304
Ca	.00579	.00467	.01046
Cd	.05840	.02059	.07899
Cu	.00564	.01567	.02131
Fe	.00585	.02073	.02131
K	.00101	.00297	.00398
Mg	.00008	.01225	.01233
Mn	.00587	.01378	.01963
Na	.00276	.01108	.01384
P	0	.01013	.00706
S	.00065	.00189	.00254
Se	.01405	.00885	.02290
Sr	.00918	.02252	.03170
Zn	.00502	.01145	.00643
Ash yield[1]	1.2962	.24222	1.5384
Dry material yield[1]	1.4399	--	--

[1]Variance component derived from nontransformed data.

RESULTS

CONCENTRATIONS OF ELEMENTS IN FRUITS AND VEGETABLES

BASES FOR REPORTING CONCENTRATIONS OF ELEMENTS

Concentration of elements in plant material are commonly expressed as the contribution by weight of the element in a sample to the total weight of the sample that was analyzed as percent, parts per million (ppm, which is 10^{-4} percent), or micrograms per gram ($\mu g/g$). The actual portion of the total sample that is analyzed may consist of a weighed aliquot of fresh plant material (commonly with a high water content), of plant material dried to an approximate constant weight, or of ash obtained by oxidation of the organic components of the sample. Of these three physical states of the sample, the one chosen for the aliquot to be analyzed is determined by requirements of the analytical methods that are to be used. Some methods require concentration of the elements of interest in relation to the total mass of the sample in order to keep the sample size within reasonable limits and to hold accuracy of the analyses within acceptable ranges.

This study is concerned with only the total concentrations of separate elements, not compounds of elements, that are in the samples. Moreover, certain elements in the samples such as carbon, hydrogen, oxygen, and nitrogen are not included as elements of interest in this study. Two methods used for concentrating the elements of interest are drying the sample and ashing the sample by combustion or chemical oxidation ("wet ashing"). The first method, drying, removes most of the water and small amounts of aromatic compounds from the sample, and the loss of the elements of interest is no greater than if the plant material had dried under natural conditions. Drying also kills the tissues, thus stopping respiration and the attendant loss of organic compounds, and further loss of weight by the sample is largely prevented. Drying stops, or greatly inhibits, the growth of decay-producing bacteria and other fungi. In this study all plant samples were dried, after having determined their fresh weight, as soon as practical.

Ashing further concentrates most of the elements of interest by oxidizing organic compounds in the sample, thus removing much of the carbon, hydrogen, and some other elements from the sample. For analyzing the many elements that are relatively stable at combustion temperatures, ash produced by burning is commonly used. Other elements such as arsenic, mercury, selenium, and sulfur are volatilized and lost from the sample at combustion temperatures; therefore, for their determination, samples are "ashed" by the use of strongly oxidizing reagents (hydrogen peroxide, perchloric acid).

Although the physical state of the material to be analyzed may be determined by requirements of particular analytical methods, the basis used for reporting element concentrations may be the weight percent (or parts per million) that the element constitutes of the fresh material, the dry material, or the ash if in the stages of sample preparation the weight lost by drying the sample and ashing the sample was recorded. Then the choice of the basis for reporting element concentrations can be determined by the intended use of the data. If the data are expected to be used principally to evaluate dietary requirements or toxicities, either the fresh basis or the dry-weight basis is most appropriate. If the concentrations of elements are to be used for correlating plant and soil chemistry, values expressed on an ash-weight basis are commonly used.

For samples taken over a wide range of locations and physical conditions, data on element concentrations based on analysis of ash are more nearly stable (reproducible) than are those based on dry or fresh weight because two kinds of variation not directly related to the elements of interest, the water and the organic-matter contents, are eliminated. The fluctuation in water content of a plant during a 24-hour period, from the wilted state to the fully turgid condition, can be very great. Likewise, but to a lesser extent, daily fluctuations in the amount of organic compounds in a plant or plant part may be appreciable owing to changes in relative rates of photosynthesis and respiration and to the movement of organic compounds from one part of the plant to another part while the amounts of the elements of interest may remain relatively constant. Because the concentrations of elements are reported as proportions of total-sample aliquot weights, the weight fluctuations of the sample caused by loss of water and organic compounds may greatly affect the concentration of elements that is reported.

The parts of most plants (except the salad vegetables) used for human food are storage organs of the plants such as seeds, fruits, stems, tubers, or roots. Whereas the elements obtained from the soil probably are largely deposited early in the formation of these organs and their amounts are only slowly increased during the maturation of these organs, the synthesis and deposition of sugars, fats, and starches increase rapidly toward the time of maturity of the storage organs. Therefore, if dried material is analyzed, the degree of maturity (ripeness, in fruits) of these tissues can greatly influence the reported concentrations of the soil-derived elements. If these dried samples are burned to ash, thereby eliminating the organic constituents, and the ash is analyzed, the effects of different degrees of maturity of the produce on the concentrations of elements of interest are greatly reduced or removed. For these reasons it is important to specify the basis used for reporting element concentrations in plants and, particularly for food plants, the data required for conversion to other bases.

This report gives summaries of element concentrations for each kind of fruit and vegetable on the basis of fresh weight, dry weight, and ash weight (except for the volatile elements), with the material used for analysis specified for each element as given in table 1. If the material actually analyzed was ash, the values obtained were converted to a dry weight basis using the following formula:

$$M_d=(M_a \times M_{pa})/100, \tag{3}$$

where M_d approximates the mean in dry weight, M_a is the mean of the element in ash weight, and M_{pa} is the mean percent ash measured for the particular kind of fruit or vegetable.

If the material analyzed was dried fruits or vegetables and the analyst reported element concentrations on the dry-weight basis (in this study arsenic, mercury, selenium, and total sulfur were so reported), these values can be converted to approximate values in ash by using the following formula:

$$M_a=\frac{M_d}{M_{pa}/100}, \tag{4}$$

where M_a approximates the mean in ash weight, M_d is the mean of the element in dry material, and M_{pa} is the mean percent ash measured for the particular kind of fruit or vegetable.

The concentrations of elements reported on a dry-weight basis can be converted to approximate concentrations in fresh material by using the formula:

$$M_f=(M_d \times M_{pd})/100, \tag{5}$$

where M_f approximates the mean in fresh material, M_d is the mean of the element in dry material, and M_{pd} is the mean percent dry material in fresh material.

To convert concentrations of elements reported in ash to concentrations in fresh material, first convert ash-weight values to dry-weight values by using formula 3 above; then convert the dry-weight values to fresh-weight values by using formula 5.

The mean percentage of water in the fresh fruits and vegetables can be calculated by subtracting the mean percent dry-material yield of fresh material (given in the last row of each table) from 100.

MEAN CONCENTRATIONS IN SAMPLES

The chemical composition of the ash of fruits and vegetables is first presented by grouping the data by areas of commercial production and giving the detection ratios, mean concentrations, deviations, and observed ranges for all elements studied for each kind of fruit or vegetable (tables 4-20). These data can be converted, if desired, to values based on dry material or fresh material by using formulas 3 and 5, respectively.

The analytical data for kinds of produce were summarized by combining all county data into one matrix for a fruit or vegetable that was collected in more than one area of commercial production, and determining ratios, means, deviations, and ranges in element concentration for each kind of produce. The resulting means, deviations, and ranges were converted, as appropriate, to three bases (fresh, dry, and ash weights) and are presented in tables 2[1] to 37. Data in these tables can be used as baseline values for these kinds of produce as grown in areas of commercial production in the United States.

Some kinds of fruits and vegetables were collected at a few sites in only one county, although they are widely grown commercially in this country. The data on these samples are given on fresh-, dry-, and ash—weight bases in tables 38 to 45. These data are not purported to represent the chemical characteristics of these fruits or vegetables as grown throughout this country in areas of commercial production but, nevertheless, suggest general ranges in values that may be expected.

Some elements were determined infrequently in the plant samples and, therefore, were not entered in the tables of element concentrations. These elements, the fruit or vegetable in which found, the sampling localities, and the concentrations found, follow:

Gallium—Two samples of lettuce, Cumberland County, N.J., 10 and 15 ppm.

Lanthanum—One sample of plums, Berrien County, Mich., 70 ppm; one sample of lettuce, Cumberland County, N.J., 70 ppm; and one sample of cabbage, Hidalgo County, Tex., 70 ppm.

Tin—One sample of grapefruit, Hidalgo County, Tex., 30 ppm.

Vanadium—One sample of pears, Berrien County, Mich., 15 ppm; nine samples of lettuce, Cumberland County, N.J., 17-70 ppm.

Ytterbium—Three samples of lettuce, Cumberland County, N.J., 2-3 ppm.

Yttrium—Three samples of lettuce, Cumberland County, N.J., 20-30 ppm.

Although looked for in the samples, the following elements, with their stated lower limits of determination in parts per million by multielement spectrographic analysis, were not found: antimony, 300; beryllium, 4; bismuth, 20; cerium, 300; europium (looked for if lanthanum or cerium was found), 200; germanium, 20; hafnium, 200; indium, 20; neodymium (looked for if lanthanum or cerium was found), 70; niobium, 20; palladium, 2; praseodymium (looked for if lanthanum or cerium was found), 200; rhenium, 70; samarium (looked for if yttrium value was greater than 50 ppm), 200; scandium, 5; tantalum, 500; tellurium, 5,000; thallium, 500; thorium, 500; tungsten, 300; and uranium, 1,000.

COMPOSITIONAL VARIATION AMONG AREAS, AMONG FIELDS WITHIN AREAS, AND WITHIN FIELDS

ANALYSIS OF VARIANCE

The variance components given in tables 46-62 reflect the amount and nature of the compositional variation within each type of produce. The total variance indicates the amount of variance present at all levels of the experimental design, including sample preparation and analysis. If the total variance is small, the concentration of the element in the specified type of produce tends to be uniform and somewhat independent of its source, and the variance components may be of little or no interest. However, if the total variance is moderate or large, the variance components expressed as percentages of the total variance will serve to indicate the nature and origin of the variance present and can be used as a basis for accumulating additional data more efficiently than would be possible otherwise. For example, if a large percentage of the total variance is between areas, there is a strong indication that the accumulation of the element by the plant in question is environmentally controlled to some large extent. On the other hand, if a large percentage of the variance is at the lowest level, between sampling sites within fields, the indication is that most of the variance is erratic and caused by either very local environmental differences, laboratory procedures, chance, or a combination of these. The percentage variance at the lowest level can be taken as the maximum percentage of the variance in the data that can be ascribed to sample preparation and analysis, as pointed out in the previous section on statistical methods.

If further sampling is to be carried out for the purpose of estimating more precise compositional averages, the variance components can be used to design efficient sampling programs. For example, if little or no variance is present between areas, it is theoretically possible to obtain as good an average by taking all samples from one area as would be obtained by sampling many areas. If all the variance were at the lowest level, between sites within field, it would be efficient to collect all the samples from a single field. Caution would have to be exercised here, however, because the variance components tabulated in tables 46–62, like all variance components, are only estimates and are subject to errors that can be considerable. The components should be taken only as general indicators of the gross nature of compositional variability within each produce type.

SIGNIFICANT DIFFERENCES IN MEAN ELEMENT CONCENTRATIONS AMONG AREAS OF COMMERCIAL PRODUCTION

The main purpose of the analysis-of-variance computations which led to the results summarized in tables 46–62 was to identify compositional differences in produce grown in different areas. The differences found to be statistically significant are summarized in table 63. Individual means are from tables 4–37.

CONCENTRATIONS OF ELEMENTS AND pH OF SOILS THAT SUPPORTED THE FRUITS AND VEGETABLES

In the tables of element concentrations and pH that follow, the geometric mean values and the ranges in values are given as parts per million for the minor elements and as percent for the major elements, based on the total weight of the sample aliquot (tables 64–99). *No attempt was made to estimate the concentration of the elements in soil that occurred in a form available to plants;* the best measure of the availability of soil elements is the concentration of elements in the plant itself. The pH values are reported in standard units, using arithmetic means and standard deviations.

COMPOSITIONAL VARIATION AMONG AREAS AND AMONG FIELDS WITHIN AREAS

ANALYSIS OF VARIANCE

Tables 100–116 give estimates of variance components for the geochemistry of the soils between and within the same areas in which the produce was sampled. The sampling design and analysis-of-variance model have been described in previous sections of this report.

The chemical compositions of the soil samples are given by grouping the data for the soils that supported each kind of fruit or vegetable in each area of commercial production and giving the detection ratios, means, deviations, and observed ranges. By this grouping the chemical characteristics of soils from these areas can be readily compared. The extremes in concentration of an element provide an estimate of the ranges within which these crops are being profitably produced but, of course, do not necessarily define the maximum or minimum concentrations that each plant species can tolerate. The concentrations given represent the total concentrations of an element without consideration of the compounds in which the element occurs. This fact is emphasized in the data tables for carbon, iron, and sulfur, because analyses of these elements are often given separately for total amounts of organic or inorganic compounds, or for different oxidation states of the elements. These data are given in tables 64–80.

Summaries of the analytical data for soils from all sampling areas were prepared by combining the data for each sampling area grouped according to the kind of fruit or vegetable plants that the soils supported. These summaries provide mean concentrations and extremes in ranges in soils for each kind of produce in major commercial production areas in the United States, as given in tables 81–97.

The summary statistics on the element concentrations in soils that supported vegetable plants from only one area of commercial production are given in tables 98 and 99.

Some elements were determined infrequently in the soil samples, and, therefore, were not entered in the tables of element concentrations. These elements, the fruit or vegetable supported by the soil, the concentrations found, and the sampling localities, follow:

Cerium—One sample of apple soil, 200 ppm, Wayne County, N.Y. One sample of potato soil, 700 ppm, and one sample of tomato soil, 150 ppm, Cumberland County, N.J. Two samples of asparagus soils, 150 and 200 ppm, Imperial County, Calif. Three samples of orange soils, 100, 150, and 200 ppm, Riverside County, Calif. One sample of grapefruit soil, 150 ppm, Yuma County, Ariz. One sample of American grape soil, 100 ppm, Yakima County, Wash. One sample of dry bean soil, 150 ppm, Mesa County, Colo.

Molybdenum—One sample of orange soil, 10 ppm, Riverside County, Calif. One sample of snap bean soil, 2 ppm, Imperial County, Calif. One sample of snap bean soil, 2 ppm, and one sample of potato soil, 10 ppm, Twin Falls County, Idaho. One sample of potato soil, 50 ppm, Yakima County, Wash. One sample of dry bean soil, 3 ppm, Mesa County, Colo.

Neodymium—One sample of apple soil, 150 ppm, and one sample of snap bean soil, 70 ppm, Wayne County, N.Y. Five samples of potato soils, 50, 70, 70, 70, and 300 ppm, and one sample of tomato soil, 70 ppm, Cumberland County, N.J. Two samples of asparagus soils, 70 and 150 ppm, Imperial County, Calif. One sample of grapefruit soil, 70 ppm, and three samples of orange soils, 70, 70, and 100 ppm, Riverside County, Calif. One sample of American grape soil, 70 ppm, and one sample of European grape soil, 70 ppm, Yakima County, Wash. One sample of dry bean soil, 70 ppm, Mesa County, Colo.

Silver—One sample of American grape soil, 0.7 ppm, Berrien County, Mich. One sample of plum soil, 30 ppm, Wayne County, N.Y. One sample of tomato soil, 10 ppm, San Joaquin County, Calif.

SIGNIFICANT DIFFERENCES IN MEAN ELEMENT CONCENTRATION AND pH AMONG AREAS OF COMMERCIAL PRODUCTION

These differences were compiled from the mean concentrations given by area in tables 64-80, and from the between-area significant variances given in tables 100-116. Mean concentrations of each element in all samples of soil that supported each kind of produce were obtained from tables 81-97. By examining these tables, the highest and lowest mean concentrations for areas were determined for each element and soil supporting each kind of produce where significant differences in element concentrations were found. From this examination, the areas having the extremes in element concentrations in soils supporting the different fruit and vegetable plants were identified, and the results are given in table 117.

DISCUSSION OF RESULTS

TRENDS IN ELEMENT CONCENTRATIONS IN FRUITS AND VEGETABLES

Differences in the reported concentrations of an element between kinds of produce or areas of production may be due to the relative abilities of the species to absorb the element in preference to other elements and to differences in the abundance and availability of the element in the plant's environment.

The hydrogen and oxygen of water and the carbon of organic compounds are not elements of interest in this study, and their presence in the weighed aliquot of a sample that is analyzed affects the concentrations of other elements that are determined in the sample. The amounts of water and organic carbon in produce are subject to wide fluctuations, as was explained earlier; therefore, they were removed from the sample aliquots by drying and combustion to provide a more stable basis, concentrations in ash, for reporting concentrations of most other elements in the sample. The more volatile elements that would be lost by combustion were determined by analyzing dry plant material, and concentrations of these elements are reported on a dry-weight basis. The differences in mean element concentrations that were found in this study reflect in some measure the element absorption capabilities of the plants as well as their geochemical environments.

AMONG KINDS OF PRODUCE

The trends in fruit and vegetable element concentrations are discussed separately. The fruit samples constitute a more homogeneous group than do the vegetable samples, because the kinds of tissue in fruits are less diverse than those of vegetable samples in that different plant organs, including roots, stems, leaves, fruits, and seeds, are included in the range of edible tissues in vegetables.

FRUITS

For convenience in distinguishing trends in the composition of fruits, the mean element compositions of the different kinds, and their percentages of water, were rearranged from tables 21-28 and are given in table 118. The means indicate clearly that certain elements vary widely in concentration among different kinds of fruits. The range in concentration is indicated by the computed high-to-low ratio for each element—the ratio of the highest mean concentration to the lowest.

Trends in the concentration of elements in these fruits, as shown by their high-to-low ratios, indicate characteristic element absorption or accumulation tendencies of the different fruit plants. The low ratios of the macronutrients potassium, phosphorus, magnesium, and sulfur may indicate a physiological control of absorption in response to metabolic requirements common to all the different fruits, or they may indicate the existence of a barrier in the translocation of the elements from the stems into the fruits. The low ratios may also be caused by a rather uniform concentration of these elements in the cultivated soils where the fruits are grown, where macronutrient fertilizers are commonly applied to the soils. The ratio of calcium, in contrast to the other macronutrients, is high, indicating either a different genetically controlled response of the various fruit plants to calcium or, again, a difference in soils among the production areas.

The micronutrients boron, copper, iron, and zinc have low ratios (less than 3:1) similar to those of most macronutrients, but the ratio of manganese is somewhat higher (4.4:1). Although the ratio of high-to-low values of molybdenum cannot be calculated, the means that are given indicate that it is very high.

The concentrations of the nonnutritive, nontoxic elements barium, cobalt, chromium, lithium, nickel, titanium, and zirconium tend to have somewhat greater ranges than do those of the nutritive elements, but aluminum has a low range and sodium and strontium have very high ranges.

The nonnutritive elements generally considered to be toxic to plants (arsenic, cadmium, mercury, and lead) occur too erratically in measurable concentrations for high-to-low ratios to be calculated, but a wide range in concentrations is shown by the available data. The concentrations of these elements are low in natural soils, but arsenic, mercury, and lead formerly were widely used as pesticides, and soils of many old orchards are contaminated with them. Cadmium in abnormal amounts in plants or soils may be suspected of resulting from pollution. With this group of elements, local variation in concentrations can be expected to occur. The range of selenium values is moderately wide, probably reflecting natural variation in soils among the sampling areas, but the levels of concentration do not suggest that plant toxicity will occur.

Some trends in mean element concentrations among species can be observed. Plums generally have low mean concentrations of the nutrient and nontoxic nonessential elements, and moderate to low values for the toxic elements. Peaches, which are closely related genetically to plums, do not show the same trends. Grapefruit and oranges are closely related species of the same genus and have quite similar mean concentrations of most elements. Their mean lithium and sodium contents are noteworthy, but an examination of the concentrations by areas shows that this content is not a genetic characteristic but rather an environmental effect. The two kinds of grapes show no close correspondence in mean element concentrations, which may have resulted from the different methods of sample preparation used for the two species: seeds were removed from the European grape samples but were retained in the samples of American grapes. Apples and pears are closely related gentically, but exhibit little relationship in mean element concentrations. In summary, a genetic effect on element concentrations in fruits of closely related species was not conclusively demonstrated; the strongest evidence for this effect was provided by the similarities of concentrations in grapefruit and oranges.

VEGETABLES

For presenting trends in the composition of vegetables, the mean element contents of the different kinds, and their percentages of water, were rearranged from tables 29–37 and are given in table 119.

The macronutrients potassium, phosphorus, magnesium, and sulfur have relatively low ratios, with potassium having the lowest range in concentrations (1.24:1). The macronutrient calcium has a high ratio. These trends are similar to those of fruits, although the ranges are somewhat wider, as might be expected because different organs of the vegetable plants were sampled. The ratios of the micronutrients copper, boron, iron, and zinc are also low. Molybdenum concentrations range from below the limit of determination to 84 ppm; the extremely high values occur in samples of snap beans and dry beans which, with other legumes, are known molybdenum accumulators.

The ranges in concentration of the nonnutritive nontoxic elements appear to exhibit no general pattern. Some element ratios that are extremely high are caused by very low estimates of the mean when the concentrations were determined in only a few of the samples. For some of these elements, contamination of the sample by soil or by airborne pollutants is indicated. The concentrations of titanium, zirconium, and often aluminum and iron have been widely used to estimate contamination in plant materials, because these elements commonly are more concentrated in soil than in the ash of uncontaminated plant samples. This kind of contamination is indicated for snap beans that have high concentrations of these elements. The whole bean pod was used for the samples, and, although the pods were washed, it was difficult to remove all soil material from the pubescent, somewhat viscid, pods. In contrast to snap beans, samples of sweet corn had very low concentrations of these elements, which may be explained by the protection provided by the husks which envelop the grains.

Ratios for the toxic elements arsenic, cadmium, mercury, and lead could not be calculated because some means were below the limit of determination, but examination of the means that were available shows a very wide range in concentrations. This wide range is attributed to airborne pollution, or contamination by pesticides, or both. Lead is a common airborne pollutant; and lettuce, which has a large surface-to-volume ratio, has the highest lead concentration of any of the samples. Although the lettuce was washed, it is evident that much of the lead was not removed from the samples collected in one area. At this location the lettuce was a cultivar having heads that were more open than those of the cultivars sampled at the other locations. This difference in element content among cultivars probably was not caused by different root absorption characteristics but only by airborne contamination that was not readily removable from the leaves.

The water content has a narrow range among the vegetables, except for dry beans. The measurements of water content were based on the weights of the samples soon after they were collected in the field, and, although the bean seeds appeared to be dry, they contained about 15 percent water.

Well-known trends in element absorption among kinds of vegetables can be observed in the mean concentrations given in table 119. Cabbage is in a plant family (Cruciferae) that is characterized by the ready uptake of sulfur and selenium. Plants in the bean family (Leguminosae) contain relatively large concentrations of molybdenum. Sweet corn is known to absorb large concentrations of zinc, and potatoes contain somewhat elevated levels of potassium. Absorption characteristics of other kinds of vegetables are not as well known, or are unknown. Some apparent trends indicated in this table are worth noting. Cabbage appears to absorb significantly large concentrations of calcium, lithium, and sodium. The strontium content of carrots seems to be unusually high, as is barium in cucumbers. Both cultivars of beans have high iron values, in addition to molybdenum. Tomatoes are distinguished by having relatively low concentrations of all elements of this study.

AMONG AREAS OF COMMERCIAL PRODUCTION

The significant differences among areas for elements in each kind of fruit and vegetable given in the analysis-of-variance tables 46-62 were assigned to the counties having the highest and lowest concentrations, as determined from tables 4-20, and are grouped by element and kind of produce in table 63. The counties having element concentrations in a fruit or vegetable that lie between the lowest and the highest concentrations are not considered in this table, because their between-area significances were not tested.

Data in table 63 demonstrate that many significant differences exist in mean element concentrations among kinds of produce from the areas in which they were sampled. Area trends in element concentrations, however, cannot be readily deduced from this table because of differences in the concentration capabilities of the species for the different elements. If the data in this table are considered along with the element data for individual areas (tables 4-20) some general trends in element concentrations characteristic of certain elements and specific areas can be observed.

Large-scale trends are considered first, as distinguished for samples from the Eastern States (defined as those that lie east of the 97th meridian), and from the Western States (west of the 97th meridian).

Lithium. This element was found in only three samples of produce from the Eastern States, and these samples are suspected of being influenced by pollution, but it was found in some samples from each of the production areas in the Western States. The citrus fruits illustrate this tendency. No lithium was found in samples of grapefruit and oranges from Florida, whereas the following mean concentrations (ppm in ash) were reported from the Western States: Hidalgo County, Texas, grapefruit 3.1, oranges 2.8; Riverside County, Calif., grapefruit 4.7, oranges 14; and Yuma County, Ariz., grapefruit 21, oranges 20.

Molybdenum. The concentrations of this element in produce have strong species and regional trends. All dry bean samples from all production areas contain measurable concentrations (mean ppm in ash) as follows: Wayne County, N.Y., 31; San Joaquin County, Calif., 67; Twin Falls County, Idaho, 103; and Mesa County, Colo., 180. In contrast, pears are not strong molybdenum concentrators, yet show marked differences among areas as follows (mean ppm in ash): Berrien County, Mich., <7; Wayne County, N.Y., <7; Yakima County, Wash., <7; San Joaquin County, Calif., 1.4; and Mesa County, Colo., 7.3. Plums show a similar trend. This regional trend in molybdenum, with high values in Colorado, was found in all produce that was sampled in Mesa County.

Selenium. The trend in concentrations of this element is very similar to that of molybdenum and may be illustrated by the mean concentrations (ppm in dry material) of oranges, as follows: Palm Beach County, Fla., <0.005; Hidalgo County, Texas, 0.0089; Yuma County, Ariz., 0.0075; and Riverside County, Calif., 0.020. This trend differs from that of molybdenum in that several kinds of produce have relatively high concentrations in New Jersey and lower concentrations in some Western States, as shown by the following example of apples (mean ppm in dry material): Berrien County, Mich., below determination limit in all samples; Wayne County, N.Y., 0.0013; Gloucester County, N.J., 0.0040; Yakima County Wash., 0.0023; and Mesa County, Colo., 0.014. Selenium concentrations in all produce from Mesa County were higher by an order of magnitude than in the same produce from all other areas.

Sodium. Sodium concentrations range more widely among kinds of produce than among regions, but there is a definite trend in most produce toward higher concentrations in the Western States. This trend may be shown by lettuce as follows (mean ppm in ash): Cumberland County, N.J., 2,200; Palm Beach County, Fla., 5,500; Hidalgo County, Texas, 25,000; and Imperial County, Calif., 54,000.

Zinc. Regional trends in this micronutrient vary greatly among the kinds of produce. Some fruits have higher values in the Eastern States, as illustrated by apples (mean ppm in ash): Berrien County, Mich., 79; Wayne County, N.Y., 72; Gloucester County, N.J., 86; Yakima County, Wash., 49; and Mesa County, Colo., 50. Plums show the same regional trend, but other fruits do not. Sweet corn, a zinc accumulator, may have somewhat lower zinc values in the Western States, as suggested by the following analyses (mean ppm in ash): Berrien County, Mich., 1,200; Salem County, N.J., 920; Palm Beach County, Fla., 1,400; and Twin Falls County, Idaho, 590. Other vegetables do not show this trend.

The element concentrations in some samples of vegetables from the New Jersey counties suggest that the pollution, or contamination by agricultural practices, affects the amounts reported. Examples of unusually high values in produce from this area follow: Lettuce—arsenic, 1.3 ppm in dry material; chromium, 22 ppm in ash; lead, 11 ppm in ash; and titanium, 1,379 ppm in ash. Snap beans—arsenic, 0.037 ppm in dry material and mercury, 0.0057 ppm in dry material. Tomatoes—titanium, 11 ppm in ash. Moreover, the presence in vegetables from these counties of some elements that are only rarely reported in plants indicates that pollution may be suspected as causative. The following elements, and their ppm in ash, were found only in lettuce from Cumberland County, N.J.: Gallium, two samples, 10 and 15 ppm; ytterbium, three samples, 2–3 ppm; and yttrium, three samples 20–30 ppm. One sample of lettuce contained 70 ppm lanthanum and nine samples contained 17–70 ppm vanadium—otherwise, lanthanum was found in only one sample of plums and vanadium in one sample of pears, both from Michigan.

TRENDS IN ELEMENT CONCENTRATIONS IN SOILS SUPPORTING FRUITS AND VEGETABLES

AMONG KINDS OF PRODUCE

A comparison of the mean concentrations of elements in soils supporting each kind of produce is given in tables 120–121. The ratios of the highest values to the lowest values for each element in the soils are also given. By this means, the concentrations of an element characteristic of soils supporting the different kinds of produce can be compared, and the ratios can be used as a measure of ranges in the mean concentrations.

For fruits (table 120), soils supporting oranges are characterized by having far the greatest number of lowest element values, and European grape soils have the greatest number of highest values. General trends in soil-element characteristics are not apparent for the other kinds of produce.

In comparing the range of values for elements among soils supporting different kinds of fruits, arsenic and lead stand out as having extreme high-to-low ratios. The high concentrations for both elements occur in apple-orchard soils, and the low concentrations for both were found in orange-grove soils. This fact suggests that these elements in soils originated principally from the use of insecticidal sprays and that some kinds of fruit trees were sprayed with lead arsenate more commonly than were other kinds. The high ratios of aluminum, iron, vanadium, and strontium result from the low natural levels of these elements in the sandy soils of citrus groves contrasted with the high levels in soils of the West Coast grape districts. The high ratios for calcium and strontium in soils supporting vegetables probably reflect the requirement of cabbage for basic soils high in calcium contrasted with the wide range in soil pH tolerated by sweet corn. The other ratios for produce are within low ranges for which the effects of natural soil chemistry, cultural requirements for specific crops, fertilizer practices, and contamination cannot be distinguished with the available data.

AMONG AREAS OF COMMERCIAL PRODUCTION

The areas having significantly different concentrations of each element in soils supporting each kind of fruit and vegetable, as indicated by analysis of variance (tables 100–116), are listed in table 117. The extreme high and extreme low areas are given because the analysis of variance measures differences only between the extremes—the other areas fall somewhere between the two.

The most striking results shown in table 117 are the wide ranges in element and pH values that are tolerated by the different kinds of produce. Even the toxic elements in soils may have wide ranges in concentration without preventing successful cultivation of the fruits and vegetables that were analyzed. For example, soil supporting plums in Mesa County, Colo. contained a mean arsenic concentration of 37 ppm, while the soil in plum orchards in Yakima County, Wash. contained an average of 6.3 ppm. Potato-field soils in Twin Falls County, Idaho, averaged 1.1 ppm mercury, while those in Yakima County averaged only 0.032 ppm. Pear-orchard soils in Yakima County averaged 160 ppm lead, but those in Berrien County, Mich., averaged only 20 ppm. Even concentrations of the major nutrient elements calcium, potassium, and magnesium have order-of-magnitude differences in soils supporting a kind of produce. The latitude in pH values also may be wide; for example, both the acid soils of Wayne County, N.Y. (pH 4.8), and the alkaline soils of Twin Falls County, Idaho (pH 8.2), produce profitable crops of potatoes.

Some pronounced trends are shown among areas in mean element concentrations and pH in soils supporting the different kinds of produce. A large-scale trend is found in the high pH values of soils from the Western States and the lower values for those of the Eastern States that is related to similar differences in calcium and magnesium concentrations in the cultivated zone of soils. Similar trends are shown by lithium and sodium.

Less distinct differences in east-to-west soil concentrations, but for which the Western States generally have higher element values, are shown by aluminum, barium, cobalt, chromium, iron, gallium, germanium, nickel, rubidium, scandium, strontium, thorium, titanium, uranium, vanadium, yttrium, ytterbium, and zinc. Locations sampled in the Eastern States tend to have higher concentrations only of silicon, which is probably caused by leaching of soil elements that are more mobile than silicon.

No clear regional trends are shown in concentrations of arsenic, boron, carbon, copper, fluorine, mercury, potassium, manganese, lead, and tin. If regional differences in concentration of these elements in soils originally existed, they have been diminished or obliterated by cultivation practices or contamination. Boron, copper, manganese, and potassium are deficient for profitable growth of fruits and vegetables in some areas and may be added to the soil in fertilizers. Total carbon concentration in soil is influenced by the content of organic matter and carbonates in soils which may range widely within areas and so obscure regional patterns. Arsenic, mercury, copper, and lead were formerly used as pesticides throughout the United States, and residues of these elements persist in some soils. The remaining elements fluorine and tin, as well as arsenic, mercury, and lead, may be added to the soil by industrial or vehicular pollution.

Reasons for the differences in element concentrations in soils that support different kinds of produce within an area are not obtainable from the tables given in this report; they can be deduced only from observations made at the different sites. For example, soils supporting lettuce in Florida and potatoes in New York are much higher in carbon than are the soils in which some other crops are grown in the areas because in these two States lettuce and tomatoes were grown in peat or muck while the other kinds of produce were grown in less organic soils. The high lead and arsenic levels in soils at apple-orchard sites in both Washington and Michigan relate to spray residues in old orchards, whereas soils of young orchards have lower concentrations of these elements. Soils of the sampling area in Cumberland County, N.J. probably reflect effects of contamination, as indicated by the uncommon soil elements found and the concentrations of other elements that are often associated with local pollution.

The effects of fertilization within and among areas cannot be evaluated from the data at hand, but as a general practice labor-intensive crops, including most kinds of fruits and vegetables, are heavily fertilized with the major nutritive elements. These fertilizers may contain trace amounts of undesirable elements such as cadmium in phosphates that can remain in the plow zone of soils for long periods of time. Certain micronutrient elements, such as copper, zinc, boron, and manganese, may be applied to the soil in areas having deficiencies of these elements. Large quantities of sewage sludge or other organic wastes were observed in vegetable fields in Imperial County, Calif., and these materials probably were also used in other areas. These wastes often contain significant amounts of undesirable heavy metals.

RELATIONSHIPS OF THE ELEMENT CONCENTRATIONS IN FRUITS AND VEGETABLES AND THE CONCENTRATIONS IN SOILS

Numerous studies have demonstrated that the concentration of an element in plant tissue commonly has only little correlation with the total concentration of the same element in the soil that supported the plant. This lack of correlation is caused by the fact that only certain chemical states of an element can be absorbed by plants; another reason is that inherent physiological characteristics of plant species control the concentrations that can be absorbed. There is no universal laboratory method of determining the availability of the elements in soils to plants; therefore, this study considered only total element concentrations, not available concentrations.

If the concentrations of an element in soils exceed certain concentrations that can be considered "normal," the plants may reflect the high soil levels by their increased absorption of the element. This reaction forms the basis for biogeochemical prospecting for mineral deposits. Agricultural soils have element concentrations that range within the requirements or tolerances of the cultivated plants; therefore, extremely high concentrations of toxic elements, or extremely low concentrations of nutritive elements, are not expected in these soils. Contamination or pollution, however, may cause local high concentrations of certain elements in agricultural soils. Moreover, natural differences in concentrations on a continental scale may be of sufficient magnitude for some elements in soils to elicit a corresponding response in plant element concentrations.

An examination of the tables giving mean element values for fruits and vegetables by areas of production (tables 4–21) and corresponding tables for soils in which these plants grew (tables 64–80) reveal some large-scale examples of plant element-soil element correlations. The following examples of correlation are believed to relate to natural soil differences in element concentrations:

Area	Soil	Fruit
Mean lithium concentrations (ppm) in ash of grapefruit and in associated soils		
Florida	0.54	<4
Texas	14	3.1
California	28	4.7
Arizona	27	12
Mean lithium concentrations (ppm) in ash of oranges and in associated soils		
Florida	6.3	<4
Texas	15	2.8
California	19	14
Arizona	19	20
Mean sodium concentrations (ppm) in ash of American grapes and in nssociated soils		
Michigan	1,200	220
New York	11,000	230
Washington	17,000	1,200
Mean potassium concentrations (ppm) in ash of European grapes and in associated soils		
Washington	1.6	14
California	2.0	29

Very few correlations of the kinds given above are evident in the data on mean element concentrations in produce and soils. Doubtless, the averaging of concentrations for areas has obscured some of the correlations that exist at the site level.

The plant-soil relationships at some sampling sites showed a strong influence of soil element concentrations on the abundance of some elements in the plants. Analyses of plants and soils at each sampling site are not given in this report, but were published by Boerngen and Shacklette (1980). The following relationships of soil and plant element contents are based on site data from the latter report.

Some sites in old apple orchards in Michigan showed the influence of having been sprayed with arsenate of lead over a period of many years, as follows (paired soil-fruit samples):

Sample No.	Soil (ppm) As	Soil (ppm) Pb	Sample No.	Fruit (ppm) As[1]	Fruit (ppm) Pb[2]
01AP110S	90	200	01AP1100	8	1,000
01AP120S	13	70	01AP1200	10	1,500

[1]In dry material.
[2]In ash.

A second example follows, in which samples were collected from an old apple orchard in Washington said by the owner to be about 30 years old and to have been sprayed with arsenate of lead four to five times per year for many years.

Sample No.	Soil (ppm) As	Soil (ppm) Pb	Sample No.	Fruit (ppm) As[1]	Fruit (ppm) Pb[2]
09AP410S	114	700	09AP4100	0.3	<10
09AP510S	135	1,000	09AP5100	0.3	<10

[1]In dry material.
[2]In ash.

In both examples, the soils contained unusually high concentrations of arsenic and lead, if compared to "typical" soil concentrations, but the response of the apple trees, as measured by the content of these elements in the fruits, was not consistent. The apple samples from Michigan indicated positive, but not proportional, responses to soil concentrations, whereas the apple samples from Washington exhibited no response to even higher soil concentrations of these elements. These erratic responses probably did not reflect surface contamination of the fruits, because all apple samples were pared, and the peel was discarded. The apple trees in Washington were irrigated, whereas those in Michigan depended entirely upon rain and snow for their supply of water. It is not clear how this difference in water supply could affect the availability of the two elements to the trees.

Analyses of paired soil-plant samples for arsenic from an area in Cumberland County, N. J., thought to be affected by pollution follow:

Sample No.	Soil (ppm)	Sample No.	Lettuce[1] (ppm)
03LH210S	4.7	03LH2100	1.0
03LH110S	11.7	03LH1100	1.5
03LH510S	12.6	03LH5100	2.0
03LH310S	13.0	03LH3100	2.5
03LH410S	17.9	03LH4100	7.0

[1]In dry material.

These high arsenic levels in both soil and lettuce are most likely caused by air or soil pollution, or both, but not by contamination with arsenate of lead insecticide, because the lead values for the soils in this area are within the normal range. The abnormally high ash values found in these plant samples indicate contamination by soil that was not removed when the lettuce was washed.

Copper values for potato tubers and soils from the New Jersey sites are anomalously high. However, the high values in the potato samples were not caused by soil contamination of the samples, as may have occurred with the lettuce samples, because the potatoes were peeled and the peels were discarded. Mean copper values for potatoes and potato-field soils from all areas follow.

Area	Soil (ppm)	Potato (ppm in ash)
New York	17	62
Idaho	20	74
Washington	40	98
New Jersey	140	135

The high copper values for New Jersey soils and potatoes strongly suggest effects of soil pollution.

The highest and lowest mean element concentrations that are significantly different in produce and soils among areas of commercial production are given by county in tables 63 and 117. The mean concentrations for each kind of produce and its supporting soils are also given. These tables serve as a ready reference for locating strong regional trends in element concentrations; they also delineate the predominant trends in soil element-plant element relationships. Only the areas having extreme values for each category of samples are given, as indicated by analysis-of-variance procedures. Other values by area for soils and produce fall somewhere between the extremes and can be found in summary tables given elsewhere in this report.

Striking features presented in tables 63 and 117 are the large numbers of significant differences that are identified and, for many elements, the magnitude of the differences. Another feature that is evident is the general lack of correspondence of extreme values between soils and produce. Very few examples can be found for which a county has the extreme values for an element in both soils and the produce grown on the same group of soils. This fact supports the general principle that ordinarily there is a low degree of correlation between the total concentration of an element in soils and the concentration in an associated species of plant. Only when soil element concentrations exceed a certain level do plants respond with a corresponding increase in content of that element. This level of response differs widely among elements and plant species and is also influenced by many external environmental factors. These complex relationships cannot be generalized quantitatively, but must be determined on a case-by-case basis. For this reason the generally accepted principle is that the best measure of soil element availability is the amount found in the plant itself.

SUMMARY

Estimates of the mean concentrations of 27 chemical elements in eight kinds of fruits and nine kinds of vegetables, based on field collections of produce from 11 areas of commercial production in the United States, provided data that can be used as background values for these elements in produce before their concentrations have been altered by harvesting, processing, or cooking. The water content of the samples was determined in the field and the ash yield of all dried samples was recorded; these measurements permitted the mean concentrations to be expressed on a fresh, dry, or ash basis.

The sampling design that was followed required the sampling of produce in 11 areas, in five fields in each area, and at two sites in each field. In addition, a duplicate sample of produce was collected at 45 sites that were randomly selected before sampling was begun. This procedure permitted the use of analysis of variance techniques to determine the distribution of variation in element concentrations among areas of production, among fields within areas, and between sites within fields.

Most variation in element concentrations was among areas. Variation at the site level included errors in sampling, preparation, and analysis, in addition to the natural variation that was influenced by factors of the environment at the site. The data from the 45 duplicate field collections and from 45 randomly selected laboratory sample splits were used to

estimate separately the effects of these factors. As a general rule, the sampling and analytical errors were judged to be within acceptable limits.

A test to determine the differences in concentrations of elements at the 0.05 probability level among areas of fruit and vegetable production revealed many significant differences in the extreme mean concentrations of elements among the different kinds of produce. The causes of these differences that could be determined with reasonable confidence were distributed on a case by case basis among natural soil differences, cultivation practices, contamination by pesticides, and pollution.

The cultivated zone of soils was sampled at each site where produce was sampled, except where duplicate field and site samples of produce were collected. Analysis of variance revealed many more significant differences in concentrations of elements in soils at the area level than were found in produce. Only the total concentrations of each element were determined in the soil samples—no attempt was made to define available concentrations by laboratory procedures, because the actual amount absorbed by the plant is the best measure of availability of elements in soils.

Correlations between the total concentration of an element in soil and in produce samples were generally absent or low. A few positive correlations at an area scale were attributed to differences in the natural concentrations of an element in the soil, but others most probably resulted from contamination or pollution effects on the soil or the produce.

Trends in element concentrations among kinds of produce identified the fruits and vegetables which concentrated certain elements in their tissues relative to concentrations in others and indicated either a strong species control, or an environmental control related to areas of production, or both. The trends in element concentrations in soils generally showed a pronounced geographical control, to which, at places, contamination and pollution effects were added.

CONCLUSIONS

1. The concentrations of elements in fruits and vegetables generally differ least in the macronutrients potassium, phosphorus, magnesium, and sulfur that are essential for plant growth. Trends in concentrations of the micronutrients boron, copper, iron, and zinc are similar but not as pronounced as those of the macronutrients. The concentrations of the nonnutritive, nontoxic elements barium, cobalt, lithium, nickel, titanium, and zirconium tend to have greater ranges than do those of the nutritive elements. Concentrations of elements generally considered toxic to organisms exhibit erratic distributions among areas and kinds of produce, and a wide range in their concentrations is indicated.
2. The total amounts of most elements in soils have only little effect on the amounts in the produce as long as concentrations are at the levels found in soils of areas where fruits and vegetables are commercially produced. If soil levels exceed these ill-defined or unknown levels, either from natural causes or from contamination or pollution, concentrations in produce may reflect these excessive levels in soils.
3. Regional differences in concentrations as great as tenfold were found for some elements in various kinds of produce. These trends may be useful in examining epidemiological peculiarities; dietary recommendations may also be influenced by these differences. Caution should be used, however, in applying grand mean concentrations of elements in produce to specific environmental or nutritional problems.
4. The concentrations of various elements in the produce sampled in this study, whether due to normal soil levels or to contamination or pollution, represent levels that may be found in fruits and vegetables in commercial markets insofar as the sampling adequately covered the major areas of production. These levels may be reduced or increased by various methods of food processing and preparation. The significance of the concentrations as applied to problems of nutrition and health of humans or animals is left to the judgment of investigators in the medical sciences.

REFERENCES CITED

Allaway, W. H., 1968, Agronomic controls over the environmental cycling of trace elements: Advances in Agronomy, v. 20, p. 235–274.

Beeson, K. C., 1941, The mineral composition of crops with particular reference to the soils in which they were grown—A review and compilation: U.S. Department of Agriculture Miscellaneous Publication 369, 164 p.

_____1957, Soil management and crop quality, *in* U.S. Department of Agriculture, Soil—Yearbook of Agriculture 1957: U.S. Government Printing Office, p. 258–267.

Bennett, C. A., and Franklin, N. L., 1954, Statistical analysis in chemistry and the chemical industry: New York and London, John Wiley & Sons, Inc., 724 p.

Boerngen, J. G., and Shacklette, H. T., 1980, Chemical analysis of fruits, vegetables, and their associated soils from areas of commercial production in the conterminous United States: U.S. Geological Survey Open-File Report 80-84, 134 p.

Chapman, H. D., ed., 1966, Diagnostic criteria for plants and soils: Riverside, Calif., University of California, Division of Agricultural Science, 793 p.

Cohen, A. C., Jr., 1959, Simplified estimators for the normal distribution when samples are singly censored or truncated: Technometrics, v. 1, no. 3, p. 217-237.

Connor, J. J., and Shacklette, H. T, 1975, Background geochemistry of some rocks, soils, plants, and vegetables in the conterminous United States, *with sections on* Field studies by R. J. Ebens, J. A. Erdman, A. T. Miesch, R. R. Tidball, and H. A. Tourtelot: U.S. Geolological Survey Professional Paper 574-F, 168 p.

Diem, Konrad, ed., 1962, Scientific tables, 6th ed.: Ardsley, New York, Geigy Pharmaceuticals, Division of Geigy Chemical Corp., 778 p.

Duke, J. A., 1970, Ethnobotanical observations on the Chocó Indians: Economic Botany, v. 24, no. 3, p. 344-366.

Egan, Harold, 1972, Trace lead in food, *in* Hepple, Peter, ed., Lead in the environment: London, Institute of Petroleum, p. 34 42.

Garber, K., 1968, Über den Fluorgehalt von Pflanzen, *in* Deutsche Forschungsgemeinschaft, Fluor-Wirkungen—Forschungsergebnisse bei Pflanze und Tier, Forschungsberichte 14, [The fluorine content of plants, *in* German Research Society, Effects of fluorine—Results of research with plants and animals, Research report 14]: Wiesbaden, Franz Steiner Verlag, p. 42-48.

Goodall, D. W., and Gregory, F. G., 1947, Chemical composition of plants as an index of their nutritional status: Imperial Bureau of Horticulture and Plantation Crops, East Malling, Kent, England, Technical Communication 17, 167 p.

Gough, L. P., and Shacklette, H. T., 1979, Element concentrations toxic to plants, animals, and man: U.S. Geological Survey Bulletin 1466, 80 p.

Harms, T. F., 1976, Analysis of plants and plant ashes by methods other than emission spectroscopy, *in* Miesch, A. T., Geochemical survey of Missouri—Methods of sampling, laboratory analysis, and statistical reduction of data: U.S. Geological Survey Professional Paper 954-A, p. 17-18.

Huffman, Claude, Jr., and Dinnin, J. I., 1976, Analysis of rocks and soils by atomic absorption spectrometry and other methods, *in* Miesch, A. T., Geochemical survey of Missouri—Methods of sampling, laboratory analysis, and statistical reduction of data: U.S. Geological Survey Professional Paper 954-A, p. 12-14.

Imperial County Board of Supervisors, 1971, Imperial County Agriculture, 1971: [Sacramento, California] Office of the Agricultural Commissioner, 6 p.

Kenworthy, A. L., 1967, Plant analysis and interpretation of analysis for horticulture crops, *in* Plant analysis, pt. 2 *of* Stelly, Matthias, ed., Soil testing and plant analysis: Madison, Wisc., Soil Science Society of America Special Publication Series 2, p. 59-75.

Kropf, R., and Geldmacher-v.Mallinckrodt, M., 1968, Der Cadmiumgehalt von Nahrungsmitteln und die tägliche Cadmiumaufnahme [The cadmium content of foodstuffs and the daily cadmium intake]: Archiv für Hygiene, v. 152, no. 3, p. 218-224.

Miesch, A. T., 1967, Theory of error in geochemical data: U.S. Geological Survey Professional Paper 574-A, 17 p.

______1976, Geochemical survey of Missouri—Methods of sampling, laboratory analysis, and statistical reduction of data: U.S. Geological Survey Professional Paper 954-A, 39 p.

Millard, H. T., Jr., 1975, Determinations of uranium and thorium in rocks and soils by the delayed neutron technique, *in* U.S. Geological Survey, Geochemical Survey of the western coal regions, Second Annual Progress Report, July 1975: U.S. Geological Survey Open-File Report 75-436, p. 79-81.

Miller, Judith, 1974, Agriculture—FDA seeks to regulate genetic manipulation of food crops: Science, v. 185, no. 4147, p. 240-242.

Monier-Williams, G. W., 1949, Trace elements in food: London, Chapman & Hall, Ltd., 511 p.

Morrison, G. H., Pierce, J. O., Allaway, W. H., Angino, E. E., Cannon, H. L., Jorden, Roger, Kubota, Joe, Laitinen, H. A., and Lakin, H. W., 1974, Sampling, sample preparation, and storage for analysis, chap. 11 *in* The relation of selected trace elements to health and disease, v. 1 *of* Geochemistry and the environment: Washington, D.C., National Academy of Science, p. 90-97.

Neiman, H. G., 1976, Analysis of rocks, soils, and plant ashes by emission spectroscopy, in Miesch, A. T., Geochemical survey of Missouri—Methods of sampling, laboratory analysis, and statistical reduction of data: U.S. Geological Survey Professional Paper 954- A, p. 14-15.

Pickersgill, Barbara, 1977, Taxonomy and the origin and evolution of cultivated plants in the New World: Nature, v. 268, 18 August 1977, p. 591-595.

Quarterman, John, 1973, Factors which influence the amount and availability of trace elements in human food plants: Plant Foods and Human Nutrition, v. 23, no. 1/3, p. 171-190.

Shacklette, H. T., 1972, Cadmium in plants: U.S. Geological Survey Bulletin 1314-G, 28 p.

Shacklette, H. T., Erdman, J. A., Harms, T. F., and Papp, C. S. E., 1978, Trace elements in plant foodstuffs, chap. 3 *in* pt. 1, Oehme, F. W., ed., Toxicity of heavy metals in the environment, *of* vol. 2, Hazardous and toxic substances: New York, Marcel Dekker, Inc., p. 25-68.

Shacklette, H. T., Sauer, H. I., and Miesch, A. T., 1970, Geochemical environments and cardiovascular mortality rates in Georgia: U.S. Geological Survey Professional Paper 574-C, 39 p.

Stipe, G. J., and Jones, K. W., comp., 1972, Agricultural report: [Stockton, Calif.] San Joaquin County Department of Agriculture, 20 p.

Underwood, E. J., 1971, Trace elements in human and animal nutrition (3d ed.): New York and London, Academic Press, 543 p.

______1973, Trace elements, chap. 3 *in* Toxicants occurring naturally in foods (2d ed.): Washington, D.C., National Academy of Sciences, p. 43-87.

U.S. Food and Drug Administration, 1972, General program—Foods, chap. 20 *in* Compliance program guidance manual: Washington, D.C., U.S. Food and Drug Administration, 16 p. plus Attachments A, B1-B4, C, D.

U.S. Geological Survey, 1970, The national atlas of the United States of America: Washington, D.C., U.S. Department of the Interior, 417 p.

U.S. Soil Conservation Service, 1969, Distribution of principal kinds of soils—Orders, Suborders, and Great Groups, *in* The national atlas of the United States of America: U.S. Geological Survey, sheet 86, 2 p.

Vernon, R. O., and Puri, H. S., 1964, Geologic map of Florida: U.S. Geological Survey, and Florida Board of Conservation, Division of Geology, Map Series 18, 1 sheet.

Wahlberg, J. S., 1976, Analysis of rocks and soils by X-ray fluorescence, *in* Miesch, A. T., Geochemical survey of Missouri—Methods of sampling, laboratory analysis, and statistical reduction of data: U.S. Geological Survey Professional Paper 594-A, p. 11-12.

Warren, H. V., 1967, Lead in potatoes: Royal College of General Practioners Journal, v. 25, p. 66-72.

Washington State Department of Agriculture, 1964, Yakima County Agriculture: Olympia, County Agriculture Data Series 1964, 69 p.

Watt, B. K., and Merrill, A. L., 1950, Composition of foods—Raw, processed, prepared: U.S. Department of Agriculture, Agriculture Handbook 8, 147 p.

Williams, K. T., and Whetstone, R. R., 1940, Arsenic distribution in soils and its presence in certain plants: U.S. Department of Agriculture Technical Bulletin 732, 20 p.

TABLES 4–121

TABLE 4.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material, and percent dried-material yield of fresh American grapes from areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Areas of commercial production											
	Berrien County, Mich.				Wayne County, N.Y.				Yakima County, Wash.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--	0:10	<1	--	--
Al	8:10	320	2.27	<150 - 700	8:10	270	3.00	<150 -1,000	10:10	550	1.65	300 -1,000
As[1]	3:9	.025	2.32	<.05 - .10	2:8	.026	1.62	<.05 - .05	4:9	.029	4.01	<.05 - .25
B	10:10	230	1.34	100 - 500	10:10	280	1.71	100 - 500	10:10	270	1.27	150 - 300
Ba	10:10	100	1.51	30 - 200	10:10	76	1.93	30 - 200	10:10	91	1.43	50 - 150
Ca[2]	10:10	2.5	1.42	1.6 - 4.6	10:10	2.5	1.57	1.1 - 3.6	10:10	2.9	1.72	1.1 - 6.2
Cd	9:10	.44	2.61	<.2 - 3	6:10	.19	2.32	<.2 - .6	6:10	.17	1.83	<.2 - .4
Co	1:10	<1	--	<1 - 1	1:10	<1	--	<1 - 1	0:10	<1	--	--
Cr	4:10	1.1	1.93	<1.5 - 3	3:10	.65	2.67	<1.5 - 5	4:10	.28	4.97	<1.5 - 700
Cu	10:10	85	1.48	50 - 150	10:10	76	1.45	50 - 150	10:10	61	1.19	50 - 70
Fe	10:10	460	1.63	300 -1,500	10:10	280	1.32	200 - 500	10:10	650	1.66	300 -2,000
Hg[1]	2:10	.0046	1.69	<.01 - .01	1:10	<.01	--	<.01 - .01	2:10	.0046	1.69	<.01 - .01
K[2]	10:10	24	1.19	18 - 32	10:10	22	1.22	16 - 28	10:10	21	1.30	14 - 30
Li	0:10	<4	--	--	0:10	<4	--	--	1:10	<4	--	<4 - 5
Mg[2]	10:10	1.4	1.42	.7 - 2	10:10	1.6	1.38	1 - 3	10:10	1.5	1.39	.7 - 2
Mn	10:10	310	1.85	150 - 700	10:10	220	2.46	50 - 700	10:10	48	1.57	30 - 100
Mo	1:10	<7	--	<7 - 30	0:10	<7	--	--	1:10	<7	--	<7 - 15
Na	10:10	220	2.10	100 - 700	10:10	230	1.37	150 - 400	10:10	1,200	2.28	400 -5,900
Ni	0:10	<10	--	--	0:10	<10	--	--	1:10	<10	--	10 - 200
P[2]	10:10	1.7	1.30	1.2 - 2.4	10:10	1.7	1.39	1.2 - 2.4	10:10	1.3	1.27	1.2 - 2.4
Pb	0:10	<20	--	--	0:10	<20	--	--	1:10	<20	--	<20 - 30
S[1,2]	10:10	.071	1.26	.045- .09	10:10	.070	1.40	.005- .11	10:10	.049	1.20	.035- .065
Se[1]	10:10	.011	1.48	.005- .02	10:10	.0076	1.43	.005- .01	10:10	.018	5.20	.005- .15
Sr	10:10	120	1.60	70 - 300	10:10	150	1.39	70 - 200	10:10	240	1.46	150 - 300
Ti	4:10	2.8	4.58	<5 - 30	5:10	4.0	2.72	<5 - 15	10:10	32	2.29	10 - 100
Zn	10:10	130	1.46	80 - 270	10:10	96	1.39	50 - 160	10:10	98	1.70	60 - 350
Zr	0:10	<20	--	--	1:10	<20	--	<20 - 20	0:10	<20	--	--
Ash, percent of dry weight	10:10	4.9	1.29	2.6 - 6.0	10:10	4.2	1.3	2.5 - 5.9	10:10	4.7	1.42	2.1 - 7.7
Dry material, percent of fresh weight	10:10	14	1.17	10 - 16	10:10	15	1.1	13 - 17	10:10	20	1.11	17 - 24

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

TABLE 5.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material, and percent dried-material yield of fresh apples from areas of commercial production*

[Explanations of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Means and ranges are given in parts million, except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Areas of commercial production							
	Berrien County, Mich.				Wayne County, N.Y.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	9:10	460	2.83	<150 -1,500	8:10	300	2.45	<100 -1,500
As[1]	8:10	.45	1.48	<.05- 10	8:8	.20	6.02	.05 - .7
B	10:10	410	1.30	300 - 500	10:10	370	1.61	150 - 700
Ba	10:10	77	1.92	30 - 200	10:10	130	1.57	50 - 200
Ca[2]	10:10	.87	1.37	.48- 1.3	10:10	1.6	1.67	.68 - 3.2
Cd	7:10	.18	1.50	<.2 - .4	7:10	.20	1.97	<.2 - .6
Co	0:10	<1	--	--	1:10	<1	--	<1 - 1
Cr	8:10	.50	3.00	<1.5 - 3	3:10	.57	4.19	<1.5 - 7
Cu	10:10	62	1.38	30 - 100	10:10	70	1.26	50 - 100
Fe	10:10	400	1.52	200 - 700	10:10	330	1.24	300 - 500
Hg[1]	8:10	.022	3.12	<.01- 6.2	1:10	<.01	--	<.01 - .01
K[2]	10:10	29	1.33	17 - 40	10:10	34	1.19	25 - 42
Li	0:10	<4	--	--	0:10	<4	--	--
Mg[2]	10:10	1.3	1.35	.7 - 2	10:10	1.7	1.16	1.5 - 2
Mn	10:10	84	1.69	30 - 150	10:10	130	1.41	70 - 200
Mo	2:10	4.3	1.38	<7 - 7	1:10	<7	--	<7 - 10
Na	10:10	350	1.51	200 - 650	10:10	360	1.73	100 - 750
Ni	1:10	<10	--	<10 - 15	0:10	<10	--	--
P[2]	10:10	2.2	1.15	1.8 - 2.4	10:10	2.4	1.19	1.8 - 3.6
Pb	3:10	54	1.81	<20 -1,500	4:10	<20	--	<20 - 700
S[1,2]	10:10	.025	1.12	.02- .03	10:10	.032	1.25	.025-
Se[1]	D:10	<.005	--	--	2:10	.0013	3.31	<.005- .01
Sr	10:10	46	1.96	15 - 150	10:10	150	1.52	70 - 200
Ti	9:10	16	2.42	<5 - 70	4:10	<5	--	<5 - 30
Zn	10:10	79	1.54	40 - 170	10:10	72	1.30	50 - 120
Zr	0:10	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	1.6	1.24	1.2 - 2.4	10:10	1.6	1.24	1.1 - 2.3
Dry material, percent of fresh weight	10:10	16	1.08	13.7 - 17.5	10:10	14	1.09	12.2 - 15.7

Element, ash, or dry material	Areas of commercial production (continued)											
	Gloucester County, N.J.				Yakima County, Wash.				Mesa County, Colo.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	1:10	<1	--	<1 - 2	0:10	<1	--	--
Al	8:10	250	2.04	<150 -3,000	10:10	490	2.14	300 -2,000	10:10	580	1.89	200 -1,500
As[1]	10:10	.18	1.49	.10 - .35	7:9	.070	2.77	<.05 - .3	4:10	.024	8.33	<.05 - .3
B	10:10	420	1.36	300 - 700	10:10	452	1.51	300 -1,000	10:10	680	1.43	500 -1,500
Ba	10:10	46	1.73	20 - 100	10:10	91	1.61	50 - 200	10:10	69	1.44	30 - 100
Ca[2]	10:10	.82	1.54	.50 - 2.0	10:10	1.1	1.47	.48 - 1.7	10:10	1.2	1.16	1 - 1.6
Cd	10:10	.27	1.53	.2 - .6	5:10	.15	1.39	<.2 - .2	7:10	.19	2.05	<.2 - .6
Co	6:10	.81	1.32	<1 - 1	2:10	.46	1.69	<1 - 1	1:10	<1	--	<1 - 1
Cr	4:10	1.1	1.99	<1.5 - 3	1:10	<1.5	--	<1.5 - 3	5:10	1.2	2.67	<1.5 - 7
Cu	10:10	60	1.39	30 - 100	10:10	61	1.19	50 - 70	10:10	62	1.44	30 - 100
Fe	10:10	415	1.49	300 -1,000	10:10	350	1.28	300 - 500	10:10	255	1.23	200 - 300
Hg[1]	1:10	<.01	--	<.01 - .01	1:10	<.01	--	<.01 - .01	2:10	.0046	1.69	<.01 - .01
K[2]	10:10	38	1.06	35 - 40	10:10	36	1.14	26 - 40	10:10	38	1.09	32 - 43
Li	0:10	<4	--	--	0:10	<4	--	--	1:10	<4	--	<4 - 4
Mg[2]	10:10	1.3	1.35	.7 - 2	10:10	1.6	1.25	1 - 2	10:10	1.4	1.19	1 - 1.5
Mn	10:10	120	1.49	50 - 150	10:10	56	1.38	30 - 100	10:10	29	1.29	20 - 50
Mo	1:10	<7	--	<7 - 7	2:10	4.3	1.38	<7 - 7	8:10	8.3	1.54	7 - 15
Na	10:10	1,200	1.45	700 -7,300	10:10	590	2.25	250 -3,100	10:10	890	1.56	700 -1,700
Ni	0:10	<10	--	--	0:10	<10	--	--	0:10	<10	--	--
P[2]	10:10	2.3	1.31	1.8 - 3.6	10:10	2.2	1.26	1.8 - 3.6	10:10	2.2	1.26	1.2 - 2.4
Pb	1:10	<20	--	<20 - 50	0:10	<20	--	---	3:10	11	2.55	<20 - 50
S[1,2]	10:10	.034	1.29	<.025- .055	10:10	.018	1.20	.015- .025	10:10	.023	1.27	.015- .035
Se[1]	6:10	.0040	1.32	<.005- .005	10:10	.0023	1.69	<.005- .005	10:10	.014	1.63	.01 - .04
Sr	10:10	46	1.67	20 - 100	10:10	130	1.56	70 - 200	10:10	207	1.33	150 - 300
Ti	8:10	12	3.28	<5 - 70	10:10	16	1.66	7 - 30	7:10	6.0	2.47	<5 - 20
Zn	10:10	86	1.44	50 - 190	10:10	49	1.27	35 - 70	10:10	50	1.37	35 - 100
Zr	0:10	<20	--	--	0:10	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	2.0	1.44	1.33 - 4.3	10:10	1.7	1.25	1.2 - 2.6	10:10	2.0	1.26	1.5 - 3.5
Dry material, percent of fresh weight	10:10	14	1.77	10.4 - 16.3	10:10	16	1.11	14.1 - 19.1	10:10	15	1.07	13.0 - 16.8

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

TABLE 6.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material, and percent dried-material yield of fresh European grapes from areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Means and ranges are given in parts per million, except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Areas of commercial production							
	Yakima County, Wash.				San Joaquin County, Calif.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag-----------	0:10	<1	--	---	0:10	<1	--	---
Al-----------	10:10	460	2.04	200 -1,500	9:10	590	2.47	<150 -2,000
As[1]----------	0:9	<.05	--	---	0:10	<.05	--	---
B------------	10:10	310	1.36	200 - 500	10:10	450	1.46	300 - 700
Ba-----------	10:10	36	2.09	7 - 100	10:10	100	1.43	70 - 200
Ca[2]----------	10:10	1.0	2.85	.4 - 3.4	10:10	2.5	1.54	1.5 - 4.8
Cd-----------	5:10	.13	2.76	<.2 - 1	7:10	.20	1.66	<.2 - 4
Co-----------	0:10	<1	--	---	1:10	<1	--	<1 - 1
Cr-----------	2:10	.67	2.09	<1.5 - 2	5:10	1.1	3.86	<1.5 - 10
Cu-----------	10:10	43	1.54	30 - 100	10:10	29	1.45	70 - 200
Fe-----------	10:10	360	1.51	200 - 700	10:10	680	1.64	300 -1,500
Hg[1]----------	0:10	<.01	--	---	2:10	.0046	1.69	<.01- .01
K[2]-----------	10:10	14	1.68	5.2 - 34	10:10	29	1.29	17 - 39
Li-----------	1:10	<4	--	<4 - 4	0:10	<4	--	---
Mg[2]----------	10:10	1.1	1.51	.7 - 1.5	10:10	1.2	1.33	1 - 3
Mn-----------	10:10	2.4	2.00	7 - 70	10:10	93	1.38	70 - 200
Mo-----------	0:10	<7	--	---	5:10	1.6	1.38	<7 - 10
Na-----------	10:10	530	1.52	250 -1,200	10:10	1,100	1.84	400 -4,000
Ni-----------	0:10	<10	--	---	0:10	<10	--	---
P[2]-----------	10:10	1.4	1.66	.6 - 2.4	10:10	3.6	1.31	2.4 - 6.0
Pb-----------	0:10	<20	--	---	4:10	14	2.48	<20 - 70
S[1,2]---------	10:10	.023	1.29	<.015- .04	10:10	.062	1.24	.05- .10
Se[1]----------	7:10	.0051	2.14	<.005- .02	0:10	<.005	--	---
Sr-----------	10:10	130	2.47	15 - 500	10:10	470	1.61	200 -1,000
Ti-----------	8:10	20	3.86	<5 - 70	8:10	15	3.54	<5 - 70
Zn-----------	10:10	50	1.72	20 - 120	10:10	87	1.43	40 - 140
Zr-----------	3:10	1.0	3.20	<20 - 70	1:10	<20	--	<20 - 20
Ash, percent of dry weight	10:10	3.1	1.39	1.5 - 4.8	10:10	2.4	1.42	1.3 - 3.9
Dry material, percent of fresh weight	10:10	23	2.3	19 - 27	10:10	20	1.31	11. - 24

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

TABLE 7.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable million, except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation.

