

Hexamitiasis of Turkey Poults

recent studies indicate possible control treatment for the disease

Ethel McNeil

Marked reduction in mortality among young turkey poults afflicted with Hexamitiasis—an enteritis—has been obtained when diseased birds are given dried whey in copper sulfate solution as a substitute for drinking water.

The beneficial effects of feeding 3% dried whey containing 50 to 70% lactose in a one to 2,000 solution of copper sulfate—bluestone—were shown by field trials as well as in controlled laboratory experiments with turkey poults over three seasons.

The symptoms of this disease—which attacks poults one to 10 weeks of age—are listlessness, sagging wings, loss of weight, an unkempt appearance and a decrease in body temperatures. At autopsy the skin is dry, the bird thin and the liver sometimes congested. There is a mucoid enteritis involving the whole upper digestive tract. The contents of the intestine are fluid; the intestinal walls are thin and lack tone. Enormous numbers of *Hexamita* are found throughout the intestine from the gizzard to the vent.

Young quail and pheasants are susceptible to *Hexamita* infection and thus can act as carriers and transmitters. Chickens can carry the organism for several weeks although they show no symptoms.

The disease is transmitted by oral ingestion of contaminated material, by rectal inoculation or by both. The incubation time is four to six days and one of the first symptoms is a loss in weight. As survivors recover, *Hexamita* disappears from the upper part of the small intestine, but may still be numerous in the ileum.

Sections of the intestinal tissue show that *Hexamita* cover the inner surfaces, clinging to the tissue. Although there is some sloughing of the intestinal lining and increase in mucin secretion as a result of this constant irritation, penetration of the tissue never has been observed.

Low blood sugar has been found associated with this disease and this may partially account for listlessness and low body temperature. It may account also for the fact that growers report that their birds sometimes go into convulsions before they die, since convulsions frequently result from very low blood sugar levels.

This low blood sugar condition is not a simple result of starvation due to absence of food consumed, because it often occurs when the intestine is full of food.

The fact that the sick birds apparently

were not utilizing their food suggested a study of enzyme action.

A large percentage of the diet of birds is carbohydrate in nature, and amylase is the only efficient enzyme for splitting the starch into the sugars which can be absorbed into the blood stream of the birds.

Tests conducted on the amylase contents of the duodenum revealed that only small amounts can be detected in birds suffering from hexamitiasis. This was interpreted as indicative of a physiological starvation because of the birds' inability to use the starches fed them.

It was also noted that in hexamitiasis very few bacteria of any sort are found in the small intestine. Whether this is due to the alkaline reaction or to a possible antibiotic action of *Hexamita* is not yet known.

The cure effected by the whey-copper sulfate solution treatment is attributed in part to the fact that lactose can be absorbed in the lower part of the small intestine. This causes a restoration of normal blood sugar levels with an accompanying improvement in temperature and in general condition of the poults.

In addition it is thought this treatment encourages the growth of acid-producing bacteria with a resulting return to normal of the acidity of the intestine and an eventual recovery of amylase action in the duodenum.

Several precautions should be taken in the use of the copper-sulfate-whey mixture. They are as follows:

1. Only dried whey is recommended—no other milk products;

2. Since whey settles out rapidly, the mixture should be made often and stirred each hour or two;

3. Neither whey nor bluestone used alone is effective;

4. Five to seven days is the optimum time for treatment.

5. After three to five days on plain water it may be necessary to repeat the treatment.

This is a preliminary report of this treatment and further studies should increase knowledge of its mode of action.

Many remedies found in use on turkey ranches as well as ones which had potential scientific possibilities were tested without success on this disease.

Such chemicals as sodium bicarbonate, aspirin, vinegar, nicotine sulfate, chlorine products and mercuric chloride were found to be of no value. Nor were several patent medicines containing phenol or hydrochloric acid effective.

Some of the so-called patent medicines were found to be toxic for the birds. A dye preparation containing gentian violet and methylene blue likewise was ineffective. None of the sulfa drugs nor penicillin was effective when used under controlled conditions.

