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Simplified Rations for Farm Chickens

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FEED cost constitutes approximately sixty per cent of the total cost of poultry production; therefore, it is important that this cost be reduced as low as possible, consistent with good results. Rations generally used in feeding chickens consist of complicated mixtures of numerous ingredients, some of which have been added without scientific knowledge of what is necessary for the proper nutrition of chickens. As a result a number of ingredients have been used in the hope of avoiding deficiencies. Rations prepared according to complicated formulas are usually expensive and confusing to farmers and often embody certain feedstuffs that are not readily available. If those feeds that can be produced satisfactorily and economically on Alabama farms are found to be adequate for growth and egg production, material savings in the cost of feed may be effected by their use.

The purpose of this circular is to present the results of experiments conducted at the Alabama Agricultural Experiment Station in which a number of simple rations were used for chickens. The efficiency of these simple rations was compared with a complicated ration which was used as a control. Results of these experiments should be of value to those who wish to reduce the cost of producing poultry by utilizing feed products grown on the farm.

EXPERIMENTAL METHODS

The experiment was divided into three periods: the brooding period covering the first eight weeks, the growing period extending from eight to twenty weeks, and the laying period covering the first six months of egg production.

Brooding Period.—Day-old Single Comb White Leghorn chicks of good breeding were used in this experiment. The flock from which the chicks were produced was tested for pullorum disease and rigidly selected for vigor. Permanent identification of chicks in the various lots was assured by toe marking each chick. Each lot contained 350 chicks in 1931 and 100 chicks in 1932. All chicks were uniformly housed and brooded in confinement. Each lot of chicks was allowed to run on an 8 by 10-foot, wire-floored porch, which permitted exposure to direct sunshine and at the same time minimized the possibilities of contact with disease-producing organisms.

The chicks in all lots were fed all-mash rations which were kept before them continuously in small wooden hoppers. They were watered in fruit jar drinking fountains for the first few days and then in partially covered galvanized troughs. The control group of chicks, Lot 1, was fed one of the standard complex rations which could be depended upon to produce satisfactory

results. Lots 2 to 8 were fed simplified rations. The formulas of the rations fed in this experiment were:

LOT 1.

	Lbs.
Yellow corn meal	45
Wheat shorts	15
Meat scrap	2
Ground oat groats	20
Dried buttermilk	10
Alfalfa meal	2
Linseed oil meal	2
Bone meal	2
Charcoal	1
Salt	1
Water to drink	

LOT 2.

	Lbs.
Yellow corn meal	100
Bone meal	5
Marble grit	5
Salt	1
Skim milk to drink	

LOT 3.

	Lbs.
White corn meal	100
Bone meal	5
Marble grit	5
Salt	1
Skim milk to drink	

LOT 4.

	Lbs.
Yellow corn meal	80
Wheat shorts	20
Bone meal	5
Marble grit	5
Salt	1
Skim milk to drink	

LOT 5.

	Lbs.
White corn meal	80
Wheat shorts	20
Bone meal	5
Marble grit	5
Salt	1
Skim milk to drink	

LOT 6.

	Lbs.
Yellow corn meal	70
Wheat shorts	20
Meat scrap	16
Bone meal	3
Salt	1
Water to drink	

LOT 7.

	Lbs.
Yellow corn meal	75
Ground oats	15
Meat scrap	16
Bone meal	3
Salt	1
Water to drink	

LOT 8.

	Lbs.
Yellow corn meal	85
Ground oats	15
Bone meal	5
Marble grit	5
Salt	1
Skim milk to drink	

In formulating the foregoing rations, except for Lot 1, every effort was made to reduce the number of ingredients and to use those feeds that were most likely to be available on the farm, or readily accessible at local feed stores. All of the rations were calculated to contain approximately the same mineral balance and about 16 per cent crude protein.

Growing Period.—Five Lots, 1, 2, 4, 5, and 8, were carried through the growing and laying periods. The other lots were unsatisfactory and were discontinued at the close of the brooding period. The cockerels were removed from each lot at eight weeks of age, and the pullets placed in laying houses where they remained throughout the experiment. Each lot continued to receive the same ration which they had received during the brooding period except that whole corn was given as a scratch grain to the simplified-ration lots. Lots receiving yellow corn

meal in the mash were given yellow corn as a scratch grain, and lots which received white corn meal in the mash were given white corn as a scratch grain. Lot 1, the control group, received a scratch grain consisting of equal parts of cracked yellow corn and whole wheat, and was changed from the complicated starting mash to a complicated growing mash consisting of 30 pounds yellow corn meal, 20 pounds ground oat groats, 15 pounds wheat shorts, 10 pounds wheat bran, 5 pounds alfalfa meal, 5 pounds meat scrap, 7 pounds dried buttermilk, 3 pounds bone meal, 3 pounds linseed meal, 1 pound charcoal, and 1 pound fine salt.

