

BULLETIN 227
OF THE
AGRICULTURAL EXTENSION SERVICE, THE OHIO STATE UNIVERSITY

JANUARY, 1943

Producing Ohio Turkeys



Producing turkeys profitably results from a well planned breeding, feeding, and management program.

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Producing Ohio Turkeys



Turkey production in Ohio during the past decade increased from 192,000 birds during 1929 to 815,000 birds in 1941—an increase of approximately 325 per cent. The turkey crop of Ohio now amounts to \$314,000,000. This rapid increase in production was largely due to the widespread adoption of good management practices. The trend during this period was decidedly toward commercial production, with many producers engaging in large scale operations.

It is reasonable to expect that there will be substantial increases in turkey production during the present decade. Whether the turkey industry in Ohio will keep pace with other turkey producing states will depend upon several factors.

Heretofore, the markets of Ohio and of big nearby cities have largely absorbed our turkey crop. However, with future expansion, the question of satisfactory markets may be an important problem. There has been but little organized marketing in Ohio. While a few individuals have done a creditable job of merchandising their products, there has not been any evidence of the adoption of a uniform breeding and marketing program by leading breeders, hatcherymen, and turkey raisers. Adoption of both these important phases are essential for making a real reputation for Ohio turkeys. A few individuals working independently cannot influence a large enough percentage of those interested in breeding, production, and marketing to reach the desired goal.

Some states in both the eastern and western parts of the country have organized breeding and disease control programs which have brought about improvement in turkey raising and marketing. The Ohio turkey industry is facing these problems and will have to work out satisfactory solutions. Perhaps one reason for the lack of organized thought on the marketing problem in Ohio is that our many cities and our location to other regions of heavy consumption have absorbed the crop, with the present methods of marketing. However, Ohio producers would receive a better price for their turkeys, if the quality was more uniform and if they were sold according to definite grades.

The tremendous production increase in this state was made possible by the adoption of preventive measures that reduced losses from blackhead—the turkey's No. 1 enemy. Twenty-five years ago this disease had practically driven the turkey to new frontiers west of the Mississippi River, where land was not contaminated with the blackhead organism. Greater production of turkeys will call for still greater efficiency, in order to maintain a satisfactory profit margin. Many growers could increase their labor returns 10 to 25 per cent by reducing disease losses.

While much has been accomplished in efforts to prevent losses from blackhead, there is evidence that other diseases may further aggravate successful turkey raising, unless research reveals suitable methods of control and such control programs are generally adopted. Pullorum disease is quite common and widespread. Research has revealed a number of facts in regard to controlling this disease in turkeys, but the industry as a whole has not taken the disease very seriously.

In recent years, trichomoniasis and hexamita, two protozoal diseases, have made inroads on flocks in some turkey production sections, with serious losses. Much is yet to be learned about these diseases, but fortunately they have not spread over the entire country.

CHOOSING A BREED

Of the six common varieties of turkeys, the Bronze is the leading variety in Ohio. The development and distribution of the Broad-breasted Bronze by western breeders has added to the popularity of this breed. White Holland is second in popularity, followed by Narragansett and Bourbon Red.

The study made by the National Association of Food Chains in 1937 indicated that 73 per cent of the consumers prefer dressed turkeys weighing 15 pounds or less, yet the production trend has been toward larger birds. For example, in 1929 the average weight of birds marketed in the United States was 13.2 pounds and in 1941 it was 15.9 pounds.

During the past several years, the spread in price between hens and toms, especially heavy toms, has become more pronounced. This, no doubt, has increased the home consumption of larger birds. Turkey on the menu over a large part of the year has also helped. During 1940 and 1941, the Surplus Marketing Administration purchased a quantity of large toms to relieve the market. At present, large turkeys are being used for canned boned turkey. These practices have helped to prevent the glut of large birds on the market, especially at certain seasons of the year.

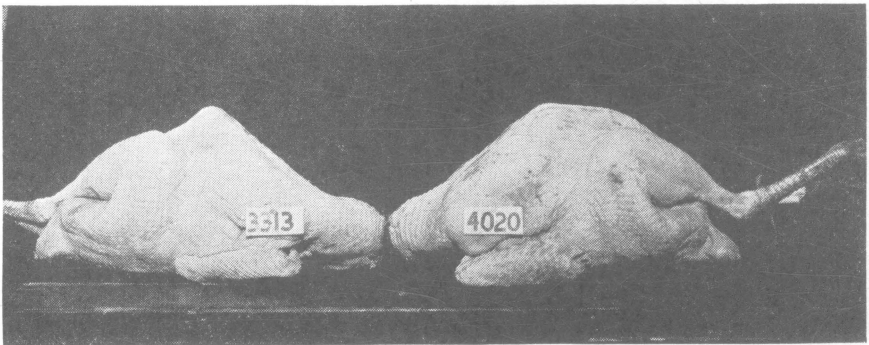


Fig. 1.—Careful flock selection is necessary to produce market birds of superior meat type. The bird on right is of good market type; the one on left is of very poor quality.

Along with the development and production of larger turkeys, two varieties of smaller sized turkeys, the Nittany and the Small White, have been developed. The Nittany was wild turkey found in the Nittany mountains of Pennsylvania and was domesticated by the Pennsylvania State College. The Small White was developed by the U. S. Department of Agriculture at the Experimental Farm at Beltsville, Md. At 24 weeks, the toms range from 12 to 17 pounds weight and the hens from 7½ to 10 pounds.

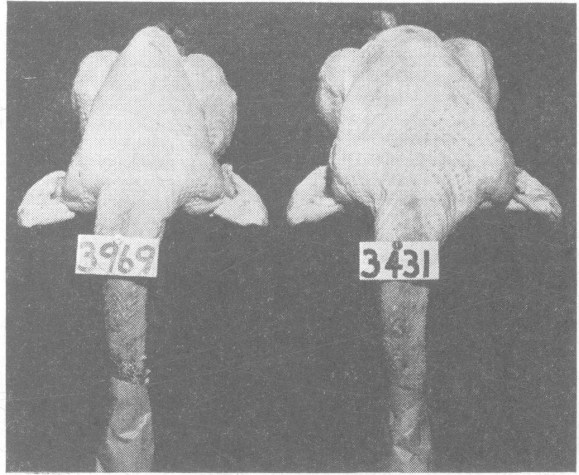


Fig. 2—The broad-breasted turkey on right is a much more desirable type and has more white edible meat than the bird on left.

There have been many questions in regard to the smaller varieties. Greater overhead cost and increased cost per pound of turkey produced is apparent. However, if the market prefers them to the extent that the price will be higher, these objections would not be against them.

During 1941, at the Ohio State University, three lots of turkeys, including Broad-breasted Bronze, native Bronze, and U.S.D.A. Small Whites, were used in feeding trials. The tests* were carried for 29 weeks and at the end of that time the three lots were scored according to body measurements by a system developed by R. C. Jaap and others of the Oklahoma Agricultural Experiment Station. The following is the summary of this work.

Results of Feeding Tests on Three Varieties of Turkeys

VARIETIES OF TURKEYS	Average weight 29 weeks	Pounds of feed per pound of gain	Average both sexes	Body measurement score
Broad-breasted Bronze:				
Toms	28.44	4.53	4.65	84.6
Hens	16.46	4.78		75.6
Native Bronze:				
Toms	22.50	4.76	5.01	61.6
Hens	13.00	5.26		44.6
U.S.D.A. Small Whites:				
Toms	15.84	4.38	4.62	70.7
Hens	8.82	4.86		51.5

* The tests were conducted by A. G. Williams, graduate student,

From the standpoint of body conformation the U.S.D.A. Small Whites were superior to the standard Bronze turkeys. While all the birds were scored at 29 weeks the U.S.D.A. Small Whites were mature at 25 weeks.