Element, ash, or dry material	Areas of commercial production							
	Palm Beach County, Fla.				Hidalgo County, Tex.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	6:10	150	2.61	<150 - 1,000	8:10	450	3.43	<150 - 2,000
As[1]	9:9	.11	1.87	.05 - .4	1:9	<.05	--	<.05 - .05
B	10:10	140	1.26	100 - 200	10:10	240	1.29	150 - 300
Ba	10:10	46	1.52	20 - 70	10:10	160	1.38	70 - 200
Ca[2]	10:10	5.6	1.24	4.2 - 7.4	10:10	8.4	1.15	7.0 - 10
Cd	7:10	.18	1.74	<.2 - .6	5:10	.14	1.77	<.2 - .4
Co	1:10	<1	--	<1 - 1	1:10	<1	--	<1 - 2
Cr	0:10	<1.5	--	--	3:10	.63	3.59	<1.5 - 3
Cu	10:10	49	1.44	30 - 70	10:10	47	1.41	30 - 70
Fe	10:10	210	1.44	150 - 500	10:10	320	1.54	200 - 700
Hg[1]	0:10	<.01	--	--	0:10	<.01	--	--
K[2]	10:10	39	1.10	30 - 42	10:10	39	1.04	35 - 41
Li	0:10	<4	--	--	5:10	3.1	1.71	<4 - 7
Mg[2]	10:10	2.0	1.26	1.5 - 3	10:10	2.2	1.56	.7 - 3
Mn	10:10	24	1.45	15 - 50	10:10	47	1.41	30 - 70
Mo	1:10	<7	--	<7 - 70	0:10	<7	--	--
Na	10:10	1,800	1.24	1,300 - 2,900	10:10	2,100	1.50	940 - 3,000
Ni	0:10	<10	--	--	0:10	<10	--	--
P[2]	10:10	3.5	1.26	2.4 - 4.8	10:10	3.3	1.18	2.4 - 3.6
Pb	0:10	<20	--	--	1:10	<20	--	<20 - 70
S[1,2]	10:10	.060	1.14	.05 - .08	10:10	.053	1.23	.035 - .07
Se[1]	4:9	.003	2.32	<.005 - .01	9:10	.011	1.99	<.005 - .02
Sr	10:10	260	1.65	150 - 700	10:10	1,100	1.41	700 - 2,000
Ti	1:10	<5	--	<5 - 7	7:10	8.2	2.72	<5 - 20
Zn	10:10	126	1.19	90 - 160	10:10	150	1.17	130 - 200
Zr	0:10	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	3.2	1.23	2.6 - 5.3	10:10	2.6	1.13	2.2 - 3.1
Dry material, percent of fresh weight	10:10	9.8	1.18	7.1 - 12	10:10	13	1.12	10 - 15

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh grapefruit from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per
Leaders (--) in figure column indicate no data available]

Areas of commercial production (continued)							
Riverside County, Calif.				Yuma County, Ariz.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	0:10	<1	--	--
10:10	810	2.35	200 - 3,000	9:10	350	2.27	<150 - 1,000
1:8	<.05	--	<.05 - .05	6:10	.044	1.99	<.05 - .10
10:10	150	1.21	100 - 200	10:10	180	1.2	150 - 300
10:10	71	1.99	30 - 150	10:10	70	2.08	20 - 150
10:10	6.9	1.11	6.0 - 8.2	10:10	3.6	1.89	1.2 - 7.2
8:10	.22	1.62	<.2 - .4	3:10	.11	1.56	<.2 - 2
2:10	.46	1.69	<1 - 1	0:10	<1	--	--
5:10	1.3	1.91	<1.5 - 3	0:10	<1.5	--	--
10:10	61	1.18	50 - 70	10:10	42	1.36	30 - 70
10:10	560	1.82	300 - 2,000	10:10	240	1.59	150 - 500
0:10	<.01	--	--	0:10	<.01	--	--
10:10	36	1.06	34 - 40	10:10	29	1.42	15 - 40
7:10	4.7	1.89	<4 - 11	10:10	12	1.51	5 - 21
10:10	1.9	1.30	1.5 - 3	10:10	1.5	1.51	.7 - 3
10:10	30	1.43	15 - 50	10:10	37	1.53	20 - 70
2:10	4.3	1.38	<7 - 7	0:10	<7	--	--
10:10	1,800	1.39	1,200 - 3,000	10:10	1,300	1.61	600 - 2,200
5:10	7.5	3.09	<10 - 70	0:10	<10	--	--
10:10	3.3	1.26	2.4 - 4.8	10:10	2.0	1.40	1.2 - 3.6
0:10	<20	--	--	0:10	<20	--	--
10:10	.083	1.09	.070 - .095	10:10	.069	1.12	.055 - .08
9:10	.022	2.30	<.005 - .06	10:10	.011	1.34	.01 - .02
10:10	1,300	1.45	700 - 2,000	10:10	470	1.82	200 - 1,000
10:10	19	2.11	7 - 30	4:10	3	5.10	<7 - 30
10:10	150	1.18	110 - 200	10:10	97	1.44	60 - 170
0:10	<20	--	--	0:10	<20	--	--
10:10	4.4	1.12	3.9 - 5.1	10:10	5.6	1.39	3.5 - 11
10:10	10	1.06	9.1 - 11	10:10	8.6	1.13	7 - 10

TABLE 8.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation. Leaders (--)

Element, ash, or dry material	Areas of commercial production							
	Palm Beach County, Fla.				Hidalgo County, Tex.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	5:10	110	5.42	<150 - 3,000	10:10	630	2.65	200 - 3,000
As[1]	0:10	<.05	--	--	0:9	<.05	--	--
B	10:10	177	1.57	70 - 300	10:10	280	1.32	200 - 500
Ba	10:10	40	1.52	20 - 70	10:10	220	1.44	150 - 500
Ca[2]	10:10	5.8	1.16	4.7 - 7.4	10:10	8.6	1.19	7.2 - 12
Cd	6:10	.17	3.77	<.2 - 2.5	4:10	.13	1.46	<.2 - .2
Co	3:10	.57	1.56	<1 - 1	2:10	.46	1.69	<1 - 1
Cr	3:10	.56	4.09	<1.5 - 7	1:10	<1.5	--	<1.5 - 3
Cu	10:10	50	1.61	20 - 70	10:10	47	1.42	30 - 70
Fe	10:10	338	1.46	300 - 1,000	10:10	360	1.49	300 - 1,000
Hg[1]	0:10	<.01	--	--	0:10	<.01	--	--
K[2]	10:10	39	1.05	37 - 42	10:10	38	1.06	35 - 42
Li	0:10	<4	--	--	4:10	2.8	1.83	<4 - 6
Mg[2]	10:10	2.5	1.41	1.5 - 5	10:10	2.2	1.33	1.5 - 3
Mn	10:10	51	1.64	30 - 150	10:10	50	1.36	30 - 70
Mo	0:10	<7	--	--	1:10	<7	--	<7 - 7
Na	10:10	1,300	1.53	700 - 2,200	10:10	1,300	1.38	700 - 2,600
Ni	0:10	<10	--	--	0:10	<10	--	--
P[2]	10:10	3.3	1.19	2.4 - 3.6	10:10	2.9	1.30	1.8 - 3.6
Pb	0:10	<20	--	--	1:10	<20	--	<20 - 20
S[1,2]	10:10	.060	1.12	.05 - .075	10:10	.064	1.12	.055 - .075
Se[1]	1:9	<.005	--	<.005 - .005	9:10	.0089	1.42	<.01 - .01
Sr	10:10	200	2.49	20 - 500	10:10	1,100	1.46	700 - 2,000
Ti	0:10	<5	--	--	6:10	5.3	3.16	<5 - 30
Zn	10:10	150	1.26	110 - 240	10:10	140	1.22	120 - 200
Zr	0:10	<20	--	--	1:10	<20	--	<20 - 20
Ash, percent of dry weight	10:10	3.3	1.09	2.8 - 3.6	10:10	3.1	1.15	2.7 - 4.4
Dry material, percent of fresh weight	10:10	12	1.12	10 - 15	10:10	14	1.09	12 - 16

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh oranges from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per million, in figure column indicate no data available]

Areas of commercial production (continued)							
Riverside County, Calif.				Yuma County, Ariz.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	0:10	<1	--	--
10:10	970	1.43	700 - 2,000	8:10	340	3.21	<150 - 3,000
0:10	<.05	--	--	2:9	.024	1.66	<.05 - .05
10:10	320	1.18	300 - 500	10:10	300	1.00	--
10:10	42	1.36	30 - 70	10:10	150	1.18	100 - 200
10:10	8.0	1.21	6.2 - 11	10:10	9.5	1.22	6.0 - 13
7:10	.24	2.22	<.2 - .8	3:10	.089	2.40	<.2 - .4
1:10	<1	--	<1 - 1	4:10	.67	1.46	<1 - 1
6:10	1.8	2.83	<1.5 - 7	4:10	1.1	2.23	<1.5 - 3
10:10	63	1.26	50 - 100	10:10	50	1.36	30 - 70
10:10	570	1.53	300 - 1,000	10:10	480	1.96	200 - 1,500
1:10	<.01	--	<.01 - .01	2:10	.0046	1.69	<.01 - .01
10:10	36	1.07	33 - 40	10:10	35	1.07	31 - 38
10:10	14	1.30	9 - 21	10:10	20	1.30	11 - 28
10:10	1.9	1.40	1.5 - 3	10:10	1.7	1.16	1.5 - 2
10:10	33	1.24	30 - 50	10:10	42	1.51	20 - 70
2:10	4.3	1.38	<7 - 7	0:10	<7	--	--
10:10	5,400	1.71	1,800 - 11,000	10:10	650	2.15	250 - 2,000
1:10	<10	--	<10 - 10	5:10	9.8	2.90	<10 - 30
10:10	2.4	1.21	1.8 - 3.6	10:10	2.5	1.38	1.2 - 3.6
0:10	<20	--	--	0:10	<20	--	--
10:10	.075	1.22	.05 - .12	10:10	.071	1.10	.06 - .085
10:10	.020	1.39	.01 - .04	10:10	.0075	1.43	.005 - .01
10:10	1,400	1.33	1,000 - 2,000	10:10	900	1.27	500 - 1,000
9:10	18	2.31	<5 - 70	5:10	.4	4.57	<5 - 50
10:10	150	1.28	100 - 220	10:10	130	1.18	100 - 150
0:10	<20	--	--	0:10	<20	--	--
10:10	4.0	1.10	3.5 - 5.1	10:10	4.1	1.16	3.5 - 5.5
10:10	14	1.11	11 - 16	10:10	13	1.06	12 - 15

TABLE 9.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable million except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation.

Element, ash, or dry material	Areas of commercial production							
	Wayne County, N.Y.				Yakima County, Wash.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	7:10	240	3.39	<150 - 2,000	10:10	1,200	2.67	200 - 7,000
As[1]	5:10	.036	2.06	<.05 - .10	2:10	.013	3.31	<.05 - .10
B	10:10	300	1.75	150 - 1,000	10:10	560	1.38	300 - 1,000
Ba	10:10	18	1.52	7 - 30	10:10	55	2.64	15 - 200
Ca[2]	10:10	.30	1.52	.16 - .58	10:10	.49	2.01	.20 - 1.2
Cd	10:10	.86	2.42	.60 - 3.0	6:10	.18	2.43	<.20 - .60
Co	3:10	.45	2.40	<1 - 2	5:10	.69	2.15	<1 - 1
Cr	5:10	1.2	4.52	<1.5 - 15	9:10	3.2	2.16	<1.5 - 10
Cu	10:10	83	1.92	30 - 200	10:10	70	1.56	30 - 150
Fe	10:10	240	1.92	70 - 700	10:10	750	1.77	300 - 2,000
Hg[1]	5:10	.0071	1.78	<.01 - .02	1:10	<.01	--	<.01 - .01
K[2]	10:10	18	1.50	12 - 36	10:10	20	1.75	8.5 - 43
Li	0:10	<4	--	--	1:10	<4	--	<4 - 4
Mg[2]	10:10	.97	1.32	.50 - 1.7	10:10	1.5	1.51	.70 - 3.0
Mn	10:10	61	1.77	20 - 150	10:10	78	1.67	30 - 150
Mo	0:10	<7	--	--	0:10	<7	--	--
Na	10:10	140	2.00	50 - 350	10:10	190	1.91	100 - 450
Ni	4:10	7.4	1.79	<10 - 15	7:10	15	2.92	<10 - 70
P[2]	10:10	1.3	1.81	.32 - 2.4	10:10	2.4	1.56	1.2 - 4.8
Pb	1:10	<20	--	<20 - 20	1:10	<20	--	<20 - 20
S[1,2]	10:10	.068	1.52	.035 - .12	10:10	.029	1.32	.02 - .045
Se[1]	5:10	.0036	1.90	<.005 - .02	6:10	.0044	1.99	<.005 - .01
Sr	10:10	27	1.55	15 - 70	10:10	82	2.14	30 - 300
Ti	3:10	<5	--	<5 - 30	10:10	61	2.45	15 - 200
Zn	10:10	110	1.83	50 - 250	10:10	122	1.87	<15 - 300
Zr	0:10	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	7.2	1.55	3.0 - 14	10:10	8.9	1.70	1.5 - 9
Dry material, percent of fresh weight	10:10	6.9	1.57	3.6 - 12	10:10	14	1.12	12 - 17

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh peaches from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per
Leaders (--), in figure column indicate no data available]

Areas of commercial production (continued)							
San Joaquin County, Calif.				Mesa County, Colo.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
2:10	.36	2.69	<1 - 2	0:10	<1	--	--
9:10	520	2.32	<150 - 1,500	7:10	220	2.88	<150 - 700
0:9	<.05	--	--	8:8	.17	1.65	.10 - .35
10:10	350	1.28	300 - 500	10:10	340	1.35	300 - 700
10:10	17	1.72	7 - 30	7:10	5.9	2.76	<3 - 20
10:10	.18	1.43	.10 - .29	10:10	.27	1.73	.12 - .70
4:10	.12	2.01	<.20 - .40	4:10	.12	2.01	<.2 - .4
0:10	<1	--	--	0:10	<1	--	--
5:10	1.3	1.92	<1.5 - 3	1:10	<1.5	--	<1.5 - 7
10:10	53	1.54	30 - 100	10:10	33	1.50	20 - 70
10:10	330	1.78	150 - 700	10:10	140	1.72	70 - 300
1:10	<.01	--	<.01 - .01	0:10	<.01	--	--
10:10	19	1.51	11 - 35	10:10	17	1.37	11 - 33
0:10	<4	--	--	0:10	<4	--	--
10:10	1.0	1.37	.70 - 1.5	10:10	.94	1.50	.50 - 2.0
10:10	29	1.58	15 - 50	10:10	23	1.34	15 - 30
0:10	<7	--	--	1:10	<7	--	<7 - 7
10:10	180	1.45	75 - 260	10:10	160	1.79	50 - 350
6:10	10	1.57	<10 - 15	1:10	<10	--	<10 - 10
10:10	1.5	1.65	.60 - 3.6	10:10	1.0	1.47	.60 - 1.8
0:10	<20	--	--	0:10	<20	--	--
10:10	.051	1.28	.035- .07	10:10	.033	1.27	.02 - .045
2:10	.0023	1.69	<.005- .005	10:10	.012	1.40	.01 - .02
10:10	42	1.85	15 - 100	10:10	48	1.75	20 - 100
8:10	14	2.83	<5 - 50	3:10	2.7	2.12	<5 - 7
10:10	71	1.64	35 - 130	10:10	71	1.50	30 - 100
1:10	<20	--	<20 - 30	2:10	9.6	2.16	<20 - 30
10:10	6.0	1.22	4.3 - 8.2	10:10	7.9	1.41	5.4 - 15
10:10	11	1.39	6.4 - 17	10:10	11	1.13	9.9 - 14

TABLE 10.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable geometric mean. Deviation, geometric deviation. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Areas of commercial production							
	Berrien County, Mich.				Wayne County, N.Y.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	9:10	390	4.20	<150 - 7,000	9:10	420	2.79	<150 - 2,000
As[1]	1:10	<.05	--	<.05 - .05	5:9	<.0025	--	<.0025 - .0025
B	10:10	430	1.54	300 - 1,000	10:10	350	1.54	300 - 700
Ba	10:10	250	1.66	150 - 700	10:10	180	1.40	150 - 300
Ca[2]	10:10	2.0	1.66	.92 - 4.8	10:10	2.7	1.50	1.4 - 5.4
Cd	10:10	.41	1.95	.20 - 1.5	10:10	.68	2.17	.20 - 3.0
Co	2:10	.26	3.31	<1 - 2	4:10	.55	2.53	<1 - 3
Cr	5:10	1.2	3.80	<1.5 - 15	4:10	.87	3.83	<1.5 - 7
Cu	10:10	130	1.73	70 - 300	10:10	110	2.03	30 - 200
Fe	10:10	390	2.01	150 - 1,000	10:10	290	1.80	100 - 700
Hg[1]	3:10	.0057	1.56	<.01 - .01	1:10	<.01	--	<.01 - .01
K[2]	10:10	25	1.38	16 - 42	10:10	28	1.23	18 - 36
Li	0:10	<4	--	--	0:10	<4	--	--
Mg[2]	10:10	1.7	1.34	1 - 3	10:10	1.7	1.16	1 - 2
Mn	10:10	100	1.74	30 - 150	10:10	90	1.86	20 - 150
Mo	0:10	<7	--	--	0:10	<7	--	--
Na	10:10	380	1.94	150 - 1,400	10:10	390	2.16	200 - 2,600
Ni	7:10	11	1.72	<10 - 30	3:10	6.4	1.64	<10 - 15
P[2]	10:10	1.7	1.63	.6 - 3.6	10:10	2.3	1.23	1.8 - 3.6
Pb	4:10	16	1.39	<20 - 30	3:10	13	1.75	<20 - 30
S[1,2]	10:10	.030	1.31	.02 - .05	10:10	.035	1.28	.025 - .05
Se[1]	6:10	.0047	2.12	<.005 - .01	7:10	.0048	2.04	<.005 - .02
Sr	10:10	116	2.03	30 - 300	10:10	190	2.05	50 - 500
Ti	6:10	5.6	6.20	<5 - 200	5:10	4.0	9.49	<5 - 70
Zn	10:10	180	3.22	10 - 720	10:10	210	1.30	130 - 290
Zr	1:10	<20	--	<20 - 20	1:10	<20	--	<20 - 30
Ash, percent of dry weight	10:10	2.3	1.31	1.5 - 3.6	10:10	2.2	1.22	1.7 - 3.5
Dry material, percent of fresh weight	10:10	14	1.13	11 - 17	10:10	13	1.12	11 - 16

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh pears from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per million, except where percent is indicated. Mean,

Areas of commercial production (continued)											
Yakima County, Wash.				San Joaquin County, Calif.				Mesa County, Colo.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	0:10	<1	--	--	0:10	<1	--	--
8:10	320	2.88	<150 - 1,500	8:10	240	2.05	<150 - 700	8:10	374	2.71	<150 - 1,500
3:10	.032	1.49	<.05 - .05	0:9	<.05	--	--	0:9	<.05	--	--
10:10	580	1.39	300 - 1,000	10:10	340	1.52	150 - 700	10:10	540	1.31	300 - 700
10:10	120	1.47	70 - 200	10:10	100	1.83	30 - 200	10:10	160	2.13	30 - 500
10:10	1.4	1.59	.74 - 3.0	10:10	1.6	1.94	.52 - 4.0	10:10	1.7	1.90	.82 - 4.0
7:10	.22	2.03	<.20 - .60	4:10	.13	1.46	<.2 - .2	7:10	.21	2.13	<.2 - .6
7:10	1.0	1.97	<1 - 3	7:10	.87	1.25	<1 - 1	10:10	3.1	1.78	<1 - 10
4:10	.95	2.76	<1.5 - 5	2:10	.75	1.79	<1.5 - 1.5	4:10	.60	1.84	<1.5 - 100
10:10	110	1.64	50 - 200	10:10	120	1.55	70 - 300	10:10	78	1.33	50 - 100
10:10	330	1.50	200 - 700	10:10	240	1.50	150 - 500	10:10	250	1.89	70 - 500
2:10	.0046	1.69	<.01 - .01	1:10	<.01	--	<.01 - .01	1:10	<.01	--	--
10:10	21	1.28	16 - 30	10:10	21	1.44	15 - 35	10:10	21	1.62	10 - 40
1:10	<4	--	<4 - 5	0:10	<4	--	--	10:10	7.3	1.47	5 - 17
10:10	1.5	1.21	1 - 2	10:10	1.4	1.42	.7 - 2	10:10	1.0	1.51	.7 - 3
10:10	79	1.46	50 - 150	10:10	79	1.46	50 - 150	10:10	70	1.72	30 - 150
0:10	<7	--	--	2:10	1.4	1.38	<7 - 7	6:10	7.3	2.07	<7 - 20
10:10	420	1.88	250 - 2,400	10:10	970	4.06	200 - 6,600	10:10	900	1.49	400 - 1,600
4:10	7.4	1.65	<10 - 15	1:10	<10	--	<10 - 10	2:10	<10	--	<10 - 70
10:10	1.5	1.35	1.2 - 2.4	10:10	1.4	1.73	.6 - 2.4	10:10	1.3	1.95	.6 - 3.6
0:10	<20	--	--	0:10	<20	--	--	0:10	<20	--	--
10:10	.026	1.21	.02 - .03	10:10	.031	1.26	.02 - .045	10:10	.023	1.31	.015 - .035
7:10	.0070	2.66	<.005 - .02	5:10	.0035	1.78	<.005 - .01	10:10	.012	1.60	.005 - .035
10:10	150	1.70	70 - 300	10:10	200	2.31	70 - 500	10:10	270	1.77	150 - 700
5:10	4.7	9.11	<5 - 70	3:10	1.8	4.78	<5 - 20	7:10	8.9	3.32	<5 - 30
10:10	120	1.60	70 - 260	10:10	100	1.77	40 - 220	10:10	150	1.72	80 - 350
1:10	<20	--	<20 - 20	0:10	<20	--	--	0:10	<20	--	--
10:10	1.9	1.11	1.7 - 2.3	10:10	2.7	1.33	1.8 - 3.7	10:10	1.7	1.34	1.0 - 2.6
10:10	14	1.06	13 - 16	10:10	16	1.12	13 - 18	10:10	18	1.08	16 - 20

TABLE 11.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in parts per million except where percent is indicated. Mean, geometric mean. Deviation, geometric

Element, ash, or dry material	Areas of commercial production							
	Berrien County, Mich.				Wayne County, N.Y.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag---------	1:10	<1	--	<1 - 3	1:10	<1	--	<1 - 1.5
Al---------	8:10	290	2.21	<150 - 1,000	6:10	150	2.28	<150 - 700
As[1]--------	4:9	.025	3.07	<.10 - .33	1:8	<.10	--	<.10 - .10
B----------	10:10	280	1.36	150 - 500	10:10	320	1.57	150 - 700
Ba---------	10:10	54	2.54	10 - 200	10:10	25	2.25	7 - 150
Ca[2]--------	10:10	.45	1.21	.35 - .66	10:10	.65	1.54	.32 - 1.2
Cd---------	7:10	.19	1.66	<.2 - .4	5:10	.14	1.78	<.2 - .4
Co---------	0:10	<1	--	--	1:10	<1	--	<1 - 1
Cr---------	4:10	1.0	2.19	<1.5 - 3	4:10	.89	3.29	<1.5 - 7
Cu---------	10:10	77	1.64	30 - 200	10:10	92	1.89	30 - 200
Fe---------	10:10	220	1.36	150 - 300	10:10	280	1.58	150 - 500
Hg[1]--------	4:10	.007	1.46	<.01 - .01	1:10	<.01	--	<.01 - .01
K[2]---------	10:10	15	1.25	11 - 20	10:10	15	1.27	9 - 22
Li---------	0:10	<4	--	--	0:10	<4	--	--
Mg[2]--------	10:10	.90	1.35	.5 - 1	10:10	1.1	1.42	.7 - 2
Mn---------	10:10	100	1.42	50 - 150	10:10	62	1.62	30 - 100
Mo---------	0:10	<7	--	--	0:10	<7	--	--
Na---------	10:10	95	1.57	50 - 200	10:10	163	1.63	100 - 320
Ni---------	2:10	6.6	1.33	<10 - 10	0:10	<10	--	--
P[2]---------	10:10	.84	1.99	.6 - 2.4	10:10	1.3	1.85	.6 - 2.4
Pb---------	2:10	<20	--	<20 - 70	0:10	<20	--	--
S[1,2]-------	10:10	.036	1.35	.025 - .055	10:10	.037	1.32	.025 - .05
Se[1]--------	8:10	.0051	1.54	<.005 - .01	6:10	.0042	1.83	<.005 - .01
Sr---------	10:10	59	2.35	15 - 150	10:10	82	2.04	30 - 300
Ti---------	5:10	4.2	2.97	<5 - 20	3:10	<5	--	<5 - 20
Zn---------	10:10	126	1.63	65 - 280	10:10	208	2.64	30 - 770
Zr---------	0:10	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	6.2	1.67	2.6 - 17	10:10	3.9	1.41	2.2 - 6.6
Dry material, percent of fresh weight	10:10	12	1.29	8.0 - 16	10:10	12	1.30	6.7 - 17

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh plums from areas of commercial production

measurable concentrations to number of samples analyzed. Means and ranges are given in
Leaders (--) in figure column indicate no data available]

Areas of commercial production (continued)							
Yakima County, Wash.				Mesa County, Colo.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
1:10	<1	--	<1 - 3	1:10	<1	--	<1 - 1.5
8:10	290	2.50	<150 - 1,500	6:10	160	2.32	<150 - 500
0:8	<.05	--	--	7:7	.59	1.32	.4 - .9
10:10	610	1.51	300 - 1,500	10:10	340	1.35	300 - 700
10:10	60	3.55	20 - 1,500	10:10	13	1.36	7 - 20
10:10	.62	1.41	.41 - 1.2	10:10	.60	1.42	.30 - .86
3:10	.11	1.56	<.2 - .2	1:10	<.2	--	<.2 - .2
1:10	<1	--	<1 - 2	0:10	<1	--	--
2:10	.51	2.77	<1.5 - 3	1:10	<1.5	--	<1.5 - 1.5
10:10	33	1.50	20 - 70	10:10	29	1.46	15 - 50
10:10	270	1.62	150 - 500	10:10	120	1.57	50 - 200
0:10	<.01	--	--	0:10	<.01	--	--
10:10	16	1.30	10 - 26	10:10	18	1.35	12 - 26
0:10	<4	--	--	0:10	<4	--	--
10:10	1.2	1.24	1 - 1.5	10:10	1.0	1.29	.7 - 1.5
10:10	45	1.46	30 - 70	10:10	27	1.51	10 - 50
0:10	<7	--	--	8:10	7	1.26	<7 - 10
10:10	125	1.61	50 - 250	10:10	110	1.70	50 - 250
1:10	<10	--	<10 - 10	0:10	<10	--	--
10:10	1.3	1.64	.6 - 2.4	10:10	.85	1.44	.6 - 1.2
1:10	<20	--	<20 - 70	7:10	23	1.40	<20 - 30
10:10	.029	1.18	.025 - .04	10:10	.027	1.23	.02 - .4
5:10	.0036	2.90	<.005 - .02	10:10	.011	1.55	.005 - .02
10:10	120	1.68	70 - 300	10:10	110	1.35	70 - 150
7:10	12	4.72	<5 - 150	1:10	<5	--	<5 - 5
10:10	100	1.82	40 - 260	10:10	65	1.43	40 - 110
1:10	<20	--	<20 - 20	0:10	<20	--	--
10:10	4.3	1.21	3.4 - 5.9	10:10	5.1	1.13	4.3 - 6.0
10:10	17	1.13	13 - 19	10:10	18	1.06	17 - 20

TABLE 12.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation. Leaders (--)

Element, ash, or dry material	Areas of commercial production							
	Berrien County, Mich.				Cumberland County, N.J.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:2	<1	--	--	0:2	<1	--	--
Al	0:2	<150	--	--	2:2	200	1.00	--
As[1]	0:2	<.05	--	--	2:2	.05	1.00	--
B	2:2	120	1.33	100 - 150	2:2	122	1.33	100 - 150
Ba	2:2	150	1.00	--	2:2	200	1.00	--
Ca[2]	2:2	6.6	1.09	6.2 - 7.0	2:2	7.7	1.02	7.6 - 7.8
Cd	2:2	.80	1.00	--	2:2	1.7	1.23	1.5 - 2
Co	0:2	<1	--	--	1:2	<1	--	<1 - 1.
Cr	0:2	<1.5	--	--	0:2	<1.5	--	--
Cu	2:2	39	1.44	30 - 50	2:2	24	1.33	20 - 30
Fe	2:2	390	1.44	300 - 500	2:2	500	1.00	--
Hg[1]	0:2	<.01	--	--	0:2	<.01	--	--
K[2]	2:2	40	1.00	--	2:2	38	1.02	38 - 39
Li	0:2	<4	--	--	0:2	<4	--	--
Mg[2]	2:2	1.7	1.23	1.5 - 2	2:2	3.2	1.91	2 - 5
Mn	2:2	150	1.00	--	2:2	122	1.33	100 - 150
Mo	2:2	15	1.00	--	2:2	15	1.00	--
Na	2:2	4,500	1.28	3,800 - 5,400	2:2	4,700	1.13	4,300 - 5,100
Ni	0:2	<10	--	--	0:2	<10	--	--
P[2]	2:2	3.6	1.00	--	2:2	3.6	1.00	--
Pb	0:2	<20	--	--	0:2	<20	--	--
S[1,2]	2:2	.58	1.09	.55 - .62	2:2	.82	1.00	--
Se[1]	2:2	.11	4.16	.04 - .3	2:2	.057	1.63	.04 - .08
Sr	2:2	200	1.00	--	2:2	300	1.00	--
Ti	0:2	<5	--	--	1:2	<5	--	<5 - 10
Zn	2:2	273	1.36	220 - 340	2:2	295	1.02	290 - 300
Zr	0:2	<20	--	--	0:2	<20	--	--
Ash, percent of dry weight	2:2	9.3	1.10	8.7 - 10	2:2	12	1.13	11 - 13
Dry material, percent of fresh weight	2:2	7.3	1.02	7.2 - 7.4	2:2	5.5	1.14	5.0 - 6.0

[1] Dry material was analyzed; values reported on dry weight basis.
[2] Means and ranges given in percent.

and percent dried-material yield of fresh cabbage from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per million, in figure column indicate no data available]

Area of commercial production (continued)							
Hidalgo County, Tex.				Yuma County, Ariz.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	1:10	<1	--	<1 - 1
4:10	96	2.97	<150 - 500	4:10	78	5.06	<150 -1,500
0:10	<.05	--	--	0:10	<.05	--	--
10:10	162	1.40	100 - 300	10:10	120	1.24	100 - 150
10:10	78	1.54	50 - 200	10:10	22	1.41	15 - 30
10:10	7.7	1.20	6.2 - 11	10:10	5.5	1.09	5.2 - 6.4
10:10	.59	2.05	.2 - 2	10:10	1.7	1.47	1 - 3
10:10	1.5	1.79	1 - 4	8:10	.96	1.40	<1 - 2
0:10	<1.5	--	--	0:10	<1.5	--	--
10:10	29	1.14	20 - 30	10:10	34	1.35	20 - 50
10:10	372	1.40	200 - 500	10:10	540	1.31	300 - 700
2:10	.0046	1.69	<.01 - .01	8:10	.0096	1.40	<.01 - .02
10:10	34	1.08	29 - 37	10:10	37	1.04	33 - 38
9:10	4.7	1.31	<4 - 7	10:10	7.1	1.45	4 - 11
10:10	1.9	1.23	1.5 - 3	10:10	1.9	1.43	1 - 3
10:10	188	1.32	150 - 300	10:10	133	1.22	100 - 150
9:10	12	1.67	<7 - 30	6:10	6.1	1.18	<7 - 7
10:10	46,000	1.18	36,000 - 64,000	10:10	30,000	1.15	33,000 44,000
8:10	11	1.35	<10 - 15	0:10	<10	--	--
10:10	2.6	1.41	1.2 - 3.6	10:10	3.8	1.11	3.6 - 4.8
0:10	<20	--	--	0:10	<20	--	--
10:10	.66	1.12	.57 - .75	10:10	.80	1.17	.55 - .95
10:10	.10	1.36	.08 - .2	10:10	.31	1.45	.15 - .45
10:10	840	1.42	500 - 1,500	10:10	840	1.36	500 -1,500
1:10	<5	--	<5 - 7	1:10	<5	--	<5 - 30
10:10	210	1.24	140 - 270	10:10	340	1.06	320 - 380
0:10	<20	--	--	0:10	<20	--	--
10:10	7.7	1.09	7.0 - 9.2	10:10	11	1.14	8.8 - 13
10:10	8.9	1.10	8.1 - 11	10:10	7.4	1.13	5.9 - 9.2

TABLE 13.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material, and percent dried-material yield of fresh carrots from areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Means and ranges are given in parts per million, except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Areas of commercial production							
	Hidalgo County, Tex.				Imperial County, Calif.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	7:10	180	2.00	<150 - 700	2:10	67	2.09	<150 - 200
As[1]	7:7	.067	1.45	.05 - .1	2:9	.024	1.66	<.05 - .05
B	10:10	130	1.23	100 - 150	10:10	157	1.23	100 - 200
Ba	10:10	270	1.54	200 - 500	10:10	50	1.65	30 - 100
Ca[2]	10:10	3.6	1.14	3.0 - 5.0	10:10	3.5	1.12	3.0 - 4.4
Cd	10:10	1.3	2.60	.2 - 4	10:10	3.4	1.69	1 - 6
Co	2:10	.46	1.70	<1 - 1	3:10	.57	1.56	<1 - 1
Cr	0:10	<1.5	--	--	0:10	<1.5	--	-
Cu	10:10	66	1.45	50 - 150	10:10	63	1.26	50 - 100
Fe	10:10	210	1.30	150 - 300	10:10	230	1.22	200 - 300
Hg[1]	2:10	.0066	1.46	<.01 - .01	2:10	.0046	1.68	<.01 - .01
K[2]	10:10	40	1.05	36 - 42	10:10	39	1.05	34 - 40
Li	0:10	<4	--	--	6:10	3.5	1.47	<4 - 6
Mg[2]	10:10	1.2	1.53	.5 - 2	10:10	1.4	1.33	.7 - 2
Mn	10:10	164	1.33	100 - 300	10:10	94	1.35	70 - 150
Mo	0:10	<7	--	--	0:10	<7	--	--
Na	10:10	3,500	1.21	3,000 - 4,600	10:10	6,700	1.22	4,900 - 7,200
P[2]	10:10	1.9	1.54	.06 - 2.4	10:10	2.8	1.23	2.4 - 3.6
Pb	0:10	<20	--	--	0:10	<20	--	--
S[1,2]	10:10	.11	1.15	.09 - .15	10:10	.15	1.17	.12 - .19
Se[1]	10:10	.032	1.40	.02 - .04	10:10	.13	1.50	.08 - .25
Sr	10:10	753	1.25	500 - 1,000	10:10	820	1.42	500 - 1,500
Ti	2:10	--	--	<5 - 15	0:10	<5	--	--
Zn	10:10	205	1.46	75 - 290	10:10	417	1.30	310 - 800
Ash, percent of dry weight	10:10	7.6	1.16	6.2 - 9.9	10:10	6.7	1.10	5.8 - 7.8
Dry material, percent of fresh weight	10:10	11	1.09	9.3 - 12	10:10	13	1.08	11 - 14

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

TABLE 14.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material, and percent dried-material yield of fresh cucumbers from areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Means and ranges are given in parts per million, except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Berrien County, Mich. Ratio	Mean	Deviation	Observed range	Wayne County, N.Y. Ratio	Mean	Deviation	Observed range	San Joaquin County, Calif. Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:2	<1	--	--	0:10	<1	--	--
Al	8:10	660	6.60	<150 - 15,000	2:2	700	1.63	500 - 1,000	8:10	476	4.66	<150 - 3,000
As[1]	7:10	.099	6.07	<.05 - .67	2:2	.63	1.39	.5 - .8	10:10	.55	1.41	.35 - .7
B	10:10	120	1.43	70 - 200	2:2	84	1.29	70 - 100	10:10	94	1.27	70 - 150
Ba	10:10	170	1.99	70 - 500	2:2	30	1.00	--	10:10	127	1.36	70 - 200
Ca[2]	10:10	3.5	1.38	2.2 - 5.4	2:2	2.9	1.69	2.0 - 4.2	10:10	3.6	1.17	2.8 - 4.4
Cd	10:10	1.5	1.75	.6 - 4	2:2	.77	1.44	.6 - 1	10:10	.60	1.49	.4 - 1.5
Co	5:10	.74	1.39	<1 - 1	1:2	<1	--	<1 - 1	10:10	1	1.00	--
Cr	3:10	.57	4.59	<1.5 - 7	1:2	<1.5	--	<1.5 - 3	1:10	<1.5	--	<1.5 - 2
Cu	10:10	110	1.84	50 - 300	2:2	71	1.63	50 - 100	10:10	66	1.31	50 - 100
Fe	10:10	1,000	2.05	500 - 3,000	2:2	500	1.00	--	10:10	480	1.42	300 - 700
Hg[1]	0:10	<.01	--	--	0:2	<.01	--	--	6:10	.0081	1.62	<.01 - .02
K[2]	10:10	38	1.14	27 - 40	2:2	40	1.00	--	10:10	39	1.02	38 - 40
Li	0:10	<4	--	--	0:2	<4	--	--	0:10	<4	--	--
Mg[2]	10:10	3.4	1.45	2 - 5	2:2	2.4	1.33	2 - 3	10:10	2.7	1.22	2 - 3
Mn	10:10	283	2.02	100 - 700	2:2	59	1.27	50 - 70	10:10	73	1.22	50 - 100
Mo	2:10	4.3	1.38	<7 - 7	2:2	12	1.33	10 - 15	10:10	16	1.25	10 - 20
Na	10:10	1,500	1.35	790 - 2,200	2:2	1,800	1.00	--	10:10	2,700	1.38	1,800 - 5,100
Ni	5:10	8.9	3.36	<10 - 50	0:2	<10	--	--	10:10	19	1.31	15 - 30
P[2]	10:10	3.7	1.45	2.4 - 9.0	2:2	5.4	1.17	4.8 - 6.0	10:10	4.7	1.19	3.6 - 6.0
Pb	0:10	<20	--	--	0:2	<20	--	--	0:10	<20	--	--
S[1,2]	10:10	.30	1.13	.25 - .35	2:2	.29	1.18	.26 - .33	10:10	.33	1.15	.25 - .42
Se[1]	10:10	.034	1.66	.02 - .05	2:2	.069	1.23	.06 - .08	10:10	.098	1.50	.06 - .2
Sr	10:10	170	1.82	70 - 500	2:2	84	1.29	70 - 100	10:10	420	1.51	200 - 700
Ti	6:10	<5	--	<5 - 100	2:2	21	1.63	15 - 30	2:10	<5	--	<5 - 100
Zn	10:10	630	1.31	450 - 1,120	2:2	360	1.17	320 - 400	10:10	417	1.11	360 - 470
Zr	0:10	<20	--	--	0:2	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	8.7	1.23	5.9 - 12	2:2	12	1.27	10 - 14	10:10	11	1.15	9.3 - 14
Dry material, percent of fresh weight	10:10	4.1	1.20	3.0 - 5.3	10:10	3.7	1.04	3.6 - 3.8	10:10	3.7	1.22	2.9 - 5.6

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

TABLE 15.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material, and percent*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable million, except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation.

Element, ash, or dry material	Areas of commercial production							
	Wayne County, N.Y.				Twin Falls County, Idaho			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	3:10	66	2.29	<150 - 500	3:10	65	3.67	<150 - 500
As[1]	0:8	<.05	--	--	0:10	<.05	--	--
B	10:10	190	1.44	100 - 300	10:10	142	1.23	100 - 200
Ba	10:10	59	1.98	20 - 150	10:10	47	1.56	20 - 70
Ca[2]	10:10	2.1	1.33	1.5 - 3.0	10:10	2.5	1.19	2.0 - 3.6
Cd	8:10	.22	1.86	<.2 - .6	9:10	.22	1.43	<.2 - .4
Co	9:10	1.9	2.70	<1 - 8	9:10	3.4	2.31	<1 - 10
Cr	4:10	1.1	1.93	<1.5 - 3	1:10	<1.5	--	<1.5 - 100
Cu	10:10	130	1.38	100 - 200	10:10	120	1.34	100 - 200
Fe	10:10	1,500	1.41	1,000 - 3,000	10:10	800	1.30	700 - 1,500
Hg[1]	1:10	<.01	--	<.01 - .01	1:10	<.01	--	<.01 - .01
K[2]	10:10	39	1.05	37 - 43	10:10	39	1.03	38 - 42
Li	0:10	<4	--	--	2:10	1.6	2.12	<4 - 5
Mg[2]	10:10	3.2	1.49	1.5 - 7	10:10	3.3	1.24	3 - 5
Mn	10:10	240	1.36	200 - 500	10:10	170	1.46	70 - 300
Mo	10:10	31	1.74	15 - 70	10:10	103	1.83	30 - 200
Na	10:10	71	1.80	25 - 150	10:10	110	1.65	50 - 200
Ni	10:10	38	1.93	15 - 150	10:10	26	1.34	15 - 30
P[2]	10:10	9.0	1.00	--	10:10	9.0	1.00	--
Pb	0:10	<20	--	--	0:10	<20	--	--
S[1,2]	10:10	.19	1.13	.16 - .23	10:10	.18	1.12	.14 - .2
Se[1]	10:10	.022	1.42	.02 - .06	10:10	.016	1.40	.01 - .02
Sr	10:10	46	1.84	20 - 150	10:10	196	1.50	100 - 300
Ti	2:10	.53	1.13	<5 - 30	0:10	<5	--	--
Zn	10:10	890	1.10	780 - 1,020	10:10	700	1.16	580 - 860
Zr	1:10	<20	--	<20 - 30	0:10	<20	--	--
Ash, percent of dry weight	10:10	3.7	1.08	3.5 - 4.3	10:10	3.7	1.09	3.4 - 4.4
Dry material, percent of fresh weight	10:10	81	1.02	78.7 - 82.9	10:10	82	1.10	68.5 - 92.4

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

dried-material yield of "fresh" (before oven drying) dry beans from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per
Leaders (--) in figure column indicate no data available]

Areas of commercial production (continued)							
San Joaquin County, Calif.				Mesa County, Colo.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
2:10	<1	--	<1 - 3	0:10	<1	--	--
5:10	<150	--	<150 - 1,500	4:10	110	1.99	<150 - 300
0:8	<.05	--	--	0:9	<.05	--	--
10:10	150	1.33	70 - 200	10:10	137	1.26	100 - 200
10:10	110	1.42	70 - 150	9:10	29	3.27	<3 - 100
10:10	2.2	1.12	1.8 - 2.6	10:10	4.5	1.15	3.8 - 6
8:10	.20	1.54	<.2 - .4	10:10	.45	1.50	.2 - .8
10:10	7.7	1.33	5 - 12	9:10	10	1.40	6 - 14
1:10	<1.5	--	<1.5 - 2	0:10	<1.5	--	--
10:10	100	1.43	70 - 200	10:10	148	1.58	70 - 300
10:10	1,700	1.52	1,000 - 3,000	10:10	1,200	1.36	700 - 2,000
0:10	<.01	--	--	1:10	<.01	--	<.01 - .01
10:10	39	1.02	38 - 40	10:10	38	1.03	35 - 40
0:10	<4	--	--	0:10	<4	--	--
10:10	3.5	1.38	2 - 5	10:10	3.3	1.24	3 - 5
10:10	200	1.35	150 - 300	10:10	180	1.26	150 - 300
10:10	67	1.46	50 - 100	10:10	240	1.35	150 - 300
10:10	83	1.40	50 - 150	10:10	83	2.20	25 - 300
10:10	78	1.27	50 - 100	10:10	54	1.46	30 - 100
10:10	11	1.15	9 - 12	10:10	9	1.00	--
0:10	<20	--	--	0:10	<20	--	--
10:10	.21	1.15	.18 - .28	10:10	.19	1.08	.17 - .22
10:10	.020	1.00	--	10:10	.11	1.65	.04 - .2
10:10	280	1.52	150 - 500	10:10	360	1.59	200 - 700
4:10	2.3	1.89	<5 - 150	1:10	<5	--	<5 - 10
10:10	770	1.06	700 - 820	10:10	810	1.08	720 - 900
0:10	<20	--	--	0:10	<20	--	--
10:10	4.0	1.04	3.7 - 4.2	10:10	4.2	1.07	4.0 - 4.9
10:10	88	1.04	80.3 - 91.5	10:10	90	1.04	82.9 - 93.7

TABLE 16.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable except where percent is indicated. Mean, geometricic mean. Deviation, geometric deviation. Leaders (--) in

Element, ash, or dry material	Areas of commercial production							
	Cumberland County, N.J.				Palm Beach County, Fla.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	1:10	<1	--	<1 - 2
Al	10:10	11,000	2.37	3,000 - 30,000	8:10	180	1.37	<150 - 300
As[1]	6:6	1.3	1.45	.5 - 2	3:7	.034	1.44	<.05 - .05
B	10:10	97	1.66	50 - 300	10:10	85	1.48	50 - 150
Ba	10:10	157	2.02	70 - 500	10:10	84	1.38	70 - 150
Ca[2]	10:10	3.1	1.36	2.0 - 4.6	10:10	5.3	1.15	4.5 - 6.6
Cd	10:10	3.9	1.50	1.5 - 6	10:10	.94	1.46	.6 - 2
Co	4:10	.53	4.13	<1 - 4	0:10	<1	--	--
Cr	10:10	22	2.13	7 - 70	0:10	<1.5	--	--
Cu	10:10	36	1.47	20 - 50	10:10	49	1.50	30 - 100
Fe	10:10	4,500	1.87	2,000 - 15,000	10:10	555	1.71	300 - 2,000
Hg[1]	7:10	.011	2.19	<.01 - .04	6:10	.0081	1.32	<.01 - .01
K[2]	10:10	28	1.35	18 - 40	10:10	40	1.03	37 - 40
Li	3:10	1.9	2.50	<4 - 8	0:10	<4	--	--
Mg[2]	10:10	2.0	1.29	1.5 - 3	10:10	1.4	1.31	.7 - 2
Mn	10:10	253	1.46	150 - 500	10:10	255	1.23	200 - 300
Mo	1:10	<7	--	<7 - 7	0:10	<7	--	--
Na	10:10	2,200	1.22	1,600 - 2,900	10:10	5,500	1.43	3,300 - 9,200
Ni	5:10	8.8	1.82	<10 - 20	0:10	<10	--	--
P[2]	10:10	1.5	1.48	.6 - 2.4	10:10	3.6	1.29	2.4 - 4.8
Pb	2:10	11	1.80	<20 - 30	0:10	<20	--	--
S[1,2]	10:10	.34	1.12	.29 - .4	10:10	.22	1.15	.16 - .25
Se[1]	10:10	.078	1.54	.04 - .2	8:10	.008	1.77	<.005 - .02
Sr	10:10	.57	1.38	100 - 200	10:10	1,000	1.37	700 - 2,000
Ti	10:10	1,379	2.02	500 - 3,000	0:10	<5	--	--
Zn	10:10	380	3.12	150 - 3,360	10:10	680	1.26	460 - 920
Zr	10:10	75	7.47	20 - 300	0:10	<20	--	--
Ash, percent of dry weight	10:10	14	2.37	18 - 29	10:10	14	1.22	11 - 20
Dry material, percent of fresh weight	10:10	6.2	1.25	3.7 - 8.0	10:10	3.5	1.25	2.9 - 5.7

[1] Dry material was analyzed; values reported on dry weight basis.
[2] Means and ranges given in percent.

and percent dried-material yield of fresh lettuce from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per million, figure column indicate no data available]

Areas of commercial production							
Hidalgo County, Tex.				Imperial County, Calif.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	0:10	<1	--	--
8:10	362	2.66	<150 - 1,500	7:10	183	1.84	<150 - 500
6:8	.044	1.22	<.05 - .05	1:8	<.05	--	<.05 - .05
10:10	90	1.29	70 - 150	10:10	100	1.20	70 - 150
10:10	113	1.30	70 - 150	10:10	13	1.61	7 - 30
10:10	5.0	1.12	3.8 - 5.8	10:10	3.9	1.17	2.8 - 4.8
10:10	2.6	1.70	.6 - 4	10:10	8.7	1.36	5 - 14
2:10	.46	1.70	<1 - 1	4:10	.66	1.46	<1 - 1
1:10	<1.5	--	<1.5 - 2	2:10	.50	3.00	<1.5 - 3
10:10	75	1.16	70 - 100	10:10	84	1.21	70 - 100
10:10	534	1.41	300 - 700	10:10	634	1.26	500 - 1,000
3:10	.0057	1.56	<.01 - .01	8:10	.010	1.03	<.01 - .02
10:10	39	1.04	37 - 40	10:10	37	1.05	34 - 40
2:10	1.5	2.46	<4 - 6	8:10	6.0	1.60	<4 - 9
10:10	1.8	1.47	1 - 3	10:10	1.8	1.26	1.5 - 3
10:10	181	1.57	70 - 300	10:10	154	1.10	150 - 200
1:10	<7	--	<7 - 15	0:10	<7	--	--
10:10	25,000	1.22	20,000 - 36,000	10:10	54,000	1.11	46,000 - 64,000
3:10	6.4	1.64	<10 - 15	7:10	9.3	1.13	<10 - 10
10:10	4.1	1.15	3.6 - 4.8	10:10	3.9	1.13	3.6 - 4.8
0:10	<20	--	--	0:10	<20	--	--
10:10	.29	1.16	.24 - .38	10:10	.29	1.16	.22 - .33
10:10	.077	1.36	.04 - .1	10:10	.18	1.26	.10 - .2
10:10	634	1.26	500 - 1,000	10:10	758	1.39	500 - 1,500
4:10	2.2	1.15	<5 - 7	2:10	<5	--	<5 - 20
10:10	620	1.19	420 - 800	10:10	460	1.13	340 - 530
0:10	<20	--	--	0:10	<20	--	--
10:10	13	1.22	11 - 19	10:10	13	1.15	10 - 16
10:10	3.6	1.17	2.9 - 4.8	10:10	3.8	1.17	3.3 - 5.3

TABLE 17.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in per million, except where percent is indicated. Mean, geometric mean. Deviation, geometric

Element, ash, or dry material	Areas of commercial production									
	Wayne County, N.Y.					Cumberland County, N.J.				
	Ratio	Mean	Deviation	Observed range		Ratio	Mean	Deviation	Observed range	
Ag	0:10	<1	--	--		0:10	<1	--	--	
Al	6:10	250	4.44	<150	- 1,500	10:10	645	2.00	200	- 1,500
As[1]	7:10	.064	2.35	<.05	- .25	10:10	.21	1.42	.10	- .35
B	10:10	64	1.33	50	- 100	10:10	68	1.22	50	- 100
Ba	8:10	9.1	4.25	<3	- 100	10:10	81	1.42	50	- 150
Ca[2]	10:10	.48	1.38	.34	- .71	10:10	.60	1.17	.48	- .76
Cd	10:10	1.4	2.68	.4	- 6.5	10:10	1.1	1.19	1	- 1.5
Co	7:10	.90	1.74	<1	- 3	3:10	.57	1.56	<1	- 1
Cr	2:10	.67	2.09	<1.5	- 2	4:10	1.1	1.63	<1.1	- 2
Cu	10:10	62	1.54	20	- 100	10:10	135	1.33	100	- 200
Fe	0:10	544	1.31	300	- 700	10:10	516	1.39	300	- 700
Hg[1]	1:10	<.01	--	<.01	- .01	0:10	<.01	--	--	
K[2]	10:10	43	1.05	41	- 47	10:10	41	1.06	38	- 45
Li	0:10	<4	--	--		0:10	<4	--	--	
Mg[2]	10:10	2.4	1.35	1.5	- 3	10:10	1.2	1.16	1.5	- 2
Mn	10:10	81	1.20	70	- 100	10:10	114	1.53	70	- 200
Mo	8:10	9	1.89	<7	- 30	2:10	3.3	1.94	<7	- 10
Na	10:10	310	2.04	100	- 900	10:10	290	1.27	200	- 400
Ni	0:10	<10	--	--		7:10	10	1.43	<10	- 15
P[2]	10:10	4.4	1.13	3.6	- 4.8	10:10	4.0	1.16	3.6	- 4.8
Pb	0:10	<20	--	--		0:10	<20	--	--	
S[1,2]	10:10	.14	1.17	.11	- .19	10:10	.16	1.11	.14	- .19
Se[1]	10:10	.009	1.48	.005	- .02	10:10	.021	1.25	.02	- .24
Sr	10:10	40	1.95	15	- 100	10:10	43	1.48	30	- 70
Ti	4:10	2.5	1.74	<5	- 100	10:10	36	2.83	10	- 150
Zn	10:10	350	1.35	280	- 480	10:10	370	1.16	280	- 520
Zr	1:10	<20	--	<20	- 20	1:10	<20	--	<20	- 20
Ash, percent of dry weight	10:10	4.1	1.13	3.4	- 4.9	10:10	5.8	1.12	4.8	- 7.0
Dry material, percent of fresh weight	10:10	19	1.06	18	- 21	10:10	16	1.14	13	- 21

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh potatoes from areas of commercial production

measurable concentrations to number of samples analyzed. Means and ranges are given in parts deviation. Leaders (--) in figure column indicate no data available]

Areas of commercial production (continued)							
Twin Falls County, Idaho				Yakima County, Wash.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	1:10	<1	--	<1 - 1
8:10	273	2.19	<150 - 700	7:10	195	2.33	<150 - 1,000
0:9	<.05	--	--	0:10	<.05	--	--
6:10	44	1.42	<50 - 70	8:10	58	1.44	<50 - 100
10:10	41	1.44	30 - 70	10:10	29	1.99	10 - 70
10:10	1.3	1.18	1.0 - 1.6	10:10	.67	1.11	.58 - .82
10:10	2.6	1.54	1.5 - 5.5	10:10	2.8	1.43	2 - 5
3:10	.57	1.56	<1 - 1	10:10	3.6	1.43	2 - 6
5:10	<1.5	--	<1.5 - 15	1:10	<1.5	--	<1.5 - 20
10:10	74	1.50	50 - 150	10:10	98	1.46	70 - 150
10:10	400	1.38	300 - 700	10:10	520	1.39	300 - 700
0:10	<.01	--	--	0:10	<.01	--	--
10:10	43	1.04	41 - 46	10:10	42	1.05	40 - 46
0:10	<4	--	--	0:10	<4	--	--
10:10	1.8	1.15	1.5 - 2	10:10	2.1	1.30	1.5 - 3
10:10	62	1.38	30 - 100	10:10	94	1.35	70 - 150
7:10	6.7	1.32	<7 - 10	5:10	5.7	1.38	7 - 10
10:10	3,900	1.16	3,100 - 5,000	10:10	1,400	1.12	1,200 - 1,700
0:10	<10	--	--	9:10	16	1.57	<10 - 30
10:10	3.2	1.35	2.4 - 6.0	10:10	4.6	1.10	3.6 - 4.8
1:10	<20	--	<20 - 50	0:10	<20	--	--
10:10	.093	1.24	.065 - .13	10:10	.12	1.14	.10 - .14
10:10	.010	1.48	.005 - .02	10:10	.008	1.62	.005 - .02
10:10	78	1.27	70 - 100	10:10	100	1.37	70 - 150
6:10	<5	--	<5 - 20	7:10	6.2	2.20	<5 - 15
10:10	273	1.36	140 - 380	10:10	385	1.27	280 - 630
0:10	<20	--	--	0:10	<20	--	--
10:10	3.3	1.23	2.6 - 4.8	10:10	4.0	1.19	3.2 - 5.0
10:10	19	1.13	15 - 23	10:10	21	1.14	17 - 25

TABLE 18.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples, in which the element was found in indicated. Mean, geometric mean. Deviation, geometric deviation. Leaders (--) in figure column

Element, ash, or dry material	Areas of commercial production							
	Berrien County, Mich.				Wayne County, N.Y.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag-----------	0:2	<1	--	--	1:10	<1	--	<1 - 2
Al-----------	2:2	590	1.27	500 - 700	10:10	980	1.95	500 - 3,000
As[1]----------	0:2	<.05	--	--	0:9	<.05	--	--
B------------	2:2	200	1.00	--	10:10	200	1.41	150 - 300
Ba-----------	2:2	200	1.00	--	10:10	210	1.89	100 - 700
Ca[2]----------	2:2	5.5	1.03	5.4 - 5.6	10:10	9.6	1.10	8.2 - 11
Cd-----------	2:2	.35	2.17	.2 - .6	10:10	.37	2.20	.2 - .8
Co-----------	1:2	<1	--	<1 - 1	6:10	1.0	3.91	<1 - 7
Cr-----------	0:2	<1.5	--	--	8:10	2.1	1.71	<1.5 - 5
Cu-----------	2:2	170	2.17	100 - 300	10:10	49	1.23	30 - 70
Fe-----------	2:2	1,200	2.10	700 - 2,000	10:10	1,300	1.63	700 - 3,000
Hg[1]----------	0:2	<.01	--	--	0:10	<.01	--	--
K[2]-----------	2:2	39	1.04	38 - 40	10:10	34	1.05	31 - 36
Li-----------	0:2	<4	--	--	0:10	<4	--	--
Mg[2]----------	2:2	3.9	1.44	3 - 5	10:10	5.4	1.25	5 - 10
Mn-----------	2:2	390	1.44	300 - 500	10:10	460	1.78	200 - 1,000
Mo-----------	2:2	14	1.63	10 - 20	9:10	13	1.84	<7 - 30
Na-----------	2:2	280	1.63	200 - 400	10:10	170	1.38	100 - 350
Ni-----------	2:2	46	1.82	30 - 70	10:10	36	1.84	15 - 70
P[2]-----------	2:2	4.8	1.00	--	10:10	3.9	1.15	3.6 - 4.8
Pb-----------	0:2	<20	--	--	0:10	<20	--	--
S[1,2]---------	2:2	.17	1.04	.17 - .18	10:10	.15	1.16	.11 - .20
Se[1]----------	2:2	.040	1.00	--	10:10	.020	1.25	.02 - .04
Sr-----------	2:2	150	2.80	70 - 300	10:10	290	1.58	150 - 500
Ti-----------	2:2	84	1.29	7 - 100	10:10	46	1.66	30 - 100
Zn-----------	2:2	530	1.50	400 - 710	10:10	490	1.15	410 - 670
Zr-----------	0:2	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	2:2	5.5	1.04	5.4 - 5.7	10:10	7.0	1.13	5.8 - 8.1
Dry material, percent of fresh weight	2:2	22	1.08	21 - 23	10:10	7.3	1.07	6.4 - 8.1

[1]Dry mateial was analyzed; values reported on dry-weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh snap beans from areas of commercial production

measurable concentrations to number of samples analyzed. Means and ranges are given in parts per million, except where percent is indicate no data available]

Areas of commercial production (continued)											
Cumberland County, N.J.				Palm Beach County, Fla.				Twin Falls County, Idaho			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	0:10	<1	--	--	0:10	<1	--	--
10:10	2,200	2.67	700 - 7,000	10:10	460	2.01	200 - 1,500	10:10	922	1.63	500 - 1,500
4:8	.037	2.20	<.05 - .10	0:10	<.05	--	--	0:8	<.05	--	--
10:10	140	1.36	100 - 200	10:10	152	1.37	100 - 300	10:10	245	1.24	200 - 300
10:10	125	1.56	50 - 200	10:10	22	1.69	7 - 30	10:10	157	1.38	100 - 300
10:10	5.9	1.19	4.8 - 8.2	10:10	8.4	1.35	4.2 - 11	10:10	8.5	1.12	7 - 10
10:10	.23	1.34	.2 - .4	10:10	.56	1.66	.2 - 1	10:10	.27	1.72	.2 - 1
8:10	1.1	1.78	<1 - 3	0:10	<1	--	--	8:10	1	1.54	<1 - 2
8:10	2.8	2.99	<1.5 - 10	10:10	4.8	2.03	2 - 15	5:10	1.2	2.66	<1.5 - 7
10:10	73	1.32	50 - 150	10:10	83	1.53	30 - 150	10:10	81	1.36	50 - 150
10:10	1,200	1.62	700 - 3,000	10:10	1,100	1.46	700 - 2,000	10:10	1,100	1.35	700 - 2,000
3:10	.0057	1.56	<.01 - .01	0:10	<.01	--	--	1:10	<.01	--	<.01 - .01
10:10	37	1.05	34 - 40	10:10	35	1.07	31 - 37	10:10	35	1.05	32 - 37
0:10	<4	--	--	0:10	<4	--	--	9:10	12	2.18	5 - 27
10:10	3.7	1.30	3 - 5	10:10	3.0	1.63	1 - 5	10:10	4.5	1.24	3 - 5
10:10	200	1.35	150 - 300	10:10	370	1.77	150 - 1,000	10:10	220	1.19	200 - 300
10:10	28	1.84	10 - 70	10:10	19	1.32	15 - 30	10:10	140	1.26	100 - 200
10:10	280	1.54	150 - 550	10:10	800	2.03	300 - 2,100	10:10	470	1.25	300 - 650
10:10	26	1.29	15 - 30	8:10	15	1.77	<10 - 30	10:10	20	1.26	15 - 30
10:10	4.3	1.16	3.6 - 4.8	10:10	4.6	1.21	3.6 - 6.0	10:10	4.8	1.00	--
0:10	<20	--	--	0:10	<20	--	--	0:10	<20	--	--
10:10	.17	1.25	.11 - .22	10:10	.19	1.41	.10 - .26	10:10	.17	1.17	.12 - .20
10:10	.045	1.27	.04 - .08	10:10	.021	1.25	.02 - .04	10:10	.027	1.53	.02 - .06
10:10	170	1.16	150 - 200	10:10	474	1.42	300 - 700	10:10	450	1.24	300 - 500
10:10	130	2.50	30 - 500	10:10	46	1.96	15 - 100	10:10	22	1.58	10 - 50
10:10	500	1.12	400 - 560	10:10	730	1.07	650 - 800	10:10	530	1.11	450 - 600
4:10	16	1.55	<20 - 30	2:10	<20	--	<20 - 100	0:10	<20	--	--
10:10	8.0	1.16	6.5 - 10	10:10	7.8	1.21	5.7 - 10	10:10	5.9	1.05	5.5 - 6.4
10:10	9.6	1.35	5.8 - 15	10:10	7.5	1.10	6.4 - 8.6	10:10	23	1.23	15 - 31

TABLE 19.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried material,*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable million, except where percent is indicated. Mean, geometric mean. Deviation, geometric deviation.

