Selection and Management of Turkey Breeding Stock Are Subjected to Studies

V. S. Asmundson

One of the simplest ways of increasing egg production of turkey breeder hens has been the use of artificial lights. This is effective provided the day is long enough—about 14 hours—and the light bright enough, about two foot-candles at the place where the birds are exposed to the light.

Artificial light should not be used too soon. There is no use in getting early eggs if they are not needed for hatching.

The time required to bring the hens into egg production varies from about five weeks for seven month old hens early in the season to one or two weeks for older birds later in the season.

It does not seem to make any difference whether one outlet such as a large floodlight is used, or whether several outlets, each 100 or 150 watt, are used. The main point is to have the area occupied by the birds effectively lighted.

Age for Lighting

Since the birds do not complete their growth until they are about 10 months old, it is advisable to let the birds reach at least seven months of age before lights are started. Birds lighted at this age tend to lay slightly smaller eggs throughout the season than unlighted birds of similar breeding. This another reason for not starting the lights too soon since the number of small eggs is likely to be increased by starting the lights on very young birds.

Indications are that overlighting, such as the use of all-night lights, increases the percentage of waste eggs. This includes particularly soft-shelled or weak-shelled eggs that are broken or cracked by the birds and are therefore unusable. From what information we have, the use of all-night lights is not recommended.

It is not yet certain whether prelighting males has any effect. However, it does no harm. There is good evidence that some males are rather slow maturing and consequently fertile eggs should not be expected too soon from the males. If they are the same age as the hens this will mean therefore that fertile eggs will not be expected from the birds until they are at least eight months old. Under such circumstances there should be no serious difficulty with early infertility of eggs from flock matings.

Selection

Selection of the males is particularly important. They should be average size males that are able to walk normally and show no indication of leg abnormalities such as enlarged bones at the hock, or a tendency of the hocks to bow in or out. Each male should be handled individually, and observed on the ground.

This selection should be made before any birds go to market and a sufficient number kept over to allow for loss either from fighting or from the tendency of some males to become excessively heavy and unfit for breeding purposes. The birds that are low in front should not be used. However, the elimination of excessively large birds will in most cases eliminate some of this group of males. The use of medium-sized, normal, active males goes a long ways towards eliminating some of the difficulty with poor fertility.

Management

Good management is of course very important. The use of a good breeder mash is one of the best insurances against low hatchability caused by nutritional deficiencies. The breeder mash should be fed to the birds at least two weeks and preferably four weeks before any eggs are expected. The breeding stock should also be fed fresh greens. By planning well in advance it should be possible to have fresh greens throughout the breeding season.

Several growers who usually get good results in fertility are either restricting the amount of feed given to males prior to the breeding season, or feeding a ration which does not encourage excessive fatness. During the breeding season the birds may become too thin rather than too fat. Undoubtedly, however, the original selection of the males is the most important.

Where fighting is particularly pronounced among the males, spreading out equipment so as to encourage a wider distribution of the flock is desirable. If fighting is particularly troublesome, debeaking the male birds should be considered. Good results have been reported where both males and females were debeaked.

Care of Hatching Eggs

While the production of a large number of good hatching eggs depends largely on the stock that is used, it is also necessary to select for use medium large, strong shelled eggs. In case of lighted birds, the selection of the best eggs for renewing the flock after the birds have been laying for about two months should help to ensure that the next season's flock will lay eggs of good size and good shell quality.

The care of the eggs is important. Results obtained last spring (1946) pointed very clearly to the importance of setting the eggs promptly, or in the case of eggs that are to be shipped, of shipping them as soon as possible. Holding eggs for as short a time as one week resulted in a definite if rather small decrease in hatchability. Holding them for two weeks resulted in a definite decrease in hatchability.

If eggs are covered with mud or dirt it interferes with the intake of oxygen and the elimination of carbon dioxide by the embryo. It is therefore necessary to clean such eggs. With eggs that are not badly stained, washing may be as effective as the use of abrasives, although satisfactory comparative tests have not been made. However, every effort should be made to get clean eggs.

