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Low Protein Grower and Layer Diets and Their Effects
on Reproductive Performance

R. A. Nelson and C. W. Carlson¹

Numerous studies, including several at this station, have shown that the layer type pullet can utilize diets as low as 10% protein during the later growing stages without affecting their subsequent reproductive performance. Frequently, these types of diets are rather bulky and therefore do not work properly in mechanical feeding systems. This year's study involved the use of a 12% protein, 2825 Kcal diet that was supplemented with methionine and/or lysine to the NRC recommended levels. A fourth diet utilized dehulled oats as its major ingredient. Ten percent alfalfa and 2% yellow grease were used in each diet to help eliminate cannibalism and dust problems. Table 1 shows the composition of these diets.

Four replicates of 44, 10-week-old pullets of three commercial strains were housed at the rate of 11 birds per cage (61 x 41 cm) and fed the four grower diets. The pullets had been started on a high energy, 20% protein corn-soybean diet. At 21 weeks of age they were placed in layer cages and data are now being collected on reproductive performance. Included in this report are the reproductive performance data for the hens from last year's grower study (A.S. Series 75-33).

Table 2 shows the data from the cage grower study. No treatment differences occurred in weight gain due to grower diets, but there was a significant difference between strains at the 15-week period. Strain 1 was significantly less efficient although the difference was not large. Methionine additions caused no increase in weight gain, but they did appear to improve feed efficiency somewhat. The dehulled oats diet greatly improved feed efficiency due to its lower fiber content.

Table 3 shows some of the production data for the completed reproductive cycles from last year's cage-reared birds. An attempt was made to restrict feed consumption after four periods of production by covering the feeders for about 8 hours during the day. Although feed consumption was significantly lowered, the desired 8 to 10% restriction in consumption was not obtained. Significant differences in feed consumption occurred between strains, also.

Although it was not significant, the restricted feeding did lower hen-day production somewhat, while strain 2 performed better on all diet regimes. The higher hen-day production for strain 2 was again reflected in improved feed efficiency in producing a dozen eggs. Feed efficiency and egg size were reduced somewhat on the lower protein layer diets, but these differences were quite small.

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Mortality was high in most groups due primarily to the high incidence of cannibalism and leukosis.

Table 1. Composition of Grower Diets
Used in Caged Pullet Experiment

	Treatment	
	1-3 ¹	4
Dehulled oats	--	50
Yellow corn	50	34
Oats	30	--
Soybean meal, 48%	4	--
Dehydrated alfalfa, 17%	10	10
Yellow grease	2	2
Dicalcium phosphate	2	2
Limestone	1	1
Salt mix	0.5	0.5
Vitamin mix	0.5	0.5

¹Treatment 2 = As 1 + 0.13% DL-methionine.
Treatment 3 = As 2 + 0.27% L-lysine.

Table 2. Average Growth Performance of Pullets
as Influenced by Grower Diet and Strain

	Initial		Final	Overall feed/gain
	10-week weight kg	15-week weight kg	20-week weight kg	
Strain				
1	0.88	1.21 ^{a1}	1.38	9.23 ^a
2	0.86	1.18 ^b	1.37	8.82 ^b
3	0.89	1.22 ^a	1.37	8.90 ^b
Treatment				
1. Control	0.88	1.21	1.37	9.31 ^a
2. As 1 + 0.13% methionine	0.86	1.20	1.37	9.12 ^a
3. As 2 + 0.27% lysine	0.87	1.21	1.37	9.13 ^a
4. Dehulled oats	0.88	1.21	1.38	8.36 ^b

¹Means with different superscripts were significantly different at the P<0.05 level of probability.

Table 3. Average Performance of Laying Hens
as Influenced by Grower Diet,
Strain and Layer Diet

Treatment	Hen-day production ¹ %	Feed per hen per day gm	Feed per dozen eggs kg	Egg weight gm	Mortality %
Grower diet ²					
10-1950	67.1	106	1.92	62.8	16
12-2900	67.0	106	1.92	62.8	18
Strain					
1	65.0 ^{b4}	104 ^c	1.96	62.9	20
2	70.6 ^a	108 ^a	1.84	62.9	12
3	65.7 ^b	106 ^b	1.96	62.7	18
Layer diet					
16%	68.6	106 ^b	1.91	63.3 ^a	16
12%	67.2	108 ^a	1.93	62.4 ^b	19
16% restricted ³	67.2	104 ^c	1.86	63.2 ^a	17
12% restricted ³	65.3	106 ^b	1.96	62.5 ^b	16

¹Fifteen 28-day periods.

²10-1950 = 10% protein-1950 Kcal of ME/kg. 12-2900 = 12% protein-2900 Kcal of ME/kg.

³Restricted feeding after 40 weeks of age.

⁴Means with unlike superscripts are significantly different at P<0.05.