Element, ash, or dry material	Areas of commercial production							
	Berrien County, Mich.				Salem County, N.J.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	10:10	<1	--	--	0:10	<1	--	--
Al	5:10	<150	--	<150 - 5,000	2:10	50	3.00	<150 - 300
As[1]	3:10	<.05	--	<.05 - .4	0:10	.05	--	--
B	9:10	63	1.33	<50 - 100	3:10	28	1.93	<50 - 70
Ba	7:10	5.7	3.02	<3 - 30	0:10	<3	--	--
Ca[2]	10:10	.25	1.73	.12 - .80	10:10	.16	1.42	.12 - .40
Cd	10:10	.73	2.26	.4 - 4	10:10	1.8	4.22	.2 - 6.5
Co	2:10	.46	1.69	<1 - 1	1:10	<1	--	<1 - 1
Cr	1:10	<1.5	--	<1.5 - 3	1:10	<1.5	--	<1.5 - 1.5
Cu	10:10	53	1.41	30 - 70	10:10	58	1.44	30 - 100
Fe	10:10	790	1.46	500 - 1,500	10:10	790	1.53	500 1,500
Hg[1]	5:10	.0074	1.39	<.01 - .01	2:10	.0046	1.69	<.01 - .01
K[2]	10:10	39	1.05	34 - 40	10:10	39	1.07	34 - 42
Li	0:10	<4	--	--	0:10	<4	--	--
Mg[2]	10:10	3.9	1.31	3 - 5	10:10	4.4	1.41	3 - 7
Mn	10:10	156	1.50	70 - 300	10:10	120	1.44	70 - 150
Mo	4:10	4.7	2.35	<7 - 15	10:10	13	1.34	7 - 30
Na	10:10	160	1.72	50 - 350	10:10	200	1.37	150 - 400
Ni	6:10	9.5	1.71	<10 - 20	6:10	9.7	1.53	<10 - 15
P[2]	10:10	8.9	1.73	2 - 12	10:10	11	1.16	.9 - 12
Pb	1:10	<20	--	<20 - 20	1:10	<20	--	<20 - 20
S[1,2]	10:10	.15	1.27	.10 - .22	10:10	.083	1.35	.05 - .12
Se[1]	10:10	.014	1.44	.01 - .02	10:10	.026	1.79	.01 - .04
Sr	9:10	16	1.49	<10 - 30	4:10	7.4	1.65	<10 - 15
Ti	1:10	<5	--	<5 - 7	1:10	<5	--	<5 - 7
Zn	10:10	1,200	1.37	760 - 1,860	10:10	920	1.11	790 1,060
Zr	0:10	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	2.3	1.39	2.1 - 5.5	10:10	2.0	1.26	1.2 - 2.5
Dry material, percent of fresh weight	10:10	22	1.38	12 - 32	10:10	32	1.13	27 - 39

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

and percent dried-material yield of fresh sweet corn from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per Leaders (--) in figure column indicate no data available]

Areas of commercial production (continued)							
Palm Beach County, Fla.				Twin Falls County, Idaho			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	0:10	<1	--	--
2:10	50	3.00	<150 - 300	9:10	240	1.83	<150 - 1,000
0:8	<.05	--	--	0:9	<.05	--	--
10:10	85	1.48	50 - 150	10:10	57	1.27	50 - 100
1:10	<3	--	<3 - 20	5:10	2.9	3.31	<3 - 20
10:10	.34	1.20	.28 - .46	10:10	.18	1.20	.14 - .26
10:10	1.8	1.42	1 - 2.5	10:10	.43	1.64	.2 - .8
0:10	<1	--	--	1:10	<1	--	<1 - 1
2:10	<1.5	--	<1.5 - 30	1:10	<1.5	--	<1.5 - 3
10:10	59	1.27	50 - 100	10:10	44	1.34	30 - 70
10:10	680	1.29	500 - 1,000	10:10	470	1.29	300 - 700
1:10	<.01	--	<.01 - .01	0:10	<.01	--	--
10:10	40	1.04	37 - 43	10:10	39	1.07	35 - 42
0:10	<4	--	--	0:10	<4	--	--
10:10	3.4	1.45	2 - 5	10:10	3.7	1.30	3 - 5
10:10	160	1.37	70 - 200	10:10	140	1.19	100 - 150
3:10	5.0	1.31	<7 - 7	7:10	7.5	1.66	<7 - 15
10:10	170	1.75	75 - 300	10:10	170	1.56	75 - 350
8:10	11	1.32	<10 - 15	0:10	<10	--	--
10:10	9.0	1.00	--	10:10	10	1.16	.9 - 12
1:10	<20	--	<20 - 100	0:10	<20	--	--
10:10	.14	1.11	.13 - .17	10:10	.10	1.14	.09 - .13
8:10	.0048	1.40	<.005 - .01	10:10	.010	1.59	.005 - .02
10:10	26	1.29	15 - 30	10:10	18	1.40	15 - 30
0:10	<5	--	--	0:10	<5	--	--
10:10	1,400	1.20	1,050 - 2,100	10:10	590	1.22	420 - 800
0:10	<20	--	--	1:10	<20	--	<20 - 20
10:10	3.3	1.18	2.8 - 5.0	10:10	2.4	1.19	1.9 - 3.2
10:10	21	1.10	17 - 24	10:10	25	1.10	23 - 30

TABLE 20.—*Elements in ash (or in dry material, as indicated), percent ash yield of dried*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable geometric mean. Deviation, geometric deviation. Leaders (--) in figure column indicate no data available]

Element, ash, or dry material	Areas of commercial production							
	Berrien County, Mich.				Cumberland County, N.J.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Ag	0:10	<1	--	--	0:10	<1	--	--
Al	8:10	<150	--	<150 - 10,000	7:10	230	3.04	<150 - 1,500
As[1]	2:7	.023	1.69	<.20 - .25	2:10	.023	1.69	<.05 - .05
B	10:10	110	1.37	70 - 150	10:10	84	1.21	70 - 100
Ba	10:10	54	1.83	30 - 150	10:10	42	1.60	30 - 100
Ca[2]	10:10	1.8	1.40	1.1 - 3.0	10:10	1.4	1.32	.96 - 2
Cd	9:10	2.7	1.96	<1 - 10	10:10	.99	1.49	.4 - 1.5
Co	2:10	.49	1.66	<1 - 1	7:10	.87	1.25	<1 - 1
Cr	4:10	1.1	1.71	<1.5 - 2	3:10	.53	5.90	<1.5 - 7
Cu	10:10	100	1.57	50 - 200	10:10	63	1.18	50 - 70
Fe	10:10	740	2.10	300 - 3,000	10:10	522	2.39	300 - 5,000
Hg[1]	1:10	<.01	--	<.01 - .01	0:10	<.01	--	--
K[2]	10:10	35	1.13	29 - 40	10:10	38	1.12	30 - 45
Li	0:10	<4	--	--	0:10	<4	--	--
Mg[2]	10:10	2.2	1.38	1.5 - 3.0	10:10	1.7	1.26	1.5 - 3
Mn	10:10	215	1.54	100 - 500	10:10	75	1.32	50 - 100
Mo	5:10	5.5	2.62	<7 - 30	4:10	5.2	1.48	<7 - 10
Na	10:10	2,700	2.13	900 - 13,000	10:10	1,300	1.27	1,100 - 2,100
Ni	1:10	<10	--	<10 - 15	0:10	<10	--	--
P[2]	10:10	3.2	1.33	2.4 - 4.8	10:10	2.3	1.23	1.8 - 3.6
Pb	0:10	<20	--	--	0:10	<20	--	--
S[1,2]	10:10	.25	1.15	.20 - .28	10:10	.25	1.15	.20 - .33
Se[1]	10:10	.027	1.53	.01 - .06	10:10	.027	1.53	.02 - .05
Sr	10:10	52	1.62	30 - 100	10:10	55	1.67	30 - 150
Ti	3:10	1.8	4.41	<5 - 10	7:10	<5	--	<5 - 150
Zn	10:10	370	1.34	240 - 620	10:10	185	1.32	120 - 260
Zr	0:10	<20	--	--	0:10	<20	--	--
Ash, percent of dry weight	10:10	8.9	1.25	6.9 - 13	10:10	14	1.09	12 - 15
Dry material, percent of fresh weight	10:10	3.3	1.44	1.8 - 6.5	10:10	4.5	1.18	3.9 - 6.2

[1]Dry material was analyzed; values reported on dry weight basis.
[2]Means and ranges given in percent.

material, and percent dried-material yield of fresh tomatoes from areas of commercial production

concentrations to number of samples analyzed. Means and ranges are given in parts per million, except where percent is indicated. Mean,

Areas of commercial production (continued)											
Palm Beach County, Fla.				Yakiman County, Wash.				San Joaquin County, Calif.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:10	<1	--	--	0:10	<1	--	--	0:10	<1	--	--
6:10	153	2.28	<150 - 200	5:10	133	2.86	<150 - 700	4:10	92	3.31	<150 - 700
1:7	<.05	--	<.05 - .05	1:8	<.15	--	<.05 - .15	2:10	<.023	1.69	<.05 - .05
9:10	65	1.47	<50 - 150	10:10	81	1.36	50 - 150	10:10	81	1.20	70 - 100
0:10	<3	--	--	10:10	13	1.76	5 - 30	10:10	40	1.65	20 - 70
10:10	.70	1.62	.82 - 1.5	10:10	1.0	1.99	.80 - 3.2	10:10	1.2	1.30	.82 - 1.8
9:10	.38	2.46	<.2 - 1.5	10:10	2.2	1.84	1 - 5.5	10:10	.38	1.90	.2 - 1.0
1:10	<1	--	<1 - 1	5:10	.74	1.39	<1 - 1	1:10	<1	--	<1 - 4
3:10	.81	2.33	<1.5 - 3	3:10	.91	1.87	<1.5 - 2	0:10	<1.5	--	--
10:10	121	1.47	70 - 200	10:10	73	1.22	50 - 100	10:10	37	1.30	30 - 50
10:10	380	1.46	300 - 700	10:10	550	1.65	500 - 1,000	10:10	300	1.24	200 - 500
1:10	<.01	--	<.01 - .01	1:10	<.01	--	<.01 - .01	2:10	.0046	1.69	<.01 - .01
10:10	30	1.20	23 - 42	10:10	34	1.24	23 - 45	10:10	31	1.10	27 - 36
0:10	<4	--	--	0:10	<4	--	--	0:10	<4	--	--
10:10	1.3	1.35	.7 - 2	10:10	1.6	1.25	1.5 - 2	10:10	1.6	1.15	1.5 - 2
10:10	73	1.38	50 - 150	10:10	114	1.37	70 - 150	10:10	88	1.43	50 - 150
9:10	7.5	1.35	<7 - 15	2:10	1.7	4.12	<7 - 20	10:10	16	1.38	10 - 30
10:10	3,200	1.28	2,500 - 5,900	10:.10	3,600	1.44	2,300 - 6,800	10:10	11,000	1.77	4,000 - 26,000
0:10	<10	--	--	9:10	15	1.46	<10 - 30	0:10	<10	--	--
10:10	1.6	1.33	1.2 - 2.4	10:10	2.5	1.38	1.2 - 3.6	10:10	2.5	1.24	1.8 - 3.6
0:10	<20	--	--	0:10	<20	--	--	0:10	<20	--	--
10:10	.19	1.08	.18 - .23	10:10	.21	1.20	.14 - .26	10:10	.16	1.13	.14 - .21
9:10	.015	2.71	.01 - .02	10:10	.035	2.44	.10 - .15	10:10	.16	1.78	.08 - .35
10:10	55	2.00	30 - 150	10:10	92	2.14	30 - 300	10:10	280	1.32	200 - 500
0:10	<5	--	--	5:10	4	2.32	<5 - 15	0:10	<5	--	--
10:10	210	1.34	160 - 350	10:10	250	1.45	110 - 400	10:10	130	1.57	80 - 240
0:10	<20	--	--	0:10	<20	--	--	0:10	<20	--	--
10:10	14	1.17	9.1 - 17	10:10	11	1.10	9.6 - 13	10:10	11	1.20	7.8 - 13
10:10	5.2	1.27	3.0 - 6.9	10:10	6.4	1.18	5.4 - 8.9	10:10	7.6	1.05	7.0 - 8.1

TABLE 21.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh American grapes collected in three areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:30	--	--	--	--	<1	--	--
Al	26:30	2.7	17	--	--	370	2.31	<150 - 1,000
As[1]	9:26	.0035	.022	3.05	<0.05 - 0.25	--	--	--
B	30:30	1.9	12	--	--	260	1.46	100 - 500
Ba	30:30	.66	4.1	--	--	89	1.65	30 - 200
Ca[2]	30:30	.019	.12	--	--	2.6	1.56	1.1 - 6.2
Cd	21:30	.0017	.011	--	--	.23	2.62	<.3 - 3
Co	2:30	.0018	.011	--	--	.24	2.03	<1 - 1
Cr	11:30	.0031	.019	--	--	<1.5	--	<1.5 - [3]700
Cu	30:30	.54	3.4	--	--	73	1.41	50 - 150
Fe	30:30	3.2	20	--	--	430	1.73	200 - 2,000
Hg[1]	5:30	.00067	.004	1.75	<.01 - .01	--	--	--
K[2]	30:30	.16	1.0	--	--	22	1.24	14 - 32
Li	1:30	--	--	--	--	<4	--	<4 - 5
Mg[2]	30:30	.011	.069	--	--	1.5	1.39	.7 - 3
Mn	30:30	1.1	6.9	--	--	150	2.86	30 - 700
Mo	2:30	--	--	--	--	<7	--	<7 - 30
Na	30:30	2.9	18	--	--	390	2.81	100 - 5,900
Ni	1:30	--	--	--	--	<10	--	<10 - 200
P[2]	30:30	.012	.074	--	--	1.6	1.34	1.2 - 2.4
Pb	1:30	--	--	--	--	<20	--	<20 - 30
S[1,2]	30:30	.0099	.062	1.36	.035 - .11	--	--	--
Se[1]	28:30	.0019	.012	2.69	<.005 - .15	--	--	--
Sr	30:30	1.2	7.4	--	--	160	1.64	70 - 300
Ti	19:30	.054	.34	--	--	7.4	4.64	<5 - 100
Zn	30:30	.81	5.1	--	--	110	1.53	50 - 350
Zr	1:30	--	--	--	--	<20	--	<20 - 20
Ash, percent of dry weight	30:30	--	--	--	--	4.5	1.37	2.1 - 7.7
Dry material percent of fresh weight	30:30	--	16	1.22	10 - 24	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.
[3]One sample probably contaminated.

TABLE 22.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh apples collected in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	1:50	--	--	--	--	<1	--	<1 - 2
Al	45:50	1.1	7.2	--	--	400	2.34	<150 - 3,000
As[1]	37:48	.20	<.05	--	<.05 - 10	--	--	--
B	50:50	1.2	8.3	--	--	455	1.52	150 - 1,500
Ba	50:50	.21	1.4	--	--	77	1.81	20 - 200
Ca[2]	50:50	.0030	.020	--	--	1.1	1.56	.48- 3.2
Cd	36:50	.0051	.034	--	--	.19	1.76	<.2 - .6
Co	10:50	.0012	.0083	--	--	.46	1.69	<1 - 1
Cr	15:50	.0019	.013	--	--	.70	2.98	<1.5 - 7
Cu	50:50	.17	1.1	--	--	63	1.33	30 - 100
Fe	50:50	.92	6.1	--	--	350	1.41	200 - 1,000
Hg[1]	13:50	--	<.01	--	<.01 - .12	--	--	--
K[2]	50:50	.094	.63	--	--	35	1.21	17 - 43
Li	1:50	--	--	--	--	<4	--	<4 - 4
Mg[2]	50:50	.0040	.027	--	--	1.5	1.29	.7 - 2
Mn	50:50	.20	1.3	--	--	74	1.94	20 - 200
Mo	14:50	.011	.070	--	--	3.9	1.92	<7 - 10
Na	50:50	1.6	11	--	--	600	2.03	100 - 3,100
Ni	1:50	--	--	--	--	<10	--	<10 - 15
P[2]	50:50	.0059	.040	--	--	2.2	1.23	1.2 - 3.6
Pb	14:50	.0073	.049	--	--	2.7	2.71	<20 - 1,000
S[1,2]	50:50	.0039	.026	1.35	.015 - .045	--	--	--
Se[1]	25:50	.00039	.0026	3.36	<.005 - .08	--	--	--
Sr	50:50	.26	1.7	--	--	97	2.19	15 - 300
Ti	38:50	.027	.18	--	--	10	2.92	<5 - 70
Zn	50:50	.18	1.2	--	--	67	1.47	35 - 190
Zr	0:50	--	--	--	--	<20	--	--
Ash, percent of dry weight	50:50	--	--	--	--	1.6	1.24	1.1 - 4.3
Dry material, percent of fresh weight	50:50	--	14	1.09	10 - 19	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 23.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh European grapes collected in two areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:20	--	--	--	--	<1	--	--
Al	19:20	2.9	14	--	--	520	2.24	<150 - 2,000
As[1]	0:19	--	<.05	--	--	--	--	--
B	20:20	2.1	10	--	--	370	1.47	200 - 700
Ba	20:20	.35	1.7	--	--	62	2.18	7 - 200
Ca[2]	20:20	.0091	.043	--	--	1.6	2.50	.4 - 4.8
Cd	12:20	.00091	.0043	--	--	.16	2.07	<.2 - 4
Co	0:20	--	--	--	--	<1	--	--
Cr	7:20	.0041	.020	--	--	.73	3.97	<1.5 - 10
Cu	20:20	.36	1.7	--	--	63	1.75	30 - 200
Fe	20:20	2.8	13	--	--	490	1.73	200 - 1,500
Hg[1]	2:20	.00065	.0031	1.91	<.01 - .01	--	--	--
K[2]	20:20	.11	.54	--	--	20	1.74	5.2 - 39
Li	1:20	--	--	--	--	<4	--	<4 - 4
Mg[2]	20:20	.0074	.035	--	--	1.3	1.52	.7 - 3
Mn	20:20	.35	1.7	--	--	62	1.96	7 - 200
Mo	5:20	.024	.11	--	--	4.2	1.55	<7 - 10
Na	20:20	4.4	21	--	--	770	1.90	250 - 4,000
Ni	0:20	--	--	--	--	<10	--	--
P[2]	20:20	.013	.062	--	--	2.3	1.85	.6 - 6
Pb	4:20	.039	.19	--	--	6.9	3.10	<20 - 70
S[1,2]	20:20	.0080	.038	1.76	.015 - .1	--	--	--
Se[1]	7:20	.00048	.0023	2.95	<.005 - .02	--	--	--
Sr	20:20	1.4	6.5	--	--	240	2.65	15 - 1,000
Ti	16:20	.096	.46	--	--	17	3.68	<5 - 70
Zn	20:20	.37	1.8	--	--	66	1.70	20 - 140
Zr	4:20	.039	.19	--	--	6.9	3.10	<20 - 70
Ash, percent of dry weight	20:20	--	--	--	--	2.7	1.43	1.3 - 4.8
Dry material, percent of fresh weight	20:20	--	21.2	1.24	10.7 - 26.6	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 24.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh grapefruit collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:4	--	--	--	--	<1	--	--
Al	33:40	1.4	14	--	--	380	3.06	<150 - 3,000
As[1]	17:36	.0034	.034	2.93	<.05 - .4	--	--	--
B	40:40	.65	6.5	--	--	170	1.35	100 - 300
Ba	40:40	.29	2.9	--	--	77	2.04	20 - 200
Ca[2]	40:40	.022	.22	--	--	5.9	1.59	1.2 - 10
Cd	23:40	.00061	.0061	--	--	.16	1.76	<.2 - .6
Co	4:40	.00068	.0068	--	--	.18	2.87	<1 - 2
Cr	8:40	.0018	.018	--	--	.47	3.14	<1.5 - 3
Cu	40:40	.19	1.9	--	--	50	1.39	30 - 70
Fe	40:40	1.2	12	--	--	310	1.82	150 - 2,000
Hg[1]	0:40	--	<.01	--	--	--	--	--
K[2]	40:40	.14	1.4	--	--	36	1.24	15 - 42
Li	22:40	.014	.14	--	--	3.7	2.76	<4 - 21
Mg[2]	40:40	.0072	.072	--	--	1.9	1.46	.7 - 3
Mn	40:40	.13	1.3	--	--	34	1.56	15 - 70
Mo	3:40	.012	.12	--	--	3.1	1.53	<7 - 7
Na	40:40	6.1	61	--	--	1,600	1.57	600 - 3,000
Ni	5:40	.065	.65	--	--	17	2.24	10 - 70
P[2]	40:40	.011	.11	--	--	3.0	1.40	1.2 - 4.8
Pb	1:40	--	--	--	--	<20	--	<20 - 70
S[1,2]	40:40	.0066	.066	1.42	<.050 - .095	--	--	--
Se[1]	32:40	.0010	.010	2.52	<.005 - .06	--	--	--
Sr	40:40	2.5	25	--	--	650	2.22	150 - 2,000
Ti	22:40	.021	.21	--	--	5.4	4.08	<5 - 70
Zn	40:40	.49	4.9	--	--	130	1.34	60 - 200
Zr	0:40	--	--	--	--	<20	--	--
Ash, percent of dry weight	40:40	--	--	--	--	3.8	1.43	2.3 - 11
Dry material, percent of fresh weight	40:40	--	10	1.20	7.0 - 15	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 25.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh oranges collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:40	--	--	--	--	<1	--	--
Al	33:40	2.0	15	--	--	430	3.25	<150 - 3,000
As[1]	2:38	.0014	.011	2.10	<.05 - .05	--	--	--
B	40:40	1.2	9.4	--	--	260	1.43	70 - 500
Ba	40:40	.040	3.1	--	--	86	2.30	20 - 500
Ca[2]	40:40	.037	.28	--	--	7.8	1.29	4.7 - 13
Cd	20:40	.00066	.0050	--	--	.14	2.79	<2 - 2.5
Co	10:40	.0024	.019	--	--	.52	1.62	<1 - 1
Cr	14:40	.0037	.029	--	--	.80	3.39	<1.5 - 7
Cu	40:40	.24	1.9	--	--	52	1.43	20 - 100
Fe	40:40	2.0	15	--	--	430	1.67	200 - 1,500
Hg[1]	3:40	.00034	.0026	2.00	<.01 - .01	--	--	--
K[2]	40:40	.17	1.3	--	--	37	1.07	31 - 42
Li	24:40	.025	.19	--	--	5.3	3.71	<4 - 28
Mg[2]	40:40	.0098	.076	--	--	2.1	1.37	1.5 - 5
Mn	40:40	.20	1.5	--	--	43	1.49	20 - 150
Mo	3:40	.014	.11	--	--	3.1	1.53	<7 - 7
Na	40:40	7.5	58	--	--	1,600	2.56	250 -11,000
Ni	6:40	--	--	--	--	<10	--	<10 - 30
P[2]	40:40	.013	.097	--	--	2.7	1.31	1.2 - 3.6
Pb	1:40	--	--	--	--	<20	--	<20 - 20
S[1,2]	40:40	.0087	.067	1.17	.055 - .12	--	--	--
Se[1]	30:39	.0010	.0077	2.31	<.005 - .04	--	--	--
Sr	40:40	3.3	26	--	--	710	2.51	20 - 2,000
Ti	20:40	.020	.15	--	--	4.2	4.70	<5 - 70
Zn	40:40	.66	5.0	--	--	140	1.23	100 - 240
Zr	1:40	--	--	--	--	<20	--	<20 - 20
Ash, percent of dry weight	40:40	--	--	--	--	3.6	1.18	2.7 - 5.5
Dry material, percent of fresh weight	40:40	--	13	1.2	10 - 16	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 26.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh peaches collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	2:40	.00058	.0059	--	--	.098	3.65	<1 - 2
Al	33:40	2.6	26	--	--	430	3.35	<150 - 7,000
As[1]	15:37	.0026	.026	4.26	<.05 - .35	--	--	--
B	40:40	2.3	23	--	--	380	1.55	150 - 1,000
Ba	37:40	.11	1.1	--	--	18	2.94	<3 - 200
Ca[2]	40:40	.0017	.017	--	--	.29	1.85	.12 - 1.2
Cd	24:40	.0011	.011	--	--	.19	3.69	<.2 - 3
Co	8:40	.0018	.018	--	--	.30	2.73	<1 - 2
Cr	20:40	.0078	.078	--	--	1.3	3.41	<1.5 - 15
Cu	40:40	.34	3.4	--	--	56	1.80	20 - 200
Fe	40:40	1.8	18	--	--	300	2.31	70 - 2,000
Hg[1]	7:40	.00034	.0034	2.17	<.01 - .02	--	--	--
K[2]	40:40	.11	1.1	--	--	19	1.52	8.5 - 43
Li	1:40	--	--	--	--	<4	--	<4 - 4
Mg[2]	40:40	.0066	.066	--	--	1.1	1.47	.5 - 3
Mn	40:40	.25	2.5	--	--	42	1.98	15 - 150
Mo	1:40	--	--	--	--	<7	--	<7 - 7
Na	40:40	.96	9.6	--	--	160	1.79	50 - 450
Ni	18:40	.044	.44	--	--	7.3	2.65	<10 - 70
P[2]	40:40	.0090	.090	--	--	1.5	1.76	.32 - 4.8
Pb	2:40	.072	.72	--	--	12	1.28	<20 - 20
S[1,2]	40:40	.0043	.043	1.57	.020 - .12	--	--	--
Se[1]	23:40	.00046	.0046	2.57	<.005 - .02	--	--	--
Sr	40:40	.28	2.8	--	--	46	2.02	15 - 300
Ti	24:40	--	--	--	--	<5	--	<5 - 30
Zn	40:40	.55	5.5	--	--	91	1.78	30 - 300
Zr	3:40	.025	.25	--	--	4.2	2.76	<20 - 30
Ash, percent of dry weight	40:40	--	--	--	--	6.7	1.60	1.5 - 15
Dry material, percent of fresh weight	40:40	--	10	1.47	3.6 - 17	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 27.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh pears collected in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:50	--	--	--	--	<1	--	--
Al	42:50	1.1	7.1	--	--	340	2.93	<150 - 7,000
As[1]	9:50	--	<.05	--	<.05 - .55	--	--	--
B	50:50	1.4	9.2	--	--	440	1.53	150 - 1,000
Ba	50:50	.47	3.2	--	--	150	1.86	30 - 700
Ca[2]	50:50	.0057	.038	--	--	1.8	1.76	.52 - 5.4
Cd	38:50	.00085	.0057	--	--	.27	2.55	<.2 - 3
Co	30:50	.0028	.019	--	--	.90	2.64	<1 - 10
Cr	19:50	.022	.014	--	--	.69	5.47	<1.5 - 100
Cu	50:50	.35	2.3	--	--	110	1.69	30 - 300
Fe	50:50	.91	6.1	--	--	290	1.76	70 - 1,000
Hg[1]	7:50	.00057	.0038	1.80	<.01 - .01	--	--	--
K[2]	50:50	.072	.48	--	--	23	1.41	10 - 42
Li	11:50	.0035	.023	--	--	1.1	3.71	<4 - 17
Mg[2]	50:50	.0047	.032	--	--	1.5	1.35	.7 - 3
Mn	50:50	.26	1.7	--	--	83	1.65	20 - 150
Mo	8:50	.0060	.040	--	--	1.9	3.07	<7 - 20
Na	50:50	1.8	12	--	--	560	2.50	150 - 6,600
Ni	17:50	.018	.12	--	--	5.7	2.37	<10 - 70
P[2]	50:50	.0050	.034	--	--	1.6	1.63	.6 - 3.6
Pb	7:50	.031	.21	--	--	9.8	1.74	<20 - 30
S[1,2]	50:50	.0044	.029	1.32	.015 - .05	--	--	--
Se[1]	35:50	.00087	.0058	2.31	<.005 - .02	--	--	--
Sr	50:50	.57	3.8	--	--	180	2.04	30 - 700
Ti	26:50	--	--	--	--	<5	--	<5 - 200
Zn	50:50	.47	3.2	--	--	150	2.01	10 - 720
Zr	3:50	.022	.15	--	--	7.1	1.81	<20 - 30
Ash, percent of dry weight	50:50	--	--	--	--	2.1	1.33	1.0 - 3.7
Dry material, percent of fresh weight	50:50	--	15	1.17	11 - 20	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 28.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh plums collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	4:40	--	--	--	--	<1	--	<1 - 3
Al	28:40	1.4	10	--	--	210	2.43	<150 - 1,500
As[1]	12:32	--	<.05	--	<.05 - 3	--	--	--
B	40:40	2.5	18	--	--	370	1.59	150 - 1,500
Ba	40:40	.22	1.5	--	--	32	2.93	7 - 1,500
Ca[2]	40:40	.0038	.027	--	--	.57	1.43	.30 - 1.2
Cd	16:40	.00081	.0058	--	--	.12	1.85	<.2 - .4
Co	2:40	--	--	--	--	<1	--	<1 - 2
Cr	11:40	.0044	.032	--	--	.66	2.80	<1.5 - 7
Cu	40:40	.34	2.4	--	--	51	2.01	15 - 200
Fe	40:40	1.4	10	--	--	200	1.72	50 - 500
Hg[1]	5:40	.00049	.0035	1.84	<.010 - .010	--	--	--
K[2]	40:40	.11	.77	--	--	.6	1.30	9 - 26
Li	0:40	--	--	--	--	<4	--	--
Mg[2]	40:40	.0074	.053	--	--	1.1	1.34	.50 - 2.0
Mn	40:40	.36	2.5	--	--	53	1.87	10 - 150
Mo	8:40	.025	.18	--	--	3.7	1.65	<7 - 10
Na	40:40	.81	5.8	--	--	120	1.67	<7 - 10
Ni	3:40	.033	.24	--	--	4.9	1.45	<10 - 10
P[2]	40:40	.0074	.053	--	--	1.1	1.78	.6 - 2.4
Pb	10:40	.056	.40	--	--	8.4	3.12	<20 - 70
S[1,2]	40:40	.0045	.032	1.31	.020 - .055	--	--	--
Se[1]	29:40	.00080	.0057	2.08	<.0050 - .020	--	--	--
Sr	40:40	.60	4.3	--	--	89	1.95	15 - 300
Ti	16:40	--	--	--	--	<5	--	<5 - 150
Zn	40:40	1.7	12	--	--	120	2.12	30 - 770
Zr	1:40	--	--	--	--	<20	--	<20 - 20
Ash, percent of dry weight	40:40	--	--	--	--	4.8	1.44	2.2 - 17
Dry material, percent of fresh weight	40:40	--	14	1.29	8.0 - 20	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 29.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh cabbage collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	1:24	--	--	--	--	<1	--	<1 - 1
Al	10:24	.69	8.8	--	--	95	3.33	<150 - 1,500
As[1]	2:21	.0012	.015	1.92	<.05 - .05	--	--	--
B	24:24	1.0	13	--	--	140	1.35	100 - 300
Ba	24:24	.38	4.8	--	--	52	2.41	15 - 200
Ca[2]	24:24	.048	.61	--	--	6.6	1.23	5.2 - 11
Cd	24:24	.0073	.093	--	--	1.0	2.08	.20 - 3.0
Co	19:24	.0080	.10	--	--	1.1	1.80	<1 - 4
Cr	0:24	--	--	--	--	<1.5	--	--
Cu	24:24	.22	2.9	--	--	31	1.29	20 - 50
Fe	24:24	3.3	42	--	--	450	1.40	200 - 700
Hg[1]	10:24	.00051	.0065	1.67	<.01 - .02	--	--	--
K[2]	24:24	.26	3.3	--	--	36	1.09	29 - 39
Li	19:24	.036	.46	--	--	4.9	1.66	<4 - 11
Mg[2]	24:24	.015	.19	--	--	2.0	1.39	1.0 - 5.0
Mn	24:24	1.1	14	--	--	150	1.33	100 - 300
Mo	19:24	.066	.85	--	--	9.1	1.78	<7 - 30
Na	24:24	210	2,700	--	--	29,000	237	3,800 - 64,000
Ni	8:24	.049	.62			6.7	1.71	<10 - 15
P[2]	24:24	.023	.30	--	--	3.2	1.33	1.2 - 4.8
Pb	0:24	--	--	--	--	<20	--	--
S[1,2]	24:24	.056	.72	1.18	.55 - .95	--	--	--
Se[1]	24:24	.012	.15	2.12	.04 - .45	--	--	--
Sr	24:24	5.0	64	--	--	690	1.75	200 - 1,500
Ti	3:24	--	--	--	--	<5	--	<5 - 30
Zn	24:24	1.9	24	--	--	270	1.33	140 - 380
Zr	0:24	--	--	--	--	<20	--	--
Ash, percent of dry weight	24:24	--	--	--	--	9.3	1.22	7.0 - 13
Dry material, percent of fresh weight	24:24	--	7.8	1.19	5.0 - 11	--	--	-

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 30.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh carrots collected in two areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:20	--	--	--	--	<1	--	--
Al	9:20	.94	7.8	--	--	110	2.31	<150 - 700
As[1]	9:16	.0048	.040	1.86	<.05 - .10	--	--	--
B	20:20	1.2	9.9	--	--	140	1.26	100 - 200
Ba	20:20	1.0	8.5	--	--	120	2.67	30 - 500
Ca[2]	20:20	.031	.26	--	--	3.6	1.13	3.0 - 5.0
Cd	20:20	.018	.15	--	--	2.1	2.47	.2 - 6
Co	5:20	.0044	.037	--	--	.52	1.62	<1 - 1
Cr	0:20	--	--	--	--	<1.5	--	--
Cu	20:20	.55	4.6	--	--	65	1.35	50 - 150
Fe	20:20	1.9	16	--	--	220	1.25	150 - 300
Hg[1]	6:20	.00068	.0057	1.56	<.01 - .01	--	--	--
K[2]	20:20	.33	2.8	--	--	39	1.05	34 - 42
Li	6:20	.020	.16	--	--	2.3	1.78	<4 - 6
Mg[2]	20:20	.011	.092	--	--	1.3	1.44	.5 - 2
Mn	20:20	1.0	8.5	--	--	120	1.49	70 - 300
Mo	0:20	--	--	--	--	<7	--	--
Na	20:20	410	3,400	--	--	4,800	1.46	2,600 - 9,600
Ni	3:20	.031	.26	--	--	3.6	2.23	<10 - 15
P[2]	20:20	.020	.16	--	--	2.3	1.47	.6 - 3.6
Pb	0:20	--	--	--	--	<20	--	--
S[1,2]	20:20	.016	.13	1.24	.09 - .19	--	--	--
Se[1]	20:20	.0077	.064	2.20	.02 - .25	--	--	--
Sr	20:20	6.6	55	--	--	780	1.33	500 - 1,500
Ti	2:20	--	--	--	--	<5	--	<5 - 15
Zn	20:20	2.5	21	--	--	290	1.62	75 - 800
Zr	0:20	--	--	--	--	<20	--	--
Ash, percent of dry weight	20:20	--	--	--	--	7.1	1.15	5.8 - 9.9
Dry material, percent of fresh weight	20:20	--	12	1.11	9.3 - 14	--	--	--

[1]Dry material was analyzed, values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 31.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh cucumbers collected in three areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:22	--	--	--	--	<1	--	--
Al	18:22	2.2	57	--	--	580	4.93	<150 - 15,000
As[1]	19:22	.011	.28	3.72	<.05 - .90	--	--	--
B	22:22	.039	9.9	--	--	110	1.38	70 - 200
Ba	22:22	.50	13	--	--	130	2.00	70 - 500
Ca[2]	22:22	.014	.35	--	--	3.5	1.31	2.0 - 5.4
Cd	22:22	.0036	.093	--	--	.94	1.91	.4 - 4
Co	16:22	.0034	.087	--	--	.88	1.24	<1 - 1
Cr	5:22	.0017	.043			.43	4.18	<1.5 - 7
Cu	22:22	.32	8.3	--	--	84	1.69	50 - 300
Fe	22:22	2.6	67	--	--	680	1.92	300 - 3,000
Hg[1]	6:22	.00018	.0047	2.02	<.01 - .02	--	--	--
K[2]	22:22	.15	3.9	--	--	39	1.09	27 - 40
Li	0:22	--	--	--	--	<4	--	--
Mg[2]	22:22	.011	.29	--	--	2.9	1.36	2 - 5
Mn	22:22	.50	13	--	--	130	2.36	50 - 700
Mo	14:22	.032	.82	--	--	8.3	2.15	<7 - 20
Na	22:22	7.7	200	--	--	2,000	1.49	790 - 5,100
Ni	15:22	.050	1.3	--	--	13	2.13	<10 - 50
P[2]	22:22	.017	.43	--	--	4.3	1.35	2.4 - 9
Pb	0:22	--	--	--	--	4.3	1.35	2.4 - 9
S[1,2]	22:22	.012	.31	1.15	.25 - .42	--	--	--
Se[1]	22:22	.0023	.059	1.96	.02 - .2	--	--	--
Sr	22:22	.93	24	--	--	240	2.09	70 - 700
Ti	10:22	.015	.38	--	--	3.8	1.34	<5 - 100
Zn	22:22	1.9	50	--	--	500	1.35	320 - 1,120
Zr	0:22	--	--	--	--	<20	--	--
Ash, percent of dry weight	22:22	--	--	--	--	10	1.23	5.9 - 14
Dry material, percent of fresh weight	22:22	--	4.1	1.20	2.9 - 5.6	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 32.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh dry beans collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	2:40	--	--	--	--	<1	--	<1 - 3
Al	15:40	2.7	3.2	--	--	82	3.97	<150 - 1,500
As[1]	0:35	--	<.05	--	--	--	--	--
B	40:40	5.0	5.8	--	--	150	1.35	70 - 300
Ba	39:40	1.8	2.1	--	--	55	2.32	<3 - 150
Ca[2]	40:40	.090	.11	--	--	2.7	1.43	1.5 - 6
Cd	35:40	.0086	.010	--	--	.26	1.75	<.2 - .8
Co	38:40	.16	.19	--	--	4.8	2.55	<1 - 14
Cr	6:40	.13	.15	--	--	3.9	4.97	<1.5 - 100
Cu	40:40	4.0	4.7	--	--	120	1.45	70 - 300
Fe	40:40	40	47	--	--	1,200	1.53	700 - 3,000
Hg[1]	3:40	.0022	.0026	2.00	<.01 - .01	--	--	--
K[2]	40:40	1.3	1.3	--	--	39	1.04	35 - 43
Li	2:40	.017	.020	--	--	.52	2.93	<4 - 5
Mg[2]	40:40	.11	.13	--	--	3.3	1.33	1.5 - 7
Mn	40:40	6.3	7.4	--	--	190	1.39	70 - 500
Mo	40:40	2.8	3.3	--	--	84	2.42	15 - 300
Na	40:40	2.8	3.3	--	--	85	1.77	25 - 300
Ni	40:40	1.5	1.8	--	--	45	1.78	15 - 150
P[2]	40:40	.31	.37	--	--	9.5	1.12	9 - 12
Pb	0:40	--	--	--	--	<20	--	--
S[1,2]	40:40	.16	.19	1.14	.16 - .28	--	--	--
Se[1]	40:40	.026	.030	2.29	.02 - .2	--	--	--
Sr	40:40	5.6	6.6	--	--	170	2.54	20 - 700
Ti	7:40	.0060	.0070	--	--	.18	2.87	<5 - 150
Zn	40:40	26	31	--	--	790	1.14	580 - 1,020
Zr	1:40	--	--	--	--	<20	--	<20 - 30
Ash, percent of dry weight	40:40	--	--	--	--	3.9	1.09	3.4 - 4.9
Dry material, percent of fresh weight	40:40	--	85	1.07	68.5 - 93.7	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 33.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh lettuce collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	1:40	--	--	--	--	<1	--	<1 - 2
Al	33:40	3.1	73	--	--	520	8.04	<150 - 30,000
As[1]	16:29	--	<.02	--	--	--	--	-
B	40:40	.55	1.3	--	--	93	1.41	50 - 300
Ba	40:40	.39	9.4	--	--	67	2.90	7 - 500
Ca[2]	40:40	.025	.59	--	--	4.2	1.33	2.0 - 6.6
Cd	40:40	.018	.42	--	--	3.0	2.47	.8 - 14
Co	10:40	.0019	.046	--	--	.33	3.06	<1 - 4
Cr	13:40	--	--	--	--	<1.5	--	<1.5 - 70
Cu	40:40	.34	8.1	--	--	58	1.57	20 - 100
Fe	40:40	5.6	130	--	--	960	2.74	300 - 1,500
Hg[1]	24:40	.00035	.0083	1.88	<.01 - .04	--	--	--
K[2]	40:40	.21	5.0	--	--	36	1.22	18 - 42
Li	13:40	.012	.28	--	--	2.0	2.72	<4 - 9
Mg[2]	40:40	.010	.24	--	--	1.7	1.35	.7 - 3
Mn	40:40	1.2	29	--	--	210	1.45	70 - 500
Mo	2:40	.0031	.074	--	--	.53	4.22	<7 - 15
Na	40:40	6.5	150	--	--	11,000	3.64	1,600 - 64,000
Ni	15:40	.042	1.0	--	--	7.2	1.61	<10 - 20
P[2]	40:40	.018	.42	--	--	3.0	1.63	.6 - 4.8
Pb	2:40	.029	.70	--	--	5.0	2.15	<20 - 30
S[1,2]	40:40	.012	.28	1.23	.16 - .4	--	--	--
Se[1]	38:39	.0024	.057	3.39	<.01 - .2	--	--	--
Sr	40:40	3.1	74	--	--	530	2.20	100 - 2,000
Ti	16:40	--	--	--	--	--	--	<5 - 5,000
Zn	40:40	3.1	73	--	--	520	1.85	150 - 3,360
Zr	10:40	.024	.56	--	--	4.0	9.55	<20 - 300
Ash, percent of dry weight	40:40	--	--	--	--	14	1.56	1.8 - 29
Dry material, percent of fresh weight	40:40	--	4.2	1.34	2.9 - 8	--	--	--

[1]Dry material was analyzed; values converted only to fresgh-weight basis.
[2]Means and ranges given in percent.

TABLE 34.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh potatoes collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	1:40	--	--	--	--	<1	--	<1 - 1
Al	31:40	2.5	13	--	--	310	2.78	<150 - 1,500
As[1]	17:39	--	<.05	5.14	<.05 - .35	--	--	--
B	34:40	.46	2.4	--	--	58	1.38	<50 - 100
Ba	38:40	.26	1.3	--	--	32	2.93	<3 - 150
Ca[2]	40:40	.0056	.029	--	--	.70	1.52	.34 - 1.6
Cd	40:40	.014	.076	--	--	1.8	1.98	.40 - 6.5
Co	23:40	.0069	.037	--	--	.86	2.98	<1 - 5
Cr	12:40	.0039	.021	--	--	.49	5.42	<1.5 - 20
Cu	40:40	.70	3.7	--	--	88	1.60	20 - 200
Fe	40:40	3.9	21	--	--	490	1.38	300 - 700
Hg[1]	1:40	--	<.01	-	<.01 -- .01	--	--	--
K[2]	40:40	.34	1.8	--	--	42	1.05	38 - 47
Li	0:40	--	--	--	--	<4	--	--
Mg[2]	40:40	.016	.084	--	--	2.0	1.29	1.5 - 3
Mn	40:40	.69	3.6	--	--	86	1.46	30 - 200
Mo	22:40	.047	.25	--	--	5.9	1.75	<7 - 30
Na	40:40	6.6	35	--	--	830	3.22	100 - 5,000
Ni	16:40	.056	.29	--	--	7.0	2.17	<10 - 30
P[2]	40:40	.033	.17	--	--	4.1	1.26	2.4 - 6
Pb	1:40	--	--	--	--	<20	--	<20 - 50
S[1,2]	40:40	.023	.12	1.29	.065 - .19	--	--	--
Se[1]	40:40	.0021	.011	1.72	.005 - .04	--	--	--
Sr	40:40	.47	2.6	--	--	61	1.78	15 - 150
Ti	27:40	--	--	--	--	<5	--	<5 - 150
Zn	40:40	2.7	14	--	--	340	1.32	140 - 630
Zr	2:40	.096	.50	--	--	12	1.28	<20 - 20
Ash, percent of dry weight	40:40	--	--	--	--	4.2	1.29	2.6 - 7
Dry material, percent of fresh weight	40:40	--	19	1.17	13 - 25	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 35.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh snap beans collected in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	1:42	--	--	--	--	<1	--	<1 - 1
Al	42:42	7.3	66	--	--	950	2.43	200 - 7,000
As[1]	4:37	.00074	.0067	3.85	<.05 - .1	--	--	--
B	42:42	1.4	13	--	--	180	1.43	100 - 300
Ba	42:42	.77	7.0	--	--	100	2.73	7 - 700
Ca[2]	42:42	.060	.55	--	--	7.8	1.30	4.2 - 11
Cd	42:42	.0026	.024	--	--	.34	1.89	.2 - 1
Co	23:42	.0059	.054	--	--	.77	2.55	<1 - 7
Cr	31:42	.018	.16	--	--	2.3	2.66	<1.5 - 15
Cu	42:42	.56	5.1	--	--	73	1.53	30 - 300
Fe	42:42	9.2	84	--	--	1,200	1.52	700 - 3,000
Hg[1]	4:42	.00033	.0030	1.92	<.01 - .01	--	--	--
K[2]	42:42	.27	2.4	--	--	35	1.06	31 - 40
Li	9:42	.0040	.036	--	--	.52	1.01	<5 - 27
Mg[2]	42:42	.031	.28	--	--	4.0	1.45	1 - 10
Mn	42:42	2.3	21	--	--	300	1.72	150 - 1,000
Mo	41:42	.23	2.1	--	--	30	2.74	<7 - 200
Na	42:42	2.8	25	--	--	360	2.05	100 - 650
Ni	40:42	.18	1.7	--	--	24	1.72	<10 - 70
P[2]	42:42	.034	.31	--	--	4.4	1.16	3.6 - 6
Pb	0:42	--	--	--	--	<20	--	--
S[1,2]	42:42	.019	.17	1.27	.1 - .26	--	--	--
Se[1]	42:42	.0031	.028	1.51	.02 - .08	--	--	--
Sr	42:42	2.4	22	--	--	310	1.75	70 - 700
Ti	42:42	.35	3.2	--	--	45	2.60	7 - 500
Zn	42:41	4.2	38	--	--	550	1.22	400 - 800
Zr	6.42	.28	2.6	--	--	37	1.95	<20 - 100
Ash, percent of dry weight	42:42	--	--	--	--	7.0	1.20	5.4 - 10
Dry material, percent of fresh weight	42:42	--	11	1.70	5.9 - 31	--	--	--

[1] Dry material was analyzed; values converted only to fresh-weight basis.
[2] Means and ranges given in percent.