Laying Period.—The simplified-ration lots continued to receive the same rations. Lot 1 was changed from the growing mash to a standard complicated laying mash consisting of 33 pounds yellow corn meal, 30 pounds wheat shorts, 4 pounds dried buttermilk, 5 pounds meat scrap, 5 pounds fish meal, 10 pounds gluten feed, 2 pounds linseed meal, 2 pounds alfalfa leaf meal, 4 pounds soybean meal, 1⅓ pounds limestone, and ⅔ of a pound bone meal. Lot 1 continued to receive the scratch grain consisting of equal parts cracked yellow corn and whole wheat.

RESULTS

Growth Rate, Feed Consumption, and Mortality During Brooding Period (8 weeks).—The data in Table 1 show for each two-week interval the average weight per chick in each experimental lot. The weights obtained in 1931 and the weights obtained in 1932 are averaged and shown in Table 1.

Table 1.—Average Weight of Chicks (Pounds) at 2, 4, 6, and 8 Weeks of Age.

Lot No.	2 Weeks	4 Weeks	6 Weeks	8 Weeks
1	.190	.340	.625	.825
2	.160	.275	.525	.655
3	.165	.265	.490	.590
4	.190	.325	.635	.770
5	.180	.290	.585	.715
6	.165	.260	.540	.645
7	.135	.205	.450	.560
8	.170	.295	.560	.705

The chicks in the control group, Lot 1, made the best growth. The chicks in Lots 4, 5, and 8 where simplified rations were fed also made satisfactory growth. Rations fed to Lots 3 and 7 were unsatisfactory, while rations fed to Lots 2 and 6 were only fairly satisfactory. Rations containing yellow corn meal gave better growth than the same ration containing white corn meal as is indicated by comparing Lots 2 and 4 with Lots 3 and 5. The addition of wheat shorts or ground oats to a ration composed of corn meal, minerals, and skim milk increased the rate of growth considerably as is in-

dicated by comparing Lot 2 with Lot 4 and 8. Wheat shorts was a better supplement to the corn meal, minerals, and skim milk ration than ground oats. This is indicated by comparing Lots 4 and 8 with Lots 6 and 7. The first lot in each case received wheat shorts and the second received ground oats. Where meat scrap (50 per cent protein) was used as the sole source of protein supplement, either with wheat shorts or with ground oats, the rate of growth was unsatisfactory, as indicated by comparing Lot 6 with Lot 7.

The amount of feed consumed per chick for the eight-week period for 1931 and 1932 is averaged and shown in Table 2.

Table 2.—Average Feed Consumption Per Chick (Pounds).

Lot No.	Mash	Skim milk
1	2.31	——
2	1.98	2.21
3	2.02	2.34
4	2.19	2.23
5	2.30	2.36
6	1.99	——
7	2.30	——
8	2.08	2.10

The average amount of skim milk consumed per chick to eight weeks of age was 2.25 pounds, or only a little more than one quart. There was but little difference in the amount of feed consumed in the various lots.

The death rate of chicks is usually quite variable because of the number of factors that enter into their production. The percentage mortality for the eight-week period for 1931 and 1932 is averaged and shown in Table 3.

Table 3.—Average Mortality.

Lot No.	Average per cent mortality	Lot No.	Average per cent mortality
1	10.0	5	18.5
2	12.1	6	29.5
3	18.3	7	39.9
4	10.4	8	12.8

The lots receiving white corn meal had a higher mortality than the lots receiving yellow corn meal, as shown by comparing Lot 2 with Lot 3, and Lot 4 with Lot 5. The lots receiving ground oats had a higher mortality than the lots receiving wheat shorts, as shown by comparing Lot 4 with Lot 8, and Lot 6 with Lot 7. Meat scrap as a sole source of protein supplement gave a higher mortality than skim milk used as the only protein supplement, as shown by comparing Lot 4 with Lot 6, and Lot 8 with Lot 7. The addition of wheat shorts or ground oats to the corn meal, minerals, and skim milk ration did not change the rate of mortality, as shown by comparing Lot 2 with Lot 4 or Lot 8.

Growth Rate and Feed Consumption During Growing Period (8 to 20 weeks).—The weights of the pullets at four-week intervals during the growing period of 1931 and 1932 are averaged and shown in Table 4.

Table 4.—Average Weight of Pullets (Pounds) at 8, 12, 16, and 20 Weeks of Age.

Lot No.	8 Weeks	12 Weeks	16 Weeks	20 Weeks
1	.825	1.67	2.21	2.41
2	.655	1.33	2.03	2.36
4	.770	1.57	2.15	2.51
5	.715	1.40	2.08	2.27
8	.705	1.32	2.03	2.33

The pullets in Lot 1 made the most rapid growth to the 16th week, but those in the other lots made the most rapid growth thereafter, with the exception of the pullets in Lot 5 where the rate of growth was practically the equivalent to that in Lot 1. In other words, growth in Lot 1 was more rapid for a time, but the pullets in the simplified-ration lots continued growth over a longer period, and at 20 weeks those in Lot 4 were heavier than those in the control lot.