There are a number of interesting points that came out of the test of hatching eggs, among them being the suggestion that cooling eggs for not more than six hours at 30° F. was beneficial to hatchability. If this is confirmed, it may be a means of improving the hatchability of the eggs, particularly those that have to be shipped some distance.

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Codling Moth Controlled by Use of DDT

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some of the new materials may be required.

DDT Spray Residue at Harvest

The past seasons' investigations have shown that three or even four applications of DDT at the dosages recommended above when properly timed did not leave a spray residue at harvest above the Federal and State tolerances of seven parts per million. Furthermore, through the search of this Division, a method is now available for the removal of DDT on harvested fruit which is both practical and effective.

The acid wash, as used for the removal of lead arsenate, is not effective in the removal of DDT deposits. The addition of certain types of oil soluble and water soluble detergents to the regular acid wash will remove both the DDT and lead arsenate spray deposits.

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Movement of soil moisture studies have shown that the capillary movement of moisture under usual field conditions is extremely slow in rate and extent. The losses of moisture by surface evaporation have been shown to be extremely small compared to plant transpiration. Cultivation in the absence of weeds has been shown to be ineffective in saving water.

Application of Micronutrient Elements to Crop May Avoid Failure and Cost is Low

D. I. Arnon

Important crops in certain areas are saved from failure by application of small amounts of micronutrient chemical elements—sometimes of not more than 20 to 50 pounds to the acre.

Investigations have established the essential nature of boron, zinc, copper, manganese and molybdenum for the growth of green plants.

The distinguishing feature common to these elements is, that they are required by the plant in exceedingly small amounts. While nitrogen and potassium are usually supplied to the nutrient medium in concentrations of several hundred parts per million, only one-half of one part per million of boron and manganese is generally added. Even smaller amounts of zinc and copper are required—two-tenths of one part or less, to five-tenths of one part per million of each.

Tomato plants in copper deficient nutrient solution. Left, sprayed with copper compound; right, received no copper.

Zinc as a Preventive of Leaf Diseases

One California example of the essentiality of micronutrient chemical elements is the use of zinc to prevent or to cure mottle leaf or little leaf disease.

The zinc compound is often sprayed on the tree, rather than applied to the soil. The fixing power of the soil for zinc may make it too difficult or too costly to correct the shortage of zinc by treating the soil. For the same reason traces of impurities in commercial fertilizers may not, in general, serve to meet the needs of a crop when micronutrient deficiencies exist.

Molybdenum Beneficial to Clover

Recently a visitor to California from an Australian experiment station gave the information that in Australia remarkably beneficial effects on the growth of clover occurred in various districts of south Australia, when very small amounts of molybdenum were applied to the soil.

The problem of failure of the growth of clover had puzzled the Australian agronomists for a long time. Then they learned of the experiments in Berkeley by refined methods showing that molybdenum was probably an essential element for plant growth.

This information, plus their own observations, set the investigators on the right track. The net result was that far larger growth of legumes could be obtained and more animals fed. And the treatments with molybdenum cost very little.

Molybdenum Deficiency Not Known in California

It is not known that molybdenum is deficient anywhere in California, but more research would be necessary to be sure of the facts. On the other hand, some evidence suggests that in a few areas in California there may be so much molybdenum absorbed by hay crops that animals may be poisoned by it.

More research is necessary on the whole question of molybdenum in relation to plant growth.

Excesses May Be Detrimental

While the chief scientific and economic interest is centered around deficiencies, there are important instances of damage to crops as a result of excess of a particular micronutrient.

The plant which has an exceedingly low requirement for an element is also generally sensitive to the presence of excessive amounts, which in absolute terms are quite low.

In California, boron toxicity, caused chiefly by small amounts of boron carried in irrigation waters, is an economic problem.

Different plants vary in their tolerance to boron. Citrus species which are among the sensitive plants are injured by several parts per million of boron in irrigation water.