Regardless of the variety selected, the strain developed should possess good market quality, including desirable body conformation, a thickly fleshed carcass, and early maturity. *Early maturity cannot be stressed too much!* The U. S. Department of Agriculture has shown that the feed consumed per pound of gain between 21 and 24 weeks was 6.54 pounds, and between 25 and 28 weeks it was 8.10 pounds. With feed at \$2.00 per hundred pounds, feed costs increased 3.1 cents a pound during the 25- to 28-week period as compared to cost during 21 to 24 weeks of age.

SELECTING BREEDING STOCK

Health and vigor are important. Both toms and hens should have a bright eye; a beak medium in length and wide at the base; and a head that is rather short but broad and deep, giving it the appearance of strength and energy.

The body should be comparatively long, broad, and only moderately deep. Birds with deep bodies are usually rangy, slow maturing, and poorly fleshed on the breast. The back should be broad with plenty of width over the ribs, indicating a good constitution. The breast should be long and prominent when viewed from in front. There should be much width between the legs and they should be comparatively short. The entire body should be well covered with flesh, especially on the breast and over the hips and thighs.

The bird should walk firmly, straight in its stride. Birds that are knock-kneed and wobbly when they move should not be selected.

Choose Birds That Mature Early.—The degree of maturity of the bird at time of selection should be considered. Birds that have reached maturity will not only have the body thickly covered with flesh, but the skin underneath the main feather tracts should also be well covered with thick layers of fat, and the body surface in between the feather tracts covered with thinner layers of fat. This gives the entire body a bleached or yellow finish, depending upon the feeding program followed.

What do pin feathers indicate? Pin feathers on the sides of the breast, hips, back, and neck indicate an immature bird. Nearly all of the main tail and wing feathers should have dry quills. The presence of green feathers showing blood in the quills indicates that the bird has *not* reached maturity. Improved dressing quality of market birds can only be secured when breeding stock having early-maturity characteristics are selected.

Birds that have the above characteristics will grade "U. S. Prime," according to the standards set up for the only official market turkey grades. Turkeys of this quality bring premium prices, because consumers are willing to pay more for them.

When to Select Stock.—The time to begin breeding stock selection is when the poults are quite young. If the flock is observed closely during the growing period, many birds of outstanding type can be identified by banding for the final selection made in the fall, before marketing time. Even at 2 to 3 months of age, birds with very desirable type can be picked out easily.

The selection of toms with very high-quality characteristics is of great importance, and every effort should be made to pick out at least twice the number that will be needed for the breeding flock the next year. The final selection of both hens and toms should be made when the birds are 25 to 26 weeks of age. By selecting only the birds that show early maturity from the

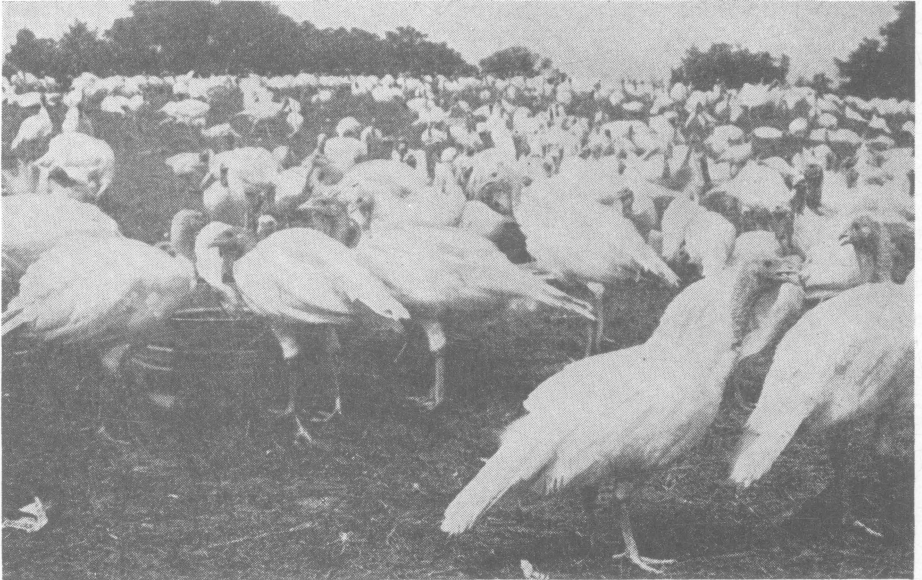


Fig. 3.—Identifying young birds of superior type and quality during growing season is important in a well planned breeding program.

standpoint of feathering, and are well finished, an earlier maturing strain can be developed in a few years. At the same time it is reasonable to expect that there would be an apparent improvement in the dressed appearance. At present, many flocks have objectionable pin feathers at 28 to 29 weeks of age. More birds are being sold by grade each year; thus it is important that turkey raisers improve the appearance of the birds as well as other quality factors.

YOUNG BIRDS PREFERRED AS BREEDERS

While limited trapnesting has been conducted with turkeys, results indicate that pullets are preferred over hens as breeders. While hens lay larger eggs, experiments show that poults from pullet eggs grow just as well and are equal in size at maturity to poults from turkey-hen eggs.

Cockerels are preferred to older toms; the greater weight of the toms causes more injury to the hens. From 12 to 15 hens can be kept with each young tom, but only 10 to 12 should be kept with yearling birds.

Another distinct advantage of keeping the stock only one year is that the older stock is removed from the premises each year, thus giving ranges and yards used a chance to clean up. Only where trapnesting and progeny testing are being carried out, would there be an advantage to keeping the flock more than one year.

TURKEY BREEDING PROGRAM

There is a real opportunity for turkey breeding work which would involve trapnesting, pedigree hatching, and progeny testing to develop



Fig. 4.—A breeding flock carefully selected and given winter protection for the production of early hatching eggs.

families of birds with superior egg production and higher hatchability. In other words, the breeding methods which have been so successful with chickens may apply to turkeys just as well.

The average turkey hen in the first year's production will lay between 50 and 70 eggs. By trapnesting and careful selection of families, 200 eggs or more per bird may be obtained. However, this would involve a longer period of production as well as greater intensity of production. Of equal importance is improvement in hatchability. It would seem that poult costs could be reduced materially by improvement in these two factors—superior egg production and higher hatchability—and, in addition, greater livability and more uniform type of market birds could be expected.

The average producer who does not desire to get deeply involved in a breeding program, should determine the type of bird most desired, then practice careful selection, and introduce new blood only when it seems undesirable to keep males from his own stock because they lack vigor or desirable market qualities. This program will result in the production of more uniform type birds. In flocks of several hundred or larger there is little danger of too close "inbreeding." If the stock was originally secured from a large flock, the small breeder can secure stock from the same breeder without danger of too close inbreeding.

Breeder Management

• • HOUSING

There has been a decided trend toward improved housing for turkey breeding stock. This makes it possible to produce hatching eggs earlier in the season. If early eggs are not wanted, a shelter with three sides will protect the flock during severe weather. If birds are housed, an open front house facing south is satisfactory. At least 8 square feet of floor space per bird should be provided.

