

Observations with Broad Breasted Bronze Turkey Breeding Stock

by

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The number of turkeys produced annually in North Dakota has dropped from two million in 1933 to less than a million in 1944. Several factors are responsible for this decline, including lack of labor on the farm, increase in predatory animals, and scarcity of good poults. There is little doubt that the latter factor has greatly influenced the reduction in number of turkeys raised, particularly during the past several years. A small percentage of poults raised are hatched in the state and a still smaller percentage are hatched from eggs produced in North Dakota. Turkey production in North Dakota has, therefore, been dependent upon other states, and as a consequence during recent years when there has been an increased demand in other areas for eggs and poults, the local turkey industry has suffered. The establishment of more turkey breeder flocks in the state is necessary in order that an adequate number of high quality poults will be available to turkey growers.

During the past year a flock of Broad Breasted Bronze turkey breeders was kept at the poultry plant of the North Dakota Agricultural College. These turkeys were obtained as poults on May 16, 1944 from a hatchery which hatched them from eggs obtained from a North Dakota breeder. The poults were not pedigreed. From these poults 60 hens were raised and every hen was kept for these studies. Therefore these observations are based on the performance of an unselected population. However, it should be pointed out that these birds were very uniform in appearance, size, and fleshing, and except under conditions of very rigorous selection, none would have been culled.

Management of Breeding Stock

The 60 hens were divided into four pens with 11 hens each and

two pens of 8 each. In each of the four 11-hen pens a tom from the same hatch as the hens was placed on January 3. These toms had been exposed to artificial lights for two weeks before they were placed in the pens. Commencing January 3 the hens were exposed to artificial lighting so as to provide 14 hours of light per day. An automatic electric switch was used and lighting was provided both mornings and evenings. These four pens were housed in a 16' x 32' uninsulated poultry house in which there were two 60 watt incandescent light bulbs. The pens of 8 hens each were housed in two 10' x 14' brooder houses in which 40 watt bulbs were placed. No toms were used in these matings as fertilization was accomplished by artificial insemination.

The turkeys were fed a mash and grain ration. The mash was the reg-

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ular chicken mash used by the experiment station poultry department with an additional 5 percent of dehydrated alfalfa leaf meal. The turkey breeder mash had the following composition:

Ground yellow corn	20	lbs.
Wheat bran	20	lbs.
Wheat middlings	20	lbs.
Ground oats	10	lbs.
Meat and bone meal	14	lbs.
Soybean meal	10	lbs.
Alfalfa leaf meal*	10	lbs.
Salt mixture**	1	lb.
Delsterol	0.12	lb.

*Dehydrated alfalfa leaf meal preferred.

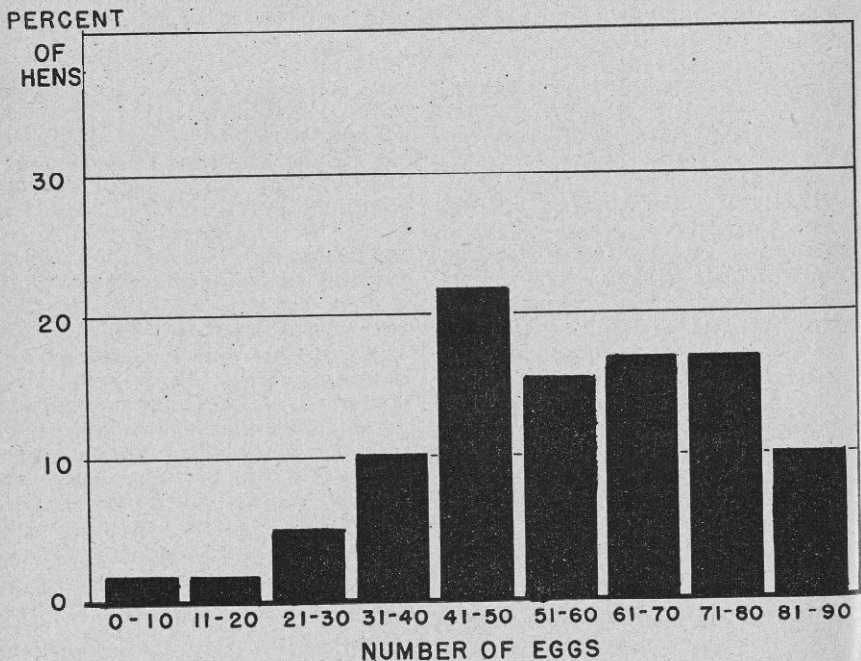
**10 grams manganous sulfate added to one pound of iodized salt.

