

# Chick Feeding Trials Demonstrate Importance of a Balanced Ration

by

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A commonplace practice with farm chick raisers is to start baby chicks on an adequate chick ration or starter feed, but to discontinue the use of such a ration and substitute either ground or whole farm grains when the chicks are two, three, or four weeks of age. Probably the greatest factor responsible for this practice is the seemingly high price of chick starter or the tediousness involved in mixing adequate chick rations at home. During the past several years the Experiment Station and the Extension Service of the North Dakota Agricultural College have cooperated in conducting chick demonstrations to show the economy of the continued feeding of a balanced ration during the entire brooding period. Some results and observations from one of these demonstrations are presented herein.

The chicks used on this particular trial were to have been exhibited at the Valley City Winter Show last March. Since the show was not held and the chicks were not shown, pictures were taken of the birds and the data summarized to acquaint poultry raisers with the results of the demonstration.

## Description of the Demonstration

On December 29, 1944, sixty-four 10-day old White Leghorn Chicks were received at the N.D.A.C. poultry plant from a North Dakota hatchery. These chicks were placed in a battery brooder and all were fed a chicken mash of 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 (dehydrated)	5	lbs.

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Salt mixture containing 10 grams of manganous sulfate to each pound of iodized salt	1	lb.
Delsterol	0.12	lbs.

During the past year this ration has been used at the College for starting chicks and as a mash fed in combination with whole grains for growing stock and laying hens. As a usual practice a grain mixture is fed with this mash when chicks are from 6 to 8 weeks of age.

When the chicks were three weeks of age they were divided into two groups of 32 chicks each. One group was continued on the above mash which will be referred to henceforth as the "balanced mash"; the other was fed an all-grain mash of the following composition.

Ground yellow corn	40	lbs.
Ground wheat	39	lbs.
Ground oats	20	lbs.
Salt mixture	1	lb.
Delsterol	0.12	lbs.

The two groups were continued on these rations to 11 weeks of age when the cockerels were removed and marketed and the pullets in both groups were then fed the balanced mash. At 3, 8, 11 and 22 weeks of age the chicks were weighed and examined.

### Observations

The chicks on the balanced mash grew much more rapidly than those on the all-grain mash. The difference in growth is shown in Fig. 1 and Table 1. At 8 weeks of age the average weight of the chicks on the balanced mash doubled the weights of those fed the all-grain diet, and at 11 weeks the average weight of the all-grain group was only 42 percent of that of the balanced mash group. It is interesting to note that there was very little difference between the sexes with respect to body weight. In the all-grain group there was practically no sex difference in weight. Also it was very difficult to determine the sex in the all-grain chicks because of the retarded development of the combs of the males. As a matter of fact at 11

weeks of age two cockerels were left in with the pullets because of this difficulty of distinguishing sex. In the group fed the balanced ration, sex could easily be determined by comb development as early as 3 to 4 weeks of age. Since comb growth in the chick is influenced by the testis, it is not surprising that the all-grain diet had a suppressing effect on comb growth. Several investigators have observed that in the rat food limitation sufficient to cause marked loss in body weight results in testicular atrophy. It has also been shown experimentally that improper nutrition adversely affects the reproductive organs of the male chick and adult cock.

At 22 weeks of age, after both groups had been on the balanced ration for 11 weeks, it was observed that there was relatively little difference in the body weights of the two groups. The pullets that had been on the all-grain mash gained 2.27 pounds each during the 11-week periods, whereas the other group gained 1.86 pounds each. This clearly shows that the chick retains its capacity to grow in a favorable en-

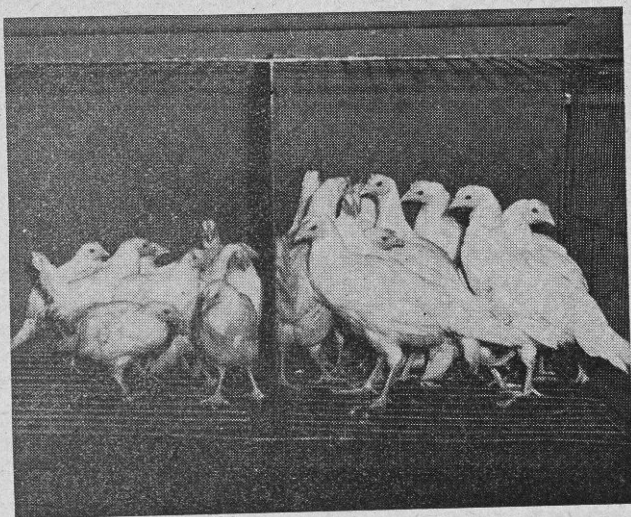


Figure 1—Feed made the difference. The small pullets were fed on an all-grain ration after three weeks of age and large pullets were continued on a balanced ration. Picture taken at 11 weeks.

vironment, even after prolonged periods of stunted growth due to improper nutrition. There are, however, certain effects of improper nutrition that are permanent.

Five, or 16 percent, of the chicks were lost in the all-grain group to 11 weeks of age, whereas none of the balanced-mash chicks died. The most losses occurred from 8 to 11 weeks and in at least 3 cases death was caused by the individual being picked by other chicks. Beginning at 6 to 7 weeks of age the all-grain chicks were exceedingly nervous and appeared to be constantly in search of feed even though the troughs contained feed at all times. They would pick at the attendant's fingers, at any object brought near them and at one another.