If birds are kept in confinement, the house should be provided with a sun porch to give additional floor space and permit the birds to get out in the direct sunlight. Some breeders prefer the sun porches equipped with slatted floors instead of a wire covering.

NESTS

One large nest 2 feet square should be provided for each five or six hens. Square nests are preferable to barrels because birds tend to crowd in the barrels, and in hot weather there is danger of smothering.

YARDS

Liberal quantities of green feed for the breeding flock prior to and during the hatching season aid in improving hatchability.

For small units of 15 to 30 hens, a yard 15 by 200 feet will provide ample space and green feed. Large flocks should have $\frac{1}{2}$ to 1 acre for each 100 birds, depending upon the type of soil and pasture crop. Low fencing can be used, but the primary feathers of one wing of the females should be clipped. The males, however, should not be clipped.

Bluegrass, rye, oats, or alfalfa can be used as pasture crops. When cereal grasses are seeded, strips of sod should be left for the roosts, feeders, waterers, and nests. This will help to keep the eggs clean.

A 3-year rotation of yards for breeding stock should be followed to prevent contamination, which is certain to cause heavy losses. Very fre-

quently, blackhead occurs during the spring and results in loss of production of eggs as well as heavy death losses.

FEEDING THE BREEDERS

Because flocks lose weight during the hatching season, liberal feeding of a complete ration should be practiced during the late fall and winter to ensure the production of hatchable eggs. The growing mash and grain can be continued until about January 1, but at that time a breeder mash should be kept before the flock. The mash should contain at least 18 to 20 per cent

18 and 24% Protein Mash, 1943

Ingredient	18% Ohio	24% Ohio
	Ration	Ration
	<i>Lbs</i>	<i>Lbs</i>
Yellow corn	41	26
Wheat middlings	20	15
Wheat bran	10	10
Meat scraps	6	10
Dried milk	5	9½
Soybean oil meal	10	22
Alfalfa leaf meal .	5	9½
Salt	1	1
Oyster shell . . .	2	2
Vitamin D supplements (400 AOAC)	¾	1

protein and also provide vitamins A, D, and G.

Experimental work thus far indicates the vitamin requirement for turkey breeding hens is approximately the same as for chicken breeding hens. The 18% and 24% protein mashes shown opposite are recommended.

Higher protein mashes or concentrates can be fed if they are well fortified with the essential vitamins (see Table, page 19).

When the 18% protein mash is used, the grain fed should not exceed the amount of mash consumed.

With the 24% protein mash, grains (corn, wheat, and oats) may be fed free choice.

Oyster shell and a hard, insoluble grit should be kept before the birds.

Feeders and Waterers.—One mash feeder 8 to 10 feet long should be provided for each 75 to 100 birds. A similar amount of space should be provided for grain.

Feeders with flat or A-shaped hinged roofs are preferable to uncovered feeders. They protect the feed from sun and rain, thus there is less danger of the feed becoming wet and causing losses from molds.

Clean water, placed in contamination-proof vessels, should be provided at all times.

USE OF ARTIFICIAL LIGHTS

When hatching eggs are wanted during the winter months, the flock should be housed and a 13- to 14-hour day provided by use of artificial lights. A 40- to 60-watt bulb will furnish enough light for 200 square feet of floor space. Morning or evening lights, or a combination of morning and evening

lights can be used, whichever is most convenient. The lights should be started one month before eggs are wanted.

Some producers put the toms under lights about three weeks earlier than the hens, believing that fertility in first eggs is improved.

SADDLES PREVENT TORN BACKS

Many hens are badly torn by the toms during mating. This is responsible for the many blue backs in breeding flocks. Often they are so badly injured that they have no market value. Some clip the ends of the toe nails to prevent injury. Others cut the nails off before the hatching season. It has also been suggested that the fourth toe be removed prior to the hatching season.

A heavy muslin saddle will prevent most of this injury and since they will last several years there is but little expense. There is reason to believe that where hens are run outside, the saddles may be beneficial in protection during cold rainy weather.

HANDLING BROODY HENS

Breaking up the broody hens quickly is important to maintain good egg production. When the hens are not under lights, it is a good practice to remove all hens that are on the nest at dark. They should be moved to a pen outside of the breeding pen; at least three small pens should be provided so that the broody hens can be held three days and then put back with the flock. A tom placed in each broody pen is desirable.



Care and Incubation of Hatching Eggs

High hatchability not only requires proper incubation but careful handling of hatching eggs before they are set in the incubator. Eggs should be gathered at least three times a day, especially in warm weather. They should be "cooled out" in wire egg baskets or wire bottom trays overnight, and then placed in cases equipped with duck egg fillers.

The eggs should be kept at a temperature between 45 and 60 degrees. A temperature between 50° and 55° is best. The basement or cellar where the eggs are kept should have a high humidity. The relative humidity or percentage of moisture in the air should be at least 70° to 75° for ideal conditions which will prevent evaporation and air cell development. Eggs should be set every week or ten days, if possible, but can be held two to three weeks if optimum holding conditions are provided. If hatching eggs are held more than one week they should be turned daily by tilting the case so that it sets at a 45° angle.

RELATION OF EGG SIZE TO HATCHABILITY

Studies have been made on hatchability of eggs of various sizes. Eggs weighing between 2¾ and 3½ ounces seem to hatch better than larger or

smaller eggs, and mortality is lower than in poults produced from the extremely large or small eggs.

INCUBATION OF EGGS

Poults should always be hatched in incubators. This practice prevents the possible spread of disease organisms from the old stock to the poults. It also keeps the hens in production, which will enable the producer to set a large number of eggs at one time. This saves labor and permits a more uniform flock.

Correct incubation involves proper temperature, ventilation, moisture, and turning. In general, the instructions of the manufacturer of the machine should be followed unless consistently poor hatches are secured.

While the incubation of turkey eggs requires 28 days, many have assumed that the incubator should be operated the same as for chicken eggs. Turkey eggs should be set *separately*, so that they can be incubated at a slightly lower temperature. It has been suggested that one reason for many poor hatches is the drying out caused by rapid movement of air in the machines.

Poults with "spraddle legs" are common with some incubator operators. Experiments indicate that this may be due to eggs being incubated at too high temperatures.

The past few years, pullorum disease has been present in poults. No doubt, the spread of this disease has been caused by incubating chicken and turkey eggs in the same machine. They should *not* be incubated together, and many breeders are now pullorum-testing their breeders to prevent possible spread from the egg to the poult. There is good evidence that the tube agglutination test is the only method known at this time that shows a high degree of efficiency in removing pullorum reactors from breeding flocks.



Brooding and Rearing the Poults

Brooding poults differs somewhat from brooding chicks in that units must be smaller. Poults are slower than chicks in learning to eat and are more likely to pile up and smother if brooder temperatures are not kept within close limits. Usually, poults should be provided heat longer than chicks, because even after they are well feathered they are inclined to pile up if the weather turns cool at night.

BATTERY BROODING

Battery brooding for the first two to three weeks is becoming a more common practice. The poults seem to learn to eat quicker, thus some of the more backward poults are saved that might get weak and die if brooded on the floor. Battery brooding requires a well lighted, well ventilated room. Unless the battery brooder is used several times during the year, it is doubtful if the average turkey raiser should invest in such equipment.

Not more than 75 to 80 poult's should be kept per standard size battery deck during the first week, and not more than 50 to 60 during the second week. One-third inch mesh floor should be used in the battery.

