

Poultry Nutrition Research Proves Helpful To Humans

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the fact that a sufficient amount of this vitamin in the diet is required to prevent a dermatitis of a different type from that caused by a deficiency of pantothenic acid. Biotin — like choline — is necessary for proper bone growth.

Folic Acid

Believed to be the only vitamin discovered by industrial research, folic acid was isolated, identified and later, in 1946, first produced synthetically in a commercial laboratory. One of the scientists participating in the synthesis of folic acid was a former member of the staff of the Division of Poultry Husbandry.

The same laboratory was conducting experiments with a synthetic diet for poultry, similar to those in progress in Project 677-D-2.

A new formula for the synthetic diet, which included folic acid, was constructed by the scientists in the commercial laboratory. Day old chicks were placed on the new formula. They grew, matured and produced eggs. In turn, those eggs hatched and the resulting chicks are growing.

Experiments with folic acid conducted as part of Project 677-D-2 indicated that the requirement of the vitamin by Single Comb White Leghorn yearling hens for egg production is low. Breeding hens require higher levels of folic acid for sustained high hatchability of their eggs than for egg production. The best level for hatchability has not been determined.

Folic acid is especially remarkable for the swiftness with which it increases the red corpuscles in the blood. This ability suggested extensive investigations which were made by many research laboratories.

Successful attempts to cure cases of diarrhea in laboratory animals, notably in monkeys, indicate the need for folic acid in the intestinal tract to prevent diarrhea.

Investigations have produced the conclusion that the natural manufacture or synthesis of folic acid by the human system is impaired, if not halted, by the presence of a sulfa compound in the intestines. Treatments with synthetic folic acid have counteracted the deficiency.

The addition of folic acid to the human blood stream results in a rapid increase in the red corpuscles with the attendant expansion of the oxygen-carrying ability of the blood. Patients suffering from certain types of anemia have made quick and complete recovery following treatment with folic acid.

Nutritional Research Continues

In universities, experiment stations, and in commercial laboratories, nutritional research continues with the emphasis of interest being extended to the specific requirements of animals and humans for amino acids.

Staff members who have worked on Project 677-D-2, under the direction of L. W. Taylor, Professor of Poultry Husbandry and Poultry Husbandman in the Experiment Station and Head of the Division of Poultry Husbandry, include: S. Lepkovsky, Professor of Poultry Husbandry and Poultry Husbandman in the Experiment Station; V. S. Asmundson, Professor of Poultry Husbandry and Poultry Husbandman in the Experiment Station; H. J. Almquist, Associate Professor of Poultry Husbandry and Associate Poultry Husbandman in the Experiment Station, resigned 1942; T. H. Jukes, Assistant Professor of Poultry Husbandry and Assistant Poultry Husbandman in the Experiment Station, resigned 1942; F. H. Kratzer, Assistant Professor of Poultry Husbandry and Assistant Poultry Husbandman in the Experiment Station; C. R. Grau, Instructor in Poultry Husbandry and Junior Poultry Husbandman in the Experiment Station; F. H. Bird, Senior Laboratory Technician; and E. L. Robert Stokstad, graduate student, 1934-1937.

Dr. H. J. Almquist and Dr. E. L. Robert Stokstad are considered contemporary discoverers of Vitamin K with Dr. Henrik Dam, Denmark.

The use of phosphate in synthesis of sugars and starch by plants is under extensive biochemical study by the Division of Plant Nutrition.

Differences In Fertilization Needs Of Citrus In Florida And In California Explained

Condensation of an article by H. D. Chapman, published in full in the June issue of Citrus Leaves and in the July issue of Citrograph.

The fertilization of citrus, or of any other crop, is far from an exact science.

Often in contemplating the purchase of some fertilizer or soil conditioner, it is forgotten that present poor tree condition or low yield may be the result of circumstances in which the soil has played no part at all. Past wind or frost damage, hot spells, scale, aphids, or spider infestations, spray injury or combinations of these often prove to be the source of the trouble.