The mash was available in hoppers at all times. A grain mixture of equal parts by weight of yellow

corn and heavy oats was hand-fed once each day on top of the mash. During January and February the amount of grain was limited to approximately 4½ ounces per bird per day, and for the remainder of the season the amount was reduced to about 4 ounces per bird per day. Granite grit and oyster shell were available at all times. All hens were trapnested.

The observations reported herein are based upon the six pens of turkeys as a group. As these pens were involved in some experiments concerned with the reproductive efficiency of Broad Breasted Bronze turkeys, certain phases of the management were not the same in all pens. Two of the four 11-hen pens were confined throughout the experiment and two pens had access to outside yards. The toms in two of the pens were switched or rotated weekly, whereas the toms in two of

Figure 1



Eggs per hen. Percent of turkey hens in several egg production groups. Only eggs laid in trapnests considered.

the pens were stationary. Also, as has been pointed out previously, the hens in the two brooder houses were artificially inseminated. Comparative data on the several pens will be reported at another time.

Results

Results obtained with a flock of Broad Breasted Bronze turkey breeders at the North Dakota Agricultural Experiment Station are shown in Table 1. The average number of eggs laid per hen to June 1 of 60 eggs is quite satisfactory and compares favorably with that observed with Standard Bronze stock at the U. S. Range Livestock Station in Montana (Marsden, 1936). To June 1 the Bronze hens averaged 48.9 eggs, when lights were turned on the first week in February. Unlighted Bronze hens laid only 40 eggs each during the season. Results reported by the National Research Center at Beltsville, Md. by Whitson, Marsden and Titus (1944) show that standard Bronze turkeys laid 76 eggs to June 1; White Holland, 63; Broad Breasted Bronze, 58; and Beltsville Small White, 62. Lighting was commenced January 1, two days earlier than with the North Dakota flock. It should be pointed out that the 60 egg average obtained at this station was with unselected stock.

The range in egg production was from 8 to 87 eggs. Six or about 10

percent of the hens laid over 80 eggs. Figure 1 shows a frequency distribution of egg production. The greatest number of eggs laid by one hen in any one month was 27 eggs.

The average date of laying the first egg was February 18, 46 days after artificial lighting was commenced. The average date of the first egg obtained at the Beltsville station was February 11 for both Broad Breasted Bronze and Small Whites, February 7 for Standard Bronze and February 4 for White Hollands.

Ninety-two percent of all eggs laid were suitable for incubation. The greatest loss was from frozen eggs. During the first two weeks of February, a number of eggs were laid on the roosts, and since the houses were uninsulated a large percentage of these eggs were frozen. A few eggs were broken in the nests and a small number were abnormally shaped.

The average percentage of eggs set that were fertile was 88.2. Three of the pens averaged over 90 percent for the season. In two of these pens mating occurred naturally and in one the hens were artificially inseminated. The range in the percentages fertility for individual hens was from 50.6 to 100. Figure 2 shows the percentage distribution of fertility. The fact that 64 percent of the hens had average fertility per-

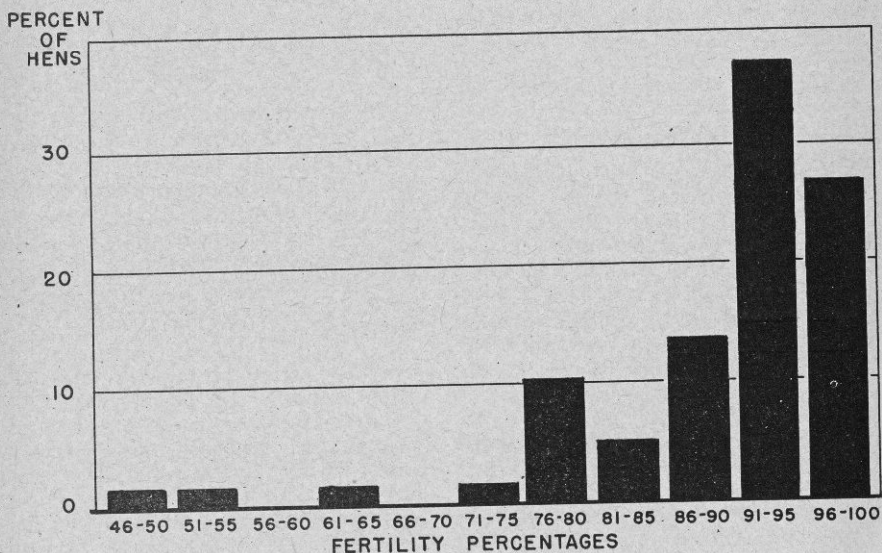
Table I
Summary of results with 1945
Broad Breasted Bronze turkey breeder flock.