SUN PORCHES FOR YOUNG POULTS

It is almost essential that poult's be brooded on sun porches for the first 6 to 10 weeks, depending upon the time of year. The importance of the sun porch in controlling blackhead and other diseases cannot be over-emphasized.

Multiple unit or colony brooder houses are most commonly used for turkeys. A house 10 by 12 feet or 10 by 14 feet, equipped with a sun porch of similar size, will accommodate not more than 150 to 200 poult's up to 8 weeks. Regardless of the size of brooder house or pen, the number of poult's



Fig. 5.—Keeping poult's in batteries for the first 2 to 3 weeks reduces labor and poult mortality.

should not exceed 250 to 300, to obtain the best results. Three-fourths to one square foot of floor space is essential when poult's are confined the first 6 to 8 weeks.

The sun porch should never be smaller than the brooder house or pen; preferably, it could be larger. The floor of the sun porch may be covered with $\frac{3}{4}$ - or 1-inch 16-gauge hexagon wire netting or 1-inch mesh welded wire of heavy gauge. Because of wire shortage, some may find it necessary to use narrow lath nailed $\frac{3}{4}$ to 1 inch apart over the floor frame.

Sun porches should be at least 30 to 36 inches above the ground to facilitate easy cleaning. Covering the droppings with lime or phosphate is desirable, to keep flies from laying eggs in the droppings.



Fig. 6.—A sun porch is essential to carrying out good sanitation practices during the brooding period.

Some turkeys are raised to maturity in confinement. When this method is used, approximately 6 square feet of floor space should be provided. After the poults are 10 to 12 weeks of age, heavy gauge 1- by 2-inch mesh welded wire, or slats spaced $1\frac{1}{2}$ inches over the floor should be used. While



Fig. 7.—Confining the turkeys in yard on a concrete floor reduces disease losses. Good drainage is essential.

this method reduces the possibility of disease outbreaks, cannibalism is sometimes a problem. A ration that is of coarse texture and feeding heavily of oats will probably lessen trouble from this cause.

Anti-pick devices are now on the market for turkeys and some growers have reported favorable results.

Litter.—Fine gravel, shavings, and coarsely ground corn cobs make satisfactory litters. It is well to cover the litter with feed sacks the first few days, so that the poultz will not learn to eat the litter before learning to eat feed.

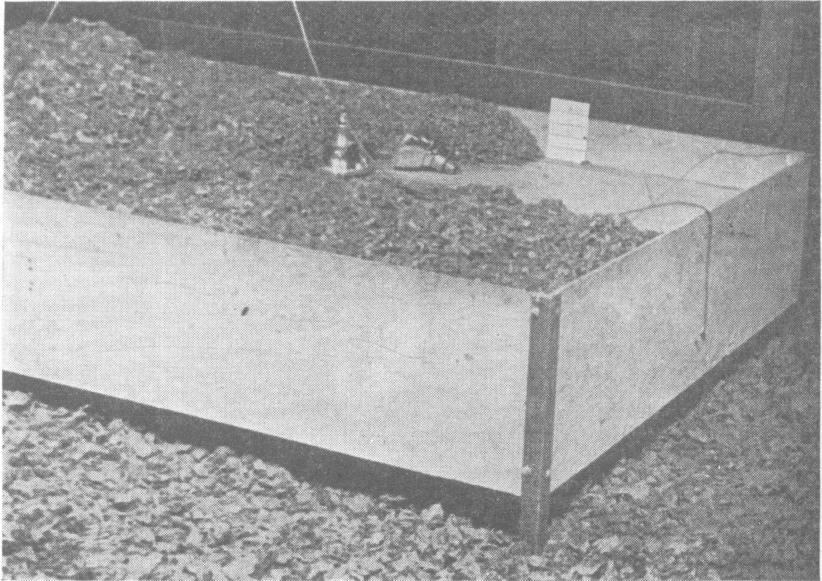


Fig. 8.—With decreased cost and the increase in use of electricity, electric hovers are becoming more popular. This home-made one uses a projector lamp.

EQUIPMENT FOR BROODING

Brooder Stoves.—For late spring and early summer brooding, oil or electric brooders are preferable to most other sources of heat. Electric brooders are especially desirable, because they keep the temperature under control. When current costs not more than 3 cents per kilowatt hour they are as economical as other types of brooders. Only one-fifth to one-third the labor is required for electric brooders as for kerosene or coal brooders.

Brooding temperatures should be approximately 90 to 95 degrees under the hover for the first week and reduced 5 degrees each week until 75 degrees is reached; this temperature may be maintained as long as the poultz require heat. Electric brooders should be maintained at a temperature of 98 to 100 degrees for the first 3 to 4 days. Ventilation is important.

A ring of metal, building paper, or cardboard should be placed 18 to 24 inches on the outside of the hover until the poults learn to roost around the hover. This also prevents floor drafts which will cause poults to pile up and smother. After the guard is removed the corners should be protected with wire until the danger of piling is over.

Poults are apt to pile up after they are fully feathered, and if cool nights occur after heat has been discontinued they should be watched closely. Until the poults are ready for range it is desirable to leave the brooder in the house for such an emergency.

A dim light or lantern should be hung above the hover to discourage piling. The attraction light under the electric hover is sufficient.

Provide Roosts.—Roosts should be placed in the brooder house by the time the poults are 3 weeks old. They can be made slanting with 2 x 4's or 2 x 2's used for roosting poles.

Feeders and Water Troughs.—Two chick-size feeders 3 feet long should be provided for each 100 poults, and after 2 to 3 weeks they should be replaced with larger feeders, to reduce feed waste and give more feeding space.

One 3-gallon water fountain should be provided for each 75 poults. Placing the water fountains on wire covered frames will reduce contamination from the litter.

Feeders and water troughs placed along the sides of the sun porch will reduce labor required for cleaning and filling them. Most of the droppings will be near the edge of the sun porch, which facilitates cleaning.



Feeding Growing Turkeys

The nutritional requirements of poults are not identical to those of chicks. Poults grow more rapidly than chicks. Experimental work on turkey feeding indicates that, as compared with chicks, poults up to 6 to 8 weeks require about 25 per cent more protein; twice as much vitamin A; about three times more vitamin D; and 25 per cent more vitamin G (riboflavin).

In recent years most turkey starting rations range from 24 to 26 per cent protein. Growth studies indicate that this is about the optimum level for both economical and rapid growth. After 6 to 8 weeks, poults do not require as much protein in the ration, and the amount may be reduced by feeding grain free choice.

VITAMIN SUPPLEMENTS

Vitamin A is especially important, because it is the health as well as the growth factor. Nutritional roup, often experienced in turkey flocks, results

when there is a deficiency of this vitamin. Because of present restrictions on the use of vitamin A from fish oils, liberal quantities of yellow corn and alfalfa leaf meal or dehydrated alfalfa should be fed in the turkey ration.

During confinement, poults should have 7 to 10 per cent of the high quality alfalfa leaf meal in the mash. High grade fish oil or dry vitamin D supplements should be used to supply the vitamin D until the poults have access to direct sunlight. Poults seem to respond to high levels of vitamin D for the first 2 or 3 weeks. However, after the poults are out on the sun porch, the amount of vitamin D can be reduced one-half after the poults are 5 to 6 weeks old.

Sun lamps are being used by producers as a substitute for part of the vitamin G normally put in the starting ration. If sun lamps (S-4 type) are used, exposing the poults to 3 hours daily would be satisfactory under most conditions.