Differences In Soils

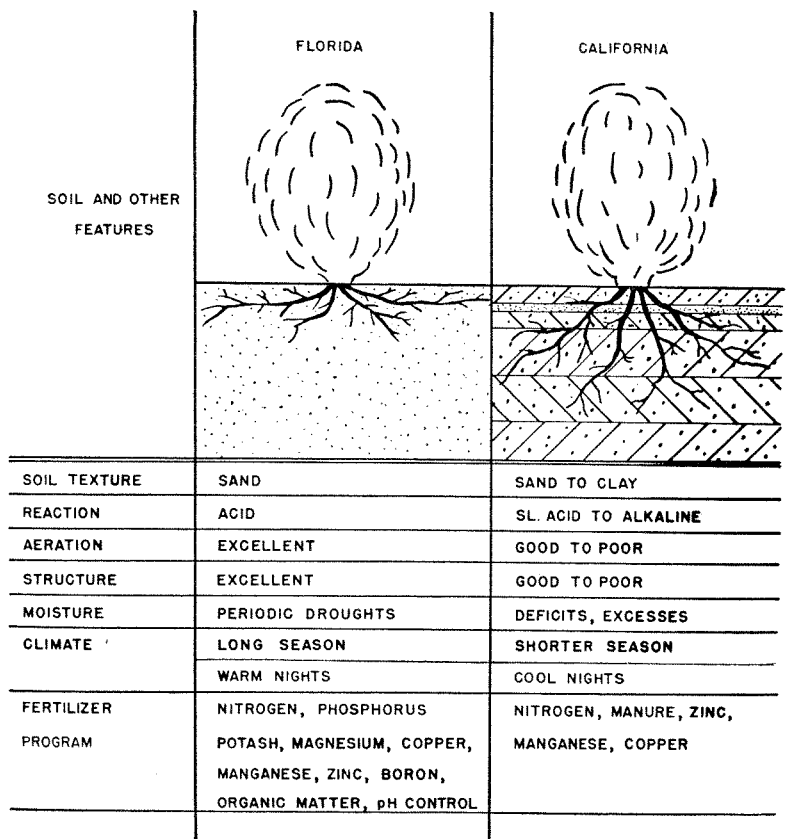
The root system of citrus trees growing in the sandy soils of Florida

very favorable physical media for root development but the needed plant foods for the most part are supplied by fertilizers and nutritional sprays.

In contrast, California soils are much richer in calcium, magnesium, phosphorus, potash, and other elements. Also, they are much more variable in texture.

The Florida fertilizer program involves the use of nitrogen, phosphorus, potassium, magnesium, zinc, manganese, copper, boron, and organic matter, with control of pH.

The hydrogen ion concentration control program is to reduce the rate



Comparative soil, climatic characteristics, and fertilizer program of Florida versus California.

is shallow and aeration is excellent. No serious difficulty therefore is encountered in getting fertilizer salts into the root zone and soil structure deterioration is not a problem in general.

California citrus soils are predominantly heavier in texture. They vary all the way from loamy sands to clays.

Aeration is, in general, poorer in California citrus soils than in the sandy soils of Florida.

The increased amount of clay in California soils, and other textural characteristics, make them susceptible to structural breakdown, to the development of poor tilth, to puddling, and to physical deterioration in general.

Soil Moisture

In Florida the average rainfall is around 50 inches annually. The general moisture situation, from the standpoint of tree growth and health, is perhaps somewhat better than under California conditions.

In California, during the summer months, moisture deficits between irrigation often occur; these tend to promote fruit dropping and in some instances may decrease the growth rate of fruit. In wet winters the root zone often remains in an overmoist condition for long enough periods to promote root rot or root deterioration.

Effect of Climate

The climate of Florida is characterized by greater humidity, warmer nights and a longer growing season than in California. These promote more rapid growth, more rapid recovery from adverse factors and perhaps better yields.

It is probably the particular complex of climatic conditions which prevail in California that makes for superior fruit quality.

Fertilization Needs

The sandy soils of Florida have become depleted of many of the essential plant foods by the leaching action of the rainfall.

It has been necessary to add some eight or nine elements to meet citrus tree requirements. The natural soil provides a moisture reservoir and a

of leaching losses of magnesium and other bases. There may be some favorable influence on plant food availability.

Organic matter is important as it tends to decrease the rate of plant food losses by leaching.

The items used in Florida which seem unnecessary in California are phosphorus, potassium, magnesium, and boron. The results of future research may bring to light data and facts which will modify present recommendations.

Phosphorus and Potash

The possible need of California citrus soils for these elements has been under investigation for many years. The weight of the evidence to date is negative as to the need for additions of potash and phosphorus.

Magnesium

Comparative soil analyses show that California citrus soils are much better supplied with magnesium than are Florida soils. In addition, all irrigation waters in California carry dissolved magnesium.

Boron

To date, no evidence of a need for boron has developed in California citrus soils. As in the case of magnesium, most irrigation waters add boron to the soil. Some waters, as is well known, supply excess boron to the point of being harmful to citrus trees.

Iron

In a number of areas in California iron chlorosis or deficiency is a perennial problem.

The most helpful practice which has come to light is better control of soil moisture. In many instances the use of less irrigation water or cutting down on irrigation frequency or holding off on the spring irrigation until the subsoil shows a real need for moisture, have done wonders toward clearing up iron deficiency.

Factors Important To Soil Conditions

Because California Citrus soils are heavier, in general, than Florida soils they are subject to structural deterioration and plow sole development. These conditions are considered to be of as much importance to the nutrition and well-being of citrus

Sugar Beet Seed-Bed Preparation On Unplowed Soil

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There were no essential differences in weight per cubic foot of soil. The pore space was in an inverse relation to the weight of a cubic foot of soil. At the time when the fleshy part of the root was enlarging, the volume weight of the soil was about the same whether the land was plowed or not plowed.

Water Infiltration

The rate of water infiltration for the first irrigation showed a higher rate for the plowed plots. For the other two irrigations, the rate was about the same for the two seed-bed treatments.

Judging from the data, plowing will not increase the rate of water infiltration except, possibly, during the first irrigation.

