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Some Effects of Low Protein Grower Diets  
Fed With or Without Antibiotics on Growth  
Rate and Subsequent Reproductive Performance

R. A. Nelson, C. E. Holmquist and C. W. Carlson<sup>1</sup>

Several studies at this station have shown that Leghorn-type pullets can utilize diets as low as 10 to 12% protein during the growing stage (8 to 20 weeks) without adversely affecting their subsequent reproductive performance. Mortality during the growing and laying period was either unaffected or decreased. However, low-protein, low-energy fed pullets tend to consume 1 to 2 pounds more feed during the growing period. As a result, pullet growers have tended to continue using the higher protein and higher energy diets. Two studies have been completed and another is under way to further evaluate low protein grower diets with and without antibiotics on subsequent egg production.

Sixty 10-week-old pullets of each of three commercial strains of layer-type chickens were placed into each of 12 pens with corn-cob litter. They had been grown on a high energy, 20% protein, corn-soybean starter diet. Two grower diets containing 10% (1900 kcal ME/kg) or 12% (2900 kcal ME/kg) protein were supplemented with or without 22 ppm each of Neomycin and Terramycin. This was replicated three times. At 21 weeks of age they were placed in layer cages and fed layer diets of 18 or 14% protein. The 14% protein diet was supplemented with 2 pounds of methionine per ton. Those on the 18% protein diet were switched to 16% protein diets at 42 weeks of age.

Results in Tables 1 through 5 indicate that the grower diets produced few differences in growth and subsequent reproductive performance. Completed experiments shown in Tables 1 and 2 and those still under way in Tables 4 and 5 confirm the observation that subsequent laying house mortality was decreased on the lower protein diets. Larger mortality differences can be noted between strains.

Larger differences in hen-day production, feed per dozen eggs and egg weights were observed for strain effects than for previous grower diets or the layer diets. No definite differences can be noted among layer diets for hen-day production, feed efficiency or egg weight. A possible exception was the higher H-H mortality noted for hens grown on the higher protein. The 10% protein diets promoted growth equal to that of the 12% protein diets with the usual increase in feed consumption per bird. Antibiotics showed no apparent beneficial effects during the grower stage while strain differences can be noted.

These results indicate that pullets can tolerate low protein, low energy grower diets and subsequently perform equally well on layer rations of low protein content.

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<sup>1</sup>Superintendent, Poultry Research Center; former Superintendent, Poultry Research Center and Professor and Leader, Poultry Research and Extension.

Table 1. Average Performance of Laying Hens as Influenced by Grower Diet and Strain of Birds<sup>1</sup>--Experiment 1

Treatment	Hen-day production %	Feed/ doz. eggs kg	Egg wt. gm	Hen housed mortality %
Grower diets <sup>2</sup>				
10-1950	68.4	1.97	58.4	10.2
10-1950+	69.9	1.99	58.9	11.1
12-2900	68.3	1.87	58.1	13.0
12-2900+	68.5	1.90	58.4	11.1
Strains				
1	68.6	1.78	59.2	6.2
2	70.0	1.98	57.5	12.5
3	67.7	2.04	58.8	15.3

<sup>1</sup>Average for twelve 28-day periods on 16% protein diet.

<sup>2</sup>10-1950 = 10% protein, 1950 kcal of ME/kg.

10-1950+ = as above plus 22 ppm Neomycin and Terramycin.

12-2900 = 12% protein, 2900 kcal of ME/kg.

12-2900+ = as above plus 22 ppm Neomycin and Terramycin.

Table 2. Average Performance of Laying Hens as Influenced by Grower Diet, Strain and Layer Diet<sup>1</sup>--Experiment 2

Treatment	Hen-day production %	Feed/ doz. eggs kg	Egg wt. gm	Hen housed mortality %
Grower diets <sup>2</sup>				
10-1950	72.5	1.59	61.1	7.4
10-1950+	72.2	1.59	61.0	9.6
12-2900	73.0	1.58	60.6	10.8
12-2900+	73.0	1.57	60.9	14.0
Strains				
1	73.3	1.65	61.4	6.8
2	71.8	1.55	59.8	15.2
3	72.9	1.54	61.4	9.4
Layer diet				
18-16	72.7	1.58	60.9	10.4
14	71.2	1.50	59.2	16.9

<sup>1</sup>Twelve 28-day production periods.

<sup>2</sup>Same grower diets as Experiment 1.

Table 3. Performance of Three Pullet Strains as Influenced by Grower Diets Fed from 10 to 20 Weeks of Age (Experiments 3 and 4)

Treatment	Avg. wt. at 20 wk. kg	Avg. gain from 10-20 wk. kg	Feed consumed from 10-20 wk. kg
10-1950 <sup>1</sup>	1.29	0.54	6.7
10-1950+ <sup>2</sup>	1.25	0.50	6.6
12-2900 <sup>3</sup>	1.29	0.54	4.9
12-2900+ <sup>4</sup>	1.28	0.53	5.1
Strain			
1	1.31	0.55	
2	1.31	0.56	
3	1.25	0.49	

<sup>1</sup>10% protein, 1950 kcal of ME/kg.

<sup>2</sup>As 1 + 22 ppm Neomycin + 22 ppm oxytetracycline.

<sup>3</sup>12% protein, 2900 kcal of ME/kg.

<sup>4</sup>As 3 + 22 ppm Neomycin + 22 ppm oxytetracycline.

Table 4. Average Performance of Laying Hens as Influenced by Grower Diet, Strain and Layer Diet<sup>1</sup>--Experiment 3

Treatment	Hen-day production %	Feed/ doz. eggs kg	Egg wt. gm	Hen housed mortality %
Grower diet <sup>2</sup>				
10-1950	82.2	1.74	61.4	5.6
10-1950+	80.4	1.78	60.7	5.6
12-2900	78.8	1.86	62.5	8.3
12-2900+	78.1	1.89	62.4	11.1
Strain				
1	78.9	1.85	63.2	11.5
2 <sup>3</sup>	82.9	1.79	61.6	8.3
3	79.9	1.81	60.5	3.1
Layer diet				
18-16	80.1	1.83	61.7	9.0
14	79.7	1.81	61.8	6.2

<sup>1</sup>Seven 28-day production periods.

<sup>2</sup>See Table 1.

<sup>3</sup>Different strain than Experiment 1 or 2, same as Experiment 4.

Table 5. Average Performance of Laying Hens as Influenced by Grower Diet, Strain and Layer Diet<sup>1</sup>--Experiment 4

Treatment	Hen-day production %	Feed/ doz. eggs kg	Egg wt. gm	Hen housed mortality %
Grower diet <sup>2</sup>				
10-1950	75.9	1.76	60.8	6.7
10-1950+	75.7	1.74	60.9	11.1
12-2900	73.8	1.86	61.0	13.4
12-2900+	74.8	1.86	60.8	14.6
Strain				
1	72.4	1.89	62.4	14.4
2 <sup>3</sup>	77.7	1.77	60.4	12.2
3	75.0	1.75	59.8	7.7
Layer diet				
18-16	74.7	1.82	60.8	12.2
14	75.4	1.79	61.0	10.7

<sup>1</sup>Seven 28-day production periods.

<sup>2</sup>See table for Experiment 1.

<sup>3</sup>Different strain than Experiment 1 or 2, same as Experiment 3.