Recently many vitamin G (riboflavin) supplements have been placed on the market. Dried distilled grains with solubles, concentrated whey, and fermentation by-products are being used instead of dried buttermilk and dried skim-milk. Fish meal is a fairly good source of this vitamin, but the supply is limited. Pea-green dehydrated alfalfa meal or alfalfa leaf meal (which contain 20 per cent protein) also are good sources of this vitamin.

Five to 7 pounds of dried milk or the equivalent in other vitamin G supplements should be provided for the first 6 to 8 weeks. In addition 7 to 10 per cent high quality dehydrated alfalfa, or alfalfa leaf meal should be included.

Other vitamins and vitamin factors shown to be important are not likely to be lacking when a variety of protein and carbohydrate feedstuffs are used. There are 12 known vitamins at present. If more than one good source of protein is used, and sufficient quantities of vitamins A, D, and G are included, rapid growth will be experienced. If any of these essential vitamins are lacking, nutritional disorders and poult losses will occur.



Fig. 9.—If birds are given plenty of floor space they can be successfully raised on sun porches to maturity.

STARTING RATIONS

The 24% Ohio Ration is recommended for starting poults. The standard ration below (on left) should be fed the first 6 to 8 weeks unless poults are on pasture; under such conditions the modified ration (at right) can be used with satisfactory results.

24% Ohio 1943	24% Modified for Range
Yellow corn 26 pounds	Yellow corn 26 pounds
Wheat middlings 15 "	Wheat middlings 15 "
Wheat bran 10 "	Wheat bran 10 "
Meat scraps 10 "	Meat scraps 10 "
Dried milk 7 "	Dried milk 4 "
Soybean oil meal 22 "	Soybean oil meal 25 "
Alfalfa leaf meal (20%) 7 "	Alfalfa leaf meal (20%) 7 "
Salt 1 "	Salt 1 "
Oyster shell 2 "	Oyster shell 2 "
400 AOAC units Vitamin D supplement 1/2 "	

Poults are sometimes slow in learning to eat mash when placed in the brooder house. Some producers use very shallow feeders or cup egg case flats, for the first few days to encourage mash eating. However, this starts the birds eating from the floor, which may lead to excessive litter consumption later. Sprinkling cottage cheese or chopped tender green feed on top of the feeders will tend to attract their attention and prevent them from becoming too weak before eating the mash.

When electric brooders are used, it is desirable to place feeders under the hover for the first 2 days.

Feeding and Range Management



FEEDING METHODS

Many growers still use 18% to 20% growing mashes along with grain. However, it has been shown that it is more economical to feed a 24% to 32% mash and free choice of grains. If this method of feeding is followed, the change should be made at 6 to 8 weeks. The birds will adjust the protein intake much more readily.

The Washington Experiment Station has reported very successful results when high protein concentrate feeding and grains free choice was compared to a 20% growing mash and grains. From 9 to 28 weeks the birds fed concentrate and grains required 3.8 pounds of feed to produce a pound of gain, whereas 4.9 pounds of feed was required by the lot of birds fed the 20% growing mash and grains.

The birds fed the concentrate and grains free choice were 2.1 pounds and 0.9 pound heavier for toms and hens respectively.

The advantage of greater utilization of home grown grains, thus reducing handling, milling, and transportation charges should not be overlooked at this critical time.

The 18%, 24% modified for range, 32% standard concentrate ration, and the 32% modification are given below. Grains should be fed with all of the rations listed.

INGREDIENTS	18% Ohio-42	24% Modified for Range*	32% Ohio-42	32% Modified for Range
	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>
Yellow corn	40	26
Middlings	20	15	10	10
Wheat bran	10	10	10	10
Meat scraps	5	10	20	20
Dried milk	5	4	7**	5
Soybean oil meal..	12	25	35	40
Alfalfa leaf meal..	5	7	12	7
Salt	1	1	2	2
Oyster shell	2	2	2	2

* When birds are kept in confinement during the growing period the standard 24% ration should be used (see page 18).

** Dried whey can be used to replace dried milk but 5 lbs. additional soybean oil meal should be added to replace 3 lbs. bran and 2 lbs. middlings to maintain the protein level. In the modified rations this is not necessary.

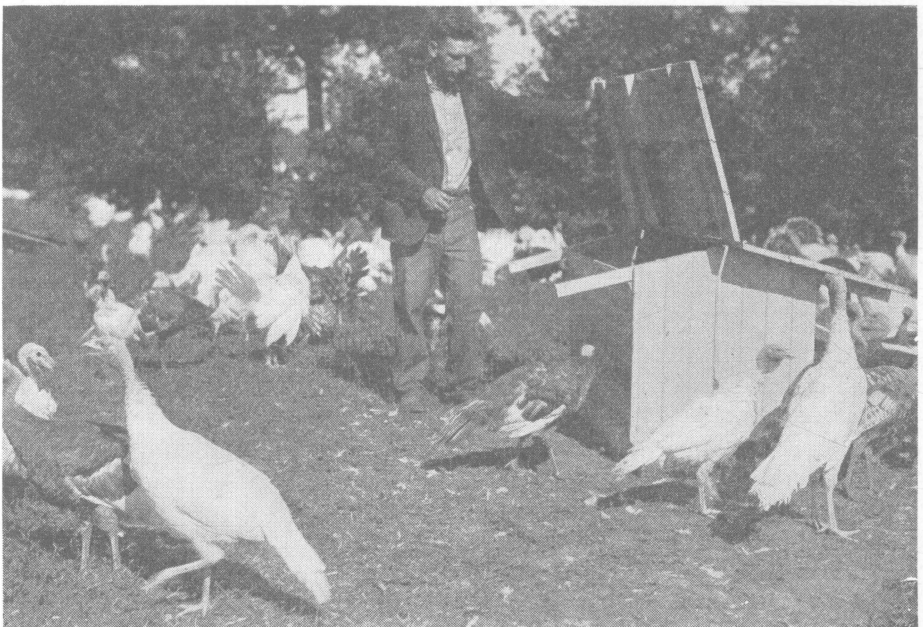


Fig. 10.—Range feeders similar to the one shown require less frequent filling. This reduces labor costs.

Where it is desirable, ground grains such as wheat and oats can be used to replace mill feeds. Oats should be used to replace bran and coarsely ground wheat used as a substitute for middlings. It is not desirable to use ground wheat to replace both bran and middlings. When wheat is used, it should be coarsely ground.

Poults should be encouraged to eat whole grains at an early age, especially when high protein growing rations are used. Placing grain on top of the mash will get the birds' attention and they will consume larger quantities of grain during the first week to 10 days.

Inasmuch as the birds prefer other grains to corn during hot weather, wheat, oats, or barley should be fed in larger amounts than corn at such



Fig. 11.—Good pasture naturally reduces amount of high protein mash consumed by growing turkeys.

times. Feeding oats heavily seems to discourage feather picking and aids in good feather growth. When wheat is not too high in price as compared to corn and oats, it can be used in the grain mixture.

Corn is preferred by most growers for cold weather and during the last few weeks before marketing. However, where a light colored skin is desired, wheat, oats, and barley should be fed, because the yellow corn will produce a yellow skin.

Hard, insoluble, coarse grit should be kept before the flock when the birds are out on range to prevent gizzard and crop-bound conditions which are likely to result from the turkeys consuming dry, fibrous material on the range.

THE USE OF PASTURES

Good, tender pasture crops aid in maintaining good health in growing turkeys. While there is need of more accurate records on the value of pastures in reducing production costs, many are of the opinion that at least 20 to 30 per cent savings in feed costs could be made if a good pasture program is followed. The acreage that should be provided will depend upon the fertility of the land and the crops used. Under ordinary conditions, 1 acre of pasture should support from 100 to 200 growing turkeys.