TABLE 36.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh sweet corn collected in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:40	--	--	--	--	<1	--	--
Al	18:40	.65	2.6	--	--	100	3.71	100 - 5,000
As[1]	3:37	.025	.10	3.32	<.05 - .4	--	--	--
B	32:40	.38	1.5	--	--	58	1.56	<50 - 100
Ba	13:40	.0084	.034	--	--	1.3	5.79	<3 - 30
Ca[2]	40:40	.0014	.0057	--	--	.22	1.56	.12 - .80
Cd	40:40	.0065	.026	--	--	1.0	2.84	.2 - 6.5
Co	4:40	.0020	.0081	--	--	.31	1.91	<1 - 1
Cr	5:40	.037	.15	--	--	5.7	3.51	<1.5 - 30
Cu	40:40	.35	1.4	--	--	54	1.38	30 - 100
Fe	40:40	4.4	17	--	--	670	1.48	300 - 1,500
Hg[1]	8:40	.0012	.0046	1.69	<.01 - .01	--	--	--
K[2]	40:40	.25	1.0	--	--	39	1.06	34 - 43
Li	0:40	--	--	--	--	<4	--	--
Mg[2]	40:40	.025	.099	--	--	3.8	1.37	2 - 7
Mn	40:40	.91	3.6	--	--	140	1.40	70 - 300
Mo	24:40	.045	.18	--	--	6.9	1.98	<7 - 30
Na	40:40	1.2	4.7	--	--	180	1.59	50 - 400
Ni	20:40	.055	.22	--	--	8.5	1.62	<10 - 20
P[2]	40:40	.063	.25	--	--	9.7	1.34	.9 - 12
Pb	3:40	.22	.88	--	--	34	2.53	<20 - 100
S[1,2]	40:40	.028	.11	1.37	.05 - .22	--	--	--
Se[1]	38:40	.0028	.011	2.17	<.01 - .04	--	--	--
Sr	33:40	.10	.42	--	--	16	1.72	<10 - 30
Ti	2:40	--	--	--	--	--	--	<5 - 70
Zn	40:40	6.4	25	--	--	980	1.49	420 - 2,100
Zr	1:40	--	--	--	--	<20	--	<20 - 20
Ash, percent of dry weight	40:40	--	--	--	--	2.6	1.34	1.2 - 5.5
Dry material, percent of fresh weight	40:40	--	25	1.28	12 - 39	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 37.—*Summary statistics of element concentrations expressed on fresh-, dry-, and ash-weight bases, ash yield of dried material, and dry-material yield of fresh tomatoes collected in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:50	--	--	--	--	<1	--	--
Al	30:50	1.1	20	--	--	170	4.92	<150 - 1,500
As[1]	8:50	.00046	.0089	4.80	<.05 - .25	--	--	--
B	49:50	.52	10	--	--	84	1.39	<50 - 150
Ba	40:50	.11	2.0	--	--	17	4.45	<3 - 150
Ca[2]	50:50	.0074	.14	--	--	1.2	1.69	.8 - 3.2
Cd	48:50	.0059	.11	--	--	1	2.87	<.2 - 10
Co	16:50	.0032	.062			.52	1.95	<1 - 4
Cr	13:50	.0039	.074	--	--	.62	2.99	<1.5 - 7
Cu	50:50	.46	8.8	--	--	73	1.68	30 - 200
Fe	50:50	3.0	58	--	--	480	1.90	200 - 500
Hg[1]	5:50	.00016	.0031	1.91	<.01 - .01	--	--	--
K[2]	50:50	.21	4.1	--	--	34	1.18	23 - 45
Li	0:50	--	--	--	--	<4	--	--
Mg[2]	50:50	.011	.20	--	--	1.7	1.34	.7 - 3
Mn	50:50	.62	12	--	--	100	1.68	50 - 500
Mo	30:50	.042	.82	--	--	6.8	2.08	<7 - 30
Na	50:50	21	410	--	--	3,400	2.26	900 - 26,000
Ni	10:50	.022	.43	--	--	3.6	2.79	<10 - 30
P[2]	50:50	.015	.29	--	--	2.4	1.41	1.2 - 4.8
Pb	0:50	--	--	--	--	<20	--	--
S[1,2]	50:50	.011	.21	1.21	.14 - .33	--	--	--
Se[1]	49:49	.0018	.036	2.86	.01 - .35	--	--	--
Sr	50:50	.52	10	--	--	83	2.33	20 - 300
Ti	15:50	--	--	--	--	--	--	<5 - 150
Zn	50:50	1.4	26	--	--	220	1.62	80 - 620
Zr	0:50	--	--	--	--	<20	--	--
Ash, percent of dry weight	50:50	--	--	--	--	12	1.25	6.9 - 17
Dry material, percent of fresh weight	50:50	--	5.2	1.43	1.8 - 8.9	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 38.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh asparagus from San Joaquin County, California*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:10	--	--	--	--	<1	--	--
Al	7:10	2.3	29	--	--	290	4.31	<150 - 3,000
As[1]	1:9	--	<.05	--	<.05 - .05	--	--	--
B	10:10	1.0	13	--	--	130	1.31	70 - 150
Ba	10:10	.23	2.9	--	--	29	1.40	20 - 50
Ca[2]	10:10	.021	.27	--	--	2.7	1.10	2.4 - 3.2
Cd	10:10	.0025	.032	--	--	.32	1.51	.2 - .6
Co	3:10	.0045	.057	--	--	.57	1.56	<1 - 1
Cr	1:10	--	--	--	--	<1.5	--	<1.5 - 3
Cu	10:10	.95	12	--	--	120	1.30	100 - 200
Fe	10:10	4.7	60	--	--	600	1.68	300 - 2,000
Hg[1]	2:10	.00036	.0046	1.69	<.01 - .01	--	--	--
K[2]	10:10	.33	4.2	--	--	42	1.04	39 - 46
Li	4:10	.022	.28	--	--	2.8	1.48	<4 - 5
Mg[2]	10:10	.014	.18	--	--	1.8	1.16	1.5 - 2
Mn	10:10	1.1	14	--	--	140	1.31	70 - 200
Mo	7:10	.054	.68	--	--	6.8	1.49	<7 - 15
Na	10:10	23	290	--	--	2,900	1.26	2,200 - 4,300
Ni	5:10	.068	.86	--	--	8.6	1.60	<10 - 15
P[2]	10:10	.043	.55	--	--	5.5	1.12	4.8 - 6.0
Pb	0:10	--	--	--	--	<20	--	--
S[1,2]	10:10	.051	.65	1.07	.62 - .72	--	--	--
Se[1]	10:10	.045	.57	1.12	.45 - .65	--	--	--
Sr	10:10	4.0	50	--	--	500	1.36	300 - 700
Ti	8:10	--	--	--	----	--		<5 - 1,500
Zn	10:10	7.3	92	--	--	920	1.09	810 - 1,030
Zr	0:10	--	--	--	--	<20	--	--
Ash, percent of dry weight	10:10	--	--	--	--	10	1.09	9.0 - 12
Dry material, percent of fresh weight	10:10	--	7.9	1.10	6.3 - 8.6	--	--	--

[1]Dry material was analyzed, values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 39.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh cantaloupes from Berrien County, Michigan*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag-----------	0:2	--	--	--	--	<1	--	--
Al-----------	2:2	3.6	45	--	--	460	1.82	300 - 700
As[1]----------	0:2	--	<.05	--	--	--	--	--
B------------	2:2	.93	12	--	--	120	1.33	100 - 150
Ba-----------	2:2	.25	3.1	-	--	32	2.97	15 - 70
Ca[2]----------	2:0	.093	.12	--	--	1.2	3.38	.5 - 2.8
Cd-----------	1:2	--	--	--	--	<.2	--	<.2 - .4
Co-----------	1:2	--	--	--	--	<1	--	<1 - 1
Cr-----------	0:2	--	--	--	--	<1.5	--	--
Cu-----------	2:2	.46	5.8	--	--	59	1.27	50 - 70
Fe-----------	2:2	2.5	31	--	--	320	1.91	200 - 500
Hg[1]----------	0:2	--	<.01	--	--	--	--	--
K[2]-----------	2:2	.29	3.7	--	--	38	1.06	37 - 40
Li-----------	0:2	--	--	--	--	<4.0	--	--
Mg[2]----------	2:2	.016	.21	--	--	2.1	1.63	1.5 - 3
Mn-----------	2:2	.29	3.6	--	--	37	2.43	20 - 70
Mo-----------	0:2	--	--	--	--	<7	--	--
Na-----------	2:2	2.7	34	--	--	3,500	1.30	2,900 - 4,200
Ni-----------	0:2	--	--	--	--	<10	--	--
P[2]-----------	2:2	.013	.17	--	--	1.7	1.63	1.2 - 2.4
Pb-----------	0:2	--	--	--	--	<20	--	--
S[1,2]---------	2:2	.013	.17	1.09	.16 - .18	--	--	--
Se[1]----------	2:2	.0022	.028	1.63	.02 - .04	--	--	--
Sr-----------	2:2	.52	6.6	--	--	67	3.12	30 - 150
Ti-----------	1:2	--	--	--	--	<5	--	<5 - 20
Zn-----------	2:2	1.8	23	--	--	230	1.32	190 - 280
Zr-----------	0:2	--	--	--	--	<20	--	--
Ash, percent of dry weight	2:2	--	--	--	--	9.8	1.18	8.7 - 11
Dry material, percent of fresh weight	2:2	--	7.9	1.40	6.2 - 10	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 40.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh Chinese cabbage from Palm Beach County, Florida*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:2	--	--	--	--	<1	--	--
Al	1:2	--	--	--	--	<150	--	<150 - 200
As[1]	2:2	.013	.26	1.49	.2 - .35	--	--	--
B	2:2	.82	17	--	-	80	1.29	70 - 100
Ba	2:2	.82	17	--	--	80	1.29	70 - 100
Ca[2]	2:2	.069	1.4	--	--	7.0	1.20	6.2 - 8.0
Cd	0:2	--	--	--	--	<.2	--	--
Co	0:2	--	--	--	--	<1	--	--
Cr	0:2	--	--	--	--	<1.5	--	--
Cu	2:2	.15	3.0	--	--	15	1.00	--
Fe	2:2	2.1	4.2	--	--	210	1.63	150 - 300
Hg[1]	1:2	--	<.01	--	<.01 - .01	--	--	--
K[2]	2:2	.38	7.8	--	--	39	1.00	--
Li	0:2	--	--	--	--	<4	--	--
Mg[2]	2:2	.015	.30	--	--	1.5	1.00	--
Mn	2:2	.49	10	--	--	50	1.00	--
Mo	1:2	--	--	--	--	<7	--	<7 - 7
Na	2:2	82	170	--	--	8,400	1.13	7,700 - 9,200
Ni	0:2	--	--	--	--	<10	--	--
P[2]	2:2	.028	.58	--	--	2.9	1.33	2.4 - 3.6
Pb	0:2	--	--	--	--	<20	--	--
S[1,2]	2:2	.031	.64	1.01	.64 - .65	--	--	--
Se[1]	2:2	.00035	.0071	1.63	.005 - .01	--	--	--
Sr	2:2	14	280	--	--	1,400	1.63	1,000 - 2,000
Ti	0:2	--	--	--	--	<5	--	--
Zn	2:2	3.5	72	--	--	360	1.06	350 - 380
Zr	0:2	--	--	--	--	<20	--	--
Ash, percent of dry weight	2:2	--	--	--	--	20	1.07	19 - 21
Dry material, percent of fresh weight	2:2	--	4.9	1.11	4.6 - 5.3	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 41.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh eggplant from Berrien County, Michigan*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:2	--	--	--	--	<1	--	--
Al	1:2	--	--	--	--	<150	--	<150 - 200
As[1]	0:2	--	<.05	--	--	--	--	--
B	2:2	.44	6.3	--	--	80	1.29	70 - 100
Ba	2:2	.31	4.4	--	--	59	1.27	50 - 70
Ca[2]	2:2	.0052	.075	--	--	1.0	1.23	1.0 - 1.5
Cd	2:2	.026	.38	--	--	<5.0	1.15	4.5 - 5.5
Co	0:2	--	--	--	--	<1	--	--
Cr	0:2	--	--	--	--	<1.5	--	--
Cu	2:2	.63	9.0	--	--	120	2.10	70 - 200
Fe	2:2	2.4	34	--	--	460	1.82	300 - 700
Hg[1]	0:2	--	<.01	--	--	--	--	--
K[2]	2:2	.20	2.9	--	--	39	1.04	38 - 40
Li	0:2	--	--	--	--	<4	-	--
Mg[2]	2:2	.013	.18	--	--	2.4	1.33	2 - 4
Mn	2:2	1.4	20	--	--	270	2.34	150 - 200
Mo	1:2	--	--	--	--	<7	--	<7 - 7
Na	2:2	5.1	73	--	--	970	1.20	850 - 1,000
Ni	0:2	--	--	--	--	<10	--	--
P[2]	2:2	.013	.18	--	--	2.4	1.00	--
Pb	0:2	--	--	--	--	<20	--	--
S[1,2]	2:2	.013	.18	1.03	.18 - .19	--	--	--
Se[1]	2:2	.00098	.014	1.63	.010 - .020	--	--	--
Sr	2:2	.24	3.4	--	--	46	1.82	30 - 70
Ti	0:2	--	--	--	--	<5	--	--
Zn	2:2	1.5	22	--	--	290	1.16	260 - 320
Zr	0:2	--	--	--	--	<20	--	--
Ash, percent of dry weight	2:2	--	--	--	--	7.4	1.09	7.0 - 8.0
Dry material, percent of fresh weight	2:2	--	7.0	1.05	6.8 - 7.3	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 42.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh endive from Palm Beach County, Florida*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:2	--	--	--	--	<1	--	--
Al	2:2	6.5	101	--	--	460	1.82	300 - 700
As[1]	1:2	--	--	--	<.05 - .2	--	--	--
B	2:2	1.2	18	--	--	84	1.29	70 - 100
Ba	2:2	1.2	18	--	--	84	1.29	70 - 100
Ca[2]	2:2	.058	.90	--	--	4.1	1.04	4.0 - 4.2
Cd	2:2	.014	.22	--	--	1.0	1.00	--
Co	0:2	--	--	--	--	<1.0	--	--
Cr	1:2	--	--	--	--	--	--	<1.5 - 2
Cu	2:2	.99	15	--	--	70	1.00	--
Fe	2:2	12	190	--	--	870	2.17	500 - 1,500
Ga	0:2	--		--	--	<10	--	--
Hg[1]	1:2	--	--	--	<.01 - .01	--	--	--
K[2]	2:2	.55	8.6	--	--	39	1.02	34 - 40
Li	0:2	--	--	--	--	<4	--	--
Mg[2]	2:2	.012	.18	--	--	.84	1.29	.70- 1
Mn	2:2	4.2	66	--	--	300	1.00	--
Mo	0:2	--	--	--	--	<7	--	--
Na	2:2	250	4,000	--	--	18,500	1.04	18,000 - 19,000
Ni	0:2	--	--	--	--	<10	--	--
P[2]	2:2	.034	.53	--	--	2.4	1.00	--
Pb	0:2	--	--	--	--	<20	--	--
S[1,2]	2:2	.023	.37	1.02	.37 - .38	--	--	--
Se[1]	2:2	.0040	.06	1.91	.04 - .10	--	--	--
Sr	2:2	12	180	--	--	840	1.29	700 - 1,000
Ti	2:2	.12	1.9	--	--	9	2.17	5 - 15
Zn	2:2	7.9	120	--	--	560	1.13	510 - 610
Zr	0:2	--	--	--	--	<20	--	--
Ash, percent of dry weight	2:2	--	--	--	--	22	1.12	20 - 24
Dry material, percent of fresh weight	2:2	--	6.4	1.05	6.2 - 6.6	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 43.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh onions from Hildalgo County, Texas*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values						
		Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:10	--	--	--	--	<1	--	--
Al	10:10	6.3	63	--	--	1,500	1.21	1,000 - 2,000
As[1]	7:10	.0045	.045	1.74	<.05 - .05	--	--	--
B	10:10	1.0	10	--	--	250	1.35	150 - 300
Ba	10:10	.88	8.8	--	--	200	1.39	150 - 500
Ca[2]	10:10	.046	.46	--	--	11	1.13	8.4 - 12
Cd	10:10	.0050	.050	--	--	1.2	1.23	1.0 - 1.5
Co	4:10	.0028	.028	--	--	.66	1.46	<1 - 1
Cr	2:10	.0021	.021	--	--	.5	3.00	<1.5 - 3
Cu	10:10	.46	4.6	--	--	110	1.42	70 - 200
Fe	10:10	3.3	33	--	--	780	1.35	500 - 1,000
Hg	0:10	--	<.01	--	--	--	--	--
K[2]	10:10	.13	1.3	--	--	30	1.05	28 - 32
Li	2:10	.0063	.063	--	--	1.6	2.23	<4 - 6
Mg[2]	10:10	.012	.12	--	--	2.8	1.19	2 - 3
Mn	10:10	1.6	16	--	--	390	1.56	150 - 700
Mo	5:10	.024	.24	--	--	5.6	1.75	<7 - 15
Na	10:10	110	1,100	--	--	2,700	1.27	1,900 - 3,800
Ni	10:10	.059	.59	--	--	13	1.26	10 - 20
P[2]	10:10	.019	.19	--	--	4.6	1.16	3.6 - 6
Pb	0:10	--	--	--	--	<20	--	--
S[1,2]	10:10	.033	.33	1.21	.21 - .45	--	--	--
Se[1]	10:10	.0042	.042	1.38	.02 - .06	--	--	--
Sr	10:10	8.8	88	--	--	2,100	1.23	1,500 - 3,000
Ti	10:10	.16	1.6	--	--	37	1.87	10 - 100
Zn	10:10	2.2	22	--	--	530	1.28	420 - 980
Zr	0:10	--	--	--	--	<20	--	--
Ash, percent of dry weight	10:10	--	--	--	--	4.2	1.17	3.1 - 5.4
Dry material, percent of fresh weight	10:10	--	10	1.2	8.2 - 13	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 44.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh parsley from Palm Beach County, Florida*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:2	--	--	--	--	<1	--	--
Al	2:2	1.1	9.5	00	00	500	1.00	--
As[1]	2:2	.006	.050	1.00	--	--	--	--
B	2:2	.19	1.6	--	--	84	1.29	70 - 100
Ba	2:2	.39	3.2	--	--	170	1.23	150 - 200
Ca[2]	2:2	.013	.11	--	--	5.8	1.16	5.2 - 6.2
Cd	1:2	--	--	--	--	--	--	<.2 - .2
Co	0:2	--	--	--	--	<1	--	--
Cr	1:2	--	--	--	--	--	--	<1.5 - 3
Cu	2:2	.055	.46	--	--	24	1.33	20 - 30
Fe	2:2	1.1	9.5	--	--	500	1.00	--
Hg[1]	2:2	.0029	.024	1.33	.02 - .03	--	--	--
K[2]	2:2	.091	.76	--	--	40	1.00	--
Li	0:2	--	--	--	--	<4	--	--
Mg[2]	2:2	.0027	.023	--	--	1.2	1.33	1 - 1.5
Mn	2:2	.016	1.3	--	--	70	1.00	--
Mo	2:2	.10	.87	--	--	46	1.82	30 - 70
Na	2:2	5.9	49	--	--	2,600	1.12	2,400 - 2,800
Ni	0:2	--	--	--	--	<10	--	--
P[2]	2:2	.0041	.034	--	--	1.8	1.00	--
Pb	0:2	--	--	--	--	<20	--	--
S[1,2]	2:2	.034	.28	1.00	--	--	--	--
Se[1]	2:2	.0034	.028	1.63	.02 - .04	--	--	--
Sr	2:2	3.9	32	--	--	1,700	1.23	1,500 - 2,000
Ti	1:2	--	--	--	--	--	--	<5 - 10
Zn	2:2	.73	6.1	--	--	320	1.12	300 - 500
Zr	0:2	--	--	--	--	<20	--	--
Ash, percent of dry weight	2:2	--	--	--	--	19	1.03	19 - 19.8
Dry material, percent of fresh weight	2:2	--	12	1.05	12 - 12.9	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 45.—*Element concentrations expressed on fresh, dry, and ash weight bases, ash yield of dried material, and dry-material yield of fresh peppers from Berrien County, Michigan*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean; deviation, geometric deviation. Means and ranges are given in parts per million, except as indicated. Leaders (--) in figure column indicate no data available. Plant material analyzed was ash, except as indicated; values converted to dry-weight and fresh-weight bases]

Element, ash, or dry material	Ratio	Basis for reporting values: Fresh weight basis	Dry weight basis			Ash weight basis		
		Mean	Mean	Deviation	Observed range	Mean	Deviation	Observed range
Ag	0:2	--	--	--	--	<1	--	--
Al	1:2	--	--	--	--	<150	--	<150 - 300
As[1]	1:2	--	<.050	--	<.050 - .15	--	--	--
B	2:2	.65	8.4	--	--	100	1.00	--
Ba	2:2	.32	4.2	--	--	50	1.00	--
Ca[2]	2:2	.0063	.081	--	--	.97	1.19	.86 - 1.1
Cd	2:2	.016	.21	--	--	2.5	1.00	--
Co	0:2	--	--	--	--	<1	--	--
Cr	0:2	--	--	--	--	<1.5	--	--
Cu	2:2	1.1	14	--	--	170	1.23	150 - 200
Fe	2:2	5.4	71	--	--	840	1.29	700 - 1,000
Hg[1]	0:2	--	<.01	--	--	--	--	--
K[2]	2:2	.21	2.7	--	--	32	1.12	30 - 35
Li	0:2	--	--	--	--	<4	--	--
Mg[2]	2:2	.016	.20	--	--	2.5	1.33	2.0 - 3.0
Mn	2:2	1.4	18	--	--	210	1.63	150 - 300
Mo	0:2	--	--	--	--	<7	--	--
Na	2:2	8.4	109	--	--	1,300	1.11	1,200 - 1,400
Ni	2:2	.21	2.7	--	--	32	1.91	20 - 50
P[2]	2:2	.019	.24	--	--	2.9	1.33	2.4 - 3.6
Pb	0:2	--	--	--	--	<20	--	--
S[1,2]	2:2	.022	.28	1.03	.28 - .29	--	--	--
Se[1]	2:2	.015	.02	1.00	--	--	--	--
Sr	2:2	.25	3.3	--	--	39	1.44	30 - 50
Ti	0:2	--	--	--	--	<5	--	--
Zn	2:2	2.3	30	--	--	360	1.31	300 - 440
Zr	0:2	--	--	--	--	<20	--	--
Ash, percent of dry weight	2:2	--	--	--	--	8.4	1.27	7.1 - 10
Dry material, percent of fresh weight	2:2	--	7.7	1.32	6.3 - 9.3	--	--	--

[1]Dry material was analyzed; values converted only to fresh-weight basis.
[2]Means and ranges given in percent.

TABLE 46.—*Estimates of logarithmic variance for American grapes from three areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al------------	0.13430	8	<1	92
B-------------	.08212	<1	30	70
Ba------------	.05223	<1	*71	29
Ca------------	.03918	<1	11	89
Cd------------	.10793	22	*36	42
Cu------------	.02349	10	33	57
Fe------------	.06621	*44	6	50
K-------------	.01125	3	<1	98
Mg------------	.02664	<1	<1	100
Mn------------	.26212	63	31	6
Na------------	.25346	*66	5	29
P-------------	.01916	13	<1	87
S-------------	.02001	*32	*42	26
Se------------	.17675	*14	*68	18
Sr------------	.06267	*39	<1	61
Zn------------	.04514	5	<1	95
Ash, percent of dry weight[1]	2.0817	<1	<1	100
Dry material, percent of fresh weight[1]	13.280	*73	*18	9

[1]Variance calculated from nontransformed data.

TABLE 47.—*Estimates of logarithmic variance for apples from five areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al------------	0.11593	7	9	84
As------------	.48775	16	*69	15
B-------------	.03429	19	*43	38
Ba------------	.07057	*29	17	54
Ca------------	.03937	*27	*33	40
Cd------------	.04177	10	<1	90
Cu------------	.01669	<1	*34	66
Fe------------	.02349	19	27	54
K-------------	.00741	*29	12	59
Mg------------	.01219	10	17	74
Mn------------	.09578	*71	8	21
Na------------	.01299	*44	*24	32
P-------------	.00851	<1	2	98
S-------------	.01937	*56	*16	28
Sr------------	.13136	*65	9	26
Ti------------	.13626	*13	27	59
Zn------------	.02994	30	13	57
Ash, percent of dry weight[1]	.34045	6	22	72
Dry material, percent of fresh weight[1]	2.9988	*25	12	63

[1]Variance calculated from nontransformed data.

TABLE 48.—*Estimates of logarithmic variance for European grapes from two areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al------------	0.11966	<1	38	62
B-------------	.03528	*34	<1	66
Ba------------	.17266	*57	<1	43
Ca------------	.19194	33	*36	31
Cu------------	.08430	*62	13	24
Fe------------	.07541	*45	<1	55
K-------------	.08214	*59	20	20
Mg------------	.04905	*37	<1	63
Mn------------	.11491	*50	<1	50
Na------------	.11169	*44	<1	56
P-------------	.10651	*70	7	23
S-------------	.10453	*90	<1	9
Sr------------	.25664	*60	<1	40
Ti------------	.23044	<1	24	76
Zn------------	.06489	*37	13	50
Ash, percent of dry weight[1]	1.0261	19	26	55
Dry material, percent of fresh weight[1]	15.263	10	18	72

[1]Variance calculated from nontransformed data.

TABLE 49.—*Estimates of logarithmic variance for grapefruit from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al------------	0.18569	*28	1	71
B-------------	.02195	*46	<1	54
Ba------------	.11663	*41	<1	59
Ca------------	.04538	*49	4	47
Cu------------	.02090	8	*48	44
Fe------------	.07494	*41	20	39
K-------------	.00952	*27	16	57
Mg------------	.02833	14	<1	86
Mn------------	.04002	*29	*28	43
Na------------	.04525	*37	<1	63
P-------------	.02385	*48	*20	32
S-------------	.01256	*55	<1	45
Sr------------	.14921	*69	<1	31
Zn------------	.01742	*38	20	42
Ash percent of dry weight[1]	3.3243	*55	*18	27
Dry material, percent of fresh weight[1]	4.1878	*64	2	34

[1]Variance calculated from nontransformed data.

TABLE 50.—*Estimates of logarithmic variance for oranges from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al	0.20532	*30	8	62
B	.02640	*43	18	39
Ba	.16402	*87	3	10
Ca	.01416	*56	3	42
Cu	.02426	3	7	90
Fe	.05171	11	*33	56
K	.00106	35	*26	39
Mg	.01946	*18	12	70
Mn	.03321	*15	<1	85
Na	.19940	*71	*14	15
P	.01466	*21	<1	79
S	.00547	*29	<1	71
Sr	.20647	*69	<1	31
Zn	.00847	<1	2	98
Ash, percent of dry weight[1]	.47054	*51	<1	49
Dry material, percent of fresh weight[1]	2.6117	*32	<1	69

[1]Variance calculated from nontransformed data.

TABLE 51.—*Estimates of logarithmic variance for peaches from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al	0.25969	*30	<1	70
B	.03867	*28	24	48
Ba	.21549	*54	<1	46
Ca	.10072	*29	<1	71
Cu	.08410	*32	<1	68
Fe	.15377	*57	<1	43
K	.04595	<1	<1	100
Mg	.03513	*17	<1	83
Mn	.10868	*56	<1	44
Mo	.06881	<1	<1	100
P	.07165	*30	<1	70
S	.04409	*60	2	38
Sr	.01048	*31	<1	69
Zn	.06876	16	<1	84
Ash, percent or dry weight[1]	9.0217	*26	17	57
Dry material, percent of fresh weight[1]	14.447	*48	<1	52

[1]Variance calculated from nontransformed data.

TABLE 52.—*Estimates of logarithmic variance for pears from five areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al	0.18966	<1	<1	100
B	.03604	*23	11	66
Ba	.07672	*27	13	61
Ca	.06188	7	31	62
Cd	.11595	*44	6	50
Cu	.05219	5	2	93
Fe	.06108	<1	31	68
K	.02250	3	12	86
Mg	.17080	2	8	89
Mn	.05080	<1	*53	47
Na	.16322	12	*48	40
P	.04623	6	26	68
S	.01651	*27	<1	73
Se	.07863	*27	*41	32
Sr	.09763	8	20	72
Zn	.09304	3	*43	54
Ash, percent of dry weight[1]	.44193	*66	3	30
Dry material, percent of fresh weight[1]	6.3830	*66	3	30

[1]Variance calculated from nontransformed data.

TABLE 53.—*Estimates of logarithmic variance for plums from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al	0.08467	6	6	88
B	.04510	*41	5	54
Ba	.23738	*34	16	50
Ca	.02496	6	*50	44
Cu	.10774	*56	<1	44
Fe	.06557	*42	<1	58
K	.01320	<1	*43	57
Mg	.01684	7	31	62
Mn	.08902	*62	<1	38
Na	.05059	8	29	63
P	.06491	7	30	62
S	.01485	20	*36	44
Se	.06560	*36	16	48
Sr	.08641	8	*44	49
Zn	.11522	*27	*41	32
Ash, percent of dry weight[1]	6.2372	13	*59	28
Dry material, percent of fresh weight[1]	12.674	*53	*33	14

[1]Variance calculated from nontransformed data.

TABLE 54.—*Estimates of logarithmic variance for cabbage from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
B	0.01742	13	10	77
Ba	.20639	*87	<1	12
Ca	.01028	*65	10	25
Cd	.12337	*51	17	33
Co	.04960	25	8	67
Cu	.01842	*17	<1	83
Fe	.02521	27	<1	73
K	.00165	*57	5	38
Li	.04581	*61	<1	38
Mg	.02495	13	<1	87
Mn	.01722	31	*35	34
Mo	.05389	*57	*27	15
Na	.20808	*98	<1	2
P	.01747	32	25	42
S	.00709	*49	<1	51
Se	.15325	*66	<1	34
Sr	.07931	*75	7	18
Zn	.02067	*73	*15	12
Ash, percent of dry weight[1]	4.8903	*73	7	20
Dry material, percent of fresh weight[1]	2.1899	*62	10	28

[1]Variance calculated from nontransformed data.

TABLE 55.—*Estimates of logarithmic variance for carrots from two areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
B	0.01605	*23	<1	76
Ba	.30955	*86	*9	5
Ca	.00291	<1	15	85
Cd	.21608	*38	<1	62
Cu	.02472	<1	<1	100
Fe	.01305	<1	<1	100
K	.00059	2	<1	98
Mg	.02528	<1	12	88
Mn	.00465	*84	3	13
Na	.04469	*84	3	13
P	.03928	*32	<1	68
S	.01251	*60	<1	40
Se	.19944	*86	*9	5
Sr	.01634	<1	<1	100
Zn	.06779	*68	<1	32
Ash, percent of dry weight[1]	1.6724	*28	<1	72
Dry material, percent of fresh weight[1]	2.3000	*55	<1	45

[1]Variance calculated from nontransformed data.

TABLE 56.—*Estimates of logarithmic variance for cucumbers from three areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al	0.38377	<1	18	82
As	.30174	31	*64	5
B	.02395	20	<1	80
Ba	.11491	*51	*30	19
Ca	.01863	<1	<1	100
Cd	.10241	*54	*25	21
Co	.00646	*32	<1	68
Cu	.05763	22	30	48
Fe	.09482	*39	5	56
K	.00167	<1	*67	33
Mg	.01925	12	21	67
Mn	.19782	*73	*15	12
Na	.03712	*49	*30	22
Ni	.06074	5	*78	17
P	.01843	17	4	79
S	.00361	<1	36	64
Se	.11629	*65	*18	17
Sr	.13853	*63	18	19
Zn	.02272	*65	4	31
Ash, percent of dry weight[1]	4.9200	*35	15	50
Dry material, percent of fresh weight[1]	.79488	4	<1	96

[1]Variance calculated from nontransformed data.

TABLE 57.—*Estimates of logarithmic variance for dry beans from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
B	0.02020	*17	<1	83
Ba	.13873	*31	<1	69
Ca	.02982	*76	*13	11
Cd	.05180	*38	8	55
Co	.17342	*54	11	34
Cu	.02697	3	*42	55
Fe	.03815	*41	*23	36
K	.00027	11	<1	89
Mg	.02084	<1	<1	100
Mn	.02063	12	3	85
Mo	.17854	*76	3	21
Na	.07074	<1	<1	100
Ni	.07732	*50	<1	50
P	.00324	*61	<1	39
S	.00339	*24	8	68
Se	.16469	*84	<1	16
Sr	.19947	*77	6	17
Zn	.00362	*39	*37	24
Ash, percent of dry weight[1]	.12337	*35	10	55
Dry material, percent of fresh weight[1]	36.355	*36	*29	35

[1]Variance calculated from nontransformed data.

TABLE 58.—*Estimates of logarithmic variance for lettuce from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al------------	0.76786	*89	<1	10
B-------------	.02970	<1	<1	100
Ba------------	.26616	*84	1	15
Ca------------	.01873	*57	<1	43
Cd------------	.19049	*83	<1	17
Cu------------	.04490	*60	13	28
Fe------------	.24585	*80	<1	20
K-------------	.01187	*39	<1	61
Mg------------	.01784	9	18	73
Mn------------	.02864	*32	*26	42
Na------------	.40647	*97	<1	2
P-------------	.05514	*78	1	21
S-------------	.00934	*62	3	35
Se------------	.34107	*92	<1	8
Sr------------	.15104	*86	<1	14
Zn------------	.07308	<1	*92	8
Ash, percent of dry weight[1]	30.469	8	<1	92
Dry material, percent of fresh weight[1]	2.3780	*65	*15	20

[1]Variance calculated from nontransformed data.

TABLE 59.—*Estimates of logarithmic variance for potatoes from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al------------	0.13469	*17	13	69
B-------------	.01582	14	*42	44
Ba------------	.20911	*51	*37	12
Ca------------	.04021	*80	<1	19
Cd------------	.09590	*30	*44	25
Cu------------	.04633	*40	13	46
Fe------------	.02020	9	<1	91
K-------------	.00049	12	16	72
Mg------------	.01324	*28	8	64
Mn------------	.02960	*34	7	59
Na------------	.32647	*91	*6	4
P-------------	.01223	*38	<1	62
S-------------	.01419	*65	*18	17
Se------------	.06513	*55	<1	45
Sr------------	.07116	*47	*30	23
Ti------------	.27643	20	*39	41
Zn------------	.01549	17	*32	51
Ash, percent of dry weight[1]	1.4361	*70	9	21
Dry material, percent of fresh weight[1]	9.4412	*46	*37	17

[1]Variance calculated from nontransformed data.

TABLE 60.—*Estimates of logarithmic variance for snap beans from five areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
Al------------	0.16107	*35	*31	34
B-------------	.02637	*36	13	51
Ba------------	.23149	*80	<1	20
Ca------------	.01516	*52	*35	13
Cd------------	.08245	*24	<1	76
Co------------	.06705	11	*47	42
Cr------------	.11849	19	*55	26
Cu------------	.03798	*44	3	53
Fe------------	.03570	<1	9	91
K-------------	.00080	*30	*44	26
Mg------------	.02771	*26	*33	41
Mn------------	.06063	*39	6	55
Mo------------	.22318	*82	*7	11
Na------------	.11192	*61	*26	13
Ni------------	.05533	*37	<1	62
P-------------	.00458	15	*53	32
S-------------	.01062	5	14	82
Se------------	.03735	*56	<1	44
Sr------------	.07973	*58	<1	42
Ti------------	.19610	*56	*17	26
Zn------------	.00865	*63	<1	37
Ash, percent of dry weight[1]	2.0250	*42	*44	14
Dry material, percent of fresh weight[1]	70.435	*89	*6	5

[1]Variance calculated from nontransformed data.

TABLE 61.—*Estimates of logarithmic variance for sweet corn from four areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total $\log_{10}$ variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
B-------------	0.03628	*36	<1	64
Ca------------	.04097	*41	*27	32
Cd------------	.22368	28	*62	10
Cu------------	.02094	8	<1	92
Fe------------	.03115	*31	<1	69
K-------------	.00061	<1	12	88
Mg------------	.01926	<1	23	77
Mn------------	.02192	9	3	89
Na------------	.04312	<1	12	88
P-------------	.01839	<1	<1	99
S-------------	.02154	*58	*33	9
Se------------	.12375	*69	11	19
Sr------------	.04675	*62	<1	37
Zn------------	.03610	*74	*16	10
Ash, percent of dry weight[1]	.80232	*32	*43	24
Dry material, percent of fresh weight[1]	38.084	*53	*34	13

[1]Variance calculated from nontransformed data.

TABLE 62.—*Estimates of logarithmic variance for tomatoes from five areas of commercial production in the conterminous United States*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, ash, or dry material	Total log_{10} variance	Percent of total variance		
		Between areas	Between fields within areas	Between sites within fields
B-------------	0.02045	*27	5	68
Ba------------	.27622	*83	<1	17
Ca------------	.06251	*32	<1	68
Cd------------	.23011	*65	5	29
Cu------------	.05758	*66	13	20
Fe------------	.10148	*17	<1	83
K-------------	.00562	*19	24	57
Mg------------	.02104	*29	<1	71
Mn------------	.05752	*61	2	37
Na------------	.14455	*68	*16	16
P-------------	.02380	*42	18	40
S-------------	.00774	*58	3	39
Se------------	.23393	*59	3	38
Sr------------	.15461	*59	<1	41
Zn------------	.04834	*54	<1	45
Ash, percent of dry weight[1]	6.9331	*56	<1	44
Dry material, percent of fresh weight[1]	3.4890	*70	9	21

[1]Variance calculated from nontransformed data.

TABLE 63.—*Areas having significantly different concentrations of elements at the 0.05 probability level in fruits and vegetables*

[Concentrations given in ash, except as indicated. Significance tested at the 95-percent confidence level]

Element, ash or dry material	Kind of produce, and mean concentration, all areas	Area; mean concentration	
		High	Low
Al, ppm	Grapefruit, 380	Riverside County, Calif.; 810	Palm Beach County, Fla.; 150
	Orange, 430	Riverside County, Calif.; 970	Palm Beach County, Fla.; 110
	Peach, 430	Yakima County, Wash.; 1,200	Mesa County, Colo.; 220
	Lettuce, 520	Cumberland County, N.J.; 11,000	Palm Beach County, Fla.; 180
	Potato, 310	Cumberland County, N.J.; 645	Yakima County, Wash.; 195
	Snap bean, 950	Cumberland County, N.J.; 2,200	Berrien County, Mich.; 590
As, ppm[1]	Apple, 0.20	Berrien County, Mich.; 0.45	Mesa County, Colo.; 0.024
	Cucumber, 0.28	Cumberland County, N.J.; 0.63	Berrien Co., Mich.; 0.099
B, ppm	European grape, 370	San Joaquin County, Calif.; 450	Yakima County, Wash.; 310
	Grapefruit, 170	Hidalgo Co., Tex.; 240	Palm Beach County, Fla.; 150
	Orange, 260	Riverside County, Calif.; 320	Palm Beach County, Fla.; 177
	Peach, 380	Yakima County, Wash.; 560	Wayne Co., N.Y.; 300
	Pear, 440	Yakima County, Wash.; 580	San Joaquin County, Calif.; 340
	Plum, 370	Yakima County, Wash.; 610	Berrien County, Mich.; 280
	Snap bean, 180	Twin Falls County, Idaho; 245	Cumberland County, N.J.; 140
	Sweet corn, 58	Palm Beach County, Fla.; 85	Salem County, N.J.; 28
	Tomato, 84	Berrien Co., Mich.; 110	Palm Beach County, Fla.; 65
Ba, ppm	Apple, 77	Wayne County, N.Y.; 130	Salem County, N.J.; 46
	European grape, 62	San Joaquin County, Calif.; 100	Yakima County, Wash.; 36
	Grapefruit, 77	Hidalgo County, Tex.; 160	Palm Beach County, Fla.; 46
	Orange, 86	Hidalgo County, Tex.; 220	Palm Beach County, Fla.; 40
	Peach, 18	Yakima County, Wash.; 55	Mesa County, Colo.; 5.9
	Pear, 150	Berrien Co., Mich.; 250	San Joaquin County, Calif.; 100
	Plum, 32	Yakima County, Wash.; 60	Mesa County, Colo.; 13
	Cabbage, 52	Berrien County, Mich.; 150	Imperial County, Calif.; 22
	Carrot, 120	Hidalgo County, Tex.; 270	Imperial County, Calif.; 22
	Cucumber, 130	Berrien County, Mich.; 170	Cumberland County, N.J.; 30
	Dry bean, 55	San Joaquin County, Calif.; 110	Mesa County, Colo.; 29
	Lettuce, 67	Cumberland County, N.J.; 157	Imperial County, Calif.; 13
	Potato, 32	Cumberland County, N.J.; 81	Wayne County, N.Y.; 9.1
	Snap bean, 100	Wayne Co., N.Y.; 210	Palm Beach County, Fla.; 22
	Tomato, 17	Berrien County, Mich.; 54	Palm Beach County, Fla.; <3
Ca, percent	Apple, 1.1	Wyane County, N.Y.; 1.6	Gloucester County, N.J.; 0.82
	Grapefruit, 5.9	Hidalgo County, Tex.; 8.4	Yuma County, Ariz.; 3.6
	Orange, 7.8	Hidalgo County, Tex.; 8.6	Yuma County, Ariz.; 2.0
	Peach, 0.29	Yakima County, Wash.; 0.49	San Joaquin County, Calif.; 0.18
	Cabbage, 6.6	Cumberland County, N.J., and Hidalgo County, Tex.; 7.7	Imperial County, Calif,; 5.5
	Dry bean, 2.7	Mesa County, Colo.; 4.5	Wayne County, N.Y.; 2.1
	Lettuce, 4.2	Palm Beach County, Fla.; 5.3	Cumberland County, N.Y.; 3.1
	Potato, 0.70	Twin Falls County, Idaho; 1.3	Wayne County, N.Y.; 0.48
	Snap bean, 7.8	Wayne County, N.Y.; 9.6	Berrien County, Mich.; 5.5
	Sweet corn, 0.22	Palm Beach County, Fla.; 0.34	Salem County, N.J.; 0.16
	Tomato, 1.2	Berrien County, Mich.; 1.8	Palm Beach County, Fla.; 0.70
Cd, ppm	Pear, 0.27	Wayne County, N.Y.; 0.68	San Joaquin, Calif.; 0.13
	Cabbage, 1.0	Cumberland County, N.J., and Imperial County, Calif.; 1.7	Hidalgo County, Tex.; 0.59
	Carrot, 2.1	Imperial County, Calif.; 3.4	Hidalgo County, Tex.; 1.3
	Cucumber, 0.94	Berrien County, Mich.; 1.5	San Joaquin, Calif.; 0.60
	Dry bean, 0.26	Mesa County, Colo.; 0.45	San Joaquin, Calif.; 0.20
	Lettuce, 3.0	Imperial County, Calif.; 8.7	Palm Beach County, Fla.; 0.94
	Potato, 1.8	Yakima County, Wash.; 2.8	Cumberland County, N.J.; 1.1
	Snap bean, 0.34	Palm Beach County, Fla.; 0.56	Cumberland County, N.J.; 0.23
	Tomato, 1.0	Berrien County, Mich.; 2.7	Palm Beach County, Fla., and San Joaquin County, Calif.; 0.38
Co, ppm	Cucumber, 0.88	Berrien County, Mich.; 0.74	Cumberland County, N.J.; <1
	Dry bean, 4.8	Mesa County, Colo.; 10	Wayne County, N.Y.; 1.9
Cu, ppm	European grape, 63	Yakima County, Wash.; 43	San Joaquin County; Calif.; 29
	Peach, 56	Wayne County, N.Y.; 83	Mesa County, Colo.; 33
	Plum, 51	Wayne County, N.Y.; 92	Mesa County, Colo.; 29
	Cabbage, 31	Berrien County, Mich.; 39	Cumberland County; N.J.; 24
	Lettuce, 58	Imperial County, Calif.; 84	Cumberland County; N.J.; 36
	Potato, 88	Cumberland County, N.J.; 135	Wayne County, N.Y.; 62
	Snap bean, 73	Berrien County, Mich.; 170	Wayne County, N.Y.; 49
	Tomato, 73	Palm Beach County, Fla.; 121	San Joaquin County, Calif.; 37
Fe, ppm	American Grape, 430	Yakima County, Wash.; 650	Wayne County, N.Y.; 280
	European grape, 490	San Joaquin County, Calif.; 680	Yakima County, Wash.; 360
	Grapefruit, 310	Riverside County, Calif.; 560	Palm Beach County, Fla.; 210
	Peach, 300	Yakima County, Wash.; 750	Mesa County, Colo.; 140
	Plum, 200	Wayne County, N.Y.; 280	Mesa County, Colo.; 120
	Cucumber, 680	Berrien County, Mich.; 1,000	San Joaquin County, Calif.; 480
	Lettuce, 960	Cumberland County, N.J.; 4,500	Hidalgo County, Texas; 534
	Sweet corn, 670	Berrien County, Mich.; and Salem County, N.J.; 790	Twin Falls County, Idaho; 470
	Tomato, 480	Berrien County, Mich.; 740	San Joaquin County, Calif.; 300

TABLE 63.—*Areas having significantly different concentrations of elements at the 0.05 probability level in fruits and vegetables*—Continued

Element, ash, or dry material	Kind of produce, and mean concentration, all areas	Area; mean concentration	
		High	Low
K, percent-----	Apple, 35	Gloucester County, N.J.; and Mesa County, Colo.; 38	Berrien County, Mich.; 29
	European grape, 20	San Joaquin County, Calif.; 29	Yakima County, Wash.; 14
	Grapefruit, 36	Palm Beach County, Fla., and Hidalgo County, Texas; 39	Yuma County, Ariz.; 29
	Cabbage, 36	Berrien County, Mich.; 40	Hidalgo County, Texas; 34
	Lettuce, 36	Hidalgo County, Texas, 39	Cumberland County, N.J.; 28
	Snap bean, 35	Berrien County, Mich.; 39	Cumberland County, N.J.; 34
Li, ppm--------	Grapefruit, 3.7	Yuma County, Ariz.; 12	Palm Beach County, Fla.; <4
	Orange, 5.3	Yuma County, Ariz.; 20	Palm Beach County, Fla.; <4
	Pear, 1.1	Mesa County, Colo.; 7.3	All others; <4
	Cabbage, 4.9	Imperial County, Calif.; 7.1	Berrien County, Mich., and Cumberland County, N.J.; <4
	Carrot, 2.3	Imperial County, Calif.; 3.5	Hidalgo County, Tex.; <4
	Lettuce, 2.0	Imperial County, Calif.; 6.0	Palm Beach County, Fla.; <4
	Snap bean, 0.52	Twin Falls County, Idaho; 12	Palm Beach County, Fla.; <4
Mg, percent----	Orange, 2.1	Palm Beach County, Fla.; 2.5	Yuma County, Ariz.; 1.7
	Peach, 1.1	Yakima County, Wash.; 1.5	Mesa County, Colo.; 0.97
	Potato, 2.0	Wayne County, N.Y.; 2.4	Cumberland County, N.J.; 1.2
	Snap bean, 4.0	Wayne County, N.Y.; 5.4	Palm Beach County, Fla.; 3.0
	Tomato, 1.7	Berrien County, Mich.; 2.2	Palm Beach County, Fla.; 1.3
Mn, ppm--------	Apple, 74	Wayne County, N.Y.; 130	Mesa County, Colo.; 29
	European grape, 62	San Joaquin County, Calif.; 93	Yakima County, Wash.; 2.4
	Grapefruit, 34	Hidalgo County, Tex.; 47	Palm Beach County, Fla.; 24
	Orange, 43	Palm Beach County, Fla.; 51	Yuma County, Ariz.; 42
	Peach, 42	Yakima County, Wash., 78	Mesa County, Colo., 23
	Plum, 53	Berrien County, Mich., 100	Mesa County, Colo.; 27
	Carrot, 120	Hidalgo County, Tex., 164	Imperial Counmty, Calif.; 94
	Cucumber, 130	Berrien County, Mich.; 283	Cumberland County, N.J.; 59
	Lettuce, 210	Cumberland County, N.J.; 253	Imperial County, Calif.; 154
	Potato, 86	Cumberland County, N.J.; 114	Twin Falls County, Idaho; 62
	Snap bean, 300	Wayne County, N.Y., 460	Cumberland County, N.J.; 200
	Tomato, 140	Berrien County, Mich.; 215	Palm Beach County, Fla.; 73
Mo, ppm--------	Cabbage, 9.1	Berrien County, Mich., and Cumberland County, N.J.; 15	Imperial County, Calif.; 6.1
	Dry bean, 84	Mesa County, Colo.; 240	Wayne County N.Y.; 31
	Snap bean, 30	Twin Falls County, Idaho; 140	Wayne County, N.Y., 13
Na, ppm--------	American grape, 390	Yakima County, Wash.; 1,300	Berrien County, Mich.; 220
	Apple, 600	Gloucester County, N.J.; 1,200	Berrien County, Mich.; 350
	European grape, 770	San Joaquin County, Calif.; 1,100	Yakima County, Wash.; 530
	Grapefruit, 1,600	Hidalgo County, Tex.; 2,100	Yuma County, Ariz.; 1,300
	Orange, 1,600	Riverside County, Calif.; 5,400	Yuma County, Ariz.; 1,300
	Cabbage, 29,000	Hidalgo County, Tex.; 46,000	Berrien County, Mich.; 4,500
	Carrot, 4,800	Imperial County, Calif.; 6,700	Hidalgo County, Tex.; 3.500
	Cucumber, 2.000	San Joaquin County, Calif.; 2,700	Berrien County, Mich.; 1,500
	Lettuce, 11,000	Imperial County, Calif.; 54,000	Cumberland County, N.J.; 2,200
	Potato, 830	Twin Falls County, Idaho; 3.900	Wayne County, N.Y.; 310
	Snap bean, 360	Twin Falls County, Idaho; 470	Wayne County, N.Y.; 170
	Tomato, 1,800	San Joaquin County, Calif.; 11,000	Cumberland County, N.J.; 1,300
Ni, ppm--------	Dry bean, 45	San Joaquin County, Calif.; 78	Twin Falls County, Idaho; 26
	Snap bean, 24	Berrien County, Mich.; 46	Palm Beach County, Fla.; 15
P, percent-----	European grape, 2.3	San Joaquin County, Calif.; 3.6	Yakima County, Wash., 1.4
	Grapefruit, 3.0	Palm Beach County, Fla.; 3.5	Yuma County, Ariz.; 2.0
	Orange, 2.7	Palm Beach County, Fla.; 3.3	Riverside County, Calif.; 2.4
	Peach, 1.5	Yakima County, Wash.; 2.4	Mesa County, Colo.; 1.0
	Cabbage, 3.2	Berrien County, Mich., Cumberland County, N.J., and Imperial County Calif.; 3.6	Hidalgo County, Tex.; 2.6
	Dry bean, 9.5	San Joaquin County, Calif.; 11	All others; 9
	Lettuce, 3.0	Imperial County, Calif.; 3.9	Cumberland County, N.J.; 1.5
	Potato, 4.1	Wayne County, N.Y.; 4.4	Yakima County, Wash.; 0.46
	Tomato, 2.4	Berrien County, Micn., 3.2	Palm Beach County, Fla.; 1.6
Pb, ppm--------	Apple, <20	Berrien County, Mich.; 54	Yakima County, Wash.; <20
	Pear, 9.8	Berrien County, Mich.; 16	Yakima County, Wash., San Joaquin County, Calif., and Mesa County, Colo.; <20
S, percent[1]----	American grape, 0.062	Berrien County, Mich.; 0.071	Yakima County, Wash.; 0.049
	Apple, 0.026	Gloucester County, N.J.; 0.034	Yakima County, Wash.; 0.018
	Grapefruit, 0.066	Riverside County, Calif.; 0.083	Hidalgo County, Tex.; 0.053
	Orange, 0.067	Riverside County, Calif.; 0.075	Palm Beach County, Fla.; 0.060
	Peach, 0.043	Wayne County, N.Y.; 0.068	Yakima County, Wash.; 0.029
	Pear, 0.029	Wayne County, N.Y.; 0.035	Mesa County, Colo.; 0.023
	Cabbage, 0.72	Imperial County, Calif.; 0.80	Berrien County, Mich.; 0.55
	Carrot, 0.13	Imperial County, Calif., 0.15	Hidalgo County, Tex.; 0.11
	Dry bean, 0.19	San Joaquin County, Calif.; 0.21	Twin Falls County, Idaho; 0.18
	Lettuce, 0.28	Cumberland County, N.J.; 0.34	Palm Beach County, Fla.; 0.22
	Potato, 0.12	Cumberland County, N.J.; 0.16	Twin Falls County, Idaho; 0.093
	Snap bean, 0.17	Palm Beach County, Fla.; 0.19	Wayne County, N.Y.; 0.15
	Tomato, 0.21	Berrien County, Mich., and Cumberland County, N.J.; 0.25	San Joaquin County, Calif.; 0.16

TABLE 63.—*Areas having significantly different concentrations of elements at the 0.05 probability level in fruits and vegetables*—Continued

Element, ash, or dry material	Kind of produce, and mean concentration, all areas	Area; mean concentration	
		High	Low
Se, ppm[1]	American grape, 0.012	Yakima County, Wash.; 0.018	Wayne County N.Y.; 0.0076
	Pear, 0.0058	Mesa County, Colo.; 0.012	San Joaquin County, Calif.; 0.0035
	Plum, 0.0057	Mesa County, Colo.; 0.011	Yakima County, Wash.; 0.0036
	Cabbage, 0.15	Imperial County, Calif.; 0.31	Cumberland County, N.J.; 0.057
	Carrot, 0.064	Imperial County, Calif.; 0.13	Hidalgo County, Tex.; 0.032
	Cucumber, 0.059	San Joaquin County, Calif.; 0.098	Berrien County, Mich.; 0.034
	Dry bean, 0.030	Mesa County, Colo.; 0.11	San Joaquin County, Calif.; 0.020
	Lettuce, 0.057	Cumberland County, N.J.; 0.078	Palm Beach County, Fla.; 0.008
	Potato, 0.011	Yakima County, Wash.; 0.056	Cumberland County, N.J.; 0.009
	Snap bean, 0.028	Cumberland County, N.J.; 0.045	Wayne County, N.Y.; 0.020
	Sweet corn, 0.011	Salem County, N.J.; 0.026	Palm Beach County, Fla.; 0.0048
	Tomato, 0.036	San Joaquin County, Calif.; 0.16	Palm Beach County, Fla.; 0.015
Sr, ppm	American grape, 160	Yakima County, Wash.; 250	Berrien County, Mich.; 150
	Apple, 97	Mesa County, Colo.; 207	Berrien County, Mich., and Gloucester County, N.J.; 46
	European grape, 240	San Joaquin County, Calif.; 470	Yakima County, Wash.; 130
	Grapefruit, 650	Riverside County, Calif.; 1,300	Palm Beach County, Fla.; 260
	Orange, 710	Riverside County, Calif.; 1,400	Palm Beach County, Fla.; 200
	Peach, 46	Yakima County, Wash.; 82	Wayne County, N.Y.; 27
	Cabbage, 690	Hidalgo County, Tex., and Imperial County, Calif.; 840	Berrien County, Mich.; 200
	Cucumber, 240	San Joaquin County, Calif.; 420	Cumberland County, N.Y.; 84
	Dry bean, 170	Mesa County, Colo.; 360	Wayne County, N.Y.; 46
	Lettuce, 530	Palm Beach County, Fla.; 1,000	Cumberland County, N.J.; 157
	Potato, 61	Yakima County, Wash.; 100	Wayne County, N.Y.; 40
	Snap bean, 310	Palm Beach County, Fla.; 470	Berrien County, Mich.; 150
	Sweet corn, 16	Palm Beach County, Fla.; 26	Salem County, N.J.; 7.4
	Tomato, 83	San Joaquin County, Calif.; 280	Berrien County, Mich.; 52
Ti ppm	American grape[2], 7.4	Wayne County, N.Y.; 40	Berrien County, Mich.; 2.8
	Apple, 10	Berrien County, Mich., and Yakima County, Wash.; 16	Wayne County, N.Y.; 3
	Potato[2], 9.6	Cumberland County, N.J.; 36	Wayne County N.Y.; 2.5
	Snap bean, 45	Cumberland County, N.J.; 130	Twin Falls County, Idaho; 22
Zn, ppm	Apple, 67	Gloucester County, N.J.; 86	Yakima County, Wash.; 49
	European grape, 66	San Joaquin County, Calif.; 87	Yakima County, Wash.; 50
	Grapefruit, 130	Hidalgo County, Tex., and Riverside County, Calif.; 150	Yuma County, Ariz.; 97
	Pear, 150	Wayne County, N.Y.; 210	Mesa County, Colo.; 100
	Plum, 120	Wayne County, N.Y.; 208	Mesa County, Colo.; 65
	Cabbage, 270	Imperial County, Calif.; 340	Hidalgo County, Tex.; 210
	Carrot, 290	Imperial County, Calif.; 417	Hidalgo County, Tex.; 205
	Cucumber, 500	Berrien County, Mich.; 630	Cumberland County, N.J.; 360
	Dry bean, 790	Wayne County, N.Y.; 890	Twin Falls County, Idaho; 700
	Snap bean, 550	Palm Beach County, Fla.; 730	Wayne County, N.Y.; 490
	Sweet corn, 980	Palm Beach County, Fla.; 1,400	Twin Falls County, Idaho, 590
	Tomato, 220	Berrien County, Mich.; 370	San Joaquin County, Calif.; 130
Zr[2], ppm	Peach, 4.2	Mesa County, Colo.; 9.6	All others; <20
	Lettuce, 4.0	Cumberland County, N.J.; 75	All others; <20
	Snap bean, 37	Cumberland County, N.J.; 16	Berrien County, Mich., Wayne County N.Y., and Twin Falls County, Idaho; <2.0
Ash, percent of dry weight	Grapefruit, 3.8	Yuma County, Ariz.; 5.6	Hidalgo County, Tex.; 2.6
	Orange, 3.6	Yuma County, Ariz.; 4.1	Hidalgo County, Tex.; 3.1
	Peach, 6.7	Yakima County, Wash.; 8.9	San Joaquin County, Calif.; 6.0
	Pear, 2.1	San Joaquin County, Calif.; 2.7	Mesa County, Colo.; 1.7
	Cabbage, 9.3	Cumberland County, N.J.; 12	Hidalgo County, Tex.; 7.7
	Carrot, 7.1	Hidalgo County, Tex.; 7.6	Imperial County, Calif.; 6.7
	Cucumber, 10	Cumberland County, N.J.; 12	Berrien County, Mich.; 8.7
	Dry bean, 3.9	San Joaquin County, Calif.; 4.0	Twin Falls County, Idaho, and Mesa County, Colo.; 3.7
	Potato, 4.2	Cumberland County, N.J.; 5.8	Twin Falls County, Idaho; 3.3
	Snap bean, 7.0	Cumberland County, N.J.; 8.0	Berrien County, Mich.; 5.5
	Sweet corn, 2.6	Palm Beach County, Fla.; 3.3	Salem County, N.J.; 2.0
	Tomato, 12	Cumberland County, N.J., and Palm Beach County, Fla.; 14	Yakima County, Wash.; 6.4
Dry material, percent of fresh weight	American grape, 16	Yakima County, Wash.; 20	Berrien County, Mich.; 14
	Apple, 14	Berrien County, Mich., and Yakima County, Wash.; 16	Wayne County, N.Y., and Gloucester County, N.J.; 14
	Grapefruit, 10	Hidalgo County, Tex.; 13	Yuma County, Ariz.; 8.6
	Orange, 13	Hidalgo County, Tex., and Riverside County, Calif.; 14	Yuma County, Ariz.; 13
	Peach, 10	Yakima County, Wash.; 14	Wayne County, N.Y.; 6.9
	Pear, 15	Mesa County, Colo.; 18	Wayne County, N.Y.; 13
	Plum, 14	Mesa County, Colo.; 18	Berrien County, Mich., and Wayne County, N.Y.; 12
	Cabbage, 7.8	Hidalgo County, Tex.; 8.9	Cumberland County, N.J.; 5.5
	Carrot, 12	Imperial County, Calif.; 13	Hidalgo County, Tex.; 11
	Dry bean, 85	Mesa County, Colo.; 90	Wayne County, N.Y.; 81
	Lettuce, 4.2	Cumberland County., N.J.; 6.2	Palm Beach County, Fla.; 3.5
	Potato, 19	Yakima County, Wash.; 21	Cumberland County, N.J.; 16
	Snap bean, 11	Twin Falls County, Idaho; 23	Wayne County, N.Y.; 7.3
	Sweet corn, 25	Salem County, N.J.; 32	Palm Beach County, Fla.; 21
	Tomato, 5.2	Yakima County, Wash.; 6.4	Berrien County, Mich.; 3.3

[1]Concentrations in dry material.
[2]Probability level could not be computed because of an excessive number of values below the limit of determination.

TABLE 64.—*Element concentrations and pH of soils that supported American grape vines in areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available]

Element,	Areas of commercial production											
	Berrien County, Mich.				Wayne County, N.Y.				Yakima County, Wash.			
or pH	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	3.0	1.30	1.9 - 3.5	5:5	4.0	1.04	3.8 - 4.1	5:5	6.1	1.05	5.7 - 6.4
As	5:5	6.1	2.01	3.2 - 15	5:5	5.6	1.60	2.9 - 10	5:5	6.0	1.35	3.7 - 8.3
B	4:5	24	2.12	<10 - 50	5:5	24	1.25	20 - 30	2:5	7.3	2.58	<10 - 20
Ba	5:5	450	1.26	300 - 500	5:5	370	1.32	300 - 500	5:5	610	1.20	500 - 700
Be	0:5	<1	--	--	0:5	<1	--	--	4:5	.95	1.10	<1 - 1.0
C, total[1]	5:5	1.2	2.00	.56 - 2.4	5:5	2.2	1.28	1.8 - 3.3	5:5	2.0	1.24	1.4 - 2.3
Ca[1]	5:5	.41	1.12	.36 - .46	5:5	.74	1.28	.53 - 1.0	5:5	3.1	1.26	2.5 - 4.2
Co	5:5	6.1	1.20	5.0 - 7.0	5:5	4.5	1.26	3.0 - 5.0	5:5	15	1.00	--
Cr	5:5	24	1.37	15 - 30	5:5	19	1.14	15 - 20	5:5	52	1.42	30 - 70
Cu	5:5	36	3.45	7 - 150	5:5	35	1.94	15 - 70	5:5	31	1.58	20 - 50
F	0:5	<400	--	--	1:5	--	--	<400 - 1,400	5:5	570	1.57	400 - 1,200
Fe, total[1]	5:5	1.3	1.26	1.0 - 1.7	5:5	1.7	1.11	1.5 - 1.9	5:5	4.5	1.07	4.0 - 4.8
Ga	5:5	7.5	1.34	5 - 10	5:5	13	1.25	10 - 15	5:5	19	1.14	15 - 20
Ge	5:5	1.1	1.10	.97 - 1.2	5:5	1.2	1.08	1.1 - 1.3	5:5	1.5	1.09	1.3 - 1.6
Hg	5:5	.048	1.67	.023 - .092	5:5	.057	1.34	.042 - .085	5:5	.028	1.20	.023 - .034
K[1]	5:5	1.6	1.22	1.2 - 1.9	5:5	1.4	1.06	1.3 - 1.5	5:5	1.7	1.05	1.5 - 1.8
La	2:5	26	1.16	<30 - 30	0:5	<30	--	--	3:5	30	1.64	<30 - 50
Li	5:5	15	1.38	9 - 21	5:5	21	1.24	15 - 27	5:5	20	1.06	19 - 22
Mg[1]	5:5	.22	1.24	.16 - .27	5:5	.38	1.12	.32 - .42	5:5	1.4	1.11	1.2 - 1.5
Mn	5:5	700	1.28	500 - 1,000	5:5	260	1.25	200 - 300	5:5	570	1.20	500 - 700
Na[1]	5:5	.62	1.12	.57 - .73	5:5	1.1	1.08	.98 - 1.1	5:5	1.7	1.03	1.7 - 1.8
Nb	2:5	8.0	1.23	<10 - 10	4:5	9.5	1.10	<10 - 10	5:5	10	1.00	--
Ni	5:5	9.8	1.17	7 - 10	5:5	8.1	1.22	7 - 10	5:5	20	1.28	15 - 30
Pb	5:5	21	2.28	10 - 50	5:5	22	1.35	15 - 30	5:5	17	1.36	15 - 30
Rb	5:5	55	1.30	40 - 75	5:5	48	1.13	40 - 55	5:5	61	1.07	55 - 65
S, total	0:5	<800	--	--	2:5	780	1.13	<800 - 900	2:5	740	1.36	<800 - 1,100
Sc	4:5	3.8	1.45	<3 - 5	5:5	4.5	1.26	3 - 5	5:5	19	1.14	15 - 20
Se	2:5	.081	2.31	<.10 - .25	2:5	.086	1.77	<.10 - .19	4:5	.16	1.69	<.10 - .32
Si[1]	5:5	36	1.05	34 - 38	5:5	33	1.06	30 - 35	5:5	27	1.03	26 - 28
Sn	5:5	.88	1.89	.59 - 2.7	5:5	.54	1.56	.28 - .96	5:5	.97	1.59	.47 - 1.7
Sr	5:5	94	1.37	70 - 150	5:5	150	1.00	--	5:5	300	1.00	--
Th	5:5	5.9	1.39	4.0 - 8.6	4:4	5.1	1.37	3.8 - 6.9	5:5	9.3	1.22	7 - 12
Ti[1]	5:5	.26	1.35	.16 - .35	5:5	.37	1.09	.33 - .40	5:5	.69	1.09	.60 - .75
U	5:5	1.7	1.43	.92 - 2.3	5:5	2.1	1.18	1.7 - 2.5	5:5	2.3	1.08	.21 - 2.6
V	5:5	34	1.48	20 - 50	5:5	41	1.32	30 - 50	5:5	150	1.00	--
Y	4:5	12	1.39	<10 - 15	5:5	15	1.28	10 - 20	5:5	22	1.35	15 - 30
Yb	4:5	1.4	1.44	<1 - 2	5:5	1.5	1.28	1 - 2	5:5	2.8	1.20	2 - 3
Zn	5:5	56	1.22	42 - 68	5:5	58	1.11	49 - 63	5:5	140	1.89	82 - 410
Zr	5:5	170	1.72	70 - 300	5:5	230	1.90	150 - 700	5:5	180	1.84	100 - 500
pH[2]	5:5	5.9	.71	5.2 - 6.8	5:5	5.9	.94	4.8 - 6.8	5:5	7.4	.44	6.8 - 8.0

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

TABLE 65.—*Element concentrations and pH of soils that supported apple trees in areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available.]