No. eggs laid per hen to June 1.....	60.4
Percent egg production.....	58.5*
No. eggs set per hen.....	55.4
Percent set of eggs laid.....	91.8
Percent fertile of eggs set.....	88.2
Percent hatchability of eggs set.....	69.1
Percent hatchability of fertile eggs.....	78.4
Poults per hen.....	38.3
Percent mortality of breeder hens.....	3.3
Feed consumed per bird, pounds.....	90.5**

*Calculated on a bird-day basis.

**January 3 to June 1, 1945.

Figure 2



Percent of eggs fertile. Percentage distribution of turkey hens relative to the average percent fertility of eggs.

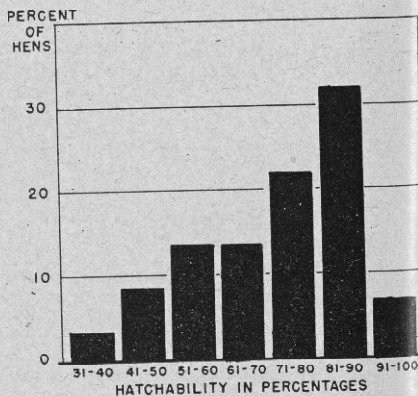
centages for the season of over 90 percent and 27 percent of them had records of over 95 percent indicates that fertility was not a very serious problem in the strain of Broad Breasted Bronze turkeys observed. Only four hens were below 75 percent in fertility of eggs and none was completely infertile.

Of the fertile eggs set 78.4 percent hatched, and 69.1 percent of all eggs set hatched (Table 1.) Fourteen percent of the poults hatched were help-outs and 5.2 percent were classified as weak or crippled. Not including the weak or crippled poults, 74.3 percent of fertile eggs hatched and 65.5 percent of all eggs hatched. Figure 3 shows frequency distribution of the percentages of hatchability of all eggs set. The number of poults per hen to June 1 ranged from 8 to 67, and the average was 38.3. The average number of vigorous poults per hen was 36.4. Figure 4 shows a frequency distribution of the number of poults per hen.

Mortality in the flock was relatively low. Only two of the 60 hens

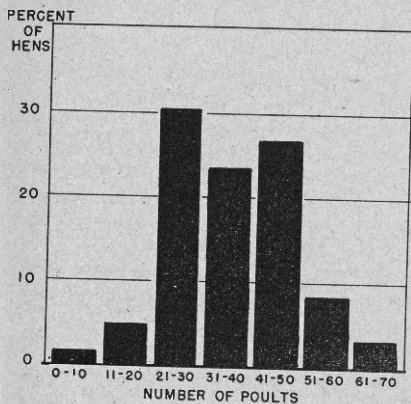
were removed. One was removed the first of February because of a leg injury and the other died on the last day, May 31, with blackhead. As a matter of interest this hen laid

Figure 3



Percent of eggs hatched. Percentage distribution of turkey hens relative to average hatchability of all eggs set.

Figure 4



Poults per hen. Percent of hens in several poults production groups.

9 eggs in the 14-day period prior to her death, all of which were fertile and 8 hatched.

Feed consumption records were kept only on the 44 hens and 4 toms maintained in the 16' x 32' house. Table 1 shows that 90.5 pounds of feed were consumed per bird from January 3 to June 1. Of this amount 52 pounds was mash and 38.5 pounds was whole grains. The relatively high mash consumption was due to the restricted feeding of the whole grains.

Weights to the nearest tenth of a pound were recorded on January 3 and June 1. Feed was removed from the pens the evening before so that the birds were weighed empty. The average weight of the 58 hens that survived the season was 17.04 pounds on January 3 and 16.96 pounds on June 1. The average loss in weight per hen was 0.08 pounds. The four toms used in the matings lost 0.8 pounds per male. Six other toms of the same age and breeding, which were used in some other studies and did not run with hens, weighed the same on the two dates.