Shape of Beet Roots

The shape of the beet roots from the two seed-bed treatments was studied for the first three years of the experiment.

From the results, it is clear that the shape of the beet is not measurably affected by whether or not the soil is plowed.

Depth of Rooting

Sugar beets root deeply. They extract all the readily available moisture and nitrate nitrogen in the soil to a depth of at least six feet.

Cultivation or even plowing can not be expected to influence greatly the growth and yield of beets which draw their nutrients and water requirements from six feet of soil.

Cultivation Trials

The effect of spring cultivation on the yield and sugar content of the sugar beet was studied.

The results indicated that cultivation is necessary only for weed control.

Weedy land with much spring rain may require three to four cultivations, whereas land relatively free from weeds may require, in the absence of rain, one or, at the most, two cultivations for control of weed growth.

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tees as is the chemical makeup of the soil.

Cultivation

It is now well-established that cultivation acts to break down soil structure and is the principal cause of plow sole development.

While the practice of noncultivation is still too recent to permit of proper evaluation, there are reasons to believe that plow sole may gradually disappear or become less serious under this system and soil structure improve.

Grove Traffic

Pest control operations, cultivation, furrowing out, picking, pruning, fertilizing, and orchard heating, together with other miscellaneous operations, amount to a considerable total of traffic in orchards.

These operations are particularly detrimental on certain soils when they are too wet. It is often not possible to time orchard operations so that moisture conditions are most favorable but every effort should be made to cut down on the amount of traffic, especially that involving trucks, tractors, and heavy machinery. It is especially important to keep off the soil while it is wet.

Structural Breakdown

To some extent the addition of manures or the growth of covercrops will help prevent or overcome structural deterioration. In many soils

ABSTRACTS OF NEW PUBLICATIONS

TOMATOES

CANNING TOMATOES: SITUATION IN CALIFORNIA, 1947, by Walter D. Fisher. Ext. Cir. 369, July, 1947. (16 pages).

California now produces over one third of the United States' canning tomatoes, and puts up a large percentage of the country's pack of tomato paste and sauces. The state's main producing areas are the counties surrounding the Delta and San Francisco Bay. Its 1946 crop was the largest in history.

Some, but not all, of the expanded production will continue. The overall picture depends on national consumer income, a factor which cannot be accurately predicted. Since the 1946 crop was so large, canners' demands for 1947 will be below those of the previous year. Both growers and canners should keep informed on economic trends in the nation as well as conditions in their own locality.

ROOTSTOCKS

APPLE, QUINCE, & PEAR ROOTSTOCKS IN CALIFORNIA.

Even favorable varieties of apple, quince, and pear differ in suitability as rootstocks. Observations and experiments with various roots and intermediate stocks have been recorded for these fruits.

Apple is the only rootstock on which apple varieties have been grown commercially in California. A well-tested, good rootstock resistant to woolly apple aphid is desirable, but no completely satisfactory one has yet been found.

Quince varieties are grown only on roots of their own species. The greatest use of rooted quince cuttings in California is for rootstocks for pear trees. The Angers type is used for this purpose.

Pear is grown in California on the so-called French pear roots, with or without blight-resistant Old Home as an intermediate stock.

Quince roots with Hardy as an intermediate stock are also used.

Insect pests and disease which attack rootstocks of each species are discussed in the following bulletin, which also covers the relation between rootstock and climate, soil, planting, irrigation, and pruning.

As a part of a long-time dairy cattle breeding project, the Division of Animal Husbandry is outcrossing inbred lines of Holsteins to determine the extent of hybrid vigor that may be developed.

where cultivation is practiced, the frequent use of some sort of organic matter is indispensable.

Water Penetration

In orchards where water penetration is poor, favorable results have been obtained in many instances from the use of gypsum or organic matter.

Many soil acidifying agents such as sulfur, sulfur dioxide, sulfuric acid, lime sulfur, etc., are being offered for sale as soil conditioners. While many of these agents will, like gypsum increase water penetration—largely through reactions which form gypsum in the soil—they also exert an acidifying influence on the soil.

No clear answer is yet available as to whether soil acidification in citrus groves is beneficial. A number of field experiments are under way on a variety of soil types, but insufficient time has elapsed for clear-cut answers to emerge.

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DONATIONS FOR AGRICULTURE RESEARCH

Gifts to the University of California for research by the College of Agriculture, accepted in July, 1947

BERKELEY

California Farm Bureau Federation and Canners League of California.....\$2,298.00
Research on tomato insects and disease control methods and procedures, by Division of Entomology

Merck & Company.....25 milligrams biotin
Division of Poultry Husbandry

DAVIS

California Committee on Relation of Electricity to Agriculture.....\$2,500.00
Electrical applications to agriculture, Division of Agricultural Engineering

Central California Berry Growers Association.....\$ 800.00
Strawberry investigations by Division of Pomology

Producers Cotton Oil Company.....One Sizz-Weeder, complete with butane equipment
Division of Agricultural Engineering

LOS ANGELES

Jerry Martin.....Two packets of valuable orchid seed from Venezuela
Division of Ornamental Horticulture