Bluegrass provides pasture up to June 1 to 15 for breeders and for poults that have been hatched early. In most seasons, bluegrass dries up after mid-June, and is likely to cause crop and gizzard bound conditions if the flocks are on it after this time.



Fig. 12.—The water tank and feed rack mounted on a truck or trailer saves much time in feeding birds on the range.

Alfalfa provides good summer pasture, and, because of its ability to grow through dry weather, provides a large quantity of feed.

Clover will not stand the severe grazing, but can be used in legume mixtures to an advantage.

Ladino clover is being used in some states for turkeys. Two pounds per acre in a clover, alfalfa, and timothy mixture improves the pasture. *Rye grass* and *orchard grass* are sometimes included in such mixtures.

Where legumes cannot be provided, a succession of plantings of other crops should be used. *Oats* and *rape* provide early pasture for late spring or early summer. *Sudan grass* seeded at the rate of 30 to 40 pounds per acre

from May 15 to June 1 will provide good pasture during July, August, September, and early October.

Barley and *rye* seeded in early August will produce an additional quantity of pasture during late fall. However, it should be seeded in strips so that roosts, feeders, and waterers can be kept on sod to avoid mud where the equipment is located.

To secure maximum benefit from the pasture crop, lime, phosphate, and potash should be applied in quantities needed for good growing conditions.

RANGE EQUIPMENT

Range equipment should be planned to save as much labor as possible. A truck or trailer with water tank and feed rack mounted is very desirable when several hundred or more turkeys are raised.

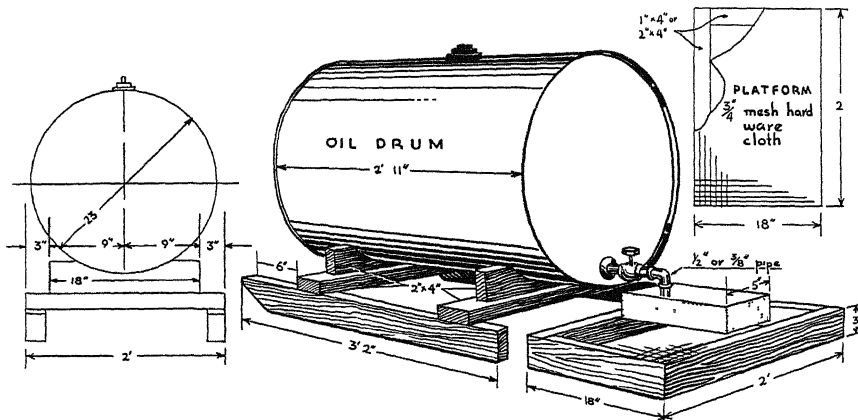


Fig. 13—A barrel waterer mounted on skids for range.

Feeders should be designed so that they will not need filling more than once or twice daily. Some prefer the large feeders similar to hog feeders which will hold enough feed for several days without refilling.

Feeders of many designs have been used. Some prefer them to be narrow, slanting in at the top, while others prefer the box shaped ones with the bottom 10 to 12 inches wide and sides 6 to 8 inches high. Flat or A-shaped hinged roofs protect the feed from sun and rain, and will aid in reducing loss from winds. A wire run horizontally along the sides of the feeders gives the birds a place to clean the feed from their beaks.

Regardless of the type of feeders used, one 8- to 10-foot feeder should be provided for each 75 to 100 birds.

Barrel waterers equipped with float and pan or trough and placed on skids (see Fig. 13) or hog waterers which hold a large amount of water are

desirable for range. Barrels sawed in half, troughs, and similar fountains require more labor in filling and keeping them clean. If this type of waterer is used, an inexpensive conical shaped guard can be made of plastering lath or snow fence to keep the birds from getting their feet in the water.

RANGE ROOSTS

If poults are moved to range when less than 8 to 10 weeks old, range shelters should be provided. Providing enough shelter room for the entire flock as they grow larger is expensive and not necessary, although shelters provide shade as well as roosting space. The shade is very important in hot weather where there is no natural shade. If shelters are used, they can be constructed with roosts underneath and on top of the roof, to provide more roosting space.

Shelters with high roosts are not necessary and are expensive to build. It is preferable to have slanting

roosts and droppings protected by placing heavy gauge wire netting or welded wire underneath the roosts.

After the birds are fully feathered — that is, their backs well covered with mature body feathers, they can roost outside without harm. Open roosts should be built on skids for quick and easy moving. They need not be more than 2 to 4 feet high. Two-by-fours, preferably laid flat, or poles can be used for roosts. At least 12 inches of roosting space should be provided for each bird from 4 months of age to maturity.



Fig. 14.—Poles, or 2 by 4's placed 2 to 4 feet above the ground, provide the necessary roosts on range.

RANGE PRACTICES

Good range management is essential to prevent contamination which will lead to disease outbreaks. Methods should be followed to get the best use of the pasture and keep the amount of labor required to care for the flock to a minimum.

Allowing birds free range is commonly practiced by many growers. Where this method is followed, a larger range area must be provided and it is more difficult to utilize the entire area to the best advantage. Unless the equipment is designed so that it can be easily moved, some areas are likely to become heavily contaminated with droppings which are likely to cause disease outbreaks.

It is preferable to provide limited range for the flock by using low fencing and moving to a new area every 7 to 14 days, depending upon topography, conditions of the pasture, and the weather. Sixty to 70 rods of 36- to 40-inch fence makes an area large enough for confining 1,000 birds to one area. However, where large numbers are ranged as one unit, the size of the pen need not be quite as large proportionately if the flock is moved once each week.

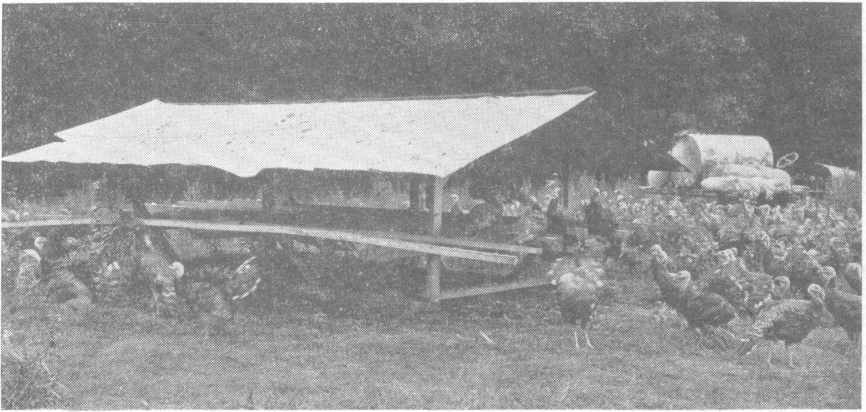


Fig. 15.—An inexpensive shelter for young poults on range gives protection from rain and hot sun.

This method provides for greater utilization of the range, because the temporary pens can be located so the entire area will be used before marketing time. This method of handling the flock will reduce to a minimum the possibility of disease outbreaks. However, in event that trouble should be experienced, the flock can be moved immediately to a new area that has not been contaminated by the flock. Where temporary pens are used, the portion of the range to be used in late summer should be clipped to reduce weed growth and keep the growing grasses and legumes high in protein and vitamin content.