That farm grains alone do not permit proper bone development in growing chicks was clearly demonstrated in this trial. Bone calcification was so retarded in the chicks fed the all-grain ration that they had to be handled very carefully at the 11-weeks weighing. In some instances dropping the chicks several feet to the floor or catching them by the wings resulted in broken bones. Crooked breast bones were very prevalent in the all-grain group at 11 weeks. Twenty of the

27 chicks remaining in the all-grain group at 11 weeks had crooked breast bones, whereas in the chicks fed the balanced mash, only two had breast bones that were markedly crooked and three had slightly crooked breasts. Figure 2 shows breasts from three male chicks from each group. At 22 weeks of age, two of the balanced-mash pullets had slightly crooked breasts, and 8 of the 10 remaining pullets in the "all-grain" group had crooked breasts, varying from slight to severe, in spite of the fact that they had been fed the balanced mash for the last 11 weeks. These observations indicate that the crooked breast bone condition caused by faulty nutrition during the brooding period cannot be corrected by proper diet in later life.

The first egg from the balanced-mash group of pullets was laid on May 16, when they were 21 weeks of age. When they were weighed and examined at 22 weeks of age four of the 12 pullets showed signs of being in production. The first egg was laid by the "all-grain" group on May 30, exactly two weeks later than the other group.

Feed consumption data are shown in Table 2. Although the amount of feed eaten by the chicks on the bal-

**Table I—Growth of White Leghorn chicks fed a balanced growing mash and an all-grain mash.**

Age	Ration	Average weight-	Average weight-	Average weight-
		both sexes	cockerels	pullets
		Lbs.	Lbs.	Lbs.
3 weeks	Balanced mash	.33	.....	.....
	All-grain mash	.33	.....	.....
8 weeks	Balanced mash	1.48	1.53	1.43
	All-grain mash	.71	.71	.70
11 weeks	Balanced mash	1.95	1.98	1.91
	All-grain mash	.82	.83	.82
After 11 weeks—both groups were fed the balanced mash.				
22 weeks	Balanced mash	.....	.....	3.77
	All-grain mash*	.....	.....	3.09

\*All-grain mash fed from 3 to 11 weeks of age.

**Table 2—Feed consumption and mortality of White Leghorn chicks fed a balanced mash and an all-grain mash.**

Comparison	0-3 weeks	3 to 8 weeks		8 to 11 weeks		0 to 11 weeks		11 to 22 weeks*	
	Both groups	Balanced	All-grain	Balanced	All-grain	Balanced	All-grain	Balanced	All-grain**
Feed consumption, lbs. ....	47.8***	134.2	75.5	117.3	44.8	275.4	144.2	219.1	192.4
Gain in weight, total, lbs. ....	15.2	37.2	10.1	14.8	1.8	59.7	19.4	14.8	29.4
Feed per lb. gain, lbs. ....	3.14	3.61	7.48	7.93	24.89	4.61	7.43	14.80	6.54
Mortality, number .....	0	0	1	0	4	0	5	0	1

\*Pullets.

\*\*From 11 to 22 weeks of age this group also was fed the balanced mash.

\*\*\*This figure is based on the assumption the 64 chicks ate 15 pounds of feed the first 10 days. The chicks were received for the trial when 10 days old.

anced mash exceeded that consumed by the chicks on the all-grain diet, the amount of feed required to produce a pound of gain was considerably less. It required 4.61 pounds of feed to produce a pound of gain with the former and 7.43 pounds with the latter group. The exceedingly large amount of feed required to produce a pound of gain with the all-grain chicks from 8 to 11 weeks was influenced by the mortality that occurred during the period. However, when the weights of the birds that died were credited to the group, over 11 pounds of feed still were required to produce a pound of gain during this period. Allowing the all-grain group the weights of all chicks that died, the amount of feed required per pound of gain from 0 to 11 weeks was 6.35, which figure is still considerably higher than the 4.61 pounds required by the balanced-mash group. This shows that the efficiency of feed utilization on the balanced mash was definitely greater than that of the chicks fed the all-grain ration.

## Summary

The results from a demonstration to show the merits of continuing chicks on a balanced ration throughout the brooding period as compared to feeding a balanced mash the first three weeks, and then feeding chicks only on an all-grain diet thereafter, show that the continued feeding of an adequate ration is necessary for satisfactory growth and normal bone development. Chicks that have experienced retarded growth due to lack of protein, vitamins and minerals in the ration, as was the case in this demonstration, will make rapid gains in body weight when given a balanced ration. The crooked breast bones caused by faulty nutrition cannot be corrected by later feeding a balanced diet. Chicks fed the balanced mash required only 62 percent as much feed to produce a pound of gain as those fed the all-grain ration.

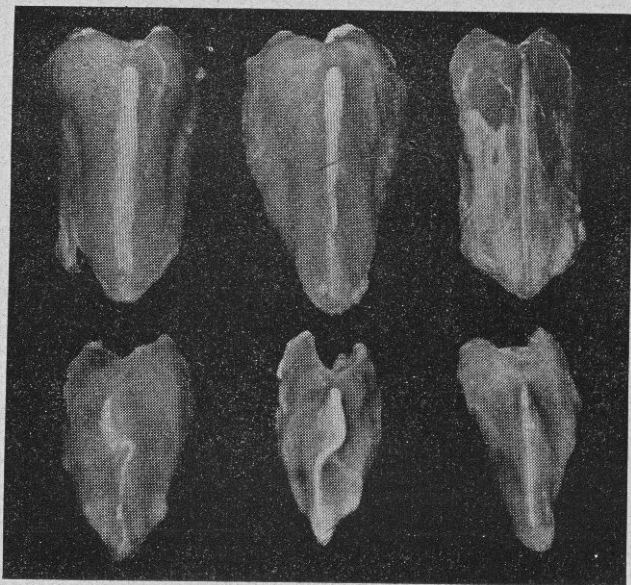


Figure 2—Breasts from 11-week old male chicks. Breasts in upper row from chicks fed a balanced ration; those in lower row from chicks fed an all-grain ration after first three weeks.