Element,	Areas of commercial production								Areas of commercial production (continued)												
	Berrien County, Mich.				Wayne County, N.Y.				Gloucester County, N.J.				Yakima County, Wash.				Mesa County, Colo.			
or pH	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	2.8	1.12	2.6 - 3.4	5:5	3.6	1.11	3.2 - 4.2	5:5	1.0	1.30	.67 - 1.3	5:5	7.3	1.08	6.7 - 8.0	5:5	4.9	1.06	4.7 - 5.3
As	5:5	16	3.09	5.6 - 90	5:5	46	2.61	13 - 100	5:5	35	1.37	23 - 49	5:5	32	3.48	11 - 130	5:5	17	1.42	13 - 27
B	5:5	26	1.50	20 - 50	3:5	12	2.30	<10 - 30	5:5	28	1.72	20 - 70	1:5	--	--	<10 - 20	5:5	61	1.20	50 - 70
Ba	5:5	410	1.32	300 - 500	5:5	330	1.26	300 - 500	5:5	160	1.14	150 - 200	5:5	570	1.36	500 - 1,000	5:5	450	1.26	300 - 500
Be	0:5	--	--	<1 - 1	1:5	<1	--	--	0:5	<1	--	--	4:5	.95	1.10	<1 - 1	4:5	.95	1.10	<1 - 1
C, total[1]	5:5	1.3	1.20	1.0 - 1.5	5:5	1.7	2.65	.34 - 3.5	5:5	1.2	1.43	.82 - 2.1	5:5	1.9	1.40	1.3 - 3.1	5:5	2.9	1.03	2.8 - 3.1
Ca[1]	5:5	.48	1.31	.36 - .70	5:5	.66	1.30	.45 - .92	5:5	.17	1.27	.13 - .23	5:5	2.8	1.07	2.5 - 3.0	5:5	2.5	1.06	2.4 - 2.7
Co	5:5	4.1	1.32	3 - 5	5:5	4.8	1.35	3 - 7	0:5	<3	--	--	5:5	16	1.14	15 - 20	5:5	5.7	1.20	5 - 7
Cr	5:5	22	1.35	15 - 30	5:5	20	1.28	15 - 30	5:5	29	1.95	15 - 70	5:5	57	1.20	50 - 70	5:5	50	1.00	--
Cu	5:5	18	1.50	10 - 30	5:5	19	1.33	15 - 30	5:5	20	1.28	15 - 30	5:5	36	1.63	20 - 70	5:5	31	1.58	20 - 50
F	0:5	<400	--	--	2:5	--	--	<400 - 400	1:5	<400	--	--	5:5	520	1.34	400 - 800	5:5	730	1.25	500 - 900
Fe, total[1]	5:5	1.0	1.15	.83 - 1.2	5:5	1.8	1.13	1.6 - 2.2	5:5	1.2	1.14	1.0 - 1.4	5:5	4.2	1.08	3.9 - 4.7	5:5	2.3	1.02	2.2 - 2.4
Ga	5:5	7.1	1.57	5 - 15	5:5	14	1.20	10 - 15	1:5	<5	--	<5 - 5	5:5	19	1.14	15 - 20	5:5	16	1.14	15 - 20
Ge	5:5	1.1	1.13	.99 - 1.3	5:5	.70	1.59	.39 - 1.2	5:5	.91	1.22	.71 - 1.1	4:5	.64	3.54	<.1 - 1.6	5:5	1.3	1.17	1.0 - 1.5
Hg	5:5	.23	2.60	.059 - .68	5:5	.20	1.50	.14 - .32	5:5	.071	2.93	.01 - .13	5:5	.044	1.94	.018 - .11	5:5	.041	1.58	.023 - .065
K[1]	5:5	1.5	1.22	1.1 - 1.9	5:5	1.4	1.10	1.2 - 1.6	5:5	.60	1.04	.57 - .63	5:5	1.4	1.12	1.2 - 1.7	5:5	1.9	1.04	1.8 - 2.0
La	0:5	<30	--	--	1:5	<30	--	<30 - 100	0:5	<30	--	--	0:5	<30	--	--	3:5	28	1.11	<30 - 30
Li	5:5	12	1.41	9 - 21	5:5	19	1.29	15 - 29	5:5	8.9	1.17	7 - 11	5:5	21	1.05	20 - 23	5:5	35	1.05	33 - 37
Mg[1]	5:5	.19	1.23	.16 - .27	5:5	.39	1.25	.31 - .54	5:5	.13	1.20	.11 - .17	5:5	1.1	1.09	.95 - 1.2	5:5	1.3	1.02	1.2 - 1.3
Mn	5:5	590	2.07	200 - 1,500	5:5	260	1.50	200 - 500	5:5	130	1.25	100 - 150	5:5	670	1.61	500 - 1,500	5:5	170	1.17	150 - 200
Na[1]	5:5	.57	1.05	.53 - .60	5:5	.98	1.07	.91 - 1.1	4:5	.086	1.23	<.07 - .11	5:5	2.0	1.08	1.9 - 2.2	5:5	.68	1.04	.65 - .71
Nb	3:5	.9	1.16	<10 - 10	3:5	8.9	1.16	<10 - 10	4:5	9.5	1.10	<10 - 10	3:5	8.9	1.16	<10 - 10	4:5	9.5	1.10	<10 - 10
Ni	5:5	7.1	1.41	5 - 10	5:5	7.1	1.57	5 - 15	2:5	1.3	2.62	<2 - 5	5:5	22	1.35	15 - 30	5:5	18	1.17	15 - 20
Pb	5:5	100	2.77	20 - 200	5:5	130	2.10	50 - 300	5:5	160	1.36	100 - 200	5:5	190	3.91	70 - 1,000	5:5	71	1.41	50 - 100
Rb	5:5	53	1.26	40 - 75	5:5	42	1.42	30 - 70	5:5	26	1.22	20 - 35	5:5	51	1.11	45 - 60	5:5	96	1.04	90 - 100
S, total	1:5	--	--	<800 - 1,000	2:5	630	2.01	<800 - 1,700	1:5	--	--	<800 - 1,000	3:5	830	1.18	<800 - 1,000	1:5	--	--	<800 - 940
Sc	3:5	2.8	1.50	<3 - 5	5:5	4.8	1.35	3 - 7	0:5	<3	--	--	5:5	17	1.17	15 - 20	5:5	7	1.00	--
Se[1]	2:4	.095	4.52	<.1 - .61	0:5	<.1	--	--	0:5	<.1	--	--	3:5	.11	2.22	<.1 - .34	3:5	.13	2.32	<.1 - .4
Si[1]	5:5	38	1.05	35 - 39	5:5	34	1.04	33 - 36	5:5	39	1.05	37 - 41	5:5	27	1.03	26 - 28	5:5	30	1.02	29 - 30
Sn	4:5	.28	3.02	<.1 - .9	4:5	.33	3.85	<.1 - 1.1	5:5	2.0	2.06	1.1 - 6.9	5:5	1.1	1.41	.84 - 1.9	5:5	.78	1.74	.36 - 1.6
Sr	5:5	82	1.52	50 - 150	5:5	140	1.20	100 - 150	5:5	13	1.25	10 - 15	5:5	500	1.00	--	5:5	170	1.17	150 - 200
Th[1]	4:4	4.7	1.31	3.8 - 7.0	4:4	5.2	1.65	3.2 - 10	4:4	8.5	1.26	6.1 - 10	5:5	6.7	1.45	3.6 - 8.8	5:5	9.8	1.23	7.2 - 12
Ti[1]	5:5	.23	1.25	.17 - .31	5:5	.37	1.16	.31 - .47	5:5	.58	1.47	.29 - .72	5:5	.59	1.05	.54 - .62	5:5	.30	1.04	.29 - .32
U	5:5	1.7	1.31	1.4 - 2.7	5:5	1.7	1.35	1.0 - 2.3	5:5	2.5	1.20	1.9 - 3.1	5:5	1.9	1.08	1.6 - 2.0	5:5	3.9	1.03	3.7 - 4.0
V	5:5	25	1.60	15 - 50	5:5	39	1.48	30 - 70	5:5	20	1.57	10 - 30	5:5	150	1.28	100 - 200	5:5	93	1.17	70 - 100
Y	4:5	9.5	1.10	<10 - 10	5:5	12	1.38	10 - 20	5:5	13	1.25	10 - 15	5:5	17	1.17	15 - 20	5:5	17	1.17	15 - 20
Yb	5:5	1.2	1.25	1 - 1.5	5:5	1.5	1.28	1 - 2	4:5	1.4	1.66	1 - 2	4:4	1.9	1.15	1.5 - 7	5:5	1.7	1.17	1.5 - 2.0
Zn	5:5	66	1.28	49 - 97	5:5	56	1.21	44 - 69	5:5	55	1.30	42 - 82	5:5	130	1.27	110 - 200	5:5	130	1.06	120 - 140
Zr	5:5	170	1.50	100 - 300	5:5	170	1.94	100 - 500	5:5	420	1.99	200 - 700	5:5	140	1.20	100 - 150	5:5	140	1.42	100 - 200
pH[2]	5:5	6.6	.84	5.6 - 7.9	5:5	5.5	.75	4.6 - 6.2	5:5	5.5	.34	5.2 - 6.0	5:5	6.6	.60	6.1 - 7.4	5:5	7.8	1.00	7.7 - 7.9

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

Table 66.—*Element concentrations and pH of soils that supported European grape vines in areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available]

Element,	Areas of commercial production							
	Yakima County, Wash.				San Joaquin County, Calif.			
or pH	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	6.6	1.04	6.2 - 6.9	5:5	7.1	1.04	6.6 - 7.4
As	5:5	4.7	1.19	3.6 - 5.6	5:5	10	1.11	9.4 - 12
B	3:5	12	2.30	<10 - 30	0:5	<10	--	--
Ba	5:5	570	1.20	500 - 700	5:5	930	1.17	700 - 1,000
Be	5:5	1.0	1.00	--	4:5	.95	1.10	<1 - 1
C, total[1]	5:5	.95	1.24	.73 - 1.3	5:5	.97	1.22	.71 - 1.2
Ca[1]	5:5	2.9	1.03	2.8 - 3.0	5:5	2.5	1.03	2.4 - 2.6
Co	5:5	15	1.00	--	5:5	7	1.00	--
Cr	5:5	39	1.48	30 - 70	5:5	26	1.25	20 - 30
Cu	5:5	22	1.20	20 - 30	5:5	27	1.58	15 - 50
F	5:5	550	1.16	500 - 700	2:5	370	1.24	<400 - 500
Fe, total[1]	5:5	4.8	1.03	4.7 - 5.0	5:5	2.6	1.08	2.3 - 2.7
Ga	5:5	18	1.17	15 - 20	5:5	17	1.17	15 - 20
Ge	5:5	1.4	1.11	1.2 - 1.5	5:5	1.2	1.21	.94 - 1.5
Hg	5:5	.030	1.96	.01 - .16	4:5	.021	1.80	<.01 - .039
K[1]	5:5	1.6	1.06	1.5 - 1.7	5:5	2.0	1.03	2.0 - 2.1
La	3:5	31	1.93	<30 - 70	1:5	--	--	<30 - 30
Li	5:5	22	1.05	20 - 23	5:5	12	1.07	11 - 13
Mg[1]	5:5	1.3	1.03	1.3 - 1.4	5:5	.60	1.03	.58 - .63
Mn	5:5	480	1.35	300 - 700	5:5	410	1.32	300 - 500
Na[1]	5:5	1.8	1.02	1.8 - 1.9	5:5	2.3	1.05	2.2 - 2.5
Nb	4.5	9.5	1.10	<10 - 10	3:5	8.9	1.16	<10 - 10
Ni	5:5	19	1.14	15 - 20	5:5	8.7	1.36	5 - 10
Pb	5:5	17	1.36	15 - 30	5:5	22	1.35	15 - 30
Rb	5:5	61	1.09	55 - 70	5:5	72	1.04	70 - 75
S, total	1:5	--	--	<800 - 1,100	0:5	--	--	<800 - 800
Sc	5:5	17	1.17	15 - 20	5:5	8.7	1.22	7 - 10
Se	3:5	.11	2.08	<.1 - .29	0:5	<.1	--	--
Si[1]	5:5	28	1.01	28 - 29	5:5	30	1.03	28 - 31
Sn	5:5	1.2	1.78	.67 - 2.5	5:5	1.1	1.37	.78 - 1.6
Sr	5:5	370	1.32	300 - 500	5:5	530	1.16	500 - 700
Th	5:5	10	1.16	8.6 - 12	5:5	11	1.24	8.9 - 16
Ti[1]	5:5	.75	1.04	.71 - .79	5:5	.32	1.09	.29 - .36
U	5:5	2.0	1.06	1.9 - 2.2	5:5	2.9	1.15	2.4 - 3.3
V	5:5	160	1.14	150 - 200	5:5	94	1.37	70 - 150
Y	5:5	20	1.00	--	5:5	15	1.28	10 - 20
Yb	5:5	2.2	1.20	2 - 3	5:5	1.8	1.50	1 - 3
Zn	5:5	96	1.15	87 - 120	5:5	54	1.12	47 - 65
Zr	5:5	150	1.28	100 - 200	5:5	54	1.12	47 - 65
pH[2]	5:5	7.9	.29	7.5 - 8.3	5:5	6.4	.78	5.7 - 7.5

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

TABLE 67.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given indicate no data available]

Element, or pH	Areas of commercial production							
	Palm Beach County, Fla.				Hidalgo County, Texas			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	1:5	--	--	<.26 - .44	5:5	2.8	1.08	2.6 - 3.1
As	4:5	.35	3.86	<.1 - 1.3	5:5	3.5	1.21	2.8 - 4.3
B	2:5	<10	--	<10 - 70	4:5	15	1.54	<10 - 20
Ba	5:5	17	1.17	15 - 20	5:5	450	1.26	300 - 500
Be	0:5	<1	--	--	0:5	<1	--	--
C, total[1]	5:5	1.4	1.40	.96 - 2.3	5:5	.78	1.49	.55 - 1.4
Ca[1]	4:5	.61	8.98	<.07 - 7.4	5:5	.53	1.17	.43 - .64
Co	0:5	<3	--	--	3:5	3.4	1.65	<3 - 5
Cr	5:5	2.5	2.11	1 - 7	5:5	15	1.00	--
Cu	5:5	8.2	1.62	5 - 15	5:5	8.7	1.22	7 - 10
F	2:5	300	2.18	<400 - 900	2:5	320	3.09	<400 - 1,400
Fe, total[1]	2:5	.024	4.25	<.03 - .17	5:5	.94	1.15	.85 - 1.2
Ga	0:5	<5	--	--	5:5	9.3	1.17	7 - 10
Ge	5:5	.82	1.17	.64 - .96	5:5	1.1	1.18	.87 - 1.3
Hg	4:5	.016	1.86	<.01 - .031	5:5	.025	1.20	.020 - .031
K[1]	5:5	.087	1.37	.052 - .12	5:5	1.6	1.06	1.6 - 1.8
La	0:5	<30	--	--	0:5	<30	--	--
Li	3:5	.54	1.68	<5 - 11	5:5	14	1.11	12 - 16
Mg[1]	2:5	.058	1.18	<.06 - .072	5:5	.27	1.14	.22 - .32
Mn	5:5	13	2.29	5 - 30	5:5	180	1.17	150 - 200
Na[1]	0:5	<.07	--	--	5:5	.63	1.05	.59 - .67
Nb	0:5	<10	--	--	4:5	9.5	1.10	<10 - 10
Ni	0:5	<2	--	--	4:5	4.4	1.87	<2 - 7
Pb	0:5	<10	--	--	5:5	10	1.00	--
Rb	0:5	<20	--	--	5:5	63	1.04	60 - 65
S, total	0:5	<800	--	--	1:5	--	--	<800 - 880
Sc	0:5	<3	--	--	3:5	2.8	1.11	<3 - 3
Se	1:5	--	--	<.11 - .27	2:5	.077	3.01	<.1 - .34
Si[1]	5:5	39	1.14	31 - 44	5:5	37	1.05	35 - 39
Sn	2:5	.078	4.11	<.1 - .47	5:5	.45	1.66	.25 - .98
Sr	3:5	<10	--	<10 - 100	5:5	100	1.00	--
Th	0:0	--	--	--	5:5	6.3	1.32	4.1 - 8.0
Ti[1]	5:5	.066	1.24	.050 - .090	5:5	.23	1.10	.21 - .27
U	5:5	.62	1.49	.37 - 1.1	5:5	1.8	1.08	1.6 - 1.9
V	1:5	<7	--	--	5:5	28	1.20	20 - 30
Y	0:5	<10	--	--	5:5	10	1.00	--
Yb	0:5	<1	--	--	5:5	1.5	1.00	--
Zn	2.5	<10	1.63	<10 - 10	5:5	39	1.32	30 - 60
Zr	5:5	100	1.94	50 - 200	5:5	190	1.33	150 - 300
pH[2]	5:5	7.6	1.70	5.0 - 8.9	5:5	7.7	.42	7.1 - 8.1

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported grapefruit trees in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except in parts per million, except where percent is indicated. Leaders (--) in figure column

Areas of commercial production (continued)							
Riverside County, Calif.				Yuma County, Ariz.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	6.8	1.05	6.4 - 7.2	5:5	5.9	1.09	5.4 - 6.7
5:5	3.2	1.21	2.6 - 4.2	5:5	5.4	1.20	4.3 - 7.2
0:5	<10	--	--	4:5	14	1.50	<10 - 20
5:5	1,100	1.20	1,000 - 1,500	5:5	1,300	1.25	1,000 - 1,500
5:5	1.2	1.25	1.0 - 1.5	4:5	.95	1.10	<1 - 1
5:5	.62	1.25	.48 - .84	5:5	.82	1.39	.57 - 1.3
5:5	3.0	1.06	2.7 - 3.2	5:5	3.3	1.11	2.9 - 3.8
5:5	8.1	1.22	7 - 10	5:5	8.1	1.22	7 - 10
5:5	26	1.50	20 - 50	5:5	70	1.28	50 - 100
5:5	15	1.28	10 - 20	5:5	19	1.33	15 - 30
5:5	870	1.17	700 - 1,000	5:5	610	1.39	400 - 900
5:5	2.6	1.08	2.4 - 3.0	5:5	2.5	1.06	2.4 - 2.7
5:5	20	1.28	15 - 30	5:5	16	1.14	15 - 20
5:5	1.3	1.13	1.1 - 1.5	5:5	1.3	1.15	1.1 - 1.6
5:5	.018	1.53	.010 - .030	5:5	.029	1.19	.024 - .037
5:5	2.4	1.00	--	5:5	2.5	1.06	2.3 - 2.7
5:5	57	1.36	50 - 100	5:5	38	1.71	30 - 100
5:5	28	1.09	25 - 31	5:5	27	1.07	25 - 29
5:5	1.1	1.08	1.0 - 1.2	5:5	1.0	1.09	.92 - 1.1
5:5	480	1.35	300 - 700	5:5	440	1.44	300 - 700
5:5	2.6	1.02	2.5 - 2.7	5:5	1.7	1.10	1.5 - 1.9
5:5	10	1.00	--	3:5	8.9	1.16	<10 - 10
5:5	13	1.25	10 - 15	5:5	19	1.33	15 - 30
5:5	16	1.14	15 - 20	5:5	18	1.17	15 - 20
5:5	110	1.10	90 - 120	5:5	95	1.05	90 - 100
2:5	730	1.81	<800 - 1,430	0:5	<800	--	--
5:5	9.4	1.37	7 - 15	5:5	9.3	1.17	7 - 10
0:5	<.1	--	--	3:5	.12	1.65	<.1 - .23
5:5	28	1.03	27 - 29	5:5	29	1.02	28 - 30
5:5	1.6	2.78	.79 - 9.6	5:5	.82	1.56	.46 - 1.2
5:5	660	1.46	500 - 1,000	5:5	700	1.41	500 - 1,000
5:5	15	1.26	11 - 21	5:5	9.2	1.31	6.8 - 14
5:5	.40	1.09	.36 - .44	5:5	.38	1.05	.35 - .39
5:5	2.6	1.13	2.3 - 3.2	5:5	2.6	1.08	.24 - 2.9
5:5	88	1.40	70 - 150	5:5	93	1.17	70 - 100
5:5	28	1.20	20 - 30	5:5	19	1.33	15 - 30
5:5	2.8	1.20	2 - 8	5:5	2.0	1.46	1.5 - 3.0
5:5	76	1.11	66 - 88	5:5	67	1.08	60 - 73
5:5	180	1.50	100 - 300	5:5	230	1.67	150 - 500
5:5	8.6	.19	8.4 - 8.9	5:5	8.8	.36	8.5 - 9.3

TABLE 68.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts data available]

Element, or pH	Areas of commercial production: Palm Beach County, Fla. — Ratio	Mean	Deviation	Observed range	Hidalgo County, Texas — Ratio	Mean	Deviation	Observed range
Al[1]	0:5	<.26	--	--	5:5	3.3	1.04	3.2 - 3.5
As	2:5	.075	7.84	<.1 - .74	5:5	4.0	1.25	2.8 - 5.0
B	1:5	<10	--	<10 - 20	5:5	26	1.50	20 - 50
Ba	5:5	18	1.17	15 - 20	5:5	500	1.00	--
Be	1:5	<1	--	<1 - 1	2:5	.80	1.23	<1 - 1
C, total[1]	5:5	.77	2.07	.48 - 2.6	5:5	.49	1.31	.35 - .66
Ca[1]	3:5	.12	5.96	<.07 - .87	5:5	.36	1.15	.29 - .43
Co	0:5	<3	--	--	3:5	2.8	1.50	<3 - 5
Cr	4:5	1.8	3.72	<1 - 7	5:5	17	1.17	15 - 20
Cu	5:5	25	6.05	7 - 300	5:5	9.4	1.37	7 - 15
F	1:5	<400	--	--	2:5	370	1.24	<400 - 500
Fe, total[1]	1:5	--	--	<.03 - .13	5:5	1.1	1.09	.97 - 1.2
Ga	0:5	<5	--	--	5:5	8.1	1.22	7 - 10
Ge	5:5	.85	1.10	.75 - .92	5:5	1.1	1.15	.86 - 1.2
Hg	5:5	.015	1.72	.01 - .034	5:5	.023	1.32	.016 - .031
K[1]	5:5	.076	1.58	.044 - .16	5:5	1.7	1.02	1.6 - 1.7
La	0:5	<30	--	--	0:5	<30	--	--
Li	3:5	6.3	1.49	<5 - 10	5:5	15	1.12	13 - 17
Mg[1]	0:5	<.06	--	--	5:5	.27	1.23	.21 - .34
Mn	5:5	19	5.79	1 - 70	5:5	180	1.17	150 - 200
Na[1]	0:5	<.07	--	--	5:5	.62	1.05	.60 - .68
Nb	0:5	<10	--	--	5:5	10	1.00	--
Ni	0:5	<2	--	--	5:5	5.2	1.42	3 - 7
Pb	0:5	<10	--	--	5:5	11	1.20	10 - 15
Rb	0:5	<20	--	--	5:5	67	1.13	60 - 80
S, total	1:5	<800	--	<800 - 800	0:5	<800	--	--
Sc	0:5	<3	--	--	3:5	2.8	1.50	<3 - 5
Se	0:5	<.1	--	--	2:5	.086	2.96	<.1 - .29
Si[1]	5:5	45	1.02	43 - 45	5:5	37	1.01	36 - 37
Sn	2:5	.080	4.86	<.1 - .47	5:5	.33	1.88	.15 - .88
Sr	1:5	<5	--	<5 - 7	5:5	87	1.22	70 - 100
Th	1:1	3.0	--	--	5:5	5.3	1.30	4.1 - 7.9
Ti[1]	5:5	.072	1.24	.055 - .094	5:5	.24	1.07	.23 - .28
U	5:5	.68	1.88	.37 - 1.4	5:5	1.8	1.05	1.7 - 1.8
V	0:5	<7	--	--	5:5	26	1.25	20 - 30
Y	0:5	<10	--	--	5:5	12	1.25	10 - 15
Yb	1:5	<1	--	<1 - 1	5:5	1.5	1.28	1 - 2
Zn	2:5	8.2	3.88	29 - 41	5:5	36	1.14	31 - 44
Zr	5:5	200	2.10	100 - 700	5:5	260	1.25	200 - 300
pH[2]	5:5	7.3	1.53	5.0 - 8.9	5:5	6.6	1.12	5.3 - 7.9

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported orange trees in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as per million, except where percent is indicated. Leaders (--) in figure column indicate no

Areas of commercial production (continued)							
Riverside County, Calif.				Yuma County, Ariz.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	6.6	1.07	6.0 - 7.2	4:5	2.6	4.60	<.26 - 6.1
5:5	2.4	1.70	1.1 - 4.6	5:5	3.0	1.88	1.2 - 4.9
0:5	<10	--	--	4:5	15	1.54	<10 - 20
5:5	1,300	1.25	1,000 - 1,500	5:5	1,100	1.20	1,000 - 1,500
5:5	1.1	1.20	1 - 1.5	5:5	1.0	1.00	--
5:5	.48	1.36	.32 - .70	5:5	.77	1.23	.57 - 1.0
5:5	2.7	1.05	2.5 - 2.8	5:5	1.6	5.24	.081 - 3.7
5:5	7	1.00	--	5:5	8.1	1.22	7 - 10
5:5	31	1.38	20 - 50	5:5	66	1.33	50 - 100
5:5	8.8	1.40	7 - 15	5:5	14	1.35	10 - 20
5:5	690	1.26	500 - 900	5:5	500	1.15	400 - 600
5:5	2.1	1.06	2.0 - 2.3	4:5	.90	8.28	<.03 - 2.6
5:5	19	1.14	15 - 20	5:5	16	1.14	15 - 20
5:5	1.2	1.17	.94 - 1.4	5:5	.90	1.73	.34 - 1.2
5:5	.032	1.51	.019 - .059	5:5	.029	1.18	.024 - .035
5:5	2.4	1.01	2.3 - 2.4	5:5	1.3	4.42	.092 - 2.8
4:5	55	2.44	<30 - 150	3:5	28	1.11	<30 - 30
5:5	19	1.09	17 - 21	5:5	19	2.11	5 - 29
5:5	.80	1.10	.69 - .88	5:5	.75	1.91	.24 - 1.1
5:5	330	1.58	200 - 700	5:5	330	1.26	300 - 500
5:5	2.6	1.04	2.5 - 2.7	5:5	1.2	1.93	.39 - 1.9
4:5	9.5	1.10	<10 - 10	3:5	8.9	1.16	<10 - 10
5:5	13	1.25	10 - 15	5:5	21	1.42	15 - 30
5:5	17	1.17	15 - 20	5:5	17	1.17	15 - 20
5:5	100	1.04	95 - 105	5:5	67	1.98	20 - 100
1:5	<800	--	<800 - 960	0:5	<800	--	--
5:5	7	1.00	--	5:5	8.1	1.22	7 - 10
1:5	--	--	<.1 - .25	3:5	.13	2.18	<.1 - .31
5:5	30	1.07	27 - 32	5:5	31	1.16	29 - 40
5:5	.69	1.19	.53 - .82	5:5	.68	1.50	.50 - 1.3
5:5	610	1.20	500 - 700	5:5	610	1.36	500 - 1,000
5:5	15	1.16	13 - 19	5:5	11	1.13	9.9 - 13
5:5	.34	1.07	.32 - .38	5:5	.26	2.21	.062 - .39
5:5	2.3	1.09	2.0 - 2.6	5:5	2.4	1.04	2.3 - 2.5
5:5	65	1.16	50 - 70	5:5	93	1.17	70 - 100
5:5	17	1.17	15 - 20	5:5	16	1.49	10 - 30
5:5	1.7	1.17	1.5 - 2	5:5	1.7	1.36	1.5 - 3
5:5	59	1.21	48 - 80	5:5	53	1.43	28 - 67
5:5	160	1.49	100 - 300	5:5	160	1.14	150 - 200
5:5	8.6	.52	8.0 - 9.3	5:5	8.8	.15	8.6 - 9.0

TABLE 69.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in
indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts
no data available]

Element, or pH	Areas of commercial production							
	Wayne County, N.Y.				Yakima County, Wash.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]-------	5:5	4.0	1.11	3.6 - 4.6	5:5	6.7	1.06	6.1 - 7.03
As--------	5:5	24	4.16	2.6 - 110	5:5	2.9	1.27	2.3 - 3.8
B---------	4:5	17	1.70	<10 - 30	1:5	<10	--	<10 - 20
Ba--------	5:5	390	1.48	300 - 700	5:5	530	1.16	500 - 700
Be--------	0:5	<1	--	--	3:5	.89	1.16	<1 - 1
C, total[1]-	5:5	2.7	1.16	2.1 - 3.1	5:5	1.6	1.08	1.5 - 1.8
Ca[1]-------	5:5	.63	1.10	.56 - .73	5:5	3.0	1.06	2.7 - 3.2
Co--------	5:5	5.3	1.16	5 - 7	5:5	14	1.20	10 - 15
Cr--------	5:5	26	1.25	20 - 30	5:5	57	1.36	50 - 100
Cu--------	5:5	19	1.33	15 - 30	5:5	36	1.46	30 - 70
F---------	3:5	460	1.26	<400 - 600	5:5	480	1.10	400 - 500
Fe, total[1]	5:5	1.9	1.11	1.7 - 2.2	5:5	4.3	1.02	4.2 - 4.4
Ga--------	5:5	14	1.20	10 - 15	5:5	19	1.14	15 - 20
Ge--------	5:5	1.3	1.12	1.0 - 1.4	5:5	1.3	1.18	1.0 - 1.5
Hg--------	5:5	.059	1.32	.040 - .085	5:5	.043	1.31	.032 - .063
K[1]--------	5:5	1.4	1.05	1.4 - 1.5	5:5	1.3	1.05	1.2 - 1.4
La--------	1:5	<30	--	<30 - 30	1:5	<30	--	<30 - 70
Li--------	5:5	21	1.19	17 - 25	5:5	22	1.03	21 - 23
Mg[1]-------	5:5	.39	1.15	.34 - .46	5:5	1.3	1.03	1.2 - 1.3
Mn--------	5:5	300	1.72	150 - 500	5:5	500	1.00	--
Na[1]-------	5:5	1.0	1.06	.98 - 1.1	5:5	1.9	1.00	--
Nb--------	3:5	8.9	1.16	<10 - 10	4:5	9.5	1.10	<10 - 10
Ni--------	5:5	9.4	1.37	7 - 15	5:5	25	1.60	15 - 50
Pb--------	5:5	90	2.88	20 - 300	5:5	11	1.20	10 - 15
Rb--------	5:5	49	1.23	40 - 65	5:5	50	1.07	45 - 55
S, total--	2:5	770	1.25	<800 - 1,000	5:5	1,900	1.81	940 - 4,100
Sc--------	5:5	5.3	1.16	5 - 7	5:5	15	1.00	--
Se--------	1:5	<.1	--	<.1 - .16	3:5	.11	1.65	<.1 - .22
Si--------	5:5	33	1.04	31 - 35	5:5	27	1.03	21 - 28
Sn--------	5:5	.69	2.51	.15 - 1.6	4:5	.71	3.63	<.1 - 1.5
Sr--------	5:5	150	1.30	100 - 200	5:5	450	1.26	300 - 500
Th--------	5:5	5.6	1.49	3.3 - 9.5	5:5	8.9	1.13	7.5 - 9.9
Ti[1]-------	5:5	.40	1.13	.34 - .46	5:5	.63	1.02	.61 - .65
U---------	5:5	2.0	1.03	1.9 - 2.1	5:5	2.1	1.07	1.9 - 2.3
V---------	5:5	45	1.26	30 - 50	5:5	150	1.00	--
Y---------	5:5	16	1.33	10 - 20	5:5	17	1.17	15 - 20
Yb--------	5:5	2.0	1.46	1.5 - 3.0	5:5	1.9	1.14	1.5 - 2.0
Zn--------	5:5	63	1.18	53 - 78	5:5	82	1.04	77 - 86
Zr--------	5:5	260	1.50	200 - 500	5:5	150	1.28	100 - 200
pH[2]-------	5:5	5.5	.53	4.9 - 6.0	5:5	5.7	.86	4.3 - 6.4

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported peach trees in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as per million, except where percent is indicated. Leaders (--) in figure column indicate

Areas of commercial production (continued)

San Joaquin County, Calif.				Mesa County, Colo.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	6.5	1.02	6.3 - 6.6	5:5	5.2	1.07	4.7 - 5.6
5:5	4.6	1.24	3.7 - 6.6	5:5	10	8.35	.26 - 69
4:5	16	1.55	<10 - 20	5:5	55	1.45	30 - 70
5:5	700	1.00	--	5:5	500	1.00	--
3:5	.89	1.16	<1 - 1	5:5	1.1	1.20	1.0 - 1.5
5:5	1.4	1.09	1.2 - 1.6	5:5	2.8	1.04	2.7 - 3.0
5:5	1.9	1.02	1.9 - 2.0	5:5	2.2	1.07	2.1 - 2.5
5:5	17	1.17	15 - 20	5:5	5.7	1.20	5 - 7
5:5	140	1.64	70 - 200	5:5	57	1.20	50 - 70
5:5	100	1.69	50 - 150	5:5	24	1.25	20 - 30
3:5	420	1.93	<400 - 1,100	5:5	800	1.48	600 - 1,600
5:5	4.4	1.03	4.3 - 4.5	5:5	2.3	1.05	2.2 - 2.4
5:5	18	1.17	15 - 20	5:5	15	1.00	--
5:5	1.5	1.08	1.3 - 1.6	4:5	.62	3.56	<.1 - 1.5
5:5	.035	1.14	.030- .043	5:5	.040	1.43	.026 - .058
5:5	1.6	1.00	--	5:5	2.0	1.02	1.9 - 2.0
1:5	<30	--	<30 - 30	3:5	28	1.11	<30 - 30
5:5	22	1.07	20 - 24	5:5	38	1.06	35 - 40
5:5	1.2	1.02	1.1 - 1.2	5:5	1.3	1.03	1.2 - 1.3
5:5	550	1.56	300 - 1,000	5:5	150	1.00	--
5:5	1.0	1.04	.96 - 1.0	5:5	.66	1.03	.63 - .69
4:5	9.5	1.10	<10 - 10	3:5	8.9	1.16	<10 - 10
5:5	45	1.78	30 - 100	5:5	17	1.17	15 - 20
5:5	15	1.57	10 - 30	5:5	82	2.11	50 - 300
5:5	79	1.07	70 - 85	5:5	97	1.09	85 - 100
1:5	--	--	<800 - 870	4:5	940	1.33	<800 - 1,480
5:5	17	1.17	15 - 20	5:5	7.0	1.00	--
0:5	<.1	--	--	3:5	.13	2.46	<.1 - .43
5:5	29	1.04	27 - 30	5:5	30	1.03	29 - 31
5:5	.85	1.25	.64 - 1.2	5:5	.83	1.66	.45 - 1.7
5:5	220	1.20	200 - 300	5:5	140	1.35	100 - 200
5:5	8.4	1.34	6 - 12	5:5	13	1.31	8.9 - 19
5:5	.58	1.04	.56 - .61	5:5	.31	1.06	.29 - .33
5:5	2.6	1.23	2.2 - 3.6	5:5	3.7	1.07	3.4 - 4.0
5:5	160	1.14	150 - 200	5:5	94	1.37	70 - 150
5:5	16	1.14	15 - 20	5:5	17	1.36	15 - 30
3:3	1.5	1.00	--	5:5	1.7	1.17	1.5 - 2.0
5:5	91	1.09	78 - 97	5:5	130	1.10	110 - 140
5:5	100	1.31	70 - 150	5:5	120	1.25	100 - 150
5:5	6.8	.09	6.8 - 7.0	5:5	7.7	.27	7.3 - 8.0

TABLE 70.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in except as indicated. Means and ranges are given in parts per million, except where percent is

Element, or pH	Areas of commercial production: Berrien County, Mich. — Ratio	Mean	Deviation	Observed range	Wayne County, N.Y. — Ratio	Mean	Deviation	Observed range
Al[1]	5:5	3.1	1.26	2.2 - 3.9	5:5	4.3	1.16	3.6 - 4.9
As	5:5	5.8	1.66	2.8 - 9.2	5:5	7.0	3.19	1.1 - 24
B	5:5	38	1.52	20 - 50	5:5	28	1.46	20 - 50
Ba	5:5	450	1.26	300 - 500	5:5	340	1.48	200 - 500
Be	1:5	<1	--	<1 - 1	1:5	<1	--	<1 - 1
C, total[1]	5:5	1.2	1.30	.84 - 1.7	5:5	2.0	1.29	1.4 - 2.7
Ca[1]	5:5	.33	1.11	.29 - .38	5:5	.68	1.72	.36 - 1.2
Co	4:5	5.1	1.62	<3 - 7	5:5	5.9	1.57	3 - 10
Cr	5:5	24	1.37	15 - 30	5:5	27	1.58	15 - 50
Cu	5:5	25	1.68	15 - 50	5:5	13	1.58	7 - 20
F	0:5	<400	--	--	3:5	420	1.32	<400 - 600
Fe, total[1]	5:5	1.4	1.34	1.0 - 1.9	5:5	2.0	1.30	1.3 - 2.5
Ga	5:5	8.8	1.51	5 - 15	5:5	12	1.25	10 - 15
Ge	5:5	1.3	1.19	1.0 - 1.6	5:5	1.2	1.24	.87 - 1.5
Hg	5:5	.044	1.51	.031 - .078	5:5	.060	1.33	.047 - .096
K[1]	5:5	1.7	1.16	1.4 - 2.0	5:5	1.5	1.16	1.2 - 1.7
La	0:5	<30	--	--	1:5	<30	--	<30 - 30
Li	5:5	17	1.55	10 - 26	5:5	29	1.22	21 - 34
Mg[1]	5:5	.25	1.46	.16 - .37	5:5	.49	1.27	.36 - .63
Mn	5:5	460	1.91	200 - 1,000	5:5	360	2.25	150 - 1,000
Na[1]	5:5	.65	1.47	.53 - 1.3	5:5	1.0	1.15	.87 - 1.2
Nb	4:5	9.5	1.10	<10 - 10	5:5	10	1.00	--
Ni	5:5	10	1.69	5 - 15	5:5	12	1.62	7 - 20
Pb	5:5	20	1.28	15 - 30	5:5	23	2.10	10 - 70
Rb	5:5	66	1.26	50 - 85	5:5	55	1.50	30 - 85
S, total	0:5	<800	--	--	0:5	<800	--	--
Sc	4:5	4	1.61	<3 - 7	5:5	5.5	1.56	3 - 10
Se	3:5	.12	1.69	<.1 - .22	1:5	--	--	<.1 - .21
Si[1]	5:5	36	1.04	33 - 37	5:5	34	1.04	33 - 36
Sn	5:5	.59	1.59	.35 - 1.2	4:5	.56	3.23	<.1 - <1.4
Sr	5:5	75	1.17	70 - 100	5:5	140	1.35	100 - 200
Th	4:4	7.1	1.41	5.2 - 11	4:4	7.7	1.20	6.0 - 9.3
Ti[1]	5:5	.28	1.31	.19 - .39	5:5	.45	1.13	.37 - .50
U	5:5	1.8	1.15	1.5 - 2.1	5:5	2.2	1.17	1.8 - 2.6
V	5:5	40	1.64	20 - 70	5:5	44	1.44	30 - 70
Y	5:5	12	1.25	10 - 15	5:5	18	1.50	10 - 30
Yb	5:5	1.4	1.42	1 - 2	5:5	1.9	1.49	1 - 3
Zn	5:5	53	1.17	40 - 60	5:5	60	1.49	31 - 90
Zr	5:5	190	1.33	150 - 300	5:5	210	1.86	100 - 500
pH[2]	5:5	5.4	.74	4.5 - 6.2	5:5	6.6	.87	5.7 - 7.8

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported pear trees in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation indicated. Leaders (--) in figure column indicate no data available.]

Areas of commercial production (continued)											
Yakima County, Wash.				San Joaquin County, Calif.				Mesa County, Colo.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	6.3	1.35	3.7 - 7.4	5:5	7.5	1.08	6.7 - 8.0	5:5	4.6	1.13	4.0 - 5.4
5:5	23	1.35	14 - 29	5:5	14	1.15	12 - 16	5:5	9.1	1.18	7.4 - 11
1:5	--	--	<10 - 15	4:5	19	1.81	<10 - 30	5:5	28	1.20	20 - 30
5:5	570	1.20	500 - 700	5:5	870	1.22	700 - 1,000	5:5	610	1.36	500 - 1,000
5:5	1.1	1.20	1.0 - 1.5	5:5	1.0	1.00	--	5:5	1.2	1.63	1 - 3
5:5	2.4	1.17	1.8 - 2.8	5:5	2.6	1.17	2.2 - 3.3	5:5	2.9	1.20	2.3 - 3.8
5:5	1.9	2.18	.47 - 2.8	5:5	1.8	1.10	1.7 - 2.2	5:5	4.5	1.25	3.6 - 6.5
5:5	12	1.25	10 - 15	5:5	17	1.17	15 - 20	5:5	6.1	1.20	5 - 7
5:5	57	1.20	50 - 70	5:5	110	1.36	100 - 200	5:5	48	1.35	30 - 70
5:5	44	1.44	30 - 70	5:5	240	1.37	150 - 300	5:5	28	2.11	15 - 100
5:5	690	1.53	400 - 1,200	5:5	570	1.20	500 - 700	5:5	660	1.30	500 - 1,000
5:5	3.1	1.67	1.2 - 4.0	5:5	4.9	1.04	4.7 - 5.1	5:5	2.5	1.07	2.4 - 2.7
5:5	19	1.14	15 - 20	5:5	20	1.00	--	5:5	15	1.00	--
5:5	1.0	1.26	.71 - 1.2	5:5	1.4	1.16	1.2 - 1.7	5:5	1.1	1.21	.80 - 1.3
5:5	.029	1.36	.019 - .040	5:5	.073	1.30	.057 - .10	5:5	.042	2.47	.019 - .20
5:5	1.6	1.05	1.5 - 1.7	5:5	1.8	1.03	1.7 - 1.8	5:5	1.9	1.11	1.6 - 2.0
3:5	28	1.11	<30 - 30	1:5	<30	--	<30 - 30	2:5	26	1.16	<30 - 30
5:5	23	1.14	20 - 28	5:5	27	1.07	25 - 30	5:5	28	1.12	25 - 33
5:5	1.1	1.04	1.1 - 1.2	5:5	1.4	1.01	1.3 - 1.4	5:5	1.0	1.08	.94 - 1.2
5:5	370	1.32	300 - 500	5:5	600	1.68	300 - 1,000	5:5	230	1.58	150 - 500
5:5	1.7	1.04	1.7 - 1.8	5:5	.99	1.03	.95 - 1.0	5:5	.74	1.04	.70 - .77
1:5	<10	--	<10 - 10	4:5	9.5	1.10	<10 - 10	1:5	<10	--	<10 - 10
5:5	19	1.14	15 - 20	5:5	65	1.89	30 - 150	5:5	14	1.20	10 - 15
5:5	160	1.33	100 - 200	5:5	61	1.20	50 - 70	5:5	28	1.20	20 - 30
5:5	58	1.08	55 - 65	5:5	93	1.21	70 - 110	5:5	84	1.17	65 - 95
2:5	770	1.24	<800 - 900	1:5	--	--	<800 - 860	0:5	<800	--	--
5:5	15	1.00	--	5:5	19	1.14	15 - 20	5:5	7.0	1.00	--
2:5	.083	2.76	<.1 - .31	3:5	.16	2.58	<.1 - .35	2:5	<.1	--	--
5:5	29	1.14	27 - 36	5:5	25	1.03	24 - 26	5:5	28	1.04	27 - 30
5:5	.84	1.24	.68 - 1.2	5:5	1.1	1.23	.90 - 1.5	5:5	1.0	1.26	.70 - 1.3
5:5	450	1.26	300 - 500	5:5	240	1.25	200 - 300	5:5	240	1.25	200 - 300
5:5	8.2	1.17	7.0 - 11	5:5	9.9	1.44	6.3 - 15	5:5	13	1.24	10 - 18
5:5	.49	1.29	.31 - .56	5:5	.54	1.03	.52 - .56	5:5	.30	1.07	.27 - .32
5:5	2.0	1.06	1.8 - 2.1	5:5	2.7	1.08	2.5 - 3.1	5:5	3.4	1.05	3.2 - 3.6
5:5	130	1.25	100 - 150	5:5	170	1.17	150 - 200	5:5	75	1.17	70 - 100
5:5	20	1.28	15 - 30	5:5	20	1.28	15 - 30	5:5	15	1.00	--
5:5	2.0	1.28	1.5 - 3	4:4	2.0	1.33	1.5 - 3.0	5:5	1.4	1.20	1.0 - 1.5
5:5	160	1.17	140 - 210	5:5	120	1.06	120 - 130	5:5	85	1.09	76 - 94
5:5	110	1.20	100 - 150	5:5	95	1.52	70 - 150	5:5	140	1.35	100 - 200
5:5	6.3	.31	6.0 - 6.7	5:5	7.0	5.96	6.5 - 8.0	5:5	8.0	1.30	7.8 - 8.1

TABLE 71.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in indicated. Deviation,geometric deviation, except as indicated. Means and ranges are given in indicate no data available]

Element, or pH	Berrien County, Mich. Ratio	Mean	Deviation	Observed range	Wayne County, N.Y. Ratio	Mean	Deviation	Observed range
Al[1]	5:5	3.1	1.38	2.3 - 4.9	5:5	4.3	1.10	3.9 - 4.7
As	5:5	6.4	2.60	2.4 - 18	5:5	18	1.81	9.9 - 41
B	4:5	24	2.35	<10 - 50	4:5	20	1.87	<10 - 30
Ba	5:5	480	1.35	300 - 700	5:5	450	1.26	300 - 500
Be	0:5	<1	--	--	2:5	.80	1.23	<1 - 1
C, total[1]	5:5	1.3	1.58	.81 - 2.2	5:5	2.9	1.54	2.1 - 6.1
Ca[1]	5:5	.39	1.29	.32 - .57	5:5	.79	1.26	.58 - 1.1
Co	5:5	5.3	1.16	5 - 7	5:5	6.5	1.16	5 - 7
Cr	5:5	30	1.72	15 - 50	5:5	55	1.56	30 - 100
Cu	5:5	18	1.50	10 - 20	5:5	25	2.86	10 - 150
F	2:5	330	1.71	<400 - 700	5:5	420	1.10	400 - 500
Fe, total[1]	5:5	1.2	1.43	.82 - 1.9	5:5	2.1	1.12	1.8 - 2.4
Ga	5:5	8.2	1.52	5 - 15	5:5	14	1.20	10 - 15
Ge	5:5	1.2	1.15	.99 - 1.4	5:5	1.2	1.40	.65 - 1.5
Hg	5:5	.061	1.32	.047 - .085	5:5	.15	5.26	.04 - 2.6
K[1]	5:5	1.7	1.18	1.5 - 2.2	5:5	1.5	1.11	1.2 - 1.6
La	2:5	26	1.16	<30 - 30	2:5	26	1.16	<30 - 30
Li	5:5	14	1.67	8 - 25	5:5	27	1.27	20 - 37
Mg[1]	5:5	.22	1.62	.13 - .36	5:5	.52	1.16	.41 - .62
Mn	5:5	690	1.86	300 - 1,500	5:5	330	1.75	200 - 700
Na[1]	5:5	.61	1.18	.49 - .75	5:5	1.1	1.08	.96 - 1.1
Nb	3:5	8.9	1.16	<10 - 10	5:5	10	1.00	--
Ni	5:5	10	2.14	5 - 30	5:5	14	1.20	10 - 15
Pb	5:5	28	2.05	15 - 70	5:5	62	2.27	30 - 200
Rb	5:5	63	1.35	45 - 90	5:5	63	1.26	45 - 85
S, total	0:5	<800	--	--	2:5	780	1.14	<800 - 900
Sc	4:5	4.5	1.94	<3 - 10	5:5	6.1	1.20	5 - 7
Se	3:5	.14	2.53	<.1 - .46	3:5	.11	1.82	<.1 - .25
Si[1]	5:5	36	1.07	33 - 38	5:5	31	1.05	30 - 34
Sn	3:5	<.10	--	<.10 - 1.1	5:5	1.9	4.18	.74 - 24
Sr	5:5	94	1.37	70 - 150	5:5	160	1.14	150 - 200
Th	5:5	4.8	1.68	3.0 - 8.9	5:5	8.1	1.52	4.8 - 12
Ti[1]	5:5	.28	1.54	.18 - .48	5:5	.44	1.05	.41 - .46
U	5:5	1.7	1.44	1.1 - 2.8	5:5	2.8	1.28	2.3 - 4.0
V	5:5	34	1.80	15 - 70	5:5	61	1.20	50 - 70
Y	4:5	12	1.85	<10 - 30	5:5	16	1.36	10 - 20
Yb	5:5	1.6	1.60	1 - 3	5:5	1.9	1.33	1.5 - 3.0
Zn	5:5	57	1.38	38 - 80	5:5	130	1.64	92 - 310
Zr	5:5	230	1.67	150 - 500	5:5	130	1.64	92 - 310
pH[2]	5:5	5.9	.56	5.2 - 6.4	5:5	6.6	.71	5.7 - 7.4

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported plum trees in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as parts per million, except where percent is indicated. Leaders (--) in figure column

Areas of commercial production (continued)							
Yakima County, Wash.				Mesa County, Colo.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	6.7	1.08	6.1 - 7.3	5:5	5.5	1.12	5.0 - 6.6
5:5	6.3	1.27	4.8 - 8.3	5:5	37	1.89	16 - 91
3:5	12	1.98	<10 - 30	5:5	53	1.16	50 - 70
5:5	650	1.16	500 - 700	5:5	410	1.32	300 - 500
5:5	1	1.00	--	5:5	1.0	1.00	--
5:5	1.7	1.14	1.5 - 1.9	5:5	2.7	1.06	2.5 - 2.9
5:5	3.0	1.14	2.6 - 3.5	5:5	2.2	1.11	1.8 - 2.4
5:5	16	1.14	15 - 20	5:5	5.3	1.16	5 - 7
5:5	45	1.26	30 - 50	5:5	50	1.00	--
5:5	36	1.46	30 - 70	5:5	31	1.38	20 - 50
5:5	570	1.23	500 - 800	5:5	780	1.11	700 - 900
5:5	4.8	1.06	4.4 - 5.2	5:5	2.6	1.35	2.2 - 4.6
5:5	20	1.00	--	5:5	17	1.17	15 - 20
5:5	1.3	1.09	1.2 - 1.5	5:5	1.1	1.24	.83 - 1.4
5:5	.025	1.69	.010 - .037	5:5	.040	1.44	.027 - .062
5:5	1.6	1.03	1.5 - 1.6	5:5	1.9	1.10	1.6 - 2.0
4:5	29	1.07	<30 - 30	3:5	28	1.11	<30 - 30
5:5	23	1.07	22 - 25	5:5	36	1.02	35 - 37
5:5	1.3	1.08	1.2 - 1.4	5:5	1.2	1.01	1.2 - 1.3
5:5	620	1.63	500 - 1,500	5:5	160	1.14	150 - 200
5:5	1.7	1.06	1.6 - 1.9	5:5	.68	1.03	.65 - .70
5:5	10	1.00	--	3:5	8.9	1.16	10 - 10
5:5	20	1.28	15 - 30	5:5	17	1.17	15 - 20
5:5	19	1.60	10 - 30	5:5	190	1.83	100 - 500
5:5	62	1.08	55 - 65	5:5	95	1.06	90 - 100
2:5	780	1.20	<800 - 950	2:5	710	1.66	<800 - 1,400
5:5	17	1.17	15 - 20	5:5	7.0	1.00	--
1:5	<.1	--	<.1 - .6	2:5	.082	2.80	<.1 - .31
5:5	26	1.03	26 - 27	5:5	29	1.05	27 - 31
5:5	.93	1.50	.48 - 1.4	5:5	1.2	1.35	.74 - 1.6
5:5	450	1.26	300 - 500	5:5	150	1.00	--
5:5	9.7	1.17	7.9 - 12	5:5	12	1.24	9.8 - 17
5:5	.74	1.05	.70 - .79	5:5	.36	1.30	.31 - .57
5:5	2.1	1.05	2.0 - 2.2	5:5	3.8	1.15	3.1 - 4.5
5:5	170	1.17	150 - 200	5:5	93	1.17	70 - 100
5:5	24	1.25	20 - 30	5:5	16	1.14	15 - 20
4:4	2.4	1.26	2 - 3	5:5	1.6	1.14	1.5 - 2.0
5:5	110	1.13	100 - 140	5:5	130	1.06	120 - 140
5:5	140	1.35	100 - 200	5:5	140	1.20	100 - 150
5:5	6.8	.55	6.2 - 7.4	5:5	7.6	.35	7.0 - 7.9

TABLE 72.—*Element concentrations and pH of soils that supported cabbage plants in areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available]

Element, or pH	Areas of commercial production							
	Hidalgo County, Texas				Imperial County, Calif.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]-------	5:5	4.9	1.05	5 - 7	5:5	5.2	1.10	4.4 - 5.6
As--------	5:5	6.8	1.21	5.0 - 8.3	5:5	6.7	1.29	4.9 - 8.9
B---------	5:5	22	1.20	20 - 30	5:5	41	1.32	30 - 50
Ba--------	5:5	370	1.32	300 - 500	5:5	530	1.16	500 - 700
Be--------	3:5	.89	1.16	<1 - 1	4:5	.95	1.10	<1 - 1
C, total[1]-	5:5	4.5	1.03	4.3 - 4.7	5:5	1.5	1.93	.48 - 2.2
Ca[1]-------	5:5	12	1.02	12 - 13	5:5	4.6	1.08	4.1 - 5.0
Co--------	5:5	5.3	1.16	5 - 7	5:5	5.7	1.20	5 - 7
Cr--------	5:5	41	1.32	30 - 50	5:5	48	1.35	30 - 70
Cu--------	5:5	18	1.36	15 - 30	5:5	25	1.60	15 - 50
F---------	5:5	610	1.18	500 - 800	5:5	760	1.26	600 - 1,000
Fe, total[1]	5:5	2.7	1.00	--	5:5	2.3	1.15	1.8 - 2.6
Ga--------	5:5	16	1.14	15 - 20	5:5	15	1.00	--
Ge--------	5:5	1.0	1.14	.88 - 1.2	5:5	1.4	1.09	1.2 - 1.5
Hg--------	5:5	.031	1.23	.023 - .038	5:5	.031	1.28	.023 - .042
K[1]--------	5:5	1.7	1.01	1.7 - 1.8	5:5	1.9	1.04	1.8 - 2.0
La--------	3:5	28	1.11	<30 - 30	2:5	26	1.16	<30 - 30
Li--------	5:5	29	1.05	28 - 31	5:5	34	1.10	29 - 37
Mg[1]-------	5:5	.76	1.46	.39 - .93	5:5	1.4	1.16	1.1 - 1.6
Mn--------	5:5	260	1.25	200 - 300	5:5	260	1.25	200 - 300
Na[1]-------	5:5	.67	1.03	.65 - .69	5:5	.60	1.06	.56 - .64
Nb--------	2:5	8.0	1.23	<10 - 10	4:5	9.5	1.10	<10 - 10
Ni--------	5:5	11	1.38	7 - 15	5:5	16	1.14	15 - 20
Pb--------	5:5	14	1.20	10 - 15	5:5	16	1.14	15 - 20
Rb--------	5:5	79	1.03	75 - 80	5:5	89	1.03	85 - 90
S, total--	0:5	<800	--	--	1:5	--	--	<800 - 1,100
Sc--------	5:5	7.5	1.17	7 - 10	5:5	7.5	1.34	5 - 10
Se--------	3:5	.12	1.50	<.1 - .18	3:5	.14	2.36	<.1 - .34
Si[1]-------	5:5	20	1.01	20 - 21	5:5	28	1.04	26 - 30
Sn--------	5:5	.89	1.28	.63 - 1.2	5:5	.95	1.24	.72 - 1.2
Sr--------	5:5	530	1.16	500 - 700	5:5	280	1.20	200 - 300
Th--------	5:5	9.8	1.22	8.2 - 13	5:5	11	1.18	8.8 - 13
Ti[1]-------	5:5	.31	1.02	.30 - .32	5:5	.30	1.07	.27 - .32
U---------	5:5	3.0	1.05	2.7 - 3.1	5:5	3.0	1.13	2.5 - 3.4
V---------	5:5	75	1.17	70 - 100	5:5	81	1.22	70 - 100
Y---------	5:5	16	1.14	15 - 20	5:5	15	1.00	--
Yb--------	5:5	1.6	1.14	1.5 - 2	5:5	1.5	1.00	--
Zn--------	5:5	83	1.02	81 - 85	5:5	73	1.12	60 - 78
Zr--------	5:5	81	1.22	70 - 100	5:5	140	1.20	100 - 150
pH[2]-------	5:5	8.1	.13	7.9 - 8.2	5:5	8.1	.15	7.9 - 8.3

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

TABLE 73.—*Element concentrations and pH of soils that supported carrot plants in areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available]

Element,	Areas of commercial production							
	Hidalgo County, Texas				Imperial County, Calif.			
or pH	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	4.4	1.09	3.9 - 5.0	5:5	5.2	1.15	4.3 - 6.2
As	5:5	8.0	1.14	6.8 - 9.2	5:5	5.9	1.11	5.3 - 7.0
B	5:5	28	1.46	20 - 50	5:5	50	1.00	--
Ba	5:5	500	1.00	--	5:5	570	1.20	500 - 700
Be	4:5	.95	1.10	<1 - 1	2:5	.80	1.23	<1 - 1
C, total[1]	5:5	1.4	1.08	1.2 - 1.5	5:5	1.9	1.06	1.7 - 2.0
Ca[1]	5:5	2.5	1.14	2.2 - 3.0	5:5	4.4	1.23	3.1 - 5.0
Co	5:5	5	1.00	--	5:5	7	1.00	--
Cr	5:5	26	1.25	20 - 30	5:5	44	1.44	30 - 70
Cu	5:5	15	1.00	--	5:5	30	1.00	--
F	1:5	<400	--	<400 - 400	5:5	680	1.07	600 - 700
Fe, total[1]	5:5	1.7	1.03	1.6 - 1.7	5:5	2.3	1.09	2.0 - 2.6
Ga	5:5	13	1.25	10 - 15	5:5	15	1.00	--
Ge	5:5	1.2	1.10	1.1 - 1.4	5:5	1.3	1.06	1.2 - 1.4
Hg	5:5	.020	1.71	.01 - .04	4:5	.019	2.03	<.01 - .034
K[1]	5:5	2.0	1.03	1.9 - 2.0	5:5	2.0	1.10	1.9 - 2.4
La	0:5	<30	--	--	3:5	28	1.11	<30 - 30
Li	5:5	20	1.13	18 - 25	5:5	36	1.06	33 - 38
Mg[1]	5:5	.64	1.04	.60 - .67	5:5	1.4	1.07	1.3 - 1.5
Mn	5:5	240	1.25	200 - 300	5:5	370	1.32	300 - 500
Na[1]	5:5	.67	1.05	.63 - .72	5:5	.82	1.36	68 - 1.4
Nb	4:5	9.5	1.10	<10 - 10	2:5	8.0	1.23	<10 - 10
Ni	5:5	10	1.31	7 - 15	5:5	18	1.17	15 - 20
Pb	5:5	12	1.25	10 - 15	5:5	15	1.28	10 - 20
Rb	5:5	81	1.10	75 - 95	5:5	87	1.05	80 - 90
S, total	1:5	--	--	<800 - 930	2:5	620	2.11	<800 - 1,800
Sc	5:5	5.7	1.20	5 - 7	5:5	8.7	1.22	7 - 10
Se	1:5	--	--	<.1 - .26	3:5	.14	2.07	<.1 - .28
Si	5:5	33	1.02	32 - 34	5:5	29	1.04	27 - 30
Sn	5:5	.68	2.31	.16 - 1.3	5:5	.79	1.57	.39 - 1.2
Sr	5:5	150	1.00	--	5:5	280	1.20	200 - 300
Th	5:5	7.9	1.23	5.8 - 9.8	5:5	9.8	1.17	7.7 - 11
Ti[1]	5:5	.30	1.03	.29 - .31	5:5	.32	1.16	.26 - .40
U	5:5	2.2	1.05	2.0 - 2.3	5:5	3.1	1.04	2.9 - 3.2
V	5:5	41	1.32	30 - 50	5:5	87	1.22	70 - 100
Y	5:5	14	1.35	10 - 20	5:5	19	1.14	15 - 20
Yb	5:5	1.8	1.36	1.5 - 3	5:5	1.8	1.18	1.5 - 2
Zn	5:5	52	1.06	49 - 57	5:5	67	1.04	65 - 72
Zr	5:5	180	1.36	150 - 300	5:5	130	1.25	100 - 150
pH[2]	5:5	8.1	.23	7.7 - 8.3	5:5	8.2	.18	8.0 - 8.4

[1]Means and ranges given in percent.
[2]Standard units, Mean is arithmetic. Deviation is standard.