Research Continuing

Increasing attention is given at present to study of the function of micronutrients in the plant. This field of research is still in its infancy but important indications point to the participation of metals in the enzyme system of the living plant.

A deficiency of a micronutrient, measured in terms of several pounds to the acre, can be as serious, economically, as a deficiency of an element like potassium, measured in terms of several hundred pounds to the acre.

A knowledge of all the elements, including micronutrients, essential for plant life, is indispensable to a rational system of soil management.

Deficiency May Affect Animals

There is the possibility that such elements as iron, copper, manganese, or cobalt, may not be present in the soil in sufficient amounts or in such a form that the crop, although containing enough of these elements for its own needs, still may be deficient in its content of one or more of the elements for the requirement of the animal which eats the crop.

In various parts of the world serious nutritional diseases of animals, especially animals living on pasture, have occurred because of such deficiencies.

An especially interesting case is a disease of sheep in Australia and England, caused by lack of cobalt. It is not known that cobalt is essential at all for the crop itself. Diseases of animals referred to do not occur commonly, but in certain areas are of great economic consequence.

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ABSTRACTS OF NEW PUBLICATIONS

Color Handbook of Citrus Diseases. By L. J. Klotz and H. S. Fawcett.

The purpose of this book is to supply citrus growers, horticulturists, packing-house workers, inspectors, investigators, and sellers of citrus fruits with a ready means of identifying and combatting citrus diseases. Nearly all parasitic and nonparasitic maladies are depicted and described. The text discusses distribution and importance of the diseases and places emphasis upon recognition of disease symptoms and the best methods known at the present time for their control.

The book is large pocket size (8¼ x 4¼ inches), loose-leaf in form, with index and space for notes. It is bound in durable dark green buckram.

The Citrus Industry. Vol. I: History, Botany, and Breeding. Edited by Herbert John Webber and Leon Dexter Batchelor.

This volume includes much of the basic knowledge which is the important foundational information for all who are interested in the citrus industry. It is a treatise that should be of special value to students, technicians, and investigators of citrus, as well as to all growers who take pride in their industry and seek to gain an understanding of their specialty. Climatology, geography, horticultural varieties, anatomy, physiology, reproduction, genetics, and breeding, as they apply to citrus, are discussed thoroughly by the authors.

Volume II: The Production of the Crop; and Volume III: The Harvesting, Marketing, and Utilization of the Crop, are to follow. Each volume is complete in itself.

The following publications are available without cost at the College of Agriculture:

CHERRY CULTURE IN CALIFORNIA, by Guy L. Philp. Cir. 46, revised January, 1947 (52 pages). This circular is intended to serve as an introductory study for the beginner and as a ready reference for the established grower. It describes the most up-to-date cultural methods, emphasizing economic aspects of the business.

BUSH BERRY CULTURE IN CALIFORNIA, by H. M. Butterfield. Ext. Cir. 80, revised January, 1947 (58 pages). Varieties, methods of propagation, harvesting, and diseases of bush berries are covered in this comprehensive report. Especial attention is given to costs of production as related to yields. Off the press this month.

GRAPE GROWING IN CALIFORNIA, by H. E. Jacob. Cir. 116, revised January, 1947 (84 pages). California's vineyards constitute about 80 per cent of the total grape acreage of the United States. The types, growing conditions, methods of propagation, and diseases of the fruits are discussed in this circular.

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BREEDING CHICKENS FOR MEAT PRODUCTION, by V. S. Asmundson and I. Michael Lerner. Bul. 675, November, 1942 (Reprinted January, 1947) (40 pages). The principles and practices of selective breeding for meat birds are detailed. The bulletin lists market requirements adopted by the United States Department of Agriculture.

MEASURING WATER FOR IRRIGATION, by J. E. Christiansen. Bul. 588, March, 1935 (Reprinted January, 1947) (91 pages). The chief purpose of this bulletin is to describe the more common methods and devices used in measuring water for irrigation in California. Tables for use with important devices are also presented.

Development of a mildew and scald resistant variety of Atlas barley has been completed.