Keeping the flock on the move is no doubt the best way of preventing heavy losses from blackhead and other diseases and parasites. Selecting ranges that have been in crops and have had no chickens or turkeys on them for at least 2 years is essential. It is important that such ranges do not receive

drainage from other ranges used in the two preceding years. All turkey and chicken droppings and manure from houses and sun porches should be kept off the fields that are to be used for turkey range.

On rolling land, hill top ranging is desirable (see Fig. 16).

Where land is relatively flat it should be well drained, because wet areas are good places for disease to break out.



Fig. 16.—Good range insures growing birds ample vitamin and protein supply. Hilltop range reduces disease and parasite losses.

Finishing and Marketing Turkeys

Most strains of larger varieties of turkeys do not reach maturity before 26 to 28 weeks. It is usually impossible to get a well finished bird before it reaches maturity, especially during warm weather. The importance of selecting for earlier maturity cannot be overlooked.

Continuing to feed a good growing mash and all the whole grains the flock will consume is usually preferable to wet fattening mashes.

Yellow corn is readily consumed by the birds in cool weather, thus it should constitute the larger portion of the grain ration.

Finishing rations should contain more fat than growing rations. About 10 per cent fat is advisable. To get this, it might be necessary to add from 2 to 5 per cent of corn oil or peanut oil, if available. Adding such fats tends to make the skin more yellow, especially if used more than 10 days to 2 weeks.

Where it is desired to feed a wet fattening mash, it should be mixed with liquid milk or buttermilk and fed two to three times daily. Birds finished in this manner tend to shrink more in moving to market than those fed on dry feed.

If the flock has been on a large area, the size of the pen should be smaller during the finishing period. However, the birds should not be confined too closely, or they will spend too much time along the fence trying to get out, and thus not consume enough feed.

MARKETING TURKEYS

Greater returns for a flock of high quality turkeys can be secured if they are well dressed, graded under official grades, and packed attractively. Ohio has not adopted the use of United States grades for turkeys. Many of the other important turkey states have adopted these grades, which are becoming more generally understood and recognized by the more discriminating consumers.

For complete information on dressing turkeys for market, secure the U. S. Department of Agriculture Farmers' Bulletin No. 1694, Dressing and Packing Turkeys for Market.

LIVE GRADING IS IMPORTANT

Even though the entire flock is the same age and has had the same care during the growing period, not all birds will be ready to market at the same time. The immature birds can be held back until they have had a chance to put on better finish.

Each bird should be examined for the amount of flesh. That is, the breast should be thickly covered with meat so that the bone does not protrude beyond the meat. The backs, hips, and other parts of the body should be well covered. No dark meat should show through the fat deposited under the skin. To determine this, the skin should be exposed by blowing against the feathers. When the bird is ready for market, a broad layer of fat appears on the back from the neck to the tail. Streaks of fat are found under the feather tracts on each side of the breast, and also appear over the hips. When the turkey is well fattened, these streaks are connected by thinner layers of fat so that the entire carcass is covered.

Pin feathers are very objectionable and are responsible for many birds being placed in lower grades. They are more noticeable over the hips, back, sides of the breast, and abdominal regions of the body. A bird that is finished should be practically free from pin feathers, especially on the breast, and relatively few over the other parts of the carcass. If pin feathers are present, they should be at least $\frac{1}{2}$ inch long so that they can be removed without smearing black pigment under the skin.

The absence of a large number of immature main tail feathers is an indication of maturity. If more than two to four have blood in the quill, the bird has not reached maturity, and should not be dressed.

In order for the bird to be classed as a U. S. Prime or U. S. Grade A bird, it must be well finished and well dressed, including proper bleeding. Before marketing high quality birds, they should meet the requirements just given. It is probable that permanent price ceilings on turkeys this year will be placed on standardized grades, and therefore the producer will gain who markets only the turkeys of high quality.

Diseases of Turkeys

Because the grower has a large investment in a flock of turkeys, it is important that disease losses be kept low so that there will be a profit above expenses. It often seems that a turkey's ambition is to die before it can be marketed. A sound management program must be followed to keep them alive.

PULLORUM DISEASE

During the past few years substantial losses in poults from pullorum disease have been experienced. It is apparent that a pullorum control program for turkeys is needed, and no doubt will become widespread in the near future. Much of the infection in turkey flocks has come about by hatching poults and chicks in the same incubators.

The California Experiment Station has shown that the rapid whole-blood test, which is widely used for chicken flocks, is only 45 per cent efficient as compared to the tube agglutination test, when both methods are used.

Because of the heavy losses that may occur in poults, breeders should test their flocks for pullorum disease. However, until the rapid whole-blood test shows more promise in accuracy, the tube agglutination test should be used.

COCCIDIOSIS

Poults are affected with coccidiosis, and losses often run high. Brooding on sun porches and using clean range are the only means of prevention. In case of an outbreak, a 40 per cent dried milk flush for one or two days and frequent cleaning of the houses should be followed.

SLIPPED TENDONS

Poults are often affected with slipped tendons. Since it is caused by too much mineral or an improper mineral balance, do not add minerals unless included in the formula used.

Pox

Turkeys frequently have pox, indicated by the scab-like lesions on the skin about the head and cankers in the mouth. Where the disease is present in the community or pox has been present in the flock the previous year, the flock should be vaccinated. See Bulletin 115, Prevention and Control of Poultry Diseases, for details.

PENDULOUS CROP

This condition is often found in poults less than 2 months old, and it may develop at any time. There is evidence that the condition is hereditary.

The trouble often develops during hot weather, when the consumption of water is high. Reducing the salt in the ration will probably help when this condition exists.

Pendulous crop may also develop from a gizzard-bound condition. Birds consuming large quantities of dry fibrous material and not receiving hard insoluble grit are likely to become gizzard-bound. The birds can be treated by inserting a long tube into the gizzard, and pouring through the tube a small amount of mineral oil.

Turkey flocks on range should always have plenty of large size insoluble grit. Hard pea-size gravel can be used.

TRICHOMONIASIS

This disease has spread over many parts of the United States. It has been present on the west coast for the past ten years. Trichomoniasis is caused by a one-celled protozoon which causes serious inflammation in the intestines. It has been reported that in some sections the parasites are found in the upper digestive tract.

Symptoms.—The birds appear listless; the wings droop, the birds sit around in a humped position. The droppings appear foamy, brown, and semi-liquid. Poults usually die very rapidly, but may linger 3 to 4 days. The disease usually affects poults 6 to 10 weeks of age. The attack starts suddenly and may cause 25 to 50 per cent mortality. It usually disappears in a few days.

Postmortem usually shows an empty crop and intestines somewhat inflamed; the contents are foamy, showing many gas bubbles. The intestines appear to be thin.

When a scraping from the intestinal tract is placed under a microscope, the presence of many trichomonads is revealed.

Treatment.—Although there have been severe outbreaks in some areas, very little is known on control methods. Some growers have reported success by using a 40 per cent dried milk flush for a short period as a means of getting the birds to eat, and keep many from becoming too weak due to loss of appetite.

BLACKHEAD

Every experienced turkey raiser knows the external and internal symptoms of this disease. However, when the disease breaks out at an early age, birds die so rapidly that the trouble is sometimes mistaken for some other disease or parasitic condition.

Symptoms.—Birds affected soon become droopy, wings tend to drop, and the typical wobbly staggering gait is noted when the bird moves about. Birds tend to sit around with the neck drawn back against the body and the back

humped. Watery, sulfur-yellow or greenish-yellow diarrhea is evident, especially after the birds show the external symptoms.