TABLE 74.—*Element concentrations and pH of soils that supported cucumber plants in areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available]

	Areas of commercial production							
Element,	Berrien County, Mich.				San Joaquin County, Calif.			
or pH	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	3.2	1.65	2.3 - 7.5	5:5	7.7	1.08	6.9 - 8.4
As	5:5	4.8	4.89	.94 - 67	5:5	7.4	1.53	4.2 - 13
B	2:5	6.8	3.98	<10 - 30	5:5	22	1.20	20 - 30
Ba	5:5	440	1.44	300 - 700	5:5	870	1.22	700 - 1,000
Be	0:5	<1	--	--	4:5	.95	1.10	<1 - 1
C, total[1]	5:5	1.3	1.60	.58 - 2.0	5:5	1.8	1.17	1.5 - 2.2
Ca[1]	5:5	.61	2.26	.38 - 2.6	5:5	2.0	1.03	1.9 - 2.0
Co	5:5	4.8	1.35	3 - 7	5:5	18	1.17	15 - 20
Cr	5:5	21	1.42	15 - 30	5:5	120	1.25	100 - 150
Cu	5:5	17	1.72	7 - 30	5:5	130	1.25	100 - 150
F	2:5	370	1.24	<400 - 500	4:5	440	1.24	<400 - 600
Fe, total[1]	5:5	1.5	1.82	.91 - 4.2	5:5	5.1	1.04	4.9 - 5.3
Ga	5:5	7.0	1.28	5 - 10	5:5	19	1.14	15 - 20
Ge	4:5	.59	3.32	.69 - 1.3	5:5	1.3	1.38	.82 - 1.8
Hg	5:5	.061	2.76	.03 - .35	5:5	.082	1.73	.043 - .13
K[1]	5:5	1.5	1.18	1.2 - 1.8	5:5	1.6	1.04	1.6 - 1.7
La	1:5	<30	--	<30 - 30	2:5	26	1.16	<30 - 30
Li	5:5	13	1.32	10 - 19	5:5	29	1.05	27 - 30
Mg[1]	5:5	.22	1.20	.17 - .26	5:5	1.4	1.01	1.4 - 1.5
Mn	5:5	880	1.51	500 - 1,500	5:5	710	1.57	500 - 1,500
Na[1]	5:5	.61	1.06	.56 - .66	5:5	1.0	1.04	.95 - 1.0
Nb	1:5	<10	--	<10 - 10	3:5	8.9	1.16	<10 - 10
Ni	5:5	8.2	1.62	5 - 15	5:5	61	1.20	50 - 70
Pb	5:5	23	2.92	10 - 150	5:5	21	1.64	15 - 50
Rb	5:5	52	1.25	40 - 70	5:5	75	1.05	70 - 80
S, total	1:5	--	--	<800 - 810	0:5	<800	--	--
Sc	2:5	2.3	2.51	5 - 7	5:5	30	2.01	20 - 100
Se	1:5	--	--	<.1 - 1.9	4:5	.14	1.89	<.1 - .38
Si[1]	5:5	34	1.15	27 - 39	5:5	26	1.03	25 - 27
Sn	3:5	.18	4.84	.22 - .89	5:5	1.0	2.91	.21 - 4.3
Sr	5:5	75	1.34	50 - 100	5:5	240	1.25	200 - 300
Th	3:3	4.3	1.54	2.6 - 6.0	5:5	9.4	1.18	8.4 - 12
Ti[1]	5:5	.27	1.62	.17 - .57	5:5	.56	1.02	.54 - .57
U	5:5	1.7	1.28	1.3 - 2.2	5:5	2.7	1.06	2.6 - 2.9
V	5:5	31	1.83	20 - 70	5:5	180	1.17	150 - 200
Y	4:5	11	1.53	<10 - 20	5:5	20	1.28	15 - 30
Yb	4:5	1.2	1.51	<1 - 2	5:5	2.4	1.25	2 - 3
Zn	5:5	50	1.28	36 - 63	5:5	100	1.06	99 - 110
Zr	5:5	150	1.57	100 - 300	5:5	110	1.20	100 - 150
pH[2]	5:5	6.3	.71	5.5 - 7.3	5:5	7.5	.15	7.3 - 7.7

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic, deviation is standard.

TABLE 75.—*Element concentrations and pH of soils that supported dry bean plants in areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except where percent is indicated. Leaders (--) in figure column indicate no data available]

Element,	Areas of commercial production								Areas of commercial production (continued)							
	Wayne County, N.Y.				Twin Falls County, Idaho				San Joaquin County, Calif.				Mesa County, Colo.			
or pH	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	3.4	1.39	2.3 - 5.6	5:5	4.7	1.12	4.0 - 5.3	5:5	7.1	1.18	5.3 - 7.9	5:5	3.8	1.42	2.1 - 5.0
As	5:5	7.1	1.62	3.4 - 12	5:5	5.2	1.26	4.0 - 7.3	5:5	3.8	1.15	3.2 - 4.7	5:5	8.9	1.21	7.4 - 11
B	5:5	26	1.50	20 - 50	5:5	26	1.25	20 - 30	3:5	12	2.30	<10 - 30	5:5	33	1.26	30 - 50
Ba	5:5	300	1.00	--	5:5	610	1.20	500 - 700	5:5	870	1.22	700 - 1,000	5:5	570	1.20	500 - 700
Be	0:5	<1	--	--	5:5	1.1	1.20	1 - 1.5	5:5	1	1.00	--	2:5	.80	1.23	<1 - 1
C, total[1]	5:5	1.2	1.31	.78 - 1.6	5:5	2.0	1.26	1.6 - 2.7	5:5	1.1	1.02	1.1 - 1.2	5:5	2.1	1.39	1.3 - 3.2
Ca[1]	5:5	.69	3.14	.37 - 5.3	5:5	4.7	1.38	3.3 - 6.5	5:5	1.9	1.14	1.7 - 2.4	5:5	3.3	4.21	.26 - 7.7
Co	5:5	5.0	1.00	--	5:5	6.5	1.16	5 - 7	5:5	16	1.14	15 - 20	5:5	5.0	1.00	--
Cr	5:5	22	1.35	15 - 30	5:5	50	1.00	--	5:5	110	1.36	100 - 200	5:5	45	1.26	30 - 50
Cu	5:5	43	1.73	20 - 70	5:5	16	1.14	15 - 20	5:5	61	1.36	50 - 100	5:5	17	1.17	15 - 20
F	3:5	430	1.14	<400 - 500	5:5	800	1.50	500 - 1,400	1:5	--	--	<400 - 500	5:5	630	1.27	500 - 800
Fe, total[1]	5:5	1.8	1.36	1.2 - 2.8	5:5	2.2	1.08	2.0 - 2.4	5:5	4.0	1.34	2.3 - 4.6	5:5	1.9	1.26	1.3 - 2.2
Ga	5:5	8.8	1.40	7 - 15	5:5	15	1.00	--	5:5	19	1.14	15 - 20	5:5	14	1.20	10 - 15
Ge	5:5	1.0	1.49	.53 - 1.4	5:5	1.0	1.22	.80 - 1.3	5:5	1.5	1.27	.96 - 1.7	5:5	1.1	1.20	.86 - 1.3
Hg	5:5	.047	1.37	.030 - .070	5:5	.038	1.22	.03 - .046	5:5	.026	1.40	.016 - .035	5:5	.036	1.26	.029 - .046
K[1]	5:5	1.4	1.25	1.1 - 1.9	5:5	1.7	1.07	1.6 - 1.9	5:5	1.6	1.09	1.5 - 1.9	5:5	1.5	1.66	.61 - 2.0
La	1:5	<30	--	<30 - 30	5:5	30	1.00	--	0:5	<30	--	--	3:5	31	3.05	<30 - 150
Li	5:5	21	1.09	19 - 23	5:5	25	1.05	24 - 27	5:5	23	1.05	22 - 25	5:5	26	1.10	22 - 28
Mg[1]	5:5	.30	1.32	.21 - .42	5:5	1.3	1.16	1.1 - 1.5	5:5	1.2	1.01	1.2 - 1.2	5:5	.90	1.08	.79 - .97
Mn	5:5	340	1.48	200 - 500	5:5	280	1.46	200 - 500	5:5	610	1.36	500 - 1,000	5:5	180	1.17	150 - 200
Na[1]	5:5	.80	1.08	.73 - .85	5:5	.88	1.09	.80 - .99	5:5	1.0	1.02	1.0 - 1.1	5:5	.77	1.10	.68 - .85
Nb	4:5	9.5	1.10	<10 - 10	5:5	10	1.00	--	3:5	8.9	1.16	<10 - 10	1:5	<10	--	<10 - 10
Ni	4:5	5.3	2.24	<2 - 10	5:5	16	1.14	15 - 20	5:5	57	1.20	50 - 70	5:5	15	1.00	--
Pb	5:5	10	1.00	--	5:5	16	1.14	15 - 20	5:5	15	1.00	--	5:5	18	1.17	15 - 20
Rb	5:5	44	1.20	35 - 55	5:5	76	1.06	70 - 80	5:5	84	1.05	80 - 90	5:5	82	1.12	70 - 95
S, total	0:5	<800	--	--	1:5	--	--	<800 - 940	1:5	--	--	<800 - 890	2:5	680	1.62	<800 - 1,300
Sc	4:5	3.8	1.45	<3 - 5	5:5	7.0	1.00	--	5:5	19	1.14	15 - 20	5:5	5.7	1.20	5 - 7
Se	3:5	.15	3.81	<.1 - .9	3:4	21	2.22	<.1 - 48	4:5	.14	1.60	<.1 - .29	3:5	.16	3.24	<1 - .69
Si[1]	5:5	34	1.15	27 - 37	5:5	29	1.04	28 - 30	5:5	28	1.04	27 - 30	5:5	30	1.17	27 - 40
Sn	4:5	.31	2.25	<.1 - .58	5:5	1.0	2.75	.18 - 2.5	5:5	.58	2.08	.17 - .98	5:5	.84	1.93	.27 - 1.4
Sr	5:5	100	1.54	70 - 200	5:5	200	1.00	--	5:5	260	1.25	200 - 300	5:5	310	1.38	200 - 500
Th	5:5	5.2	1.45	3.3 - 7.5	5:5	12	1.13	11 - 14	5:5	8.0	1.15	6.5 - 9.5	5:5	10	1.22	7.9 - 14
Ti[1]	5:5	.35	1.17	.28 - .43	5:5	.34	1.06	.31 - .36	5:5	.51	1.31	.31 - .59	5:5	.30	1.58	.23 - .68
U	5:5	2.0	1.05	1.9 - 2.1	5:5	3.0	1.06	2.7 - 3.2	5:5	2.7	1.04	2.6 - 2.8	5:5	3.6	1.07	3.4 - 4.0
V	5:5	33	1.26	30 - 50	5:5	65	1.16	50 - 70	5:5	160	1.14	150 - 200	5:5	140	1.20	100 - 150
Y	5:5	13	1.25	10 - 15	5:5	16	1.14	15 - 20	5:5	16	1.14	15 - 20	5:5	17	1.17	15 - 20
Yb	5:5	1.5	1.00	--	5:5	1.8	1.36	1.5 - 3	5:5	2.0	1.33	1.5 - 3	5:5	1.8	1.36	1.5 - 3
Zn	5:5	44	1.14	37 - 51	5:5	76	1.11	71 - 92	5:5	110	1.04	100 - 120	5:5	84	1.12	71 - 96
Zr	5:5	370	1.79	200 - 700	5:5	180	1.36	150 - 300	5:5	120	1.25	100 - 150	5:5	110	1.20	100 - 150
pH[2]	5:5	5.8	.44	5.4 - 6.5	5:5	8.1	.26	7.7 - 8.4	5:5	7.0	.19	6.8 - 7.3	5:5	7.9	.31	7.4 - 8.2

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

TABLE 76.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in indicate no data available]

Element, or pH	Areas of commercial production: Cumberland County, N.J. Ratio	Mean	Deviation	Observed range	Palm Beach County, Fla. Ratio	Mean	Devtation	Observed range
Al[1]-------	5:5	2.0	1.37	1.3 - 2.8	0:5	<.26	--	--
As--------	5:5	11	1.65	4.7 - 18	5:5	.93	5.66	.22 - 18
B---------	5:5	28	1.72	20 - 70	0:5	<10	--	--
Ba--------	5:5	200	1.28	150 - 300	5:5	77	2.18	50 - 300
Be--------	2:5	.80	1.23	<1 - 1	0:5	<1	--	--
C, total[1]-	5:5	.94	1.26	.66 - 1.2	5:5	46	1.03	44 - 48
Ca[1]-------	5:5	.27	1.17	.24 - .34	5:5	3.0	1.05	2.9 - 3.2
Co--------	3:5	3.0	1.64	<3 - 5	0:5	<3	--	--
Cr--------	5:5	16	1.33	10 - 20	5:5	1.4	1.42	1 - 2
Cu--------	5:5	14	1.35	10 - 20	5:5	50	1.00	--
F---------	1:5	<400	--	<400 - 900	1:5	<400	--	<400 - 400
Fe, total[1]	5:5	1.0	1.25	.82 - 1.4	4:5	.076	2.21	.056- .20
Ga--------	5:5	5.7	1.20	5 - 7	0:5	<5	--	--
Ge--------	5:5	1.0	1.22	.75 - 1.2	1:5	<.1	--	<.1 - 1.3
Hg--------	5:5	.048	1.39	.030 - .063	5:5	.14	1.19	.11 - .16
K[1]--------	5:5	.70	1.20	.53 - .85	5:5	.27	1.62	.17 - .57
La--------	4:5	29	1.07	<30 - 30	0:5	<30	--	--
Li--------	5:5	14	1.25	10 - 17	0:5	<5	--	--
Mg[1]-------	5:5	.17	1.31	.12 - .24	5:5	.19	1.14	.15 - .21
Mn--------	5:5	190	1.33	150 - 300	5:5	200	7.30	70 - 7,000
Na[1]-------	5:5	.20	1.24	.15 - .27	0:5	<.07	--	--
Nb--------	4:5	9.5	1.10	<10 - 10	0:5	<10	--	--
Ni--------	5:5	7.0	1.28	5 - 10	0:5	<2	--	--
Pb--------	5:5	14	1.42	10 - 20	0:5	<10	--	--
Rb--------	5:5	37	1.37	25 - 55	0:5	<20	--	--
S, total--	0:5	<800	--	--	0:5	<800	--	--
Sc--------	4:5	2.9	1.07	<3 - 3	0:5	<3	--	--
Se--------	2:5	.075	3.95	<.1 - .46	3:5	.14	2.10	<.1 - .32
Si[1]-------	5:5	37	1.08	35 - 42	5:5	.55	1.23	.42 - .71
Sn--------	4:5	.66	3.61	<.1 - 1.8	2:5	.054	10.7	<.1 - 1.3
Sr--------	5:5	23	1.46	15 - 30	5:5	82	1.41	70 - 150
Th--------	5:5	7.3	1.44	4.8 - 11	--	--	--	--
Ti[1]-------	5:5	.48	1.11	.42 - .54	1:4	<.03	--	<.03 - .03
U---------	5:5	2.4	1.17	2.0 - 2.9	5:5	1.1	1.46	.64 - 1.5
V---------	5:5	24	1.37	15 - 30	0:5	<7	--	--
Y---------	5:5	16	1.33	10 - 20	1:5	<10	--	<10 - 10
Yb--------	5:5	1.6	1.14	1.5 - 2	0:5	<1	--	--
Zn--------	5:5	38	1.37	27 - 59	5:5	83	1.25	58 - 100
Zr--------	5:5	200	1.28	150 - 300	0:5	<10	--	--
pH[2]-------	5:5	6.6	.44	6.0 - 7.0	5:5	4.9	.11	4.7 - 5.0

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported lettuce plants in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as parts per million, except where percent is indicated. Leaders (--) in figure column

Areas of commercial production (continued)

Hidalgo County, Texas				Imperial County, Calif.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	4.9	1.07	4.5 - 5.3	5:5	4.9	1.50	2.4 - 6.5
5:5	10	1.15	8.5 - 12	5:5	11	2.07	6.3 - 40
5:5	20	1.00	--	5:5	37	1.32	30 - 50
5:5	500	1.00	--	5:5	610	1.36	500 - 1,000
4:5	.95	1.10	<1 - 1	3:5	.89	1.16	<1 - 1
5:5	3.9	1.12	3.3 - 4.4	5:5	2.2	1.19	1.9 - 3.0
5:5	11	1.00	--	5:5	2.8	2.75	.46 - 4.6
5:5	5	1.00	--	5:5	7	1.00	--
5:5	41	1.32	30 - 50	5:5	48	1.35	30 - 70
5:5	16	1.14	15 - 20	5:5	31	1.38	20 - 50
5:5	730	1.21	600 - 1,000	5:5	630	1.24	500 - 800
5:5	2.5	1.02	2.5 - 2.6	5:5	2.2	1.41	1.2 - 2.8
5:5	15	1.00	--	5:5	17	1.17	15 - 20
5:5	1.0	1.23	.74 - 1.3	5:5	1.3	1.15	1.1 - 1.5
5:5	.047	1.20	.036 - .059	5:5	.041	1.70	.029 - .10
5:5	1.8	1.02	1.8 - 1.9	5:5	1.7	1.31	1.1 - 2.0
3:5	28	1.11	<30 - 30	4:5	31	1.35	<30 - 50
5:5	30	1.02	29 - 30	5:5	40	1.10	34 - 43
5:5	.87	1.03	.84 - .90	5:5	1.2	1.67	.48 - 1.6
5:5	240	1.25	200 - 300	5:5	310	1.38	200 - 500
5:5	.82	1.04	.79 - .86	5:5	.61	1.07	.56 - .66
0:5	<10	--	--	2:5	8	1.23	<10 - 10
5:5	12	1.25	10 - 15	5:5	17	1.17	15 - 20
5:5	15	1.00	--	5:5	22	1.20	20 - 30
5:5	81	1.11	70 - 90	5:5	93	1.14	80 - 120
0:5	<800	--	--	1:5	--	--	<800 - 1,700
5:5	7	1.00	--	5:5	8.7	1.22	7 - 10
3:5	.11	1.57	<.1 - .19	4:5	.18	1.90	<.1 - .36
5:5	22	1.04	21 - 23	5:5	29	1.18	26 - 39
5:5	1.7	2.03	.88 - 5.6	5:5	1.0	1.77	.40 - 1.8
5:5	500	1.00	--	5:5	260	1.50	200 - 500
5:5	10	1.20	8.3 - 13	5:5	12	1.12	11 - 14
5:5	.32	1.03	.31 - .34	5:5	.31	1.10	.27 - .33
5:5	2.8	1.07	2.5 - 3.0	5:5	3.3	1.10	2.8 - 3.6
5:5	75	1.17	70 - 100	5:5	87	1.22	70 - 100
5:5	16	1.14	15 - 20	5:5	19	1.14	15 - 20
5:5	1.6	1.14	1.5 - 2	5:5	1.9	1.33	1.5 - 3
5:5	78	1.06	72 - 81	5:5	81	1.12	67 - 88
5:5	100	1.31	70 - 150	5:5	100	1.46	70 - 150
5:5	8.1	.25	7.8 - 8.4	5:5	8.0	.11	7.9 - 8.2

TABLE 77.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in indicate no data available]

Element,	Areas of commercial production							
	Wayne County, N.Y.				Cumberland County, N.J.			
or pH	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]-------	5:5	2.6	1.99	.77 - 4.0	5:5	3.8	1.06	3.6 - 4.1
As--------	5:5	13	1.85	6.2 - 24	5:5	34	1.30	24 - 46
B---------	4:5	16	1.55	<10 - 20	5:5	61	1.20	50 - 70
Ba--------	5:5	240	2.10	70 - 500	5:5	450	1.26	300 - 500
Be--------	0:5	<1	--	--	5:5	1.5	1.46	1 - 2
C, total[1]-	5:5	5.9	3.61	2.0 - 40	5:5	1.2	1.31	.88 - 1.7
Ca[1]-------	5:5	1.0	2.27	.61 - 4.3	5:5	.38	1.07	.34 - .40
Co--------	4:5	4.3	1.38	<3 - 5	5:5	6.1	1.20	5 - 7
Cr--------	5:5	17	2.09	5 - 30	5:5	59	1.46	30 - 70
Cu--------	5:5	17	2.41	7 - 50	5:5	140	1.29	100 - 150
F---------	2:5	374	1.45	500 - 600	5:5	700	1.39	500 - 1,200
Fe, total[1]	5:5	1.2	1.34	.67 - 1.5	5:5	2.0	1.07	1.8 - 2.1
Ga--------	4:5	7.9	1.60	<5 - 10	5:5	11	1.20	10 - 15
Ge--------	5:5	1.0	1.99	.31 - 1.7	5:5	1.3	1.11	1.2 - 1.5
Hg--------	5:5	.070	2.55	.024 - .31	5:5	.20	1.32	.15 - 2.7
K[1]--------	5:5	.92	2.00	.27 - 1.4	5:5	1.4	1.07	1.3 - 1.5
La--------	0:5	<30	--	--	5:5	110	2.52	50 - 500
Li--------	4:5	14	1.97	17 - 22	5:5	21	1.06	20 - 23
Mg[1]-------	5:5	.24	1.51	.12 - .33	5:5	.35	1.10	.30 - .39
Mn--------	5:5	145	1.54	70 - 200	5:5	220	1.35	150 - 300
Na[1]-------	4:5	.49	3.45	<.07 - 1.0	5:5	.45	1.04	.43 - .48
Nb--------	1:5	<10	--	<10 - 10	5:5	13	1.25	10 - 15
Ni--------	5:5	6.1	1.36	5 - 10	5:5	13	1.25	10 - 15
Pb--------	5:5	14	1.35	1 - 20	5:5	20	1.00	--
Rb--------	4:5	33	1.49	<20 - 50	5:5	67	1.02	60 - 75
S, total--	2:5	670	1.75	<800 - 1,500	1:5	--	--	<800 - 810
Sc--------	4:5	3.4	1.44	<3 - 5	4:5	5.5	1.63	<3 - 7
Se--------	5:5	.34	1.84	.13 - .58	4:5	.25	2.42	<.1 - .75
Si[1]-------	5:5	20	3.19	2.5 - 36	5:5	35	1.02	34 - 36
Sn--------	4:5	.49	3.81	<.1 - 2.4	4:5	.78	4.36	.97 - 3.4
Sr--------	5:5	110	1.38	70 - 150	5:5	87	1.22	70 - 100
Th--------	4:4	4.7	1.15	4.1 - 5.3	5:5	13	1.14	11 - 15
Ti[1]-------	5:5	.26	2.40	.055 - .41	5:5	.62	1.03	.61 - .65
U---------	5:5	2.4	1.47	1.6 - 4.5	5:5	4.6	1.04	4.4 - 4.9
V---------	4:5	22	2.53	<7 - 50	5:5	57	1.20	50 - 70
Y---------	4:5	12	1.39	<10 - 15	5:5	44	1.44	30 - 70
Yb--------	4:5	1.3	1.60	<1 - 2	5:5	4.5	1.26	3 - 5
Zn--------	5:5	46	1.26	36 - 64	5:5	51	1.12	45 - 61
Zr--------	4:5	118	6.02	<200 - 500	5:5	255	1.25	200 - 300
pH[2]-------	5:5	4.8	6.30	4.9 - 6.8	5:5	5.5	.58	4.8 - 6.3

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported potato plants in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as parts per million, except where percent is indicated. Leaders (--) in figure column

Areas of commercial production (continued)							
Twin Falls County, Idaho				Yakima County, Wash.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	4.5	1.06	4.2 - 4.8	5:5	7.1	1.07	6.6 - 7.9
5:5	4.4	1.12	3.7 - 4.9	5:5	7.1	1.15	6.0 - 8.8
5:5	31	1.38	20 - 50	0:5	<10	--	--
5:5	700	1.28	500 - 1,000	5:5	610	1.20	500 - 700
5:5	1.1	1.20	1.0 - 1.5	5:5	1.0	1.00	--
5:5	1.8	1.21	1.5 - 2.4	5:5	.76	1.25	.55 - .96
5:5	3.5	1.47	1.2 - 5.4	5:5	2.7	1.04	2.6 - 2.9
5:5	8.8	1.40	7 - 15	5:5	18	1.36	15 - 30
5:5	53	1.16	50 - 70	5:5	61	1.36	50 - 100
5:5	20	1.68	15 - 50	5:5	40	1.64	20 - 70
5:5	500	1.15	400 - 600	2:5	360	1.65	<400 - 700
5:5	2.0	1.01	1.9 - 2.0	5:5	4.8	1.07	4.4 - 5.1
5:5	14	1.20	10 - 15	5:5	17	1.17	15 - 20
5:5	1.1	1.15	.93 - 1.4	5:5	1.4	1.09	1.3 - 1.5
5:5	.031	1.21	.023 - .037	5:5	.032	1.20	.026 - .041
5:5	1.7	1.05	1.6 - 1.8	5:5	1.4	1.14	1.2 - 1.6
3:5	28	1.50	<30 - 50	1:5	<30	--	<30 - 30
5:5	22	1.06	21 - 24	5:5	23	1.13	19 - 26
5:5	1.0	1.08	.91 - 1.1	5:5	1.2	1.11	1.1 - 1.5
5:5	280	1.46	200 - 500	5:5	700	1.57	500 - 1,500
5:5	.96	1.06	.88 - 1.0	5:5	2.0	1.10	1.7 - 2.2
4:5	10	1.30	<10 - 15	4:5	9.5	1.10	<10 - 10
5:5	19	1.33	15 - 30	5:5	30	1.00	--
5:5	17	1.17	15 - 20	5:5	12	1.25	10 - 15
5:5	72	1.12	60 - 80	5:5	52	1.27	40 - 70
0:5	<800	--	--	1:5	--	--	<800 - 830
5:5	7	1.28	5 - 10	5:5	20	1.00	--
1:5	--	--	<.1 - .21	1:5	--	--	<.10 - .16
5:5	31	1.04	29 - 32	5:5	27	1.02	27 - 28
5:5	1.4	1.59	.80 - 2.6	5:5	.95	1.39	.63 - 1.4
5:5	217	1.20	200 - 300	5:5	370	1.32	300 - 500
5:5	11	1.37	6.6 - 15	5:5	7.9	1.24	6.1 - 9.5
5:5	.32	3.19	.30 - .33	5:5	.68	1.10	.60 - .76
5:5	2.7	1.10	2.6 - 3.2	5:5	1.9	1.11	1.7 - 2.1
5:5	70	1.28	50 - 100	5:5	180	1.17	150 - 200
5:5	21	1.42	15 - 30	5:5	22	1.35	15 - 30
5:5	2.2	1.35	1.5 - 3.0	4:5	2.4	1.26	<1 - 3
5:5	66	1.09	58 - 73	5:5	93	1.03	90 - 98
5:5	210	1.64	150 - 500	5:5	150	1.28	100 - 200
5:5	8.2	1.64	8.0 - 8.3	5:5	7.1	.35	6.7 - 7.6

TABLE 78.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in deviation, except as indicated. Means and ranges are given in parts per million, except where

Element, or pH	Areas of commercial production: Berrien County, Mich. — Ratio	Mean	Deviation	Observed range	Wayne County, N.Y. — Ratio	Mean	Deviation	Observed range
Al[1]	2:2	2.8	1.15	2.5 - 3.1	5:5	4.6	1.06	4.3 - 5.1
As	2:2	5.5	1.20	4.8 - 6.2	5:5	5.1	1.28	3.8 - 6.7
B	0:2	<10	--	--	5:5	36	1.63	20 - 70
Ba	2:2	300	1.00	--	5:5	500	1.00	--
Be	0:2	<1	--	--	4:5	.95	1.10	<1 - 1
C, total[1]	2:2	.58	1.05	.56 - .60	5:5	1.8	1.14	1.5 - 2.1
Ca[1]	2:2	.43	1.10	.40 - .46	5:5	.45	1.28	.34 - .67
Co	2:2	5	1.00	--	5:5	7.5	1.17	7 - 10
Cr	2:2	15	1.00	--	5:5	41	1.32	30 - 50
Cu	2:2	21	1.63	15 - 30	5:5	19	1.33	15 - 30
F	0:2	<400	--	--	5:5	540	1.29	400 - 800
Fe, total[1]	2:2	1.5	1.03	1.4 - 1.5	5:5	2.3	1.03	2.3 - 2.4
Ga	2:2	5.9	1.27	5 - 7	5:5	15	1.00	--
Ge	2:2	1.1	1.29	.91 - 1.3	5:5	1.5	1.15	1.2 - 1.7
Hg	2:2	.047	1.31	.039 - .057	5:5	.056	1.37	.035- .086
K[1]	2:2	1.2	1.00	--	5:5	1.6	1.01	1.5 - 1.6
La	0:2	<30	--	--	3:5	28	1.50	<30 - 50
Li	2:2	12	1.13	11 - 13	5:5	32	1.13	28 - 38
Mg[1]	2:2	.20	1.00	--	5:5	.54	1.09	.48 - .59
Mn	2:2	1,500	1.00	--	5:5	480	1.35	300 - 700
Na[1]	2:2	.57	1.03	.56 - .59	5:5	.94	1.06	.87 - 1.0
Nb	0:2	<10	--	--	5:5	11	1.20	10 - 15
Ni	2:2	8.4	1.29	7 - 10	5:5	16	1.33	10 - 20
Pb	2:2	15	1.00	--	5:5	16	1.14	15 - 20
Rb	2:2	42	1.09	40 - 45	5:5	77	1.04	75 - 80
S, total	0:2	<800	--	--	1:5	--	--	<800 - 860
Sc	2:2	5	1.00	--	5:5	7.5	1.17	7 - 10
Se	0:2	<.1	--	--	2:5	.078	2.73	<.1 - .31
Si[1]	2:2	38	1.02	37 - 38	5:5	33	1.04	31 - 34
Sn	2:2	3.6	7.87	.83 - 15	5:5	.86	1.47	.50 - 1.4
Sr	2:2	59	1.27	50 - 70	5:5	150	1.00	--
Th	2:2	4.0	1.26	3.4 - 4.7	5:5	8.0	1.17	6.7 - 9.3
Ti[1]	2:2	.22	1.07	.21 - .24	5:5	.48	1.06	.45 - .51
U	2:2	1.4	1.00	--	5:5	2.6	1.16	2.2 - 3.2
V	2:2	20	1.00	--	5:5	75	1.17	70 - 100
Y	2:2	12	1.33	10 - 15	5:5	19	1.33	15 - 30
Yb	2:2	1.5	1.00	--	5:5	1.9	1.33	1.5 - 3.0
Zn	2:2	54	1.03	53 - 55	5:5	77	1.08	69 - 84
Zr	2:2	150	1.00	--	5:5	200	1.46	150 - 300
pH[2]	2:2	6.4	.07	6.3 - 6.4	5:5	5.7	62	4.8 - 6.2

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported snap bean plants in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric percent is indicated. Leaders (--) in figure column indicate no data available.]

Areas of commercial production (continued)											
Cumberland County, N.J.				Palm Beach County, Fla.				Twin Falls County, Idaho			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
5:5	2.5	1.56	1.4 - 4.9	1:5	--	--	.26 - 7.4	5:5	5.1	1.05	4.8 - 5.4
5:5	6.5	1.31	4.5 - 8.7	3:5	.17	2.61	<.1 - .8	5:5	6.3	1.49	4.5 - 12
5:5	28	1.46	20 - 50	4:5	48	4.22	<10 - 200	5:5	28	1.20	20 - 30
5:5	220	1.20	200 - 300	5:5	19	1.60	20 - 30	5:5	650	1.16	500 -700
1:5	<1	--	<1 - 1	0:5	<1	--	--	5:5	1.2	1.25	1.0 - 1.5
5:5	.78	1.42	.54 - 1.3	5:5	.89	1.49	.58 - 1.5	5:5	1.8	1.27	1.3 - 2.6
5:5	.45	4.74	.15 - 7.0	5:5	.28	3.71	.082 - 2.6	5:5	3.4	1.26	2.6 - 4.4
3:5	3.4	1.65	<3 - 5	0:5	<3	--	--	5:5	7	1.00	--
5:5	21	1.64	15 - 50	5:5	2.4	1.37	1.5 - 3.0	5:5	57	1.20	50 - 70
5:5	14	1.35	10 - 20	5:5	5.2	2.08	1.5 - 10	5:5	18	1.17	15 - 20
1:5	--	--	<400 - 500	0:5	<400	--	--	5:5	580	1.15	500 -700
5:5	1.4	1.35	.98 - 2.2	1:5	--	--	<.03 - 1.9	5:5	2.6	1.05	2.4 - 2.7
5:5	5.7	1.20	5 - 7	0:5	<5	--	--	5:5	15	1.00	--
5:5	1.1	1.11	.92 - 1.2	5:5	.75	2.02	.21 - 1.1	5:5	1.4	1.09	1.2 - 1.6
5:5	.068	5.73	.020 - 1.4	5:5	.016	1.54	.010 - .025	5:5	.037	1.25	.030 - .052
5:5	.91	1.52	.60 - 1.8	5:5	.20	3.99	.098 - 2.4	5:5	1.8	1.04	1.7 - 1.8
3:5	30	1.64	<30 - 50	0:5	<30	--	--	5:5	33	1.26	30 - 50
5:5	14	1.17	11 - 16	0:5	<5	--	--	5:5	27	1.07	25 - 29
5:5	.15	1.21	.13 - .20	1:5	--	--	<.06 - .084	5:5	1.1	1.08	.96 - 1.2
5:5	170	1.17	150 - 200	5:5	22	4.33	2 - 70	5:5	450	1.26	300 -500
5:5	.20	1.24	.15 - .27	1:5	--	--	<.07 - .052	5:5	1.0	1.02	1.0 - 1.1
4:5	9.5	1.10	<10 - 10	0:5	<10	--	--	5:5	10	1.00	--
4:5	4.4	2.02	<2 - 10	1:5	--	--	<2 - 5	5:5	17	1.17	15 - 20
5:5	13	1.25	10 - 15	0:5	<10	--	--	5:5	17	1.17	15 - 20
5:5	35	1.42	25 - 55	0:5	<20	--	--	5:5	76	1.06	70 - 80
0:5	<800	--	--	0:5	<800	--	--	0:5	<800	--	--
4:5	3.8	1.45	<3 - 5	0:5	<3	--	--	5:5	8.1	1.22	7 - 10
2:5	.068	4.09	<.1 - .47	2:5	.054	11.2	<.1 - 1.5	3:5	.12	1.76	<.1 - .23
5:5	35	1.15	28 - 40	5:5	38	1.18	29 - 45	5:5	30	1.04	28 - 31
5:5	.92	1.60	.51 - 1.8	1:5	--	--	<.1 - .22	5:5	1.0	1.42	.58 - 1.5
5:5	27	1.76	15 - 50	0:5	<5	--	--	5:5	240	1.25	200 -300
5:5	8.2	1.46	4.7 - 11	0:5	<1	--	--	5:5	12	1.27	8.1 - 16
5:5	.45	1.37	.26 - .56	5:5	.081	2.16	.044 - .28	5:5	.42	1.06	.39 - .44
5:5	2.6	1.15	2.0 - 2.9	5:5	.52	1.28	.40 - .69	5:5	3.0	1.07	2.8 - 3.3
5:5	26	1.25	20 - 30	0:5	<7	--	--	5:5	81	1.22	70 -100
5:5	16	1.33	10 - 20	1:5	--	--	<10 - 15	5:5	22	1.20	20 - 30
5:5	1.7	1.17	1.5 - 2.0	1:5	--	--	<1 - 1.5	5:5	2.4	1.25	2 - 3
5:5	35	1.24	25 - 46	2:5	6.3	3.60	<10 - 38	5:5	80	1.06	76 - 89
5:5	210	1.64	150 - 500	5:5	89	3.19	30 - 300	5:5	180	1.36	150 -300
5:5	6.2	.47	5.5 - 6.7	5:5	6.9	.62	6.2 - 7.9	5:5	8.3	.11	8.1 - 8.4

TABLE 79.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in indicate no data available]

Element, or pH	Areas of commercial production: Berrien County, Mich.				Salem County, N.J.			
	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	2.4	1.31	1.6 - 3.4	5:5	1.2	1.69	.61 - 2.1
As	5:5	7.9	2.83	3.9 - 48	5:5	5.5	1.57	3.4 - 11
B	4:5	20	2.13	<10 - 50	5:5	31	1.38	20 - 50
Ba	5:5	410	1.32	300 - 500	5:5	180	1.17	150 - 200
Be	0:5	<1	--	--	0:5	<1	--	--
C, total[1]	5:5	.72	1.51	.53 - 1.5	5:5	.81	1.41	.55 - 1.2
Ca[1]	5:5	.36	1.13	.31 - .42	5:5	.18	1.30	.15 - .27
Co	5:5	5.2	1.42	3 - 7	1:5	<3	--	<3 - 3
Cr	5:5	30	1.67	20 - 70	5:5	32	3.49	15 - 300
Cu	5:5	13	1.25	10 - 15	5:5	18	1.36	15 - 30
F	1:5	<400	--	<400 - 400	3:5	430	1.14	<400 - 500
Fe, total[1]	5:5	1.0	1.16	.91 - 1.3	5:5	1.2	1.16	1.0 - 1.5
Ga	5:5	7.1	1.41	5 - 10	2:5	3.7	1.33	<5 - 5
Ge	5:5	1.1	1.12	.92 - 1.2	5:5	1.1	1.32	.70 - 1.3
Hg	5:5	.043	1.59	.023 - .082	5:5	.069	2.50	.023 - .21
K[1]	5:5	1.4	1.28	.93 - 1.7	5:5	.63	1.16	.53 - .75
La	0:5	<30	--	--	2:5	26	1.16	<30 - 30
Li	5:5	12	1.28	9 - 17	5:5	10	1.17	8 - 12
Mg[1]	5:5	.20	1.20	.16 - .27	5:5	.14	1.24	.096 - .17
Mn	5:5	520	1.42	300 - 700	5:5	160	1.33	100 - 200
Na[1]	5:5	.60	1.09	.54 - .66	3:5	.082	1.98	<.07 - .21
Nb	2:5	8.0	1.23	<10 - 10	5:5	10	1.00	--
Ni	5:5	7.0	1.28	5 - 10	3:5	2.2	2.63	<2 - 7
Pb	5:5	22	1.35	15 - 30	5:5	12	1.38	10 - 20
Rb	5:5	52	1.17	40 - 60	5:5	26	1.18	20 - 30
S, total	0:5	<800	--	--	0:5	<800	--	--
Sc	2:5	2.2	1.81	<3 - 5	0:5	<3	--	--
Se	3:5	.12	1.82	<.1 - .26	4:5	.16	1.53	<.1 - .24
Si[1]	5:5	35	1.13	29 - 40	5:5	39	1.02	38 - 40
Sn	5:5	.28	2.33	.10 - .70	5:5	.79	1.56	.43 - 1.2
Sr	5:5	87	1.22	70 - 100	5:5	12	1.79	5 - 20
Th	4:4	4.9	1.25	3.6 - 5.8	5:5	4.8	1.29	3.4 - 6.8
Ti[1]	5:5	.19	1.39	.11 - .25	5:5	.47	1.34	.32 - .65
U	5:5	1.3	1.16	1.1 - 1.6	5:5	2.4	1.18	2.0 - 2.8
V	5:5	28	1.20	20 - 30	5:5	23	1.46	15 - 30
Y	4:5	9.5	1.10	<10 - 10	3:5	9.8	1.79	<10 - 20
Yb	5:5	1.1	1.20	1 - 1.5	4:5	1.4	1.85	<1 - 3
Zn	5:5	40	1.13	35 - 45	5:5	32	1.32	21 - 41
Zr	5:5	140	1.35	100 - 200	5:5	360	1.46	300 - 700
pH[2]	5:5	6.1	.69	5.5 - 7.3	5:5	6.3	.44	5.7 - 6.8

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported sweet corn in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except parts per million, except where percent is indicated. Leaders (--) in figure column

Areas of commercial production (continued)

Palm Beach County, Fla.				Twin Falls County, Idaho			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:5	<.3	--	--	5:5	4.6	1.15	4.1 - 5.8
1:5	--	--	<.1 - .12	5:5	5.0	1.38	3.5 - 7.3
4:5	34	2.58	<10 - 70	5:5	24	1.25	20 - 30
5:5	15	1.28	10 - 20	5:5	650	1.16	500 - 700
0:5	<1	--	--	5:5	1.1	1.20	1 - 1.5
5:5	.52	1.41	.32 - .71	5:5	2.4	1.27	1.6 - 3.0
5:5	.092	1.16	.077 - .11	5:5	5.3	1.46	2.9 - 7.9
0:5	<3	--	--	5:5	7.5	1.34	5.0 - 10
5:5	4.5	1.26	3 - 5	5:5	71	1.41	50 - 100
5:5	15	1.28	10 - 20	5:5	24	1.38	15 - 30
2:5	390	1.27	<400 - 500	5:5	630	1.24	500 - 800
0:5	<.03	--	--	5:5	2.3	1.14	2.1 - 2.9
0:5	<5	--	--	5:5	17	1.17	15 - 20
5:5	.76	1.20	.59 - .92	5:5	1.2	1.12	1.0 - 1.4
5:5	.029	1.41	.018 - .040	5:5	.035	1.25	.024 - .043
5:5	.077	1.40	.050 - .11	5:5	1.7	1.05	1.6 - 1.8
0:5	<30	--	--	3:5	30	1.64	<30 - 50
0:5	<5	--	--	5:5	26	1.09	24 - 30
0:5	<.06	--	--	5:5	1.3	1.14	1.1 - 1.6
5:5	34	1.48	20 - 50	5:5	400	1.64	200 - 700
0:5	<.07	--	--	5:5	.92	1.07	.87 - 1.0
1:5	--	--	<10 - 10	5:5	10	1.00	--
0:5	<2	--	--	5:5	17	1.17	15 - 20
0:5	<10	--	--	5:5	17	1.17	15 - 20
0:5	<20	--	--	5:5	71	1.10	65 - 80
0:5	<800	--	--	0:5	<800	--	--
0:5	<3	--	--	5:5	7.0	1.28	5 - 10
2.5	.092	1.30	<.1 - .13	3:5	.13	2.20	<.1 - 3.1
5:5	41	1.05	38 - 43	5:5	27	1.08	25 - 30
3:5	.17	3.19	<.1 - .53	5:5	1.1	1.55	.69 - 1.9
0:5	<5	--	--	5:5	220	1.20	200 -300
--	--	--	--	5:5	11	1.19	8.4 - 13
5:5	.054	1.24	.040 - .066	5:5	.35	1.17	.31 - .45
5:5	.56	1.20	.44 - .69	5:5	2.9	1.08	2.6 - 3.1
0:5	<7	--	--	5:5	87	1.22	70 - 100
0:5	<10	--	--	5:5	21	1.42	15 - 30
0:5	<1	--	--	5:5	2.3	1.46	1.5 - 3.0
5:5	20	1.45	12 - 32	5:5	68	1.08	62 - 75
5:5	78	1.99	30 - 200	5:5	230	1.46	150 - 300
5:5	5.8	.39	5.5 - 6.4	5:5	8.0	.13	7.9 - 8.2

TABLE 80.—*Element concentrations and pH of soils that*

[Explanation of column headings: Ratio, number of samples in which the element was found in except as indicated. Means and ranges are given in parts per million, except where percent is

Element, or pH	Areas of commercial production: Berrien County, Mich. Ratio	Mean	Deviation	Observed range	Cumberland County, N.J. Ratio	Mean	Deviation	Observed range
Al[1]	5:5	2.4	1.16	2.1 - 3.0	5:5	2.5	1.21	1.9 - 3.2
As	5:5	5.0	3.15	.95 - 20	5:5	7.3	1.25	5.0 - 8.9
B	3:5	12	2.30	<10 - 30	5:5	33	1.26	30 - 50
Ba	5:5	370	1.32	300 - 500	5:5	222	1.35	150 - 300
Be	0:5	<1	--	--	1:5	--	--	<1 - 1.5
C, total[1]	5:5	.95	1.34	.66 - 1.4	5:5	.89	1.19	.67 - 1.0
Ca[1]	5:5	.42	1.11	.35 - .46	5:5	.23	1.22	.18 - .32
Co	5:5	4.1	1.32	3 - 5	5:5	4.1	1.32	3 - 5
Cr	5:5	23	1.90	15 - 70	5:5	24	1.37	15 - 30
Cu	5:5	15	1.28	10 - 20	5:5	19	1.60	10 - 30
F	2:5	370	1.70	<400 - 700	1:5	<400	--	<400 - 400
Fe, total[1]	5:5	1.0	1.27	.B2 - 1.5	5:5	1.3	1.12	1.1 - 1.5
Ga	5:5	6.1	1.20	5 - 7	5:5	6.5	1.16	5 - 7
Ge	5:5	1.0	1.13	.88 - 1.2	5:5	1.2	1.07	1.0 - 1.2
Hg	5:5	.061	2.14	.031 - .22	5:5	.051	1.36	.036 - .082
K[1]	5:5	1.3	1.14	1.1 - 1.5	5:5	.79	1.09	.67 - .83
La	0:5	<30	--	--	5:5	41	1.32	30 - 50
Li	5:5	11	1.16	9 - 13	5:5	16	1.09	14 - 17
Mg[1]	5:5	.18	1.16	.16 - .23	5:5	.17	1.10	.14 - .19
Mn	5:5	680	1.73	300 - 1,000	5:5	240	1.25	200 - 300
Na[1]	5:5	.59	1.08	.52 - .65	5:5	.23	1.04	.22 - .24
Nb	0:5	<10	--	--	5:5	13	1.25	10 - 15
Ni	5:5	8.2	1.41	7 - 15	4:5	5.7	2.52	<2 - 15
Pb	5:5	19	2.13	10 - 70	5:5	13	1.25	10 - 15
Rb	5:5	45	1.12	40 - 50	5:5	41	1.05	40 - 45
S, total	0:5	<800	--	--	1:5	--	--	<800 - 860
Sc	1:5	--	--	<3 - 5	4:5	4.5	1.50	<3 - 7
Se	4:5	.19	2.00	.11 - .36	2:5	.070	3.17	<.1 - .35
Si[1]	5:5	38	1.04	36 - 40	5:5	37	1.03	35 - 39
Sn	3:5	.15	2.34	.23 - .35	5:5	1.1	1.38	.75 - 1.6
Sr	5:5	81	1.22	70 - 100	5:5	31	1.38	20 - 50
Th	5:5	4.2	1.20	3.3 - 5.4	5:5	9.2	1.12	8.5 - 11
Ti[1]	5:5	.20	1.14	.17 - .24	5:5	.58	1.10	.54 - .68
U	5:5	1.2	1.14	.98 - 1.4	5:5	2.8	1.12	2.4 - 3.3
V	5:5	20	1.00	--	5:5	31	1.38	20 - 50
Y	5:5	10	1.00	--	5:5	28	1.46	20 - 50
Yb	5:5	1.1	1.36	1 - 2	5:5	3.3	1.58	2 - 7
Zn	5:5	44	1.19	38 - 54	5:5	31	1.10	28 - 34
Zr	5:5	130	1.74	70 - 300	5:5	330	1.75	200 - 700
pH[2]	5:5	6.5	4.55	5.8 - 7.0	5:5	6.8	1.09	6.0 - 8.6

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic. Deviation is standard.

supported tomato plants in areas of commercial production

measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, indicated. Leaders (--) in figure column indicate no data available.]

Areas of commercial production (continued)											
Palm Beach County, Fla.				Yakima County, Wash.				San Joaquin County, Calif.			
Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range	Ratio	Mean	Deviation	Observed range
0:5	<.26	--	--	5:5	7.4	1.05	6.9 - 7.7	5:5	6.9	1.02	6.8 - 7.1
2:5	.070	14.1	<.1 - 1.3	5:5	5.5	1.38	3.6 - 8.4	5:5	3.3	1.25	2.7 - 4.8
0:5	<10	--	--	0:5	<10	--	--	0:5	<10	--	--
5:5	17	1.17	15 - 20	5:5	620	1.63	500 - 1,500	5:5	870	1.22	700 - 1,000
0:5	<1	--	--	4:5	.95	1.10	<1 - 1	5:5	1.0	1.00	--
5:5	.58	1.15	.53 - .74	5:5	.57	1.10	.51 - .64	5:5	.40	1.23	.29 - .48
5:5	.29	1.29	.20 - .40	5:5	2.9	1.02	2.8 - 2.9	5:5	2.7	1.02	2.7 - 2.8
1:5	--	--	<3 - 5	5:5	17	1.17	15 - 20	5:5	6.1	1.2	5 - 7
5:5	2.7	2.85	1 - 15	5:5	88	1.40	70 - 150	5:5	20	1.28	15 - 30
5:5	45	1.60	20 - 70	5:5	37	1.32	30 - 50	5:5	8.1	1.22	7 - 10
0:5	<400	--	--	3:5	<400	--	<400 - 400	1:5	--	--	<400 - 500
0:5	<.03	--	--	5:5	4.9	1.04	4.8 - 5.2	5:5	2.4	1.08	2.3 - 2.7
0:5	<5	--	--	5:5	20	1.00	--	5:5	18	1.17	15 - 20
5:5	.81	1.23	.59 - 1.0	5:5	1.4	1.15	1.2 - 1.7	5:5	1.0	1.14	.87 - 1.2
5:5	.020	1.51	.010 - .03	5:5	.046	1.32	.03 - .67	5:5	.026	1.72	.010 - .039
5:5	.099	1.17	.076 - .12	5:5	1.3	1.03	1.3 - 1.4	5:5	2.1	1.02	2.0 - 2.1
0:5	<30	--	--	0:5	<30	--	--	0:5	<30	--	--
0:5	<5	--	--	5:5	22	1.03	21 - 23	5:5	13	1.08	12 - 15
1:5	<.06	--	<.06 - .06	5:5	1.2	1.02	1.2 - 1.3	5:5	.58	1.04	.56 - .62
5:5	57	1.20	50 - 70	5:5	700	1.41	500 - 1,000	5:5	280	1.20	200 - 300
0:5	<.07	--	--	5:5	2.0	1.04	1.9 - 2.1	5:5	2.7	1.02	2.6 - 2.8
1:5	--	--	<10 - 15	2:5	8.0	1.23	<10 - 10	3:5	8.9	1.16	<10 - 10
0:5	<2	--	--	5:5	30	1.00	--	5:5	10	1.31	7.0 - 15
0:5	<10	--	--	5:5	10	1.00	--	5:5	16	1.14	15 - 20
0:5	<20	--	--	5:5	46	1.10	40 - 50	5:5	75	1.07	70 - 80
0:5	<800	--	--	1:5	--	--	<800 - 940	0:5	<800	--	--
0:5	<3	--	--	5:5	20	1.00	--	5:5	6.5	1.16	5 - 7
0:5	<.1	--	--	1:5	--	--	<.1 - .18	1:5	--	--	<.1 - .11
5:5	39	1.10	35 - 44	5:5	27	1.04	26 - 28	5:5	29	1.05	27 - 30
1:5	--	--	<.1 - .85	5:5	1.0	1.51	.52 - 1.5	4:5	.53	3.13	.75 - 1.4
0:5	<5	--	--	5:5	410	1.32	300 - 500	5:5	810	1.22	700 - 1,000
--	--	--	--	5:5	6.2	1.11	5.2 - 7.0	5:5	15	1.44	10 - 24
5:5	.053	1.21	.039 - .067	5:5	.64	1.04	.62 - .68	5:5	.33	1.03	.32 - .34
5:5	.58	1.14	.47 - .65	5:5	1.8	1.21	1.5 - 2.4	5:5	3.0	1.08	2.7 - 3.3
0:5	<7	--	--	5:5	160	1.14	150 - 200	5:5	93	1.17	70 - 100
0:5	<10	--	--	5:5	18	1.36	15 - 30	5:5	11	1.20	10 - 15
0:5	<1	--	--	3:3	2	1.00	--	5:5	1.2	1.25	1.0 - 1.5
5:5	21	1.05	20 -- 23	5:5	96	1.08	86 -- 100	5:5	48	1.14	40 - 55
5:5	140	1.35	100 - 200	5:5	120	1.25	100 - 150	5:5	100	1.46	70 - 150
5:5	8.2	.50	7.4 - 8.7	5:5	6.6	.26	6.3 - 6.9	5:5	8.5	.22	8.2 - 8.7

TABLE 81.—*Summary statistics of element concentrations and pH of soils that supported American grape vines in three areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	15:15	4.1	1.40	1.9 - 6.3	Na[1]	15:15	1.0	1.54	.57 - 1.8
As	15:15	5.9	1.62	2.9 - 15	Nb	11:15	9.4	1.12	<10 - 10
B	11:15	17	2.12	<10 - 50	Ni	15:15	12	1.59	7 - 30
Ba	15:15	470	1.36	300 - 700	Pb	15:15	20	1.66	10 - 50
Be	4:15	.72	1.29	<1 - 1	Rb	15:15	54	1.21	40 - 75
C, total[1]	15:15	1.8	1.62	.56 - 3.3	S, total	4:15	680	1.31	<800 - 1,100
Ca[1]	15:15	1.0	2.48	.35 - 4.2	Sc	14:15	6.8	2.24	<3 - 20
Co	15:15	7.5	1.73	3 - 15	Se	8:15	.11	1.90	<.1 - .32
Cr	15:15	29	1.67	15 - 70	Si[1]	15:15	32	1.15	26 - 38
Cu	15:15	34	2.21	7 - 150	Sn	15:15	.78	1.73	.28 - 2.7
F	6:15	310	2.28	<400 - 1,400	Sr	15:15	160	1.68	70 - 300
Fe, total[1]	15:15	2.2	1.78	.97 - 4.8	Th	14:14	6.6	1.45	3.8 - 12
Ga	15:15	12	1.55	5 - 20	Ti[1]	15:15	.40	1.57	.16 - .78
Ge	15:15	1.3	1.17	.97 - 1.6	U	15:15	2.0	1.29	.92 - 2.6
Hg	15:15	.042	1.58	<.01 - .092	V	15:15	59	2.08	20 - 150
K[1]	15:15	1.5	1.15	1.2 - 1.9	Y	14:15	16	1.47	<10 - 30
La	5:15	21	1.69	30 - 50	Yb	14:15	1.8	1.52	<1 - 3
Li	15:15	17	1.29	9 - 27	Zn	15:15	76	1.75	42 - 410
Mg[1]	15:15	.49	2.21	.16 - 1.5	Zr	15:15	190	1.77	70 - 700
Mn	15:15	470	1.64	200 - 1,000	pH[2]	15:15	6.4	.97	4.8 - 8.0

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 82.—*Summary statistics of element concentrations and pH of soils that supported apple trees in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	25:25	3.3	1.98	.67 - 8.0	Na[1]	24:26	.57	3.00	<.07 - 2.2
As	25:25	27	2.50	5.6 - 135	Nb	17:25	9.2	1.14	<10 - 10
B	19:25	20	2.56	<10 - 70	Ni	22:25	8.1	2.70	<2 - 30
Ba	25:25	350	1.65	150 - 1,000	Pb	25:25	120	2.36	20 - 1,000
Be	9:25	.78	1.24	<1 - 1	Rb	25:25	49	1.61	20 - 1,000
C, total[1]	25:25	1.7	1.74	.34 - 3.5	S, total	8:25	660	1.49	<800 - 1,600
Ca[1]	25:25	.82	2.98	.13 - 3.0	Sc	18:25	4.6	2.49	<3 - 20
Co	20:25	5	2.15	<3 - 20	Se	8:24	.060	3.24	<.1 - .61
Cr	25:25	33	1.71	15 - 70	Si[1]	25:25	33	1.16	26 - 41
Cu	25:25	24	1.58	10 - 70	Sn	23:25	.7	3.04	<.1 - .69
F	13:25	400	1.59	<400 - 900	Sr	25:25	104	3.48	10 - 500
Fe, total[1]	25:25	1.84	1.68	.83 - 4.7	Th	22:22	6.8	1.51	3.2 - 12
Ga	21:25	9.8	2.06	<5 - 20	Ti[1]	25:25	.38	1.53	.17 - .72
Ge	24:25	.92	1.79	<.1 - 1.58	U	25:25	2.2	1.46	1.0 - 4.0
Hg	25:25	.09	2.79	.01 - .68	V	25:25	49	2.33	10 - 200
K[1]	25:25	1.3	1.51	.57 - 2.0	Y	24:25	13	1.34	<10 - 20
La	4:25	40	1.83	<30 - 100	Yb	23:24	1.5	1.35	<1 - 2
Li	25:25	17	1.68	7 - 37	Zn	25:25	81	1.56	42 - 200
Mg[1]	25:25	.42	2.56	.11 - 1.3	Zr	25:25	190	1.86	100 - 700
Mn	25:25	290	2.20	100 - 1,500	pH[2]	25:25	6.4	1.03	4.6 - 7.9

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 83.—*Summary statistics of element concentrations and pH of soils that supported European grape vines in two areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	10:10	6.8	1.05	6.3 - 7.4	Na[1]	10:10	2.1	1.14	1.78 - 2.52
As	10:10	7.0	1.56	3.6 - 12	Nb	7:10	9.3	1.13	<10 - 10
B	3:10	4.5	3.69	<10 - 30	Ni	10:10	13	1.59	5 - 20
Ba	10:10	730	1.36	500 - 1,000	Pb	10:10	20	1.37	15 - 30
Be	9:10	.98	1.07	<1 - 1	Rb	10:10	66	1.12	55 - 75
C, total[1]	10:10	.96	1.21	7.1 - 13	S, total	1:10	--	--	<800 - 1,100
Ca[1]	10:10	2.7	1.08	2.4 - 3.0	Sc	10:10	12	1.47	7 - 20
Co	10:10	10	1.49	7 - 15	Se	3:10	.060	2.57	<.1 - .29
Cr	10:10	32	1.46	20 - 70	Si[1]	10:10	29	1.04	28 - 30
Cu	10:10	24	1.41	15 - 50	Sn	10:10	1.2	1.55	.67 - 2.5
F	7:10	460	1.29	<400 - 700	Sr	10:10	440	1.34	300 - 700
Fe, total[1]	10:10	3.5	1.40	2.1 - 4.7	Th	10:10	11	1.20	8.6 - 16
Ga	10:10	17	1.16	15 - 20	Ti[1]	10:10	.49	1.59	.29 - .78
Ge	10:10	1.3	1.18	.94 - 1.5	U	10:10	2.4	1.25	1.9 - 3.3
Hg	9:10	.024	2.43	<.01 - .16	V	10:10	120	1.43	70 - 200
K[1]	10:10	1.8	1.14	1.5 - 2.1	Y	10:10	17	1.26	10 - 20
La	4:10	22	2.02	<30 - 70	Yb	10:10	2.0	1.37	1 - 3
Li	10:10	16	1.38	11 - 23	Zn	10:10	72	1.38	47 - 120
Mg[1]	10:10	.89	1.52	.58 - 1.4	Zr	10:10	160	1.25	100 - 200
Mn	10:10	440	1.34	300 - 700	pH[2]	10:10	7.2	.96	5.7 - 8.3