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Poults showing typical symptoms of hexamitiasis.



PRUNING

Continued from page 11

or towers in some districts. It seems practical to do some cutting back of limbs to allow passage of the equipment, as some growers are now doing, provided too much fruiting area does not have to be sacrificed.

In future plantings trees may well be spaced a little wider in one direction than the other to allow for mechanization. This also would help in hauling out fruit. The difficulty of operating the equipment in muddy soils may be partially answered by light weight and wide, mud-grip tires or multiple-drive wheels.

Good platform and tower equipment now being developed for pruning is also finding use in other orchard operations such as thinning, knocking and harvesting.

Rig has platform nine feet high, 7½ feet wide: slip-boards, 2" by 12". 12 feet long, iron reinforced.



Two-stage pruning platform for pears with slipboards on upper deck. Compressor is mounted on tractor.

In addition to certain savings, results show better timing of work for regularly employed crews, easier and more desirable employment for more highly skilled help, fewer troubles in labor training and management, and better control of quality work.

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ORANGES

Continued from page 4

at all involved in the small size problem as it occurs in the orchards some other factors also bear on it, especially micro-organisms, soil structure and other environmental factors.

Extensive experiments are being carried on in Riverside and Ventura counties studying the effect of soil fumigation on soil organisms, the growth of trees replanted on such soil, and a search is being made for soil fumigants which can be used in orchards without harmful effects on the trees.

The symptoms of poor feeder root systems under trees producing small size fruit have been observed rather generally.

The presence of nematodes on roots of both decadent and healthy trees has been generally observed wherever citrus is grown in various parts of the world. There also are usually several other micro-organisms closely associated with the nematodes.

Enlarged studies of this complex association during the past three years consider the possibility of relationship to slow decline of citrus trees which has gone hand-in-hand with small sizes. This study is important also to the problem of replanting land again to citrus.

Work is well underway studying the effect of rootstocks and varietal bud selections on fruit sizes.

A comprehensive plant breeding project also is underway to produce new varieties and to rejuvenate old varieties by means of nucellar seedlings.

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NEW PUBLICATIONS

A copy of the publications listed here may be obtained without charge from the local office of the Farm Advisor or by addressing a request to Publications Office, College of Agriculture, University of California, Berkeley 4, California.

THE PEACH TWIG BORER, by Stanley F. Bailey. Bulletin 708, September, 1948.

Written for the grower, pest-control operator and the entomologist, this bulletin describes the life history and cycle of this pest. A control program based upon the latest research information is outlined.

CONSTRUCTION OF FARM REFRIGERATORS AND FREEZERS, by James R. Tavernetti. Station Circular 386, September, 1948.

This circular suggests several designs to fit farm refrigeration needs. It discusses construction, materials, equipment and costs.

MAKING A COAT, by Ethelwryi Dodson and Frances Reis. Extension Circular 145, August, 1948.

Pictorial illustration of tailoring techniques and a step-by-step simplified work plan for construction of the garment are given in this booklet.

SUGAR-BEET

Continued from page 8

sugar-beet nematode in California have not been successful. The reasons are not known but preliminary experiments have been started in an attempt to determine whether soil conditions, or the time of treatment in relation to the stage of the life cycle of the nematode present may account for the failure of chemicals to control the nematode in California.

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DONATIONS FOR AGRICULTURAL RESEARCH

Gifts to the University of California for research by the College of Agriculture accepted September, 1948

BERKELEY

Chipman Chemical Company..... 16 pounds Toxaphene, 40% spray powder;
400 pounds Chipman Toxaphene, 10% sulfur, 40% dust
Lederle Laboratories Div., American Cyanamid Co..... 5 pounds special feed supplement
Rohm and Haas Company..... 100 pounds of Rhothane WP-50

DAVIS

Cling Peach Advisory Board..... \$6,500.00
Cling peach production problems
Committee on Relation of Electricity to Agriculture, Pacific Gas and Electric Company... \$3,625.00