In the early stage, there is often only a small portion of the droppings the sulfur-yellow color, the remaining part of the droppings being normal. The feathers around the vent and on the back of the hocks are frequently stained with the sulfur-yellow droppings.

Along with these symptoms the birds lose weight rapidly and the breast-bone becomes sharp due to the flesh wasting away.

Internal examination usually shows enlarged ceca, which are filled with bloody or cheesy-like exudate. These lesions actually penetrate the tissue of the ceca.

Method of Transmission.—The disease may be transmitted through the droppings of affected birds which, if they survive, are carriers. Earthworms and other forms of animal or insect life which burrow through the soil that is contaminated play an important part in the spread of the disease.

The cecum worm in the chicken seems to be the most important carrier. The eggs of this parasite, which protects the blackhead organism, pass out of the body in the droppings of the chickens or turkeys and are picked up by poults on contaminated ranges.

Method of Control.—Although there are numerous so-called Blackhead cures, *none have proven to be highly satisfactory.* Therefore, preventive measures must be resorted to, to prevent heavy losses. Complete isolation of the turkeys from the chicken flock is extremely important if both are raised on the same farm. Ranges do not clean up in one year's time, so that at least two years and preferably three should elapse before turkeys are put on a range that was used previously for turkeys or chickens. Also, no chicken or turkey droppings should be spread on the land during this time.

Even when clean ranges are used, proper range management is important. Moving feeders and waterers every few days prevents contamination

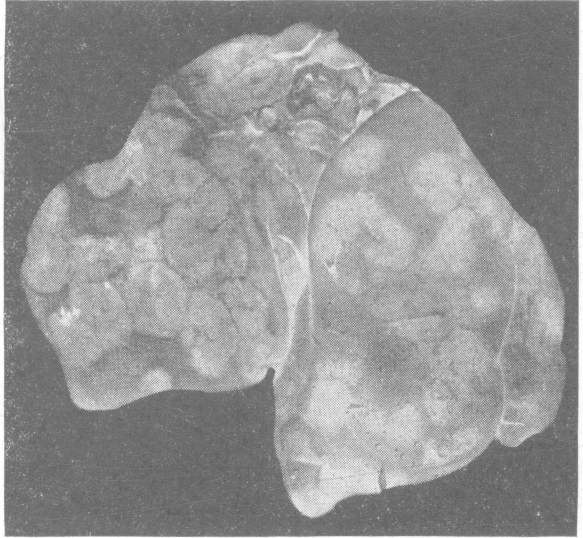


Fig. 17.—Typical liver lesions of young turkeys with blackhead.

on the areas where the birds spend much of their time. Wire covered platforms should be placed underneath the water fountains or troughs, whichever are used, to prevent birds picking the moist ground around the waterers.

Treatment if the Disease Occurs. — In the case of an outbreak, a clean-up program should be followed. If the flock is small, all birds should be handled and those showing external symptoms removed. The flock should be given a mash feed containing about 40 per cent dried milk for 1 day, then be moved to a new location on the range the second day. Each morning thereafter, if evidence of blackhead is present in the droppings under the roosts, the flock should be observed closely in order to pick out the affected birds. Quite often they are but a short distance from the roosts.

In case of large flocks where it is not possible to handle the entire flock, daily observation to detect affected birds should be practiced. If questionable

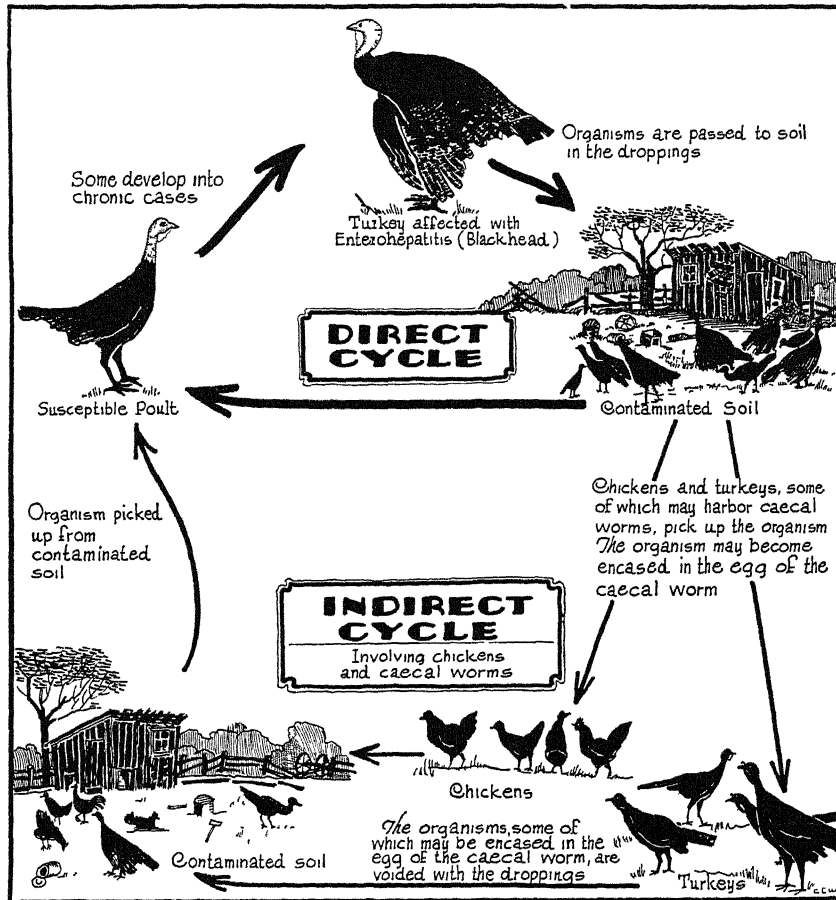


Fig. 18.—Life cycle of *Histomonas meleagridis*, the parasite causing blackhead in turkeys.

birds are removed, confine them in a small pen or coop and observe the droppings. Birds that improve and seem healthy should never be returned to the flock because they are carriers. Producers who have practiced continued removal of birds by daily observation of the flock have been able to keep down losses to a low level.

Recently, the drug called phenothiazine has become widely used as a treatment of parasites in livestock. The Washington Experiment Station demonstrated that phenothiazine was effective in removing ceca worms and, therefore, may be of value in a treatment to prevent the spread of Blackhead. They were able to stop losses where an outbreak had occurred.

One to two pounds of phenothiazine are recommended for 1,000 growing birds. Feed should be taken away early the day before the treatment, so that the birds are hungry. The quantity of phenothiazine should be mixed with enough mash so that all birds can feed on it for one or two hours. Moisten the feed to encourage consumption of the drug. For individual treatment, feed should be taken away the afternoon before and one 0.5 gram tablet given each bird.

This is definitely a treatment for the removal of parasites and not a cure for the disease.

Some of the diseases and nutritional disorders affecting turkeys are not discussed here. For detailed information on other diseases and parasites, see Extension Bulletin 115, Prevention and Control of Poultry Diseases.

THE OHIO STATE UNIVERSITY
Cooperating with
THE UNITED STATES DEPARTMENT
OF AGRICULTURE



AGRICULTURAL EXTENSION SERVICE

H C RAMSOWER, Director

Columbus, Ohio

Printed and distributed in furtherance of the
Acts of May 8 and June 30, 1914

Printed by
THE OHIO STATE UNIVERSITY PRESS
Columbus, Ohio