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 84. –*Summary statistics of element concentrations and pH of soils that supported grapefruit trees in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	16:20	1.9	5.55	<.26 - 7.4	Na[1]	16:20	.48	7.38	<.07 - 2.7
As	19:20	2.2	3.38	<.1 - 7.2	Nb	12:20	8.9	1.16	<10 - 10
B	10:20	8.9	3.03	<10 - 70	Ni	14:20	5.4	3.83	<2 - 30
Ba	20:20	320	6.05	15 - 1,500	Pb	15:20	12	1.54	<10 - 20
Be	9:20	.80	1.41	<1 - 1.5	Rb	15:20	54	2.37	<20 - 120
C, total[1]	20:20	.86	1.54	.48 - 7.3	S, total	3:20	380	2.05	<800 - 1,500
Ca[1]	19:20	1.4	3.49	<.07 - 7.1	Sc	13:20	4.1	2.53	<3 - 15
Co	13:20	4.3	2.17	<3 - 10	Se	6:20	.062	2.68	<.1 - .34
Cr	20:20	16	3.71	1 - 100	Si[1]	20:20	33	1.18	27 - 44
Cu	20:20	12	1.60	5 - 30	Sn	17:20	.51	3.41	.25 - 9.6
F	14:20	560	1.74	<400 - 1,400	Sr	18:20	<5	--	<5 - 1,000
Fe, total[1]	17:20	<.03	--	<.03 - 2.9	Th	15:15	9.6	1.55	4.1 - 21
Ga	15:20	9.3	2.36	<5 - 30	Ti[1]	20:20	.22	2.12	.049 - .44
Ge	20:20	1.1	1.26	.64 - 1.6	U	20:20	1.7	1.89	.37 - 3.2
Hg	19:20	.022	1.52	<.01 - .036	V	16:20	29	4.20	<7 - 150
K[1]	20:20	.99	4.22	.05 - 2.7	Y	15:20	13	1.94	<10 - 30
La	10:20	26	2.12	<30 - 100	Yb	15:20	1.5	1.87	<1 - 3
Li	18:20	16	2.02	<5 - 31	Zn	17:20	34	1.73	<10 - 88
Mg[1]	17:20	.34	3.90	<.06 - 1.2	Zr	20:20	170	1.73	50 - 500
Mn	20:20	150	4.83	5 - 700	pH[2]	20:20	8.2	.98	5.0 - 9.3

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 85.—*Summary statistics of element concentrations and pH of soils that supported orange trees in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	14:20	<.26	--	<.26 - 7.4	Na[1]	15:20	.49	5.85	<.07 - 2.7
As	17:20	1.4	4.66	<.1 - 5.0	Nb	12:20	8.9	1.16	<10 - 10
B	10:20	9.3	2.67	<10 - 50	Ni	15:20	5.9	3.53	<2 - 30
Ba	20:20	330	5.92	15 - 1,500	Pb	15:20	12	1.53	<10 - 20
Be	13:20	.91	1.22	<1 - 1.5	Rb	15:20	49	2.43	<20 - 100
C, total[1]	20:20	.61	1.59	.32 - 2.6	S, total	2:20	880	1.13	<800 - 960
Ca[1]	18:20	.68	4.82	<.07 - 3.7	Sc	13:20	3.9	2.11	<3 - 10
Co	13:20	3.9	2.11	<3 - 10	Se	6:20	.058	3.15	<.1 - .31
Cr	19:20	16	4.40	<1 - 100	Si[1]	20:20	35	1.20	27 - 45
Cu	20:20	13	2.62	7 - 300	Sn	17:20	.39	2.40	<.1 - 1.3
F	13:20	450	1.43	<400 - 900	Sr	16:20	--	--	<5 - 1,000
Fe, total[1]	15:20	<.03	--	<.03 - 2.6	Th	16:16	8.9	1.74	3 - 19
Ga	15:20	8.8	2.30	<5 - 20	Ti	20:20	.20	2.05	.06 - .38
Ge	20:20	1.0	1.36	.34 - 1.4	U	20:20	1.6	1.82	.37 - 2.6
Hg	20:20	.024	1.58	.01 - .059	V	15:20	25	4.17	<7 - 100
K[1]	20:20	.80	4.86	.04 - 2.7	Y	15:20	12	1.59	<10 - 30
La	7:20	16	3.02	<30 - 150	Yb	16:20	1.3	1.53	<1 - 3
Li	18:20	13	1.99	<5 - 29	Zn	17:20	<10	--	<10 - 80
Mg[1]	15:20	.26	4.13	.06 - 1.1	Zr	20:20	190	1.57	100 - 700
Mn	20:20	140	4.39	1 - 700	pH[2]	20:20	7.8	1.31	5.0 - 9.3

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 86.—*Summary statistics of element concentrations and pH of soils that supported peach trees in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	20:20	5.3	1.25	3.5 - 6.9	Na[1]	20:20	1.0	1.47	.63 - 1.9
As	20:20	7.5	4.23	.26 - 108	Nb	14:20	9.3	1.13	<10 - 10
B	14:20	17	2.72	<10 - 70	Ni	20:20	20	2.01	7 - 100
Ba	20:20	520	1.33	300 - 700	Pb	20:20	33	3.24	10 - 300
Be	11:20	.87	1.27	<1 - 1.5	Rb	20:20	66	1.38	40 - 100
C, total[1]	20:20	2.0	1.39	1.2 - 3.1	S, total	12:20	870	1.96	<800 - 4,100
Ca[1]	20:20	1.7	1.84	.56 - 3.1	Sc	20:20	9.9	1.67	5 - 20
Co	20:20	9.2	1.73	5 - 20	Se	7:20	.072	2.37	<.1 - .43
Cr	20:20	59	1.99	20 - 200	Si[1]	20:20	29	1.09	26 - 35
Cu	20:20	36	2.11	15 - 150	Sn	19:20	.78	2.14	<.1 - 1.7
F	16:20	510	1.56	<400 - 1,600	Sr	20:20	210	1.71	100 - 500
Fe, total[1]	20:20	3.0	1.47	1.7 - 4.5	Th	20:20	8.6	1.50	3.3 - 19
Ga	20:20	16	1.20	10 - 20	Ti[1]	20:20	.46	1.35	.29 - .66
Ge	19:20	1.1	1.86	.63 - 1.6	U	20:20	2.5	1.31	1.9 - 4.0
Hg	20:20	.043	1.38	.026- .085	V	20:20	100	1.73	30 - 200
K[1]	20:20	1.6	1.16	1.3 - 2.0	Y	20:20	16	1.24	10 - 30
La	6:20	19	1.70	<30 - 70	Yb	18:18	1.8	1.26	1.5 - 3
Li	20:20	25	1.30	17 - 40	Zn	20:20	88	1.32	53 - 140
Mg[1]	20:20	.90	1.67	.33 - 1.3	Zr	20:20	150	1.58	70 - 500
Mn	20:20	330	1.86	150 - 1,000	pH[2]	20:20	6.4	1.03	4.3 - 8.0

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 87.—*Summary statistics of element concentrations and pH of soils that supported pear trees in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	25:25	4.9	1.43	2.2 - 7.9	Na[1]	25:25	.96	1.47	.30 - 1.8
As	25:25	10	2.10	1.1 - 29	Nb	15:25	8.9	1.16	<10 - 10
B	20:25	21	2.06	<10 - 50	Ni	25:25	18	2.19	5 - 150
Ba	25:25	540	1.50	200 - 1,000	Pb	25:25	42	2.35	10 - 200
Be	17:25	.92	1.42	<1 - 3	Rb	25:25	69	1.36	30 - 110
C, total[1]	25:25	2.1	1.43	.84 - 3.8	S, total	3:25	570	1.34	<800 - 990
Ca[1]	25:25	1.3	2.75	.29 - 6.5	Sc	24:25	8.5	1.94	<3 - 20
Co	24:25	8.2	1.75	<3 - 20	Se	11:25	.092	2.97	<.1 - .63
Cr	25:25	46	1.92	15 - 200	Si[1]	25:25	30	1.15	24 - 37
Cu	25:25	40	3.0	7 - 300	Sn	24:25	.80	1.77	<.1 - 1.5
F	18:25	510	1.50	<400 - 1,200	Sr	25:25	190	1.91	70 - 500
Fe, total[1]	25:25	2.5	1.67	.97 - 5.1	Th	23:23	9.1	1.39	5.2 - 18
Ga	25:25	14	1.45	5 - 20	Ti[1]	25:25	.31	1.38	.14 - .42
Ge	25:25	1.2	1.24	.71 - 1.7	U	25:25	2.4	1.29	1.5 - 3.6
Hg	25:25	.047	1.74	.019- 2.0	V	25:25	78	1.91	20 - 200
K[1]	25:25	1.7	1.14	1.2 - 2.1	Y	25:25	17	1.38	10 - 30
La	7:25	24	1.20	<30 - 30	Yb	24:24	1.7	1.39	1 - 3
Li	25:25	24	1.34	10 - 34	Zn	25:25	88	1.61	31 - 210
Mg[1]	25:25	.72	1.98	.16 - 1.4	Zr	25:25	140	1.62	70 - 500
Mn	25:25	380	1.85	150 - 1,000	pH	25:25	6.7	1.02	4.5 - 8.1

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 88.—*Summary statistics of element concentrations and pH of soils that supported plum trees in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	20:20	4.7	1.40	2.3 - 7.4	Na[1]	20:20	.96	1.55	.49 - 1.9
As	20:20	13	2.65	2.4 - 91	Nb	16:20	9.5	1.10	<10 - 10
B	16:20	24	2.31	<10 - 70	Ni	20:20	15	1.59	5 - 30
Ba	20:20	490	1.34	300 - 700	Pb	20:20	50	2.95	10 - 500
Be	12:20	.89	1.16	<1 - 1	Rb	20:20	69	1.29	45 - 110
C, total[1]	20:20	2.0	1.59	.81 - 6.1	S, total	6:20	670	1.42	800 - 1,400
Ca[1]	20:20	1.2	2.35	.32 - 3.5	Sc	19:20	7.6	1.79	<3 - 20
Co	20:20	7.4	1.62	5 - 20	Se	9:20	.091	2.91	<.1 - .59
Cr	20:20	44	1.52	15 - 100	Si[1]	20:20	30	1.13	26 - 38
Cu	20:20	26	1.87	10 - 150	Sn	18:20	.80	3.63	<.1 - 24
F	17:20	520	1.40	<400 - 900	Sr	20:20	180	1.85	70 - 500
Fe, total[1]	20:20	2.4	1.77	.84 - 5.1	Th	20:20	8.3	1.62	3.0 - 17
Ga	20:20	14	1.51	5 - 20	Ti[1]	20:20	.43	1.54	.18 - .78
Ge	20:20	1.2	1.24	.65 - 1.5	U	20:20	2.5	1.45	1.1 - 4.5
Hg	20:20	.055	2.92	.01 - 2.6	V	20:20	75	1.95	15 - 200
K[1]	20:20	1.7	1.15	1.2 - 2.2	Y	19:20	17	1.47	<10 - 30
La	11:20	27	1.12	<30 - 30	Yb	19:19	1.8	1.40	1 - 3
Li	20:20	24	1.53	8.0 - 37	Zn	20:20	100	1.57	38 - 310
Mg[1]	20:20	.66	2.21	.13 - 1.4	Zr	20:20	170	1.56	100 - 500
Mn	20:20	390	2.12	150 - 1,500	pH[2]	20:20	6.7	.81	5.2 - 7.9

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 89.—*Summary statistics of element concentrations and pH of soils that supported cabbage plants in two areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	10:10	5.1	1.08	4.4 - 5.8	Na[1]	10:10	.63	1.08	.56 - .69
As	10:10	6.7	1.23	4.9 - 8.9	Nb	6:10	8.9	1.16	<10 - 10
B	10:10	30	1.49	20 - 50	Ni	10:10	13	1.35	7 - 20
Ba	10:10	440	1.34	300 - 700	Pb	10:10	15	1.18	10 - 20
Be	7:10	.93	1.13	<1 - 1	Rb	10:10	84	1.07	75 - 90
C, total[1]	10:10	2.6	2.03	.48 - 4.7	S, total	1:10	--	--	<800 - 1,100
Ca[1]	10:10	7.9	1.69	4.1 - 13	Sc	10:10	7.5	1.25	5 - 10
Co	10:10	5.5	1.18	5 - 7	Se	6:10	.13	2.00	<.1 - .34
Cr	10:10	44	1.34	30 - 70	Si[1]	10:10	24	1.18	20 - 30
Cu	10:10	21	1.50	15 - 50	Sn	10:10	.92	1.25	.63 - 1.2
F	10:10	680	1.25	500 - 1,000	Sr	10:10	380	1.46	200 - 700
Fe, total[1]	10:10	2.4	1.13	1.8 - 2.7	Th	10:10	10	1.20	8.2 - 13
Ga	10:10	15	1.10	15 - 20	Ti[1]	10:10	.31	1.05	.26 - .32
Ge	10:10	1.2	1.19	.88 - 1.5	U	10:10	3.0	1.09	2.5 - 3.4
Hg	10:10	.031	1.24	.023 - .042	V	10:10	78	1.19	70 - 100
K[1]	10:10	1.8	1.06	1.7 - 2.0	Y	10:10	15	1.10	15 - 20
La	5:10	27	1.14	<30 - 30	Yb	10:10	1.5	1.10	1.5 - 2
Li	10:10	32	1.11	28 - 37	Zn	10:10	78	1.10	60 - 85
Mg[1]	10:10	1.0	1.54	.39 - 1.6	Zr	10:10	110	1.40	70 - 150
Mn	10:10	260	1.23	200 - 300	pH[2]	10:10	8.1	1.34	7.9 - 8.3

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 90.—*Summary statistics of element concentrations and pH of soils that supported carrot plants in two areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	10:10	4.8	1.15	4.0 - 6.3	Na[1]	10:10	.74	1.26	.63 - 1.4
As	10:10	6.9	1.22	5.3 - 9.2	Nb	6:10	8.9	1.16	<10 - 10
B	10:10	38	1.48	20 - 50	Ni	10:10	13	1.44	7 - 20
Ba	10:10	530	1.15	500 - 700	Pb	10:10	13	1.28	10 - 20
Be	6:10	.89	1.16	<1 - 1	Rb	10:10	84	1.09	75 - 95
C, total[1]	10:10	1.6	1.18	1.2 - 2	S, total	3:10	560	1.87	<800 - 1,800
Ca[1]	10:10	3.3	1.42	2.2 - 5.1	Sc	10:10	7.0	1.33	5 - 10
Co	10:10	5.9	1.19	5 - 7	Se	4:10	.087	2.70	<.1 - .28
Cr	10:10	33	1.50	20 - 70	Si[1]	10:10	31	1.07	28 - 34
Cu	10:10	21	1.44	15 - 30	Sn	10:10	.73	1.89	.16 - 1.3
F	6:10	460	1.53	<400 - 700	Sr	10:10	200	1.41	140 - 300
Fe, total[1]	10:10	1.3	1.20	1.6 - 2.6	Th	10:10	8.8	1.23	5.8 - 11
Ga	10:10	14	1.19	10 - 15	Ti[1]	10:10	.31	1.12	.26 - .40
Ge	10:10	1.2	1.08	1.1 - 1.4	U	10:10	2.6	1.21	2.0 - 3.2
Hg	9:10	.020	1.79	<.01 - .040	V	10:10	59	1.58	30 - 100
K[1]	10:10	2.0	1.07	1.9 - 2.4	Y	10:10	16	1.32	10 - 20
La	3:10	24	1.19	<30 - 30	Yb	10:10	1.8	1.26	1.5 - 3
Li	10:10	27	1.37	18 - 38	Zn	10:10	59	1.16	49 - 72
Mg[1]	10:10	.96	1.53	.60 - 1.5	Zr	10:10	150	1.37	100 - 300
Mn	10:10	290	1.40	200 - 500	pH[1]	10:10	8.1	2.04	7.7 - 8.4

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 91.—*Summary statistics of element concentrations and pH of soils that supported cucumber plants in two areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	10:10	4.9	1.76	2.3 - 8.5	Na[1]	10:10	.78	1.30	.56 - 1.0
As	10:10	6.0	3.06	.94 - 67	Nb	4:10	8.0	1.23	<10 - 10
B	7:10	15	2.04	<10 - 30	Ni	10:10	22	3.04	5 - 70
Ba	10:10	610	1.58	300 - 1,000	Pb	10:10	22	2.20	10 - 150
Be	4:10	.80	1.23	<1 - 1	Rb	10:10	62	1.28	40 - 80
C, total[1]	10:10	1.5	1.47	.58 - 2.2	S, total	1:10	<800	--	<800 - 810
Ca[1]	10:10	1.1	2.28	.38 - 2.6	Sc	7:10	--	--	<3 - 100
Co	10:10	9.3	2.06	3 - 20	Se	5:10	.085	4.95	<.1 - 1.9
Cr	10:10	50	2.58	15 - 150	Si[1]	10:10	30	1.19	25 - 39
Cu	10:10	46	3.14	7 - 150	Sn	8:10	.46	4.27	<.21 - 4.3
F	6:10	410	1.24	<400 - 600	Sr	10:10	130	1.91	50 - 300
Fe, total[1]	10:10	2.7	2.14	.91 - 5.3	Th	8:8	7.0	1.62	2.6 - 12
Ga	10:10	12	1.74	5 - 20	Ti[1]	10:10	.39	1.64	.17 - .57
Ge	9:10	.89	2.41	<.1 - 1.8	U	10:10	2.2	1.34	1.3 - 2.9
Hg	10:10	.071	2.19	.03 - .35	V	10:10	74	2.76	20 - 200
K[1]	10:10	1.6	1.13	.83 - 1.8	Y	9:10	15	1.55	<10 - 30
La	3:10	24	1.19	<30 - 30	Yb	9:10	1.7	1.57	<1 - 3
Li	10:10	20	1.56	10 - 30	Zn	10:10	72	1.53	36 - 114
Mg[1]	10:10	.56	2.72	.17 - 1.4	Zr	10:10	130	1.43	100 - 300
Mn	10:10	790	1.53	500 - 1,500	pH[1]	10:10	6.9	.83	5.5 - 7.7

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 92.—*Summary statistics of element concentrations and pH of soils that supported dry bean plants in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	20:20	4.5	1.46	2.1 - 7.9	Na[1]	20:20	.89	1.15	.68 - 1.1
As	20:20	5.9	1.53	3.2 - 12	Nb	13:20	9.1	1.14	<10 - 10
B	18:20	24	1.65	<10 - 50	Ni	19:20	16	2.57	<2 - 70
Ba	20:20	550	1.52	300 - 1,000	Pb	20:20	14	1.27	10 - 20
Be	12:20	.89	1.24	<1 - 1.5	Rb	20:20	69	1.33	35 - 95
Ca[1]	20:20	2.1	3.10	.26 - 7.9	S, total	4:20	570	1.48	<800 - 1,300
C, total[1]	20:20	1.5	1.46	.78 - 3.2	Sc	19:20	7.3	1.91	<3 - 20
Co	20:20	7.1	1.64	5 - 20	Se	13:19	.17	2.53	<.1 - .9
Cr	20:20	49	1.89	15 - 20	Si[1]	20:20	30	1.13	27 - 40
Cu	20:20	29	1.96	15 - 100	Sn	19:20	.63	2.42	<.1 - 2.5
F	14:20	500	1.62	<400 - 1,400	Sr	20:20	200	1.67	70 - 500
Fe, total[1]	20:20	2.3	1.49	1.2 - 4.6	Th	20:20	8.4	1.46	3.3 - 14
Ga	20:20	14	1.41	7 - 20	Ti[1]	20:20	.37	1.38	.23 - .66
Ge	20:20	1.1	1.34	.53 - 1.7	U	20:20	2.8	1.25	1.9 - 4.0
Hg	20:20	.036	1.40	.016 - .070	V	20:20	83	1.94	30 - 200
K[1]	20:20	1.6	1.31	.61 - 2.0	Y	20:20	15	1.20	10 - 20
La	9:20	22	2.03	<30 - 150	Yb	20:20	1.8	1.29	1.5 - 3.0
Li	20:20	24	1.11	19 - 28	Zn	20:20	74	1.43	37 - 120
Mg[1]	20:20	.78	1.84	.21 - 1.6	Zr	20:20	170	1.82	100 - 700
Mn	20:20	320	1.72	150 - 1,000	pH[2]	20:20	7.2	.95	5.4 - 8.4

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 93.—*Summary statistics of element concentrations and pH of soils that supported lettuce plants in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	15:20	1.4	5.87	<.26 - 6.3	Na[1]	15:20	.25	3.48	.07 - .89
As	20:20	5.8	4.10	.22 - 40	Nb	6:20	7.4	1.27	<10 - 10
B	15:20	18	2.26	<10 - 70	Ni	15:20	6.1	3.11	<2 - 20
Ba	20:20	260	2.55	50 - 1,000	Pb	15:20	13	1.65	<10 - 30
Be	9:20	.83	1.21	<1 - 1	Rb	15:20	43	2.31	<20 - 115
C, total[1]	20:20	4.4	4.45	.66 - 48	S, total	1:20	--	--	<800 - 1,700
Ca[1]	20:20	2.2	4.24	.24 - 11	Sc	14:20	4.1	2.08	<3 - 10
Co	13:20	3.7	1.80	<3 - 7	Se	12:20	.13	2.15	<.1 - .46
Cr	20:20	14	4.34	1 - 70	Si[1]	20:20	11	5.89	.42 - 42
Cu	20:20	24	1.78	10 - 50	Sn	16:20	.62	4.17	.19 - 5.6
F	12:20	470	1.63	<400 - 1,000	Sr	20:20	120	3.47	15 - 500
Fe, total[1]	19:20	.80	4.56	<.03 - 2.8	Th	15:15	9.6	1.36	4.8 - 14
Ga	15:20	7.7	2.29	<5 - 20	Ti[1]	16:20	.17	3.81	<.03 - .54
Ge	16:20	.62	3.34	<.1 - 1.5	U	20:20	2.2	1.63	.64 - 3.7
Hg	20:20	.060	1.78	.029 - .16	V	15:20	25	4.26	<7 - 100
K[1]	20:20	.83	2.33	.17 - 2.0	Y	16:20	14	1.51	<10 - 20
La	11:20	27	1.26	<30 - 50	Yb	15:20	1.3	1.59	<1 - 3
Li	15:20	15	2.87	<5 - 43	Zn	20:20	67	1.46	27 - 100
Mg[1]	20:20	.43	2.56	.12 - 1.6	Zr	15:20	53	5.07	<10 - 300
Mn	20:20	230	2.60	70 - 7,000	pH[2]	20:20	6.9	1.38	4.7 - 8.4

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 94.—*Summary statistics of element concentrations and pH of soils that supported potato plants in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	20:20	4.2	1.63	.79 - 7.9	Na[1]	10:20	.82	2.25	<.07 - 2.1
As	20:20	11	2.34	3.7 - 46	Nb	14:20	9.7	1.33	<10 - 15
B	14:20	19	2.92	<10 - 70	Ni	20:20	15	1.89	5 - 30
Ba	20:20	470	1.75	70 - 1,000	Pb	20:20	15	1.32	10 - 20
Be	15:20	1.0	1.45	<1 - 2	Rb	19:20	54	1.45	<20 - 80
C, total[1]	20:20	1.8	2.70	.55 - 39	S, total	4:20	540	1.55	<800 - 1,500
Ca[1]	20:20	1.4	2.70	.34 - 5.0	Sc	18:20	7.1	2.14	<3 - 20
Co	19:20	8.0	1.87	<3 - 30	Se	11:20	.13	3.15	<.1 - .75
Cr	20:20	43	1.99	5 - 100	Si[1]	20:20	28	1.77	2.5 - 35
Cu	20:20	37	2.70	7 - 150	Sn	18:20	.88	2.70	<.1 - 3.4
F	14:20	490	1.45	<400 - 1,200	Sr	20:20	170	1.88	70 - 500
Fe, total[1]	20:20	2.1	1.75	.67 - 5.1	Th	19:19	8.7	1.53	4.1 - 15
Ga	19:20	12	1.46	<5 - 20	Ti[1]	20:20	.43	1.79	.054 - .78
Ge	20:20	1.2	1.42	.31 - 1.7	U	20:20	2.8	1.47	1.6 - 4.9
Hg	20:20	.061	2.47	.023 - .31	V	19:20	63	2.40	<7 - 200
K[1]	20:20	1.3	1.50	.27 - 1.8	Y	19:20	22	1.77	<10 - 70
La	9:20	20	4.04	<30 - 500	Yb	18:19	2.4	1.73	<1 - 5
Li	19:20	20	1.42	<5 - 26	Zn	20:20	61	1.36	36 - 98
Mg[1]	20:20	.57	2.09	.12 - 1.4	Zr	19:20	180	2.36	<10 - 500
Mn	20:20	280	2.01	70 - 1,500	pH	20:20	6.7	1.16	4.8 - 8.3

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 95.—*Summary statistics of element concentrations and pH of soils that supported snap bean plants in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	18:22	2.0	4.43	<.26 - 7.4	Na[1]	18:22	.32	3.73	<.07 - 1.0
As	20:22	2.7	4.75	<.1 - 12	Nb	14:22	9.1	1.22	<10 - 15
B	19:22	29	2.46	<10 - 200	Ni	17:22	6.4	3.10	<2 - 20
Ba	22:22	200	3.97	10 - 700	Pb	17:22	13	1.46	<10 - 20
Be	10:22	.80	1.40	<1 - 1.5	Rb	17:22	41	2.04	<20 - 80
C, total[1]	22:22	1.1	1.67	.54 - 2.6	S, total	1:22	<800	--	<800 - 800
Ca[1]	22:22	.64	3.72	.08 - 7.0	Sc	16:22	4.5	1.89	<3 - 10
Co	15:22	4.3	1.88	<3 - 10	Se	9:22	.072	3.81	<.1 - 1.5
Cr	22:22	18	3.46	1.5 - 70	Si[1]	22:22	34	1.14	28 - 45
Cu	22:22	13	1.94	1.5 - 30	Sn	18:22	.58	4.03	<.1 - 15
F	11:11	410	1.45	<400 - 800	Sr	17:22	36	7.33	<5 - 300
Fe, total[1]	18:22	--	--	<.03 - 2.7	Th	16:16	8.3	1.50	3.4 - 16
Ga	17:22	7.4	2.10	<5 - 15	Ti[1]	22:22	.28	2.26	.043 - .56
Ge	22:22	1.1	1.52	.21 - 1.7	U	22:22	1.8	2.06	.40 - 3.3
Hg	22:22	.039	2.66	.01 - 1.4	V	17:22	25	3.77	<7 - 100
K[1]	22:22	.91	2.88	.10 - 2.4	Y	18:22	15	1.60	<10 - 30
La	11:11	26	1.52	<30 - 50	Yb	18:22	1.6	1.60	<1 - 3
Li	17:22	14	2.46	<5 - 38	Zn	19:22	40	2.40	<10 - 89
Mg[1]	18:22	.24	3.55	<.06 - 1.1	Zr	22:22	160	1.98	30 - 500
Mn	22:22	210	4.61	2 - 1,500	pH[2]	22:22	6.7	1.05	4.8 - 8.4

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 96.—*Summary statistics of element concentrations and pH of soils that supported sweet corn plants in four areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	15:20	1.1	4.18	<.26 - 5.8	Na[1]	13:20	--	--	<.07 - 1.0
As	16:20	--	--	<.1 - 48	Nb	13:20	9.1	1.14	<10 - 10
B	18:20	27	1.86	<10 - 70	Ni	13:20	3.7	3.80	<2 - 20
Ba	20:20	160	4.55	10 - 700	Pb	15:20	13	1.73	<10 - 30
Be	5:20	.62	1.54	<1 - 1.5	Rb	15:20	33	1.97	20 - 80
C, total[1]	20:20	.92	1.93	.32 - 3.0	S, total	0:20	<800	--	--
Ca[1]	20:20	.42	4.95	.07 - 7.8	Sc	7:20	1.8	2.86	<3 - 10
Co	11:20	3.1	2.27	<3 - 10	Se	12:20	.12	1.82	<.1 - .31
Cr	20:20	24	3.40	3 - 300	Si[1]	20:20	35	1.19	25 - 43
Cu	20:20	17	1.42	10 - 30	Sn	18:20	.47	2.72	<.1 - 1.9
F	11:20	410	1.42	<400 - 800	Sr	15:20	23	8.09	<5 - 300
Fe, total[1]	15:20	<.03	--	<.03 - 2.9	Th	14:14	6.4	1.56	3.4 - 13
Ga	12:20	5.1	2.57	<5 - 20	Ti[1]	20:20	.20	2.42	.04 - .66
Ge	20:20	1.0	1.29	.59 - 1.4	U	20:20	1.5	1.96	.44 - 3.1
Hg	20:20	.042	1.83	.018- .21	V	15:20	20	3.64	<7 - 100
K[1]	20:20	.58	3.57	.05 - 1.7	Y	12:20	9.8	1.92	<10 - 30
La	5:20	18	1.77	<30 - 50	Yb	14:20	1.2	1.93	<1 - 3
Li	15:20	10	2.18	<5 - 30	Zn	20:20	36	1.65	12 - 75
Mg[1]	15:20	.17	4.32	<.06 - 1.6	Zr	20:20	170	2.05	30 - 700
Mn	20:20	180	3.16	20 - 700	pH[2]	20:20	6.6	.96	5.5 - 8.2

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 97.—*Summary statistics of element concentrations and pH of soils that supported tomato plants in five areas of commercial production*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	20:25	--	--	<.26 - 7.9	Na[1]	20:25	--	--	<.07 - 2.8
As	22:25	2.6	4.93	<.1 - 20	Nb	11:25	7.9	1.51	<10 - 15
B	9:25	4.5	4.74	<10 - 50	Ni	19:25	6.6	3.52	<2 - 30
Ba	25:25	240	4.29	15 - 1,500	Pb	20:25	12	1.70	<10 - 70
Be	10:25	.78	1.34	<1 - 1.34	Rb	20:25	40	1.70	<20 - 80
C, total[1]	25:25	.65	1.45	.29 - 1.4	S, total	2:25	570	1.28	<800 - 940
Ca[1]	25:25	.71	3.12	.19 - 2.9	Sc	15:25	4.0	3.21	<3 - 20
Co	21:25	5.2	2.12	<3 - 20	Se	8:25	.062	2.82	<.1 - .36
Cr	25:25	19	3.55	1 - 150	Si[1]	25:25	34	1.18	26 - 43
Cu	25:25	21	2.04	7 - 70	Sn	18:25	.37	4.17	<.1 - 1.6
F	7:25	320	1.42	400 - 700	Sr	20:25	--	--	<5 - 1,000
Fe, total[1]	20:25	--	--	<.03 - 5.2	Th	20:20	7.8	1.71	3.3 - 24
Ga	20:25	8.1	2.23	<5 - 20	Ti[1]	25:25	.26	2.54	.039 - .66
Ge	25:25	1.1	1.25	.59 - 1.7	U	25:25	1.6	1.87	.47 - 3.3
Hg	25:25	.037	1.88	<.01 - .22	V	20:25	30	4.30	<7 - 200
K[1]	25:25	.77	3.01	.076 - 2.1	Y	20:25	13	1.83	<10 - 50
La	5:25	14	2.10	<30 - 50	Yb	18:23	1.3	2.00	<1 - 7
Li	20:25	11	1.86	<5 - 23	Zn	25:25	42	1.68	20 - 100
Mg[1]	21:25	.24	3.45	<.06 - 1.3	Zr	25:25	150	1.79	70 - 700
Mn	25:25	280	2.67	50 - 1,000	pH	25:25	7.3	1.02	5.8 - 8.7

[1] Means and ranges given in percent.
[2] Standard units. Mean is arithmetic; deviation is standard.

TABLE 98.—*Element concentrations and pH of soils that supported asparagus in San Joaquin County, California*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	6.5	1.06	5.8 - 6.8	Na[1]	5:5	2.4	1.06	2.2 - 2.6
As	5:5	2.2	1.52	1.5 - 3.8	Nb	3:5	8.9	1.16	<10 - 10
B	0:5	<10	--	--	Ni	5:5	11	1.59	7 - 20
Ba	5:5	1,200	1.25	1,000 - 1,500	Pb	5:5	17	1.17	15 - 20
Be	5:5	1	1.00	--	Rb	5:5	96	1.07	85 - 100
C, total[1]	5:5	.58	1.40	.41 - .89	S, total	0:5	<800	--	--
Ca[1]	5:5	3.0	1.18	2.6 - 3.7	Sc	5:5	7.5	1.17	7 - 10
Co	5:5	6.1	1.20	5 - 7	Se	3:5	.13	2.79	<.1 - .38
Cr	5:5	26	1.50	20 - 50	Si[1]	5:5	29	1.07	26 - 32
Cu	5:5	12	1.50	7 - 20	Sn	5:5	.76	1.38	.54 - 1.1
F	5:5	550	1.16	500 - 700	Sr	5:5	610	1.20	500 - 700
Fe, total[1]	5:5	2.3	1.15	1.9 - 2.7	Th	5:5	16	1.31	11 - 23
Ga	5:5	20	1.28	15 - 30	Ti[1]	5:5	.32	1.11	.28 - .37
Ge	5:5	1.2	1.13	1.1 - 1.5	U	5:5	2.2	1.12	1.9 - 2.5
Hg	4:5	.020	1.67	<.01 - .034	V	5:5	75	1.17	70 - 100
K[1]	5:5	2.5	1.06	2.3 - 2.7	Y	5:5	19	1.14	15 - 20
La	4:5	55	2.44	<30 - 150	Yb	5:5	1.9	1.14	1.5 - 2
Li	5:5	18	1.18	15 - 23	Zn	5:5	60	1.20	48 - 72
Mg[1]	5:5	.81	1.25	.6 - 1.0	Zr	5:5	120	1.25	100 - 150
Mn	5:5	370	1.32	300 - 500	pH[2]	5:5	8.2	1.00	6.5 - 8.9

[1] Means and ranges given in percent.
[2] Standard units. Mean is arithmetic; deviation is standard.

TABLE 99.—*Element concentrations and pH of soils that supported onion plants in Hidalgo County, Texas*

[Explanation of column headings: Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. Mean, geometric mean, except as indicated. Deviation, geometric deviation, except as indicated. Means and ranges are given in parts per million, except as indicated]

Element, or pH	Ratio	Mean	Deviation	Observed range	Element, or pH	Ratio	Mean	Deviation	Observed range
Al[1]	5:5	4.8	1.07	4.4 - 5.2	Na[1]	5:5	.64	1.05	.61 - .69
As	5:5	7.3	1.16	5.9 - 8.4	Nb	4:5	9.5	1.10	<10 - 10
B	5:5	28	1.20	20 - 30	Ni	5:5	19	1.14	15 - 20
Ba	5:5	500	1.00	--	Pb	5:5	13	1.25	10 - 15
Be	4:5	.95	1.10	<1 - 1	Rb	5:5	87	1.08	80 - 95
C, total[1]	5:5	4.4	1.02	4.3 - 4.5	S, total	0:5	<800	--	--
Ca[1]	5:5	12	1.01	12.0 - 12.4	Sc	5:5	10	1.00	--
Co	5:5	6.5	1.16	5 - 7	Se	5:5	.18	1.49	.12 - .32
Cr	5:5	61	1.20	50 - 70	Si[1]	5:5	21	1.02	20 - 21
Cu	5:5	26	1.25	20 - 30	Sn	5:5	1.1	1.44	.61 - 1.6
F	5:5	870	1.22	700 - 1,000	Sr	5:5	290	1.65	200 - 500
Fe, total[1]	5:5	2.8	1.02	2.7 - 2.8	Th	5:5	9.7	1.06	8.9 - 10
Ga	5:5	15	1.00	--	Ti[1]	5:5	.29	1.06	.27 - .32
Ge	5:5	1.1	1.11	1.0 - 1.3	U	5:5	3.0	1.02	3.0 - 3.1
Hg	5:5	.032	1.41	.018 - .041	V	5:5	130	1.25	100 - 150
K[1]	5:5	1.7	1.03	1.6 - 1.7	Y	5:5	26	1.25	20 - 30
La	3:5	28	1.11	<30 - 30	Yb	5:5	2.4	1.25	2 - 3
Li	5:5	30	1.00	--	Zn	5:5	89	1.01	88 - 90
Mg[1]	5:5	1.0	1.01	.96 - 1.0	Zr	5:5	110	1.20	100 - 150
Mn	5:5	440	1.44	300 - 700	pH[2]	5:5	8.3	.0837	8.2 - 8.4

[1]Means and ranges given in percent.
[2]Standard units. Mean is arithmetic; deviation is standard.

TABLE 100.—*Estimates of logarithmic variance for American-grape vines soils from three areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance		Element, or pH	Total $\log_{10}$ variance	Percent of total variance	
		Between areas	Between fields within areas			Between areas	Between fields within areas
Al	0.02816	*84	16	Nb	.00157	26	74
As	.05054	<1	100	Ni	.05366	*85	15
B	.07148	35	65	Pb	.05437	<1	100
Ba	.02061	*49	50	Rb	.00728	24	76
Ca	.21531	*96	4	Sc	.15015	*93	7
C	.04735	22	78	Si	.00483	*91	9
Co	.07784	*93	7	Sn	.05934	14	86
Cr	.06396	*77	23	Sr	.06930	*91	9
Cu	.13750	<1	100	Th	.03075	*50	49
Fe	.08607	*95	5	Ti	.05078	*87	13
Ga	.04750	*80	20	U	.01328	23	77
Ge	.00566	*75	25	V	.13547	*89	11
Hg	.04624	*48	52	Y	.02906	*50	49
K	.00375	27	73	Yb	.03704	*66	34
Li	.01344	29	71	Zn	.07066	*60	40
Mg	.16502	*97	3	Zr	.06767	<1	100
Mn	.06134	*85	15	pH[1]	1.1196	*53	47
Na	.04898	*98	2				

[1]Variance calculated from nontransformed data.

TABLE 101.—*Estimates of logarithmic variance for apple tree soils from five areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.10493	*96	4	Nb------	.00180	<1	100
As------	.15953	6	94	Ni------	.17569	*86	14
B-------	.11938	*69	31	Pb------	.13936	<1	99
Ba------	.05413	*79	21	Rb------	.04964	*83	17
Ca------	.26891	*97	3	Sc------	.10913	*93	7
C-------	.06029	24	76	Si------	.00476	*94	6
Co------	.09097	*91	9	Sn------	.21861	*40	60
Cr------	.06029	*61	39	Sr------	.34988	*97	3
Cu------	.04184	*32	68	Th------	.03406	*40	60
Fe------	.06114	*97	3	Ti------	.03919	*78	22
Ga------	.08646	*88	12	U-------	.03079	*75	25
Ge------	.07515	1	99	V-------	.15643	*84	16
K-------	.03794	*94	6	Y-------	.01668	*53	47
Li------	.05987	*86	14	Yb------	.01621	16	84
Mg------	.19958	*97	3	Zn------	.04360	*80	20
Mn------	.13312	*72	28	Zr------	.07729	*40	60
Na------	.27315	*98	2	pH[1]-----	1.1986	*71	29

[1]Variance calculated from nontransformed data.

TABLE 102.—*Estimates of logarithmic variance for European-grape vines soils from two areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.00064	*53	47	Na------	.00592	*95	5
As------	.06327	*94	6	Nb------	.00173	<1	100
Ba------	.02687	*79	21	Ni------	.06503	*84	16
Be------	.00069	<1	100	Pb------	.02005	13	87
Ca------	.00213	*91	9	Rb------	.00335	*75	25
C-------	.00790	<1	100	Sc------	.04623	*87	13
Co------	.05478	100	<1	Si------	.00036	*75	25
Cr------	.03297	42	<1	Sn------	.04064	*<1	100
Cu------	.02283	<1	100	Sr------	.02079	*54	46
F-------	.03040	*70	30	Th------	.00625	<1	100
Fe------	.03765	*98	2	Ti------	.07164	*99	1
Ga------	.00468	<1	100	U-------	.01497	*86	14
Ge------	.00613	25	75	V-------	.03474	*68	32
Hg------	.15109	<1	100	Y-------	.01375	*58	42
K-------	.00591	*94	6	Yb------	.01869	<1	100
Li------	.03516	*98	2	Zn------	.03232	*90	10
Mg------	.06005	*99	<1	Zr------	.01011	20	80
Mn------	.01606	<1	100	pH[1]-----	1.4046	*75	25

[1]Variance calculated from nontransformed data.

TABLE 103.—*Estimates of logarithmic variance for grape fruit tree soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance		Element, or pH	Total $\log_{10}$ variance	Percent of total variance	
		Between areas	Between fields within areas			Between areas	Between fields within areas
Al------	0.48832	*98	2	Na------	.74993	*95	5
As------	.33580	*76	24	Ni------	.23252	*91	9
Ba------	.77266	*99	1	Pb------	.02702	*93	7
Ca------	.32391	*41	59	Rb------	.16484	*99	<1
C-------	.03917	*48	52	Si------	.00610	*84	16
Cr------	.40050	*91	9	Sn------	.29755	*64	36
Cu------	.04803	*59	41	Sr------	.81140	*88	12
F-------	.05955	26	74	Th------	.04554	*72	16
Fe------	.77480	*94	6	Ti------	.13329	*98	2
Ga------	.10751	*95	5	U-------	.09401	*91	9
Ge------	.01198	*67	33	V-------	.95195	*94	6
Hg------	.03844	20	80	Y-------	.06437	*92	8
K-------	.49406	*99	1	Yb------	.05615	*85	15
Li------	.12021	*90	10	Zn------	.22263	*97	3
Mg------	.39186	*99	1	Zr------	.05939	24	76
Mn------	.58105	*92	8	pH[1]-----	.99727	19	81

[1]Variance calculated from nontransformed data.

TABLE 104.—*Estimates of logarithmic variance for orange tree soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance		Element, or pH	Total $\log_{10}$ variance	Percent of total variance	
		Between areas	Between fields within areas			Between areas	Between fields within areas
Al------	0.56612	*80	20	Ni------	.23310	*94	6
As------	.48441	*78	22	Pb------	.02361	*85	15
Ba------	.75426	*99	<1	Rb------	.16169	*86	14
Ca------	.48773	*55	45	Si------	.00743	*83	17
C-------	.04167	17	83	Sn------	.16241	*54	46
Cr------	.46582	*86	14	Sr------	1.0424	*99	1
Cu------	.17791	6	94	Th------	.05934	*89	11
Fe------	.89176	*72	28	Ti------	.11517	*72	28
Ga------	.10224	*97	3	U-------	.07979	*76	24
Ge------	.17742	7	93	V-------	1.0406	*100	<1
Hg------	.04231	*37	63	Y-------	.02890	*62	38
K-------	.56657	*80	20	Yb------	.02716	*67	33
Li------	.10643	*66	34	Zn------	.12312	*63	37
Mg------	.37365	*94	6	Zr------	.03892	6	94
Mn------	.47985	*67	33	pH[1]-----	1.9162	*49	51
Na------	.57570	*96	4				

[1]Variance calculated from nontransformed data.

TABLE 105.—*Estimates of logarithmic variance for peach tree soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance		Element, or pH	Total $\log_{10}$ variance	Percent of total variance	
		Between areas	Between fields within areas			Between areas	Between fields within areas
Al------	0.01143	*92	8	Na------	.03496	*99	1
As------	.41371	24	76	Nb------	.00173	<1	100
B-------	.12445	*74	26	Ni------	.10751	*70	30
Ba------	.01718	*52	48	Pb------	.30638	*71	29
Ca------	.01874	*99	1	Rb------	.02389	*88	12
C-------	.02569	*93	7	Sc------	.06174	*96	4
Co------	.07039	*92	8	Si------	.00157	*87	13
Cr------	.10809	*82	18	Sn------	.13744	<1	100
Cu------	.12634	*80	20	Sr------	.06615	*83	17
F-------	.04201	*35	65	Th------	.03564	*56	44
Fe------	.03476	*98	2	Ti------	.02140	*95	5
Ga------	.00679	*48	52	U-------	.01669	*85	15
Ge------	.08956	10	90	V-------	.07018	*89	11
Hg------	.02087	*34	66	Y-------	.01030	<1	100
K-------	.00541	*95	5	Yb------	.01026	3	97
Li------	.01616	*89	11	Zn------	.01784	*88	12
Mg------	.06283	*98	2	Zr------	.04565	64	36
Mn------	.01862	*73	27	pH[1]-----	1.2711	*78	22

[1]Variance calculated from nontransformed data.

TABLE 106.—*Estimates of logarithmic variance for pear tree soils from five areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance		Element, or pH	Total $\log_{10}$ variance	Percent of total variance	
		Between areas	Between fields within areas			Between areas	Between fields within areas
Al------	0.02789	*75	25	Mn------	.07318	16	84
As------	.11167	*41	59	Na------	.03247	*80	20
B-------	.07551	*65	35	Ni------	.13258	*73	27
Ba------	.03444	*59	41	Pb------	.16003	*82	18
Be------	.01353	19	81	Rb------	.01879	*43	57
Ca------	.22361	*84	16	Sc------	.08993	*84	16
C------	.02746	*71	29	Si------	.00431	*79	21
Co------	.06292	*70	30	Sn------	.07153	4	96
Cr------	.09165	*78	22	Sr------	.09364	*89	11
Cu------	.26352	*82	18	Th------	.02190	*39	61
F-------	.03985	*62	38	Ti------	.02175	*72	28
Fe------	.05604	*72	28	U-------	.01406	*85	15
Ga------	.02920	*69	31	V-------	.09047	*80	20
Ge------	.00920	22	78	Y-------	.02063	*38	62
Hg------	.06017	23	77	Yb------	.02080	17	83
K-------	.00362	*40	60	Zn------	.04903	*83	17
Li------	.01735	*42	58	Zr------	.04666	*38	62
Mg------	.10381	*92	8	pH[1]-----	1.1833	*70	30

[1]Variance calculated from nontransformed data.

TABLE 107.—*Estimates of logarithmic variance for plum tree soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.02521	*75	25	Na------	.04539	*96	4
As------	.20478	*60	40	Nb------	.04294	23	77
B-------	.10176	*47	*53	Pb------	.25798	*68	32
Ba------	.01708	*32	68	Rb------	.01402	*49	51
Ca------	.17258	*96	4	Sc------	.06975	*75	25
C-------	.04622	*58	42	Si------	.00349	*87	13
Co------	.05410	*93	7	Sn------	.32636	*42	58
Cr------	.03493	27	73	Sr------	.08908	*91	9
Cu------	.07418	4	96	Th------	.04924	*51	49
F-------	.03029	*65	35	Ti------	.04113	*70	30
Fe------	.07447	*85	15	U-------	.03033	*67	33
Ga------	.03701	*70	30	V-------	.10127	*80	20
Ge------	.00808	<1	100	Y-------	.02491	27	73
Hg------	.23291	*34	66	Yb------	.02213	18	82
K-------	.00388	*41	39	Zn------	.04404	*61	39
Li------	.03929	*61	39	Zr------	.03879	20	80
Mg------	.14749	*92	8	pH[1]-----	.74460	*58	42
Mn------	.12252	*62	37				

[1]Variance calculated from nontransformed data.

TABLE 108.—*Estimates of logarithmic variance for cabbage plant soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.00110	<1	100	Mn------	.000930	<1	100
As------	.00930	<1	100	Na------	.00164	*79	21
B-------	.04592	77	23	Ni------	.02213	*49	51
Ba------	.02079	*54	46	Pb------	.00554	16	84
Be------	.01735	<1	100	Rb------	.00145	*90	10
Ca------	.09397	*99	<1	Sc------	.01040	<1	100
C-------	.13867	*71	29	Si------	.00939	*98	2
Co------	.00534	<1	100	Sn------	.00999	<1	100
Cr------	.01606	<1	100	Sr------	.04517	*88	12
Cu------	.03185	8	92	Th------	.00632	<1	100
F-------	.01081	28	72	Ti------	.00054	<1	99
Fe------	.00398	*54	46	U-------	.00164	<1	100
Ga------	.00156	<1	100	V-------	.00600	<1	100
Ge------	.00828	*71	29	Y-------	.00156	<1	100
Hg------	.01000	<1	100	Yb------	.00156	<1	100
K-------	.00103	*85	15	Zn------	.00236	*47	53
Li------	.00280	*61	39	Zr------	.03270	*80	29
Mg------	.05062	*69	31	pH[1]-----	.02000	<1	100

[1]Variance calculated from nontransformed data.

TABLE 109.—*Estimates of logarithmic variance for carrot plant soils from two areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total log_{10} variance	Percent of total variance		Element, or pH	Total log_{10} variance	Percent of total variance	
		Between areas	Between fields within areas			Between areas	Between fields within areas
Al------	0.00494	*49	51	Na------	.01106	18	82
As------	.01089	*75	25	Ni------	.03782	*76	24
B-------	.04152	*68	32	Pb------	.01288	19	81
Ba------	.00427	25	75	Rb------	.00143	20	30
Ca------	.03642	*84	16	Sc------	.02175	69	31
C-------	.00840	*89	11	Si------	.00161	*88	12
Co------	.01070	100	<1	Sn------	.08502	<1	100
Cr------	.04102	*58	42	Sr------	.07810	*92	8
Cu------	.04531	100	<1	Th------	.00959	32	68
Fe------	.01025	*93	7	Ti------	.00230	4	96
Ga------	.00620	25	75	U-------	.01168	*97	3
Ge------	.00116	<1	100	V-------	.06252	*82	18
Hg------	.07538	<1	100	Y-------	.01855	*46	54
K-------	.00094	<1	100	Yb------	.01108	<1	100
Li------	.03181	*95	5	Zn------	.00681	*92	8
Mg------	.06035	*99	1	Zr------	.02283	41	59
Mn------	.02852	*58	42	pH[1]-----	.04250	<1	100

[1]Variance calculated from nontransformed data.

TABLE 110.—*Estimates of logarithmic variance for cucumber plant soils from three areas of commercial production*

[Asterisk (*) significantly greater than zero at the 0.05 probability level]

Element, or pH	Total log_{10} variance	Percent of total variance		Element, or pH	Total log_{10} variance	Percent of total variance	
		Between areas	Between fields within areas			Between areas	Between fields within areas
Al------	0.09025	*73	27	Na------	.02351	*98	2
As------	.25468	<1	100	Ni------	.40021	*94	6
B-------	.05926	15	85	Pb------	.13147	<1	100
Ba------	.05766	*72	28	Rb------	.01661	*70	30
Ca------	.18097	*65	35	Sc------	.47350	*86	14
C-------	.03111	25	75	Si------	.00877	*78	22
Co------	.16969	*94	6	Sn------	.40000	36	64
Cr------	.29329	*95	5	Sr------	.13196	*90	10
Cu------	.41802	*92	8	Th------	.06940	*78	22
Fe------	.16988	*80	20	Ti------	.06636	*67	33
Ga------	.09788	*93	7	U-------	.02364	*74	26
Ge------	.17516	12	88	V-------	.31960	*88	12
Hg------	.12529	<1	100	Y-------	.04139	*57	43
K-------	.00320	13	87	Yb------	.04633	*64	36
Li------	.06157	*88	12	Zn------	.05639	*89	11
Mg------	.33695	*99	1	Zr------	.02623	16	84
Mn------	.03524	<1	100	pH[1]-----	1.0296	*74	26

[1]Variance calculated from nontransformed data.

TABLE 111.—*Estimates of logarithmic variance for dry bean plant soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.03043	*58	42	Na------	.00433	*74	26
As------	.03952	*59	41	Ni------	.18914	*86	14
B-------	.04315	*34	66	Pb------	.01350	*86	14
Ba------	.04094	*88	12	Rb------	.01879	*88	12
Ca------	.26230	*37	62	Sc------	.01898	*92	8
C-------	.01376	*65	35	Si------	.00305	27	73
Co------	.05814	*97	3	Sn------	.15487	16	84
Cr------	.09442	*88	12	Sr------	.01585	*73	27
Cu------	.01316	*80	20	Th------	.03132	*68	32
F-------	.05059	*67	33	Ti------	.02075	30	70
Fe------	.03532	*67	33	U-------	.01120	*95	5
Ga------	.02577	*70	30	V-------	.10383	*94	6
Ge------	.01649	17	83	Y-------	.00688	26	74
Hg------	.02332	*38	62	Yb------	.01256	<1	100
K-------	.01488	<1	100	Zn------	.01956	*94	6
Li------	.00222	*54	46	Zr------	.07903	70	30
Mg------	.08815	*94	6	pH[1]-----	1.1205	91	9
Mn------	.06514	*70	30				

[1]Variance calculated from nontransformed data.

TABLE 112.—*Estimates of logarithmic variance for lettuce plant soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.46495	*97	3	Na------	.31041	*99	1
As------	.42754	*58	42	Ni------	.18840	*97	3
B-------	.09360	*81	19	Pb------	.03572	*80	20
Ba------	.19965	*82	18	Rb------	.14806	*96	4
Ca------	.48509	*90	10	Sc------	.07113	*97	3
C-------	.53046	*99	1	Si------	.75016	*46	54
Cr------	.50964	*97	3	Sr------	.36484	*95	5
Cu------	.07706	*87	13	Th------	.02063	*46	54
Fe------	.53929	*92	8	Ti------	.34473	*99	1
Ga------	.10157	*97	3	U-------	.05505	*84	16
Ge------	.29278	*71	29	V-------	1.0502	*99	1
Hg------	.07431	*71	29	Y-------	.02695	*78	21
K-------	.16636	*90	10	Yb------	.03038	*82	18
Li------	.22449	*99	1	Zn------	.01361	*76	24
Mg------	.20726	*92	8	Zr------	.38599	*97	3
Mn------	.19744	<1	100	pH[1]-----	2,3802	*97	3

[1]Variance calculated from nontransformed data.

TABLE 113.—*Estimates of logarithmic variance for potato plant soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.05078	*55	45	Na------	.15220	*47	53
As------	.16575	*86	14	Nb------	.00950	*44	56
B-------	.14877	*91	9	Ni------	.09434	*89	11
Ba------	.10650	*51	49	Pb------	.01656	*53	47
Be------	.10881	*56	44	Rb------	.03725	*59	41
Ca------	.22562	*83	17	Sc------	.11273	*85	15
C-------	.21296	*60	40	Si------	.06358	<1	100
Co------	.08268	*81	19	Sn------	.19611	<1	100
Cr------	.10311	*63	37	Sr------	.09129	*87	13
Cu------	.21988	*72	28	Th------	.04043	*78	22
F-------	.03449	*39	61	Ti------	.07191	*49	51
Fe------	.07366	*94	6	U-------	.03326	*76	24
Ga------	.02827	*54	46	V-------	.32998	*49	51
Ge------	.02389	<1	100	Y-------	.06695	*70	30
Hg------	.18369	*74	26	Yb------	.06108	*72	28
K-------	.03299	28	71	Zn------	.02203	*84	16
Li------	.03392	14	86	Zr------	.14018	<1	100
Mg------	.12810	*93	7	pH[1]-----	1.6314	*83	17
Mn------	.10905	*73	27				

[1]Variance calculated from nontransformed data.

TABLE 114.—*Estimates of logarithmic variance for snap bean plant soils from five areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total log_{10} variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.34029	*61	39	Na------	.34888	*99	1
As------	.51976	*88	12	Ni------	.18423	*83	17
B-------	.12682	30	70	Pb------	.02064	*80	20
Ba------	.43405	*97	3	Rb------	.11110	*95	5
Ca------	.35482	*47	53	Sc------	.05332	*86	14
C-------	.01573	*72	28	Si------	.00362	*38	62
Co------	.04687	*86	14	Sn------	.36523	*78	22
Cr------	.34833	*94	6	Sr------	.58835	*97	3
Cu------	.09291	*62	38	Th------	.03616	*65	35
Fe------	.70945	*74	26	Ti------	.14516	*79	21
Ga------	.08247	*97	3	U-------	.11802	*96	4
Ge------	.03503	30	70	V-------	.90091	*99	1
Hg------	.18655	19	81	Y-------	.03403	*63	37
K-------	.23585	*61	39	Yb------	.03404	*70	30
Li------	.16954	*99	1	Zn------	.17017	*84	16
Mg------	.31567	*98	2	Zr------	.08900	9	91
Mn------	.51276	*80	20	pH[1]-----	1.2994	*82	18

[1]Variance calculated from nontransformed data.

TABLE 115.—*Estimates of logarithmic variance for sweet corn plant soils from four areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.38244	*95	5	Mn------	.30940	*91	9
As------	.95358	*93	7	Pb------	.04202	*76	24
B-------	.06245	<1	100	Rb------	.10132	*97	3
Ba------	.54677	*98	2	Si------	.00715	*85	15
Ca------	.60874	*98	2	Sn------	.02705	*52	48
C-------	.09787	*78	22	Sr------	.64710	*97	3
Cr------	.33290	*72	28	Th------	.04785	*81	19
Cu------	.02599	*45	55	Ti------	.18326	*93	7
Fe------	.86337	*99	1	U-------	.10631	*96	4
Ge------	.01332	*52	48	V-------	.91003	*99	1
Hg------	.07149	19	81	Yb------	.05273	*60	40
K-------	.38383	*98	2	Zn------	.05716	*81	19
Li------	.13158	*97	3	Zr------	.11262	*64	36
Mg------	.38484	*99	1	pH[1]-----	1.1340	*81	19

[1]Variance calculated from nontransformed data.

TABLE 116.—*Estimates of logarithmic variance for tomato plant soils from five areas of commercial production*

[Asterisk (*), significantly greater than zero at the 0.05 probability level]

Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas	Element, or pH	Total $\log_{10}$ variance	Percent of total variance: Between areas	Percent of total variance: Between fields within areas
Al------	0.42696	*99	<1	Ni------	.21979	*85	15
As------	.50817	*71	29	Pb------	.04028	*40	60
B-------	.47679	*96	4	Rb------	.07264	*99	1
Ca------	.29205	*99	1	Sc------	.13233	*93	7
C-------	.02994	*76	24	Si------	.00612	*91	9
Co------	.09488	*88	12	Sn------	.31586	*58	42
Cr------	.35009	*81	19	Sr------	.86373	*99	1
Cu------	.10965	*79	21	Th------	.06564	*86	14
Fe------	.85356	*99	<1	Ti------	.19651	*99	1
Ga------	.10070	*97	3	U-------	.08827	*96	4
Ge------	.01059	*64	36	V-------	.92649	*99	1
Hg------	.08157	*44	56	Y-------	.05602	*82	18
K-------	.27377	*99	<1	Yb------	.07066	*79	21
Li------	.09394	*98	2	Zn------	.06082	*96	4
Mg------	.30517	*99	<1	Zr------	.06940	*51	49
Mn------	.21456	*91	9	pH[1]-----	1.1818	*70	30

[1]Variance calculated from nontransformed data.