The amount of feed consumed per pullet during the growing period for 1931 and 1932 is averaged and shown in Table 5.

Table 5.—Average Feed Consumption Per Pullet (Pounds).

Lot No.	Mash	Grain	Skim milk
1	8.19	2.67	——
2	6.09	2.32	15.81
4	6.45	1.69	22.87
5	6.10	1.68	18.77
8	5.74	2.75	15.64

The average amount of skim milk consumed per pullet during the 12-week growing period was 18.27 pounds or 2.1 gallons.

Egg Production, Feed Consumption, and Hatchability of Eggs During Laying Period (6 months).—The rate of egg production in each lot from September to February for 1931-32 and 1932-33 is averaged and shown in Table 6.

Table 6.—Average Number and Weight of Eggs Laid (6 Months).

Lot No.	Eggs laid per bird	Egg weight (ounces)
1	58.72	1.799
2	63.99	1.855
4	67.98	1.876
5	62.44	1.862
8	56.19	1.890

All chicks used in this experiment in 1931-32 were hatched early and went into partial molt during the fall and winter, thus causing the rate of egg production to be a little low. It will be noted that egg production from the simplified rations was in every lot, excepting Lot 8, slightly higher than that in the control lot. The egg weights, as determined by weighing all individual eggs produced by each lot once each week for the six-month period, were also slightly in favor of the simplified rations.

The amount of feed consumed per pullet during the laying period for 1931-32 and 1932-33 is averaged and shown in Table 7.

Table 7.—Average Feed Consumption Per Pullet (Pounds).

Lot No.	Mash	Grain	Skim milk
1	18.26	14.08	——
2	16.09	14.15	71.06
4	16.50	15.00	81.02
5	14.81	17.69	75.16
8	14.24	15.76	76.92

The average amount of skim milk consumed per pullet during the six-month laying period was 76.04 pounds. This is equal to about 4½ gallons of skim milk per hundred birds per day.

The total number of eggs incubated in 1931 and 1932, and the average percentage of fertile eggs that hatched from each lot are shown in Table 8.

Table 8.—Percentage Hatchability.

Lot No.	No. eggs incubated	Per cent fertile eggs hatched
1	246	73.75
2	362	75.15
4	379	66.60
5	304	73.45
8	255	65.80

There was but little difference in the percentage hatchability in the various lots.

SUMMARY

1.—Simplified rations used in Lots 2, 4, 5, and 8, prepared largely of home-grown products, gave satisfactory results for farm chickens.

2.—The pullets in the simplified ration lots did not grow as fast as the pullets in the control group, but grew over a longer period, and at 20 weeks of age the pullets in Lot 4 had greater weight than those in the control group.

3.—Simplified rations used in Lots 3, 6, and 7 were unsatisfactory, as measured by growth rate and mortality.

4.—Yellow corn meal gave better results than white corn meal in simplified rations.

5.—Wheat shorts were superior to ground oats as a supplement to the corn meal, minerals, and skim milk ration.

6.—Skim milk as a sole protein supplement in simplified rations gave good results.

7.—Meat scrap as a sole protein supplement in simplified rations resulted in poor growth and high mortality during the brooding period.

PRACTICAL APPLICATION

According to results obtained in these experiments, farmers may obtain good results by feeding their chickens simple home-mixed rations. The chicks fed simplified rations will probably not grow as fast as chicks fed complicated rations, but will continue to grow over a longer period and at five months of age there will be very little difference in the weight of the pullets fed simple rations and those fed complicated rations.

The simplified formula to use depends upon the feeds readily available on the farm where the ration is to be fed. In general, the ration used in Lot 4 (Page 3) gave the best results; therefore, a farmer having yellow corn meal and skim milk available can, by purchasing a small amount of wheat shorts and minerals, mix a ration at a very low cash cost that will give results comparable to those obtained from standard complicated rations. Wheat shorts may be left out of the ration as in Lot 2 (Page 3), if the poultry enterprise does not justify its purchase, and the results secured will be only slightly under those obtained from Lot 4. The earlier growth will probably be slower, but the pullets at maturity should be almost as large as those which received wheat shorts. Farmers having oats available may use ground oats at the rate of 15 per cent (by weight) in the ration, as in Lot 8 (Page 3), and thereby utilize another home-grown product. The results secured by feeding this ration should be about the same as those obtained from Lot 2.

In simplified rations, yellow corn meal will give much better results than white corn meal; therefore, the use of white corn meal is to be discouraged, especially when the chicks are brooded in confinement and corn meal is the only grain or by-product used. White corn meal would perhaps give satisfactory results if the chicks are allowed free range on seasonal green feeds. Meat scrap (50 per cent protein) cannot be used with satisfactory results as the sole source of protein supplement in simplified rations. Its use results in poor growth and high mortality.