Discussion

The results described herein show that the maintenance of turkey

breeding stock may be a very profitable enterprise in North Dakota. It requires very little figuring to find that a turkey hen that lays from 50 to 60 eggs during the hatching season is a profitable animal, especially when turkey hatching eggs sell for 35 to 40 cents each, as has been the case during the past two years.

Since these results were obtained from an unselected population and with birds of very excellent meat type, they have particular significance. The figures presented in Table 1 are averages that any flock owner can approach with good stock and proper management. Good results with turkey breeding stock can be obtained in North Dakota with unheated and uninsulated houses.

That cold weather adversely affects turkey breeding stock is a common belief. Only recently workers at the Oklahoma Agricultural Experiment Station (Milby and Thompson, 1945) reported that cold waves of short duration do not affect fertility, but one of ten day's duration caused a marked decline in fertility in all varieties. However, the fact that fertility in the station flock was above 90 percent during February when temperatures ranged from 18 degrees below zero to 38 degrees above, and averaged 14 degrees above zero, indicates that cold weather is not an important limiting factor to good fertility. It was observed, however, that artificial insemination is not conveniently accomplished in an uninsulated house, when the temperature is 15 degrees below zero.

The growth of the turkey hatching egg industry in North Dakota is hampered by the lack of electricity. To obtain early poults, the breeding stock must be exposed to artificial lighting. The fact that the interval between commencing artificial lighting and the average date of the first egg was 46 days indicates that the lights may not have been intense enough. After these trials were underway Asmundson

(1945) of the California station reported that turkey breeders are sensitive to the amount or intensity of artificial lighting. He observed that birds exposed to a minimum of 2 foot-candles started to lay nearly four weeks earlier and laid about 20 more eggs to the end of May than birds exposed to a minimum of about one-foot candle. To give 2 foot-candles, a light of 100 watts, suspended 8 feet above the floor, is necessary for an area 18 x 18 feet. With the North Dakota flock two 60 watt bulbs were used for an area 16 x 32 feet. This was less light than recommended by Dr. Asmundson, the light intensity in the pens varying from about one foot-candle on the floor to 1½ foot-candles on the roosts.

Summary

Broad Breasted Bronze turkey hens laid an average of 60 eggs per hen to June 1. Eighty-eight percent of these eggs were fertile and 78.4 percent of the fertile eggs hatched. The average hatchability of all eggs

set during the season was 69.1 percent. The number of poults per hen ranged from 8 to 67 with an average of 38.3. Four pens of 11 hens and 4 toms consumed 90.5 pounds of feed per bird from January 3 to June 1 of which 52 pounds was mash and 38.5 pounds was whole grains. The mortality rate to June 1 was 3.3 percent. The average loss in weight of hens from January 3 to June 1 was less than a tenth of a pound.

Literature Cited

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 Marsden, S. J., 1936. A study of egg production in Bronze turkeys. *Poultry Science* 15:439-445.
 Milby, T. T. and R. B. Thompson, 1945. Some observations on fertility in turkeys. *Poultry Science* 24:99-104.
 Whitson, B., S. J. Marsden, and H. W. Titus, 1944. A comparison of the performance of four varieties of turkeys during the breeding season. *Poultry Science* 23:314-320.

A recent issue of the house organ, "The Laboratory," published by the Fisher Scientific Company, contains an interesting article entitled "Science Develops New Chemicals for War Against Insects." One of the illustrations in the article shows an entomologist at the Dr. Hess & Clark laboratories, Ashland, Ohio, dusting an infested chicken with DDT to study its effectiveness as a lousicide. The entomologist, Dr. H. S. Telford, was formerly assistant entomologist of the North Dakota Agricultural Experiment Station. He resigned May 11, 1944 to accept a research position with Dr. Hess & Clark. (H.L.W.)

The National Institute of Agricultural Engineering at Askham Bryan, York, England, recently asked the North Dakota Agricultural Experiment Station for a copy of an article published by Thos. E. Long, formerly Assistant Agricultural Engineer, on the subject "What speed of operation for a potato digger causes the least amount of injury?" The article appeared in Vol. 6, No. 6 (1944) of the Bimonthly Bulletin of the Station. This Bimonthly Bulletin appears 6 times a year and is free to North Dakota citizens who request the same.