TABLE 117.—*Areas having significantly different concentrations of elements and pH at the 0.05 probability level in soils supporting fruits and vegetables*

Element or pH	Kind of produce supported by soil, and mean concentration in soils, all areas	Area; mean concentrations	
		High	Low
Al, percent----	American grape, 4.1	Yakima County, Wash.; 6.1	Berrien County, Mich.; 3.0
	Apple, 3.3	Yakima County, Wash.; 7.3	Gloucester County, N.J.; 1.0
	European grape, 6.8	San Joaquin County, Calif.; 7.1	Yakima County, Wash.; 6.6
	Grapefruit, 1.9	Riverside County, Calif.; 6.8	Hidalgo County, Tex.; 2.8
	Orange, 1.3	Riverside County, Calif.; 6.6	Palm Beach County, Fla.; <0.26
	Peach, 5.3	Yakima County, Wash.; 6.7	Wayne County, N.Y.; 4.0
	Pear, 4.9	San Joaquin County, Calif.; 7.5	Berrien County, Mich.; 3.1
	Plum, 4.7	Yakima County, Wash.; 6.7	Berrien County, Mich.; 3.1
	Carrot, 4.8	Imperial County, Calif.; 5.2	Hidalgo County, Tex.; 4.4
	Cucumber, 4.9	San Joaquin County, Calif., 7.7	Berrien County, Mich.; 3.2
	Dry bean, 4.5	San Joaquin County, Calif.; 7.1	Wayne County, N.Y.; 3.4
	Lettuce, 1.4	Hidalgo County, Tex. and Imperial County, Calif.; 4.9	Palm Beach County, Fla.; <0.26
	Potato, 4.2	Yakima County, Wash.; 7.1	Wayne County, N.Y.; 2.6
	Snap bean, 2.0	Twin Falls County, Idaho; 5.1	Palm Beach County.; Fla.; <0.26
	Sweet corn, 1.1	Twin Falls County, Idaho; 4.6	Palm Beach County,Fla.; <0.30
	Tomato, 1.9	Yakima County, Wash.; 7.4	Palm Beach County, Fla.; <0.26
As, ppm--------	European grape, 7.0	San Joaquin County, Calif.; 10	Yakima County, Wash.; 4.7
	Grapefruit, 2.2	Yuma County, Ariz.; 5.4	Palm Beach County, Fla.; 0.35
	Orange, 1.4	Riverside County, Calif.; 5.5	Palm Beach County, Fla.; 0.075
	Pear, 10	Yakima County, Wash.; 23	Berrien County, Mich.; 5.8
	Plum, 13	Mesa County, Colo.; 37	Yakima County, Wash.; 6.3
	Carrot, 6.9	Hidalgo County, Tex.; 8.0	Imperial County, Calif.; 5.9
	Dry bean, 5.9	Mesa County, Colo.; 8.9	San Joaquin County, Calif.; 3.8
	Lettuce, 5.8	Cumberland County, N.J., and Imperial County, Calif.; 11	Palm Beach County, Fla.; 0.93
	Potato, 11	Cumberland County, N.J.; 34	Twin Falls County, Idaho; 4.4
	Snap bean, 2.7	Cumberland County, N.J.; 6.5	Palm Beach County, Fla.; 0.17
	Sweet corn, 1.7	Berrien County, Mich.; 7.9	Palm Beach County, Fla.; <1
	Tomato, 2.6	Cumberland County, N.J.; 7.3	Palm Beach County, Fla.; 0.070
B, ppm---------	Apple, 20	Mesa County, Colo.; 61	Wayne County, N.Y.; 12
	Peach, 17	Mesa County, Colo., 55	Yakima County, Wash.; <10
	Pear, 21	Berrien County, Mich.; 28	Yakima County, Wash.; <10
	Plum, 24	Mesa County, Colo.; 53	Yakima County, Wash.; 12
	Carrot, 38	Imperial County, Calif.; 50	Hidalgo County, Tex.; 28
	Dry bean, 24	Mesa County, Colo.; 33	San Joaquin County, Calif.; 12
	Lettuce, 18	Imperial County, Calif.; 37	Palm Beach County, Fla., <10
	Potato, 19	Cumberland County, N.J.; 61	Yakima County, Wash.; <10
	Tomato, 4.5	Cumberland County, N.J.; 33	Palm Beach County, Fla., Yakima County, Wash., and San Joaquin County, Calif.; <10
Ba, ppm--------	American grape, 470	Yakima County, Wash.; 610	Wayne County, N.Y.; 370
	Apple, 350	Yakima County, Wash.; 570	Gloucester County, N.J.; 160
	European grape, 730	San Joaquin County, Calif.; 930	Yakima County, Wash.; 570
	Grapefruit, 320	Yuma County, Ariz.; 1,300	Palm Beach County, Fla.; 17
	Orange, 330	Riverside County, Calif.; 1,300	Palm Beach County, Fla.; 18
	Peach, 520	San Joaquin County, Calif.; 700	Wayne County, N.Y.; 390
	Pear, 540	San Joaquin County, Calif.; 870	Wayne County, N.Y.; 340
	Plum, 490	Yakima County, Wash.; 650	Mesa County, Colo.; 410
	Cabbage, 440	Imperial County, Calif.; 530	Hidalgo County, Tex.; 370
	Cucumber, 610	San Joaquin County, Calif.; 870	Berrien County, Mich.; 440
	Dry bean, 550	San Joaquin County, Calif.; 870	Wayne County, N.Y.; 300
	Lettuce, 260	Imperial County, Calif.; 610	Palm Beach County, Fla.; 77
	Potato, 470	Twin Falls County, Idaho; 700	Wayne County, N.Y.; 240
	Snap bean, 200	Twin Falls County, Idaho; 650	Palm Beach County, Fla.; 19
	Sweet corn, 160	Twin Falls County, Idaho; 650	Palm Beach County, Fla.; 15
Be, ppm--------	Potato, 1.0	Cumberland County, N.J.; 1.5	Wayne County, N.Y.; <1
C, percent----	Grapefruit, 0.86	Palm Beach County, Fla.; 1.4	Riverside County, Calif.; 0.62
	Peach, 2.0	Mesa County, Colo.; 2.8	San Joaquin County, Calif.; 1.4
	Pear, 2.1	Mesa County, Colo.; 2.9	Berrien County, Mich., 1.2
	Plum, 2.0	Wayne County, N.Y.; 2.9	Berrien County, Mich.; 1.3
	Cabbage, 2.6	Hidalgo County, Tex.; 4.5	Imperial County, Calif.; 1.5
	Carrot, 1.6	Imperial County, Calif.; 1.9	Hidalgo County, Tex.; 1.4
	Dry bean, 1.5	Mesa County, Colo.; 2.1	San Joaquin County, Calif.; 1.1
	Lettuce, 4.4	Palm Beach County, Fla.; 46	Cumberland County, N.J.; 0.94
	Potato, 1.8	Wayne County, N.Y.; 5.9	Yakima County, Wash.; 0.76
	Snap bean, 1.1	Wayne County, N.Y., and Twin Falls County, Idaho; 1.8	Berrien County, Mich.; 0.58
	Sweet corn, 0.92	Twin Falls County, Idaho; 2.4	Palm Beach County, Fla.; 0.52
	Tomato, 0.65	Berrien County, Mich.; 0.95	San Joaquin County, Calif.; 0.40

TABLE 117.—*Areas having significantly different concentrations of elements and pH at the 0.05 probability level in soils supporting fruits and vegetables*—Continued

Element, or pH	Kind of produce supported by soil and, mean concentration in soils, all areas	Area; mean concentrations	
		High	Low
Ca, percent----	American grape, 1.0	Yakima County, Wash., 3.1	Berrien County, Mich.; 0.41
	Apple, 0.82	Yakima County, Wash.; 2.8	Gloucester County, N.J.; 0.17
	European grape, 2.7	Yakima County, Wash.; 2.9	San Joaquin County, Calif.; 2.5
	Grapefruit, 1.4	Yuma County, Ariz.; 3.3	Hidalgo County, Tex.; 0.53
	Orange, 0.68	Riverside County, Calif.; 2.7	Palm Beach County, Fla.; 0.12
	Peach, 1.7	Yakima County, Wash., 3.0	Wayne County, N.Y.; 0.63
	Pear, 1.3	Mesa County, Colo.; 4.5	Berrien County, Mich.; 0.33
	Plum, 1.2	Yakima County, Wash., 3.0	Berrien County, Mich.; 0.39
	Cabbage, 7.9	Hidalgo County, Tex.; 12	Imperial County, Calif.; 4.6
	Carrot, 3.3	Imperial County, Calif., 4.4	Hidalgo County, Tex.; 2.5
	Cucumber, 1.1	San Joaquin County, Calif.; 2.0	Berrien County, Mich.; 0.61
	Dry bean, 1.5	Twin Falls County, Idaho; 4.7	Wayne County, N.Y.; 0.69
	Lettuce, 2.2	Hidalgo County, Tex.; 11	Cumberland County, N.J.; 0.27
	Potato, 1.4	Twin Falls County, Idaho, 3.5	Cumberland County, N.Y.; 0.38
	Snap bean, 0.64	Twin Falls County, Idaho; 3.4	Palm Beach County, Fla.; 0.28
	Sweet corn, 0.42	Twin Falls County, Idaho; 5.3	Palm Beach County, Fla.; 0.092
	Tomato, 0.71	Yakima County, Wash.; 2.9	Cumberland County, N.J.; 0.23
Co, ppm--------	American grape, 7.5	Yakima County, Wash.; 15	Wayne County, N.Y.; 4.5
	Apple, 5.0	Yakima County, Wash.; 16	Gloucester County, N.J.; <3
	Peach, 9.2	San Joaquin County, Calif.; 17	Wayne County, N.Y.; 5.3
	Pear, 8.2	San Joaquin County, Calif.; 17	Berrien County, Mich.; 5.1
	Plum, 7.4	Yakima County, Wash.; 16	Berrien County, Mich., and Mesa County, Colo.; 5.3
	Cucumber, 9.3	San Joaquin County, Calif.; 18	Berrien County, Mich.; 4.8
	Dry bean, 7.1	San Joaquin County, Calif.; 16	Wayne County, N.Y., and Mesa County, Colo.; 5.0
	Potato, 8.0	Yakima County, Wash.; 18	Wayne County, N.Y.; 4.3
	Snap bean, 4.3	Wayne County, N.Y.; 7.5	Palm Beach County, Fla.; <3
	Tomato, 5.2	Yakima County, Wash.; 17	Palm Beach County, Fla.; <3
Cr, ppm--------	American grape, 29	Yakima County, Wash.; 52	Wayne County, N.Y.; 19
	Apple, 33	Yakima County, Wash.; 57	Wayne County, N.Y.; 20
	Grapefruit, 16	Yuma County, Ariz., 70	Palm Beach County, Fla.; 2.5
	Orange, 16	Yuma County, Ariz.; 66	Palm Beach County, Fla., 1.8
	Peach, 59	San Joaquin County, Calif.; 140	Wayne County, N.Y.; 26
	Pear, 46	San Joaquin County, Calif., 110	Berrien County, Mich.; 24
	Carrot, 33	Imperial County, Calif.; 44	Hidalgo County, Tex.; 26
	Cucumber, 50	San Joaquin County, Calif.; 120	Berrien County, Mich.; 21
	Dry bean, 49	San Joaquin County, Calif.; 110	Wayne County, N.Y.; 22
	Lettuce, 14	Imperial County, Calif.; 48	Palm Beach County, Fla., 1.4
	Potato, 43	Yakima County, Wash.; 61	Wayne County, N.Y.; 17
	Snap bean, 18	Twin Falls County, Idaho; 57	Palm Beach County, Fla.; 2.4
	Sweet Corn, 24	Twin Falls County, Idaho; 71	Palm Beach County, Fla.; 4.5
	Tomato, 19	Yakima County, Wash.; 88	Palm Beach County, Fla.; 2.7
Cu, ppm--------	Apple, 24	Yakima County, Wash.; 36	Berrien County, Mich.; 18
	Grapefruit, 12	Yuma County, Ariz.; 19	Palm Beach County, Fla.; 8.2
	Peach, 36	San Joaquin County, Calif.; 100	Wayne County, N.Y.; 19
	Pear, 40	San Joaquin County, Calif.; 240	Wayne County, N.Y.; 13
	Cucumber, 46	San Joaquin County, Calif.; 130	Berrien County, Mich.; 17
	Dry bean, 29	San Joaquin County, Calif.; 61	Twin Falls County, Idaho; 16
	Lettuce, 24	Palm Beach County, Fla.; 50	Cumberland County, N.J.; 14
	Potato, 37	Cumberland County, N.J.; 140	Wayne County, N.Y.; 17
	Snap bean, 13	Berrien County, Mich.; 21	Palm Beach County, Fla.; 5.2
	Sweet corn, 7	Twin Falls County, Idaho; 24	Berrien County, Mich.; 13
F, ppm---------	European grape, 460	Yakima County, Wash., 550	San Joaquin County, Calif.; 370
	Peach, 510	Mesa County, Colo., 800	San Joaquin County, Calif.; 420
	Pear, 510	Yakima County, Wash.; 690	Berrien County, Mich.; <400
	Plum, 520	Mesa County, Colo., 780	Berrien County, Mich.; 330
	Dry bean, 500	Twin Falls County, Idaho; 800	San Joaquin County, Calif.; <400
	Potato, 490	Cumberland County, N.J.; 700	Yakima County, Wash.; 360
Fe, percent----	American grape, 2.2	Yakima County, Wash.; 4.5	Berrien County, Mich.; 1.3
	Apple, 1.8	Yakima County, Wash., 4.2	Berrien County, Mich.; 1.0
	European grape, 5.5	Yakima County, Wash.; 4.8	San Joaquin County, Calif.; 2.6
	Grapefruit, 0.67	Riverside County, Calif., 2.6	Palm Beach County Fla.; 0.024
	Orange, 0.44	Riverside County, Calif.; 2.1	Palm Beach County, Fla.; <0.03
	Peach, 3.0	San Joaquin County, Calif.; 4.4	Wayne County, N.Y.; 1.9
	Pear, 2.5	San Joaquin County, Calif.; 4.9	Berrien County, Mich.; 1.4
	Plum, 2.4	Yakima County, Wash., 4.8	Berrien County, Mich.; 1.2
	Cabbage, 2.4	Hidalgo County, Tex.; 2.7	Imperial County, Calif.; 2.3
	Carrot, 1.3	Imperial County, Calif.; 2.3	Hidalgo County, Tex.; <.03
	Cucumber, 2.7	San Joaquin County, Calif.; 5.1	Berrien County, Mich.; 1.5
	Dry bean, 2.3	San Joaquin County, Calif.; 4.0	Wayne County, N.Y.; 1.8
	Lettuce, 0.80	Hidalgo County, Texas; 2.5	Palm Beach County, Fla.; 0.076
	Potato, 2.1	Yakima County, Wash.; 4.8	Wayne County, N.Y.; 1.2
	Snap bean, 0.81	Twin Falls County, Idaho; 2.6	Palm Beach County, Fla.; <0.03
	Sweet corn, 0.43	Twin Falls County, Idaho; 2.3	Palm Beach County, Fla.; <0.03
	Tomato, 0.74	Yakima County, Wash.; 4.9	Palm Beach County, Fla.; <0.03

TABLE 117.—*Areas having significantly different concentrations of elements and pH at the 0.05 probability level in soils supporting fruits and vegetables*—Continued

Element, or pH	Kind of produce supported by soil and, mean concentration in soils, all areas	Area; mean concentrations	
		High	Low
Ga, ppm--------	American grape, 12	Yakima County, Wash.; 19	Berrien County, Mich.; 7.5
	Apple, 9.8	Yakima County, Wash.; 19	Gloucester County, N.J.; <5
	Grapefruit, 9.3	Riverside County, Calif.; 20	Palm Beach County, Fla.; <5
	Orange, 8.8	Riverside County, Calif.; 19	Palm Beach County, Fla.; <5
	Peach, 16	Yakima County, Wash.; 19	Wayne County, N.Y.; 1.4
	Pear, 14	San Joaquin County, Calif.; 20	Berrien County, Mich.; 8.8
	Plum, 14	Yakima County, Wash.; 20	Berrien County, Mich.; 8.2
	Cucumber, 12	San Joaquin County, Calif.; 19	Berrien County, Mich.; 7.0
	Dry bean, 14	San Joaquin County, Calif.; 19	Wayne County, N.Y.; 8.8
	Lettuce, 7.7	Imperial County, Calif.; 17	Palm Beach County, Fla.; <5
	Potato, 12	Yakima County, Wash.; 17	Wayne County, N.Y.; 7.9
	Snap bean, 7.4	Twin Falls County, Idaho; 15	Palm Beach County, Fla.; <5
	Tomato, 8.1	Yakima County, Wash.; 20	Palm Beach County, Fla.; <5
Ge, ppm--------	American grape, 1.3	Yakima County, Wash.; 1.5	Berrien County, Mich.; 1.1
	Grapefruit, 1.1	Riverside County, Calif., and Yuma County, Ariz.; 1.3	Palm Beach County, Fla.; 0.82
	Cabbage, 1.2	Imperial County, Calif.; 1.4	Hidalgo County, Texas; 1.0
	Lettuce, 0.62	Imperial County, Calif.; 1.3	Palm Beach County, Fla.; <0.1
	Sweet corn, 1.0	Twin Falls County, Idaho; 1.2	Palm Beach County, Fla.; 0.76
	Tomato, 1.1	Yakima County, Wash.; 1.4	Palm Beach County, Fla.; 0.81
Hg, ppm--------	American grape, 0.042	Wayne County, N.Y.; 0.057	Yakima County, Wash.; 0.028
	Apple, 0.090	Berrien County, Mich.; 0.23	Mesa County, Colo.; 0.041
	Orange, 0.024	Riverside County, Calif.; 0.032	Palm Beach County, Fla.; 0.015
	Peach, 0.043	Wayne County, N.Y.; 0.059	San Joaquin County, Calif.; 0.035
	Plum, 0.055	Berrien County, Mich.; 0.061	Yakima County, Wash.; 0.025
	Dry bean, 0.036	Wayne County, N.Y.; 0.047	San Joaquin County, Calif.; 0.026
	Lettuce, 0.060	Palm Beach County, Fla.; 0.14	Imperial County, Calif.; 0.041
	Potato, 0.061	Twin Falls County, Idaho; 1.7	Yakima County, Wash.; 0.032
	Tomato, 0.037	Berrien County, Mich.; 0.061	Palm Beach County, Fla.; 0.020
K, percent-----	Apple, 1.3	Mesa County, Colo.; 1.9	Gloucester County, N.J.; 0.60
	European grape, 1.8	San Joaquin County, Calif.; 2.0	Yakima County, Wash.; 1.6
	Grapefruit, 0.99	Yuma County, Ariz.; 2.5	Palm Beach County, Fla.; 0.087
	Orange, 0.80	Hidalgo County, Tex.; 1.7	Riverside County, Calif.; 0.032
	Peach, 1.6	Mesa County, Colo.; 2.0	Yakima County, Wash.; 1.3
	Pear, 1.7	Mesa County, Colo.; 1.9	Wayne County, N.Y.; 1.5
	Plum, 1.7	Mesa County, Colo.; 1.9	Wayne County, N.Y.; 1.5
	Cabbage, 1.8	Imperial County, Calif.; 1.9	Hidalgo County, Tex.; 1.7
	Lettuce, 0.83	Hidalgo County, Tex.; 1.8	Palm Beach County, Fla.; 0.27
	Snap bean, 0.91	Twin Falls County, Idaho; 1.8	Palm Beach County, Fla.; 0.20
	Sweet corn, 0.58	Twin Falls County, Idaho; 1.7	Palm Beach County, Fla., 0.077
	Tomato, 0.77	San Joaquin County, Calif.; 2.1	Palm Beach County, Fla.; 0.099
Li, ppm--------	Apple, 17	Mesa County, Colo.; 35	Gloucester County, N.J.; 8.9
	European grape, 16	Yakima County, Wash.; 22	San Joaquin County, Calif.; 12
	Grapefruit, 16	Riverside County, Calif.; 28	Palm Beach County, Fla.; 0.54
	Orange, 13	Riverside County, Calif. and Yuma County, Ariz.; 19	Palm Beach County, Fla.; 6.3
	Peach, 25	Mesa County, Colo.; 38	Wayne County, N.Y.; 21
	Pear, 24	Wayne County, N.Y.; 29	Berrien County, Mich.; 17
	Plum, 24	Mesa County, Colo.; 36	Berrien County, Mich.; 14
	Cabbage, 32	Imperial County, Calif.; 34	Hidalgo County, Tex.; 29
	Carrot, 27	Imperial County, Calif.; 36	Hidalgo County, Tex.; 20
	Cucumber, 20	San Joaquin County, Calif.; 29	Berrien County, Mich.; 13
	Dry bean, 24	Mesa County, Colo.; 26	Wayne County, N.Y.; 21
	Lettuce, 15	Imperial County, Calif.; 40	Palm Beach County, Fla.; <5
	Snap bean, 14	Wayne County, N.Y.; 32	Palm Beach County, Fla.; <5
	Sweet corn, 10	Twin Falls County, Idaho; 26	Palm Beach County, Fla.; <5
	Tomato, 11	Yakima County, Wash.; 22	Palm Beach County, Fla.; <5
Mg, percent----	American grape, 0.49	Yakima County, Wash.; 1.4	Berrien County, Mich.; 0.22
	Apple, 0.42	Mesa County, Colo.; 1.3	Gloucester County, N.J.; 0.13
	European grape, 0.89	Yakima County, Wash.; 1.3	San Joaquin County, Calif.; 0.60
	Grapefruit, 0.34	Riverside County, Calif.; 1.1	Palm Beach County, Fla.; 0.058
	Orange, 0.26	Riverside County, Calif.; 0.80	Palm Beach County, Fla.; <0.06
	Peach, 0.90	Yakima County, Wash.; 1.3	Wayne County, N.Y.; 0.39
	Pear, 0.72	San Joaquin County, Calif.; 1.4	Berrien County, Mich.; 0.25
	Plum, 0.66	Yakima County, Wash.; 1.3	Berrien County, Mich.; 0.22
	Cabbage, 1.0	Imperial County, Calif.; 1.4	Hidalgo County, Tex.; 0.76
	Carrot, 0.98	Imperial County, Calif.; 1.4	Hidalgo County, Tex.; 0.64
	Cucumber, 0.56	San Joaquin County, Calif.;1.4	Berrien County, Mich., 0.22
	Dry bean, 0.78	Twin Falls County , Idaho, 1.3	Wayne County, N.Y.; 0.30
	Lettuce, 0.43	Imperial County, Calif.; 1.2	Cumberland County, N.J.; 0.17
	Potato, 0.57	Yakima County, Wash.; 1.2	Wayne County, N.Y.; 0.24
	Snap bean, 0.24	Twin Falls County, Idaho; 1.1	Plam Beach County, Fla.; <0.06
	Sweet corn, 0.17	Twin Falls County, Idaho; 1.3	Palm Beach County, Fla.; <0.06
	Tomato, 0.24	Yakima County, Wash.; 1.2	Palm Beach County, Fla.; <0.06

TABLE 117.—***Areas having significantly different concentrations of elements and pH at the 0.05 probability level in soils supporting fruits and vegetables*****—Continued**

Element, or pH	Kind of produce supported by soil and, mean concentration in soils, all areas	Area; mean concentrations	
		High	Low
Mn, ppm--------	American grape, 470	Berrien County, Mich..; 700	Wayne County, N.Y.; 260
	Apple, 290	Yakima County, Wash.; 670	Gloucester County, N.J.; 130
	Grapefruit, 150	Riverside County, Calif.; 480	Palm Beach County, Fla.; 13
	Orange, 140	Riverside County, Calif., and Yuma County, Ariz.; 330	Palm Beach County, Fla.; 19
	Peach, 330	San Joaquin County, Calif.; 550	Mesa County, Colo.; 150
	Plum, 390	Berrien County, Mich.; 690	Mesa County, Colo.; 160
	Carrot, 290	Imperial County, Calif.; 370	Hidalgo County, Tex.; 240
	Dry bean, 320	San Joaquin County, Calif.; 610	Mesa County, Colo.; 180
	Potato, 250	Yakima County, Wash.; 700	Wayne County, N.Y.; 145
	Snap bean, 210	Berrien County, Mich.; 1,500	Palm Beach County, Fla.; 22
	Sweet corn, 180	Berrien County, Mich.; 520	Palm Beach County, Fla.; 34
	Tomato, 280	Yakima County, Wash.; 700	Palm Beach County, Fla.; 57
Na, percent----	American grape, 1.0	Yakima County, Wash.; 1.7	Berrien County, Mich.; 0.62
	Apple, 0.57	Yakima County, Wash.; 2.0	Gloucester County, N.J.; 0.086
	European grape, 2.1	San Joaquin County, Calif.; 2.3	Yakima County, Wash.; 1.8
	Grapefruit, 0.48	Riverside County, Calif.; 2.6	Palm Beach County, Fla.; <0.07
	Orange, 0.49	Riverside County, Calif.; 2.6	Palm Beach County, Fla.; <0.07
	Peach, 1.0	Yakima County, Wash.; 1.9	Mesa County, Colo.; 0.66
	Pear, 0.96	Yakima County, Wash.; 1.7	Berrien County, Mich.; 0.65
	Plum, 0.96	Yakima County, Wash.; 1.7	Berrien County, Mich.; 0.61
	Cabbage, 0.63	Hidalgo County, Tex.; 0.67	Imperial County, Calif.; 0.60
	Cucumber, 0.78	San Joaquin County, Calif.; 1.0	Berrien County, Mich.; 0.61
	Dry bean, 0.89	San Joaquin County, Calif.; 1.0	Mesa County, Colo.; 0.77
	Lettuce, 0.25	Hidalgo County, Tex.; 0.82	Palm Beach County, Fla.; <0.07
	Potato, 0.82	Yakima County, Wash.; 2.0	Cumberland County, N.J.; 0.45
	Snap bean, 0.32	Twin Falls County, Idaho; 1.0	Palm Beach County, Fla.; <0.07
	Tomato, 0.47	San Joaquin County, Calif.; 2.7	Palm Beach County, Fla,; <0.07
Nb, ppm--------	Potato, 9.7	Cumberland County, N.J.; 13	Wayne County, N.Y.; <10
Ni, ppm--------	American grape, 12	Yakima County, Wash.; 20	Wayne County N.Y.; 8.1
	Apple, 8.1	Yakima County, Wash.; 22	Gloucester County, N.J.; 1.3
	European grape, 13	Yakima County, Wash.; 19	San Joaquin County, Calif.; 8.7
	Grapefruit, 5.4	Yuma County, Ariz.; 19	Palm Beach County, Fla.; <2
	Orange, 5.9	Yuma County, Ariz.; 21	Palm Beach County, Fla.; <2
	Peach, 20	San Joaquin County, Calif.; 45	Wayne County, N.Y.; 9.4
	Pear, 18	San Joaquin County, Calif.; 65	Berrien County, Mich.; 10
	Cabbage, 13	Imperial County, Calif.; 16	Hidalgo County, Tex.; 11
	Carrot, 13	Imperial County, Calif.; 18	Hidalgo County, Tex.; 10
	Cucumber, 22	San Joaquin County, Calif.; 61	Berrien County, Mich.; 8.2
	Dry bean, 16	San Joaquin County, Calif.; 57	Wayne County, N.Y.; 5.3
	Lettuce, 6.1	Imperial County, Calif.; 17	Palm Beach County, Fla.; <2
	Potato, 15	Yakima County, Wash.; 30	Wayne County, N.Y.; 6.1
	Snap bean, 6.4	Twin Falls County, Idaho; 17	Palm Beach County, Fla.; <2
	Tomato, 6.6	Yakima County, Wash.; 30	Palm Beach County, Fla.; <2
Pb, ppm--------	Grapefruit, 12	Yuma County, Ariz.; 18	Palm Beach County, Fla.; <10
	Orange, 12	Riverside County, Calif., and Yuma County, Ariz.; 17	Palm Beach County, Fla.; <10
	Peach, 33	Wayne County, N.Y.; 90	Yakima County, Wash.; 11
	Pear, 42	Yakima County, Wash.; 160	Berrien County, Mich.; 20
	Plum, 50	Mesa County, Colo.; 190	Yakima County, Wash.; 19
	Dry bean, 14	Mesa County, Colo.; 18	Wayne County, N.Y.; 10
	Lettuce, 13	Imperial County, Calif.; 22	Palm Beach County, Fla.; <10
	Potato, 15	Cumberland County, N.J.; 20	Yakima County, Wash.; 12
	Snap bean, 13	Twin Falls County, Idaho; 17	Palm Beach County, Fla.; <10
	Sweet corn, 13	Berrien County Mich.; 22	Palm Beach County, Fla.; <10
	Tomato, 12	Berrien County, Mich.; 19	Palm Beach County, Fla.; <10
Rb, ppm--------	Apple, 49	Mesa County, Colo.; 96	Gloucester County, N.J.; 26
	European grape, 66	San Joaquin County, Calif.; 72	Yakima County, Wash.; 61
	Grapefruit, 54	Riverside County, Calif.; 110	Palm Beach County, Fla.; <20
	Orange, 49	Riverside County, Calif.; 100	Palm Beach County, Fla.; <20
	Peach, 66	Mesa County, Colo.; 97	Wayne County, N.Y.; 49
	Pear, 69	San Joaquin County, Calif.; 93	Wayne County, N.Y.; 55
	Plum, 69	Mesa County, Colo.; 95	Yakima County, Wash.; 62
	Cucumber, 62	San Joaquin County, Calif.; 75	Berrien County, Mich.; 52
	Dry bean, 69	San Joaquin County, Calif.; 84	Wayne County, N.Y.; 44
	Lettuce, 43	Imperial County, Calif.; 93	Palm Beach County, Fla.; <20
	Potato, 54	Twin Falls County, Idaho; 72	Wayne County, N.Y., 33
	Snap bean, 41	Wayne County, N.Y.; 77	Palm Beach County, Fla.; <20
	Sweet corn, 33	Twin Falls County, Idaho; 71	Palm Beach County, Fla.; <20
	Tomato, 40	San Joaquin County, Calif.; 75	Palm Beach County, Fla.; <20

TABLE 117.—*Areas having significantly different concentrations of elements and pH at the 0.05 probability level in soils supporting fruits and vegetables*—Continued

Element, or pH	Kind of produce supported by soil and, mean concentration in soils, all areas	Area; mean concentrations	
		High	Low
Sc, ppm--------	American grape, 6.8	Yakima County, Wash.; 19	Berrien County, Mich.; 3.8
	Apple, 4.6	Yakima County, Wash.; 17	Gloucester County, N.J.; <3
	European grape , 12	Yakima County, Wash.; 17	San Joaquin County, Calif.; 8.7
	Peach, 9.9	San Joaquin County, Calif.; 17	Wayne County, N.Y.; 5.3
	Pear, 8.5	San Joaquin County, Calif.; 19	Berrien County, Mich.; 4.0
	Plum, 7.6	Yakima County, Wash.; 17	Berrien County, Mich.; 4.5
	Cucumber, 7.7	San Joaquin County, Calif.; 30	Berrien County, Mich.; 2.3
	Dry bean, 7.3	San Joaquin County Calif.; 19	Wayne County, N.Y.; 3.8
	Lettuce, 4.1	Imperial County, Calif.; 8.7	Palm Beach County, Fla.; <3
	Potato, 7.1	Yakima County, Wash.; 20	Wayne County, N.Y.; 3.4
	Snap bean, 4.5	Twin Falls County, Idaho; 8.1	Palm Beach County, Fla.; <3
	Tomato, 4.0	Yakima County, Wash.; 20	Palm Beach County, Fla.; <3
Si, percent----	American grape, 32	Berrien County, Mich.; 36	Yakima County, Wash.; 27
	Apple, 33	Gloucester County, N.J.; 39	Yakima County, Wash.; 27
	European grape, 29	San Joaquin County, Calif.; 30	Yakima County, Wash.; 28
	Grapefruit, 33	Palm Beach County, Fla.; 39	Riverside County, Calif.; 28
	Orange, 35	Palm Beach County, Fla.; 45	Riverside County, Calif.; 30
	Peach, 29	Wayne County, N.Y.; 33	Yakima County, Wash.; 27
	Pear, 30	Berrien County, Mich.; 36	San Joaquin County, Calif.; 25
	Plum, 30	Berrien County, Mich.; 36	Yakima County, Wash.; 26
	Cabbage, 24	Imperial County, Calif.; 27	Hidalgo County, Texas; 20
	Carrot, 31	Hidalgo County Texas; 33	Imperial County, Calif.; 29
	Cucumber, 30	Berrien County, Mich.; 34	San Joaquin County, Calif.; 26
	Lettuce, 11	Cumberland County, N.J.; 37	Palm Beach County, Fla.; 0.55
	Snap bean, 34	Berrien County, Mich., and Palm Beach County, Fla.; 38	Twin Falls County, Idaho; 30
	Sweet corn, 35	Salem County, N.J.; 39	Twin Falls County, Idaho; 27
	Tomato, 34	Palm Beach County, Fla.; 39	Yakima County, Wash.; 27
Sn, ppm--------	Apple, 0.70	Gloucester County, N.J.; 2.0	Berrien County, Mich., 0.28
	European grape, 1.2	Yakima County, Wash.; 1.2	San Joaquin County, Calif.; 1.1
	Grapefruit, 0.51	Riverside County, Calif.; 1.6	Palm Beach County, Fla.; 0.078
	Orange, 0.34	Riverside County, Calif.; 0.69	Palm Beach County, Fla.; 0.080
	Plum, 0.80	Wayne County, N.Y.; 1.9	Berrien County, Mich.; 0.14
	Snap bean, 0.58	Berrien County, Mich.; 3.6	Palm Beach County, Fla.; <0.1
	Sweet corn, 0.47	Salem County, N.J.; 0.79	Palm Beach County, Fla.; 0.17
	Tomato, 0.37	Cumberland County, N.Y.; 1.1	Palm Beach County, Fla.; <0.1
Sr, ppm--------	American grape, 160	Yakima County, Wash., 300	Berrien County, Mich.; 94
	Apple, 104	Yakima County, Wash.; 500	Gloucester County, N.J.; 13
	European grape, 440	San Joaquin County, Calif.; 530	Yakima County, Wash.; 370
	Grapefruit, 140	Yuma County, Ariz.; 700	Palm Beach County, Fla.; 6.1
	Orange, 85	Riverside County, Calif.; and Yuma County, Ariz., 610	Palm Beach County, Fla.; <5
	Peach, 210	Yakima County, Wash.; 450	Mesa County, Colo.; 140
	Pear, 190	Yakima County, Wash.; 450	Berrien County, Mich.; 75
	Plum, 180	Yakima County, Wash.; 450	Berrien County, Mich.; 94
	Cabbage, 380	Hidalgo County, Tex.; 530	Imperial County, Calif.; 280
	Carrot, 200	Imperial County, Calif.; 280	Hidalgo County, Tex.; 150
	Cucumber, 130	San Joaquin County, Calif.; 240	Berrien County, Mich.; 75
	Dry bean, 200	Mesa County, Colo.; 310	Wayne County, N.Y., 100
	Lettuce, 120	Hidalgo County, Tex.; 500	Cumberland County, N.J.; 23
	Potato, 170	Yakima County, Wash.; 370	Cumberland County, N.J.; 87
	Snap bean, 36	Twin Falls County, Idaho; 240	Palm Beach County, Fla.; <5
	Sweet corn, 23	Twin Falls County, Idaho; 220	Palm Beach County, Fla.; <5
	Tomato, 63	San Joaquin County, Calif.; 810	Palm Beach County, Fla.; <5
Th, ppm--------	American grape, 6.6	Yakima County, Wash.; 9.3	Wayne County, N.Y.; 5.1
	Apple, 6.8	Mesa County, Colo.; 9.8	Berrien County, Mich.; 4.7
	Grapefruit, 9.6	Riverside County, Calif.; 15	Hidalgo County, Tex.; 6.3
	Orange, 8.9	Riverside County, Calif.; 15	Palm Beach County, Fla.; 3.0
	Peach, 8.6	Mesa County, Colo.; 13	Wayne County, N.Y.; 5.6
	Pear, 9.1	Mesa County, Colo.; 13	Berrien County, Mich.; 7.1
	Plum, 8.3	Mesa County, Colo.; 12	Berrien County, Mich.; 4.8
	Cucumber, 7.0	San Joaquin County, Calif., 9.4	Berrien County, Mich.; 4.3
	Dry bean, 8.4	Twin Falls County, Idaho; 12	Wayne County, N.Y.; 5.2
	Lettuce, 9.6	Imprial County, Calif.; 12	Cumberland County, N.J.; 7.3
	Potato, 8.7	Cumberland County, N.J.; 13	Wayne County, N.Y.; 4.7
	Snap bean, 8.3	Twin Falls County, Idaho; 12	Berrien County, Mich.; 4.0
	Sweet corn, 6.4	Twin Falls County, Idaho; 11	Salem County, N.J.; 4.8
	Tomato, 7.8	San Joaquin County, Calif.; 15	Berrien County, Mich.; 4.2
Ti, percent----	American grape, 0.40	Yakima County, Wash.; 0.69	Berrien County, Mich.; 0.26
	Apple, 0.38	Yakima County, Wash.; 0.59	Berrien County, Mich.; 0.23
	European grape, 0.49	Yakima County, Wash.; 0.75	San Joaquin County, Calif.; 0.32
	Grapefruit, 0.22	Riverside County, Calif.; 0.40	Palm Beach County, Fla.; 0.066
	Orange, 0.20	Riverside County, Calif.; 0.34	Palm Beach County, Fla.; 0.072
	Peach, 0.46	Yakima County, Wash.; 0.63	Mesa County, Colo.; 0.31
	Pear, 0.31	San Joaquin County, Calif.; 0.54	Berrien County, Mich.; 0.28
	Plum, 0.43	Yakima County, Wash.; 0.74	Berrien County, Mich.; 0.28
	Cucumber, 0.39	San Joaquin County, Calif.; 0.56	Berrien County, Mich.; 0.27
	Lettuce, 0.17	Cumberland County, N.J.; 0.48	Palm Beach County, Fla.; <0.03
	Potato, 0.43	Yakima County, Wash.; 0.68	Wayne County, N.Y.; 0.26
	Snap bean, 0.28	Wayne County, N.Y.; 0.48	Palm Beach County, Fla.; 0.081
	Sweet corn, 0.20	Salem County, N.J.; 0.47	Palm Beach County, Fla.; 0.054
	Tomato, 0.26	Yakima County, Wash.; 0.64	Palm Beach County, Fla.; 0.053

TABLE 117.—*Areas having significantly different concentrations of elements and pH at the 0.05 probability level in soils supporting fruits and vegetables*—Continued

Element or pH	Kind of produce supported by soil and, mean concentration in soils, all areas	Area; mean concentrations	
		High	Low
U, ppm	Apple, 2.2	Mesa County, Colo.; 3.9	Berrien County, Mich., and Wayne County, N.Y.; 1.7
	European grape, 2.4	San Joaquin County, Calif.; 2.9	Yakima County, Wash.; 2.0
	Grapefruit, 1.7	Riverside County, Calif., and Yuma County, Ariz.; 2.6	Palm Beach County, Fla.; 0.62
	Orange, 1.6	Yuma County, Ariz.; 2.4	Palm Beach County, Fla.; 0.68
	Peach, 2.5	Mesa County, Colo.; 3.7	Wayne County, N.Y.; 2.0
	Pear, 2.4	Mesa County, Colo.; 3.4	Berrien County, Mich.; 1.8
	Plum, 2.5	Mesa County, Colo.; 3.8	Berrien County, Mich.; 1.7
	Carrot, 2.6	Imperial County, Calif.; 3.1	Hidalgo County, Tex.; 2.2
	Cucumber, 2.2	San Joaquin County, Calif.; 2.7	Berrien County, Mich., 1.7
	Dry bean, 2.8	Mesa County, Colo.; 3.6	San Joaquin County, Calif.; 2.7
	Lettuce, 2.2	Imperial County, Calif.; 3.3	Palm Beach County, Fla.; 1.1
	Potato, 2.8	Cumberland County, N.J.; 4.6	Yakima County, Wash.; 1.9
	Snap bean, 1.8	Twin Falls County, Idaho; 3.0	Palm Beach County, Fla.; 0.52
	Sweet corn, 1.5	Twin Falls County, Idaho; 2.9	Palm Beach County, Fla.; 0.56
	Tomato, 1.6	San Joaquin County, Calif.; 3.0	Palm Beach County, Fla.; 0.58
V, ppm	American grape, 59	Yakima County, Wash.; 150	Berrien County, Mich.; 34
	Apple, 49	Yakima County, Wash.; 150	Berrien County, Mich.; 25
	European grape, 120	Yakima County, Wash.; 160	San Joaquin County, Calif.; 94
	Grapefruit, 29	Yuma County, Ariz.; 93	Palm Beach County, Fla.; <7
	Orange, 23	Yuma County, Ariz.; 93	Palm Beach County, Fla.; <7
	Peach, 100	San Joaquin County, Calif.; 160	Wayne County, N.Y.; 45
	Pear, 78	San Joaquin County, Calif.; 170	Berrien County, Mich.; 40
	Plum, 75	Yakima County, Wash., 170	Berrien County, Mich.; 34
	Carrot, 59	Imperial County, Calif.; 87	Hidalgo County, Texas; 41
	Cucumber, 74	San Joaquin County, Calif.; 180	Berrien County, Mich., 31
	Dry bean, 83	San Joaquin County, Calif.; 160	Wayne County, N.Y.; 33
	Lettuce, 25	Imperial County, Calif.; 87	Palm Beach County, Fla.; <7
	Potato, 63	Yakima County, Wash.; 180	Wayne County N.Y.; 22
	Snap bean, 25	Twin Falls County, Idaho; 81	Palm Beach County, Fla.; <7
	Sweet corn, 20	Twin Falls County, Idaho; 87	Palm Beach County, Fla.; <7
	Tomato, 30	Yakima County, Wash.; 160	Palm Beach County, Fla.; <7
Y, ppm	American grape, 16	Yakima County, Wash.; 22	Berrien County, Mich.; 12
	Apple, 13	Yakima County, Wash., and Mesa County, Colo.; 17	Berrien County, Mich.; 9.5
	European grape, 17	Yakima County, Wash.; 20	San Joaquin County, Calif.; 15
	Grapefruit, 13	Riverside County, Calif.; 28	Palm Beach County, Fla.; <10
	Orange, 12	Riverside County, Calif.; 17	Palm Beach County, Fla.; <10
	Pear, 17	Yakima County, Wash., and San Joaquin County, Calif.; 20	Berrien County, Mich.; 12
	Carrot, 16	Imperial County, Calif.; 19	Hidalgo County, Tex.; 14
	Cucumber, 15	San Joaquin County, Calif.; 20	Berrien County, Mich.; 11
	Lettuce, 14	Imperial County, Calif.; 19	Palm Beach County, Fla.; <10
	Potato, 22	Cumberland County, N.J., 44	Wayne County, N.Y.; 12
	Snap bean, 15	Twin Falls County, Idaho; 22	Palm Beach County, Fla.; <10
	Tomato, 13	Cumberland County, N.J., 28	Palm Beach County, Fla.; <10
Yb, ppm	American grape, 1.8	Yakima County, Wash.; 2.8	Berrien County, Mich.; 1.4
	Grapefruit, 1.5	Riverside County, Calif., 2.8	Palm Beach County, Fla., <1
	Orange, 1.3	Riverside County, Calif., and Yuma County, Ariz.; 1.7	Palm Beach County, Fla.; <1
	Cucumber, 1.7	San Joaquin County, Calif.; 2.4	Berrien County, Mich., 1.2
	Lettuce, 1.3	Imperial County, Calif.; 1.9	Palm Beach County, Fla.; <1
	Potato, 2.4	Cumberland County, N.J.; 4.5	Wayne County, N.Y.; 1.3
	Snap bean, 1.6	Twin Falls County, Idaho; 2.4	Palm Beach County, Fla.; <1
	Sweet corn 1.2	Twin Falls County, Idaho; 2.3	Palm Beach County, Fla.; <1
	Tomato, 1.3	Cumberland County, N.J.; 3.3	Palm Beach County, Fla.; <1
Zn, ppm	American grape, 76	Yakima County, Wash.; 140	Berrien County, Mich.; 56
	Apple, 81	Yakima County, Wash., and Mesa County, Colo.; 130	Gloucester County, N.J.; 55
	European grape, 72	Yakima County, Wash.; 96	San Joaquin County, Calif.; 54
	Grapefruit, 34	Riverside County, Calif.; 76	Palm Beach County, Fla.; 12
	Orange, 49	Riverside County, Calif.; 59	Palm Beach County, Fla.; 8.2
	Peach, 88	Mesa County, Colo.; 130	Wayne County, N.Y.; 63
	Pear, 88	Yakima County, Wash.; 160	Berrien County, Mich.; 53
	Plum, 100	Mesa County, Colo.; 130	Berrien County, Mich.; 57
	Cabbage, 78	Hidalgo County, Tex.; 83	Imperial County, Calif.; 73
	Carrot, 59	Imperial County, Calif.; 67	Hidalgo County, Tex.; 52
	Cucumber, 72	San Joaquin County, Calif.; 100	Berrien County, Mich.; 50
	Dry bean, 74	San Joaquin County, Calif.; 110	Wayne County, N.Y.; 44
	Lettuce, 67	Palm Beach County, Fla.; 83	Cumberland County, N.Y.; 38
	Potato, 61	Yakima County, Wash.; 93	Wayne County, N.Y.; 46
	Snap bean, 40	Twin Falls County, Idaho; 80	Cumberland County, N.J.; 35
	Sweet corn, 36	Twin Falls County, Idaho; 68	Palm Beach County, Fla.; 20
	Tomato, 42	Yakima County, Wash.; 96	Palm Beach County, Fla.; 21

TABLE 117.—*Areas having significantly different concentrations of elements and pH at the 0.05 probability level in soils supporting fruits and vegetables*—Continued

Element or pH	Kind of produce supported by soil and, mean concentration in soils, all areas	Area; mean concentrations	
		High	Low
Zr, ppm--------	Apple, 190	Gloucester County, N.J.; 420	Yakima County, Wash., and Mesa County, Colo.; 140
	Pear, 140	Wayne County, N.Y.; 210	San Joaquin County, Calif.; 95
	Cabbage, 110	Imperial County, Calif.; 140	Hidalgo County, Tex.; 81
	Lettuce, 53	Cumberland County, N.J.; 200	Palm Beach County, Fla.; <10
	Sweet corn, 170	Salem County, N.J.; 360	Palm Beach County, Fla.; 78
	Tomato, 150	Cumberland County, N.J.; 330	San Joaquin County, Calif.; 100
pH, standard units----------	American grape, 6.4	Yakima County, Wash.; 7.4	Berrien County, Mich., and Wayne County, N.Y.; 5.9
	Apple, 6.4	Mesa County, Colo.; 7.8	Wayne County, N.Y.; 5.5
	European grape, 7.2	Yakima County, Wash.; 7.9	San Joaquin County, Calif.; 6.4
	Orange, 7.8	Yuma County, Ariz.; 8.8	Hidalgo County, Tex.; 6.6
	Peach, 6.4	Mesa County, Colo.; 7.7	Wayne County N.Y.; 5.5
	Pear, 6.7	Mesa County, Colo.; 8.0	Berrien County, Mich.; 5.4
	Plum, 6.7	Mesa County, Colo.; 7.6	Berrien County, Mich.; 5.9
	Cucumber, 6.9	San Joaquin County, Calif.; 7.5	Berrien County, Mich.; 6.3
	Lettuce, 6.9	Hidalgo County, Tex., and Imperial County, Calif.; 8.1	Palm Beach County, Fla.; 4.9
	Potato, 6.7	Twin Falls County, Idaho; 8.2	Wayne County, N.Y.; 4.8
	Snap bean, 6.7	Twin Falls County, Idaho; 8.0	Palm Beach County, Fla., 5.8
	Tomato, 7.3	San Joaquin County, Calif.; 8.5	Berrien County, Mich.; 6.5

TABLE 118.—*Mean concentrations and high-to-low ratios of elements and water in fruits*

[Means are geometric means. Concentrations are parts per million in ash, except as indicated. Leaders (--) in figure columns indicate that mean and ratio cannot be calculated because of excessively censored data. Highest values underscored lowest values marked with asterisk (*)]

Element, or water	Kind of fruit								High-to-low ratio
	American grape	Apple	European grape	Grapefruit	Orange	Peach	Pear	Plum	
Al------	370	400	520	380	430	430	340	*210	2.5
As[1]-----	.022	.13	--	.034	*.011	.026	.0068	.016	>11.8
B-------	260	455	370	*170	260	380	440	370	2.7
Ba------	89	77	62	77	86	*18	150	32	8.3
Ca[2]-----	2.6	1.1	1.6	5.9	7.8	*.29	1.8	.57	26.9
Cd------	.23	.19	.16	.16	.14	.19	.27	*.12	>2.3
Co------	.24	.46	--	.18	.52	.30	.90	*.050	>18.0
Cr------	*.42	.70	.73	.47	.80	1.3	.69	.66	3.1
Cu------	73	63	62	*50	52	56	110	51	2.2
Fe------	430	350	490	310	430	300	290	*200	2.5
Hg[1]-----	.0040	*.0022	.0031	--	.0026	.0034	.0038	.0035	>1.8
K[2]------	22	35	20	36	37	19	23	*16	2.3
Li------	--	--	--	3.7	5.3	--	*1.1	--	>4.8
Mg[2]-----	1.5	1.5	1.3	1.9	2.1	*1.1	1.5	*1.1	1.9
Mn------	150	74	62	*34	43	42	83	53	4.4
Mo------	*.099	3.9	4.2	3.1	3.1	--	1.9	3.7	>42.4
Na[2]-----	.039	.060	.077	.16	.16	.016	.056	*.012	13.3
Ni------	--	--	--	17	*1.0	7.3	5.7	4.9	>17.0
P[2]------	1.6	2.2	2.3	3.0	2.7	1.5	1.6	*1.1	2.7
Pb------	--	*2.7	6.9	--	--	12	9.8	8.4	>4.4
S[1,2]----	.062	*.026	.038	.066	.067	.043	.029	.032	2.6
Se[1]-----	.012	.0026	*.0023	.010	.0077	.0046	.0058	.0057	5.2
Sr------	160	97	240	650	710	*46	180	89	15.4
Ti------	7.4	10	17	5.4	4.2	7.3	4.6	*2.6	6.5
Zn------	110	67	*66	130	140	91	150	120	2.3
Zr------	--	--	6.9	--	--	*4.2	7.1	--	>1.7
Water[3]--	84	86	*79	90	87	90	85	86	1.1

[1]Concentrations in dry material.
[2]Concentrations given in percent.
[3]Percent of fresh weight.

TABLE 119.—*Mean concentrations and high-to-low ratios of elements and water in vegetables*

[Means are geometric means. Concentrations are parts per million in ash, except as indicated. Leaders (--) in figure columns indicate that mean and ratio cannot be calculated because of excessively censored data. Highest values underscored lowest values marked with asterisk (*)]

Element, or water	Kind of vegetable									High-to-low ratio
	Cabbage	Carrot	Cucumber	Dry Bean	Lettuce	Potato	Snap bean	Sweet corn	Tomato	
Al------	95	110	580	*82	520	310	950	100	170	11.6
As[1]-----	.015	.040	.28	--	.038	.031	*.0067	.10	.0089	>6.0
B-------	140	140	110	150	93	*58	180	*58	84	3.1
Ba------	52	120	130	55	67	32	100	*1.3	17	100.
Ca[2]-----	6.6	3.6	3.5	2.7	4.2	.70	7.8	*.22	1.2	30.0
Cd------	1.0	2.1	.94	*.26	3.0	1.8	.34	1.0	1.0	11.5
Co------	1.1	.52	.88	4.8	.33	.86	.77	*.31	.52	15.5
Cr------	--	--	.43	3.9	*.33	.49	2.3	5.7	.62	>17.3
Cu------	*31	65	84	120	58	88	73	54	73	3.9
Fe------	450	*220	680	1,200	960	490	1,200	670	480	5.5
Hg[1]-----	.0065	.0057	.0047	*.0026	.0083	--	.0030	.0046	.0031	>3.2
K[2]------	36	39	39	39	36	42	35	39	*34	1.2
Li------	4.9	2.3	--	*.52	2.0	--	*.52	--	--	>9.4
Mg[2]-----	2.0	*1.3	2.9	3.3	1.7	2.0	4.0	3.8	1.7	3.1
Mn------	150	120	130	190	210	*86	300	140	100	3.5
Mo------	9.1	--	8.3	84	*.53	5.9	30	6.9	6.8	>159.
Na[2]-----	2.9	.48	.20	*.0085	1.1	.083	.036	.018	.34	341.
Ni------	6.7	*3.6	13	45	7.2	7.0	24	8.5	*3.6	12.5
P[2]------	3.2	*2.3	4.3	9.5	3.0	4.1	4.4	9.7	2.4	4.2
Pb------	--	--	--	--	5.0	--	--	--	--	--
S[1,2]----	.72	.13	.31	.19	.28	.12	.17	*.11	.21	6.6
Se[1]-----	.15	.064	.059	.030	.057	*.011	.028	*.011	.036	13.6
Sr------	690	780	240	170	530	61	310	*16	83	48.8
Ti------	2.9	*.17	3.8	.18	1.3	9.6	45	--	1.3	265.
Zn------	270	290	500	790	520	340	550	980	*220	4.5
Zr------	--	--	--	--	*4.0	12	37	--	--	>9.3
Water[3]--	92	88	96	*15	96	81	89	75	95	6.4

[1]Concentrations in dry material.
[2]Concentrations given in percent.
[3]Percent of fresh weight.

TABLE 120.—*Mean concentrations and high-to-low ratios of elements and pH of soils that support fruits*

[Means are geometric means. Concentrations are parts per million, except as indicated. Leaders (--) in figure columns indicate that mean and ratio cannot be calculated because of excessively censored data. Highest values underscored lowest values marked with asterisk(*)]

Element, or pH	Kind of fruit								High-to-low ratio
	American grape	Apple	European grape	Grapefruit	Orange	Peach	Pear	Plum	
Al[1]-----	4.1	3.3	6.8	1.9	*1.3	5.3	4.9	4.7	5.2
As------	5.9	27	7.0	2.2	*1.4	7.5	10	13	19.2
B-------	17	20	*4.5	8.9	9.3	17	21	24	5.3
Ba------	470	350	730	*320	330	520	540	490	2.3
Be------	*.72	.78	.98	.80	.91	.87	.92	.89	1.4
C[1]------	1.8	1.7	.96	.86	*.61	2.0	2.1	2.0	3.4
Ca[1]-----	1.0	.82	2.7	1.4	*.68	1.7	1.3	1.2	4.0
Co------	7.5	5.0	10	4.3	*3.9	9.2	8.2	7.4	2.6
Cr------	29	33	32	*16	*16	59	46	44	3.7
Cu------	34	24	24	*12	13	36	40	26	3.3
F-------	*310	400	460	560	450	510	510	520	1.8
Fe[1]-----	2.2	1.8	3.5	.67	*.44	3.0	2.5	2.4	8.0
Ga------	12	9.8	17	9.3	*8.8	16	14	14	1.9
Ge------	1.3	*.92	1.3	1.1	1.0	1.1	1.2	1.2	1.4
Hg------	.042	.090	.024	*.022	.024	.043	.047	.055	4.1
K[1]------	1.5	1.3	1.8	.99	*.80	1.6	1.7	1.7	2.3
La------	21	40	22	26	*16	19	24	27	2.5
Li------	17	17	16	16	*13	25	24	24	1.9
Mg[1]-----	.49	.42	.89	.34	*.26	.90	.72	.66	3.5
Mn------	470	290	440	150	*140	330	380	390	3.4
Na[1]-----	1.0	.57	2.1	*.48	.49	1.0	.96	.96	4.4
Nb------	9.4	9.2	9.3	*8.9	*8.9	9.3	*8.9	9.5	1.1
Ni------	12	8.1	13	*5.4	5.9	20	18	15	3.7
Pb------	20	120	20	*12	*12	33	42	50	10
Rb------	54	*49	66	54	*49	66	69	69	1.4
S-------	680	660	--	*380	880	870	570	670	>2.3
Sc------	6.8	4.6	12	*4.1	3.9	9.9	8.5	7.6	2.9
Se------	.11	.060	.060	.062	*.058	.072	.092	.091	1.9
Si[1]-----	32	33	*29	33	35	*29	30	30	1.2
Sn------	.78	.70	1.2	.51	*.39	.78	.80	.80	3.1
Sr------	160	104	440	140	*85	210	190	180	5.2
Th------	*6.6	6.8	11	9.6	8.9	8.6	9.1	8.3	1.6
Ti[1]-----	.40	.38	.49	.22	*.20	.46	.31	.43	2.5
U-------	2.0	2.2	2.4	1.7	*1.6	2.5	2.4	2.5	1.6
V-------	59	49	120	29	*23	100	78	75	5.2
Y-------	16	13	17	13	*12	16	17	17	1.4
Yb------	1.8	1.5	2.0	1.5	*1.3	1.8	1.7	1.8	1.5
Zn------	76	81	72	*34	49	88	88	100	2.9
Zr------	190	190	160	170	190	150	*140	170	1.4
pH[1,2]---	*6.4	*6.4	7.2	8.2	7.8	*6.4	6.7	6.7	1.3

[1]Concentrations given in percent.
[2]Standard units.

TABLE 121.—*Mean concentrations and high-to-low ratios of elements and pH of soils that supported vegetables*

[Means are geometric means. Concentrations are parts per million except as indicated. Leaders (--) in figure columns indicate that mean and ratio cannot be calculated because of excessively censored data. Highest values underscored; lowest values marked with asterisk (*)]

Element, or pH	Kind of vegetable									High-to-low ratio
	Cabbage	Carrot	Cucumber	Dry bean	Lettuce	Potato	Snap bean	Sweet corn	Tomato	
Al[1]------	5.1	4.8	4.9	4.5	1.4	4.2	2.0	*1.1	1.9	4.6
As------	6.7	6.9	6.0	5.9	5.8	11	2.7	*1.7	2.6	6.4
B-------	30	38	15	24	18	19	29	27	*4.5	8.4
Ba------	440	530	610	550	260	470	200	*160	240	3.8
Be------	.93	.89	.80	.89	.83	1.0	.80	.62	*.78	1.3
C[1]------	2.6	1.6	1.5	2.1	4.4	1.8	1.1	.92	*.65	6.8
Ca[1]-----	7.9	3.3	1.1	1.5	2.2	1.4	.64	*.42	.71	19
Co------	5.5	5.9	9.3	7.1	3.7	8.0	4.3	*3.1	5.2	3.0
Cr------	44	33	50	49	*14	43	18	24	19	3.6
Cu------	21	21	46	29	24	37	*13	17	21	3.5
F-------	680	460	410	500	470	490	410	410	*320	2.1
Fe[1]-----	2.4	1.3	2.7	2.3	.80	2.1	.81	*.43	.74	6.3
Ga------	15	14	12	14	7.7	12	7.4	*5.1	8.1	2.9
Ge------	1.2	1.2	.89	1.1	*.62	1.2	1.1	1.0	1.1	1.9
Hg------	.031	*.020	.071	.036	.060	.061	.039	.042	.037	3.5
K[1]------	1.8	2.0	1.6	1.6	.83	1.3	.91	*.58	.77	3.4
La------	27	24	24	22	27	20	26	18	*14	1.9
Li------	32	27	20	24	15	20	14	*10	11	3.2
Mg[1]-----	1.0	.98	.56	.78	.43	.57	.24	*.17	.24	5.9
Mn------	260	290	790	320	230	280	210	*180	280	4.4
Na[1]-----	.63	.74	.78	.89	.25	.82	.32	*.18	.47	5.0
Nb------	8.9	8.9	8.0	9.1	*7.4	9.7	9.1	9.1	7.9	1.3
Ni------	13	13	22	16	6.1	15	6.4	*3.7	6.6	6.0
Pb------	15	13	22	14	13	15	13	13	*12	1.8
Rb------	84	84	62	69	43	54	41	*33	40	2.5
S-------	--	560	--	570	--	*540	--	--	570	>1.1
Sc------	7.5	7.0	7.7	7.3	4.1	7.1	4.5	*1.8	4.0	4.3
Se------	.13	.087	.085	.17	.13	.13	.072	.12	*.062	2.7
Si[1]-----	24	31	30	30	*11	28	34	35	34	3.2
Sn------	.92	.73	.46	.63	.62	.88	.58	.47	*.37	2.5
Sr------	380	200	130	200	120	170	36	*23	63	17
Th------	10	8.8	7.0	8.4	9.6	8.7	8.3	*6.4	7.8	1.6
Ti[1]-----	.31	.31	.39	.37	*.17	.43	.28	.20	.26	2.5
U-------	3.0	2.6	2.2	2.8	2.2	2.8	1.8	*1.5	1.6	2.0
V-------	78	59	74	83	25	63	25	*20	30	4.2
Y-------	15	16	15	15	14	22	15	*9.8	13	2.2
Yb------	1.5	1.8	1.7	1.8	1.3	2.4	1.6	*1.2	1.3	2.0
Zn------	78	59	72	74	67	61	40	*36	42	2.2
Zr------	110	150	130	170	*53	180	160	170	150	3.4
pH[1,2]---	8.1	8.1	6.9	7.2	6.9	6.7	6.7	*6.6	7.3	1.2

[1]Concentrations given in percent.
[2]Standard units.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1980—677-129/49