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Summary of Poultry Cases Submitted to the South Dakota Animal Disease Research and Diagnostic Laboratory Fiscal Year 1974

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Effects of Feed Restriction and Energy-Protein
Relationships on Egg Production

E. Guenther and C. W. Carlson¹

Feed restriction is frequently used in handling broiler breeder hens to maximize performance and to economize feed costs. Some attempts have been made to apply this technique to egg laying strains. In the test to be reported here, 80 groups (24 hens per group) of caged egg-production strain pullets were fed four diets on a restricted and full-fed basis. The four diets provided two levels of protein (13.9 and 18.3%) and two levels of energy (2500 and 3300 Cal ME). Feed restriction was accomplished by covering the feeders at 3:00 PM and removing the covers the following morning at 7:00 AM. This permitted the restricted hens to feed 8 hours each day. The full-fed hens had access to feed 14 hours per day.

As indicated in Table 1, the main effects showed feed restriction averaged over the energy-protein effects to:

- a. reduce egg production 6.2%
- b. reduce daily feed intake 6.7 gm
- c. increase feed per doz. eggs 0.1 kg
- d. decrease egg weight 1.1 gm
- e. reduce mortality 0.4%
- f. increase Haugh units 0.9 units.

The effects of feed restriction as influenced by protein-energy levels are shown in Table 2. Each increase in protein or energy resulted in an increase in egg production. Feed restriction reduced egg production with all diets, the most severe effect being observed with the 13.9%-2500 Cal diet. With feed restriction when comparing the 13.9% and 18.3% protein diets, production was reduced 11.0% vs 6.4% as the energy was reduced from 3300 to 2500 Cal ME. When full-fed, the differences in production were 8.4% vs 8.0%, respectively.

With feed restriction comparing the 2500 Cal diets, production was reduced 8.9% with the 13.9% protein diets and 3.9% with the 18.3% diets. Likewise, with feed restriction comparing the 3300 Cal diets, production was reduced 6.3% with the 13.9% protein diets and 5.5% with the 18.3% diets. Averaged over feeding methods, the lower protein diet reduced egg production 4.1% and the lower energy diet reduced production 8.5%.

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Table 1. Main Effects of Feed Restriction on Laying Hen Performance

Parameter	Restricted	Full-fed
Hen-day production, %	64.5	70.7
Feed per day, gm	96.5	103.2
Feed per dozen, kg	1.8	1.7
Egg weight, gm	58.8	59.9
Mortality, %	5.5	5.9
Haugh units, HU	82.9	82.0

Table 2. Effects of Feed Restriction and Energy-Protein Relationships on Egg Production

Protein level, %	13.9		18.3		Avg.
	2500	3300	2500	3300	
Cal per kg ME	%	%	%	%	
Hen-day production					
Full-fed	65.1 (8.9)	(8.4) ¹ 73.5 (6.3)	68.0 (3.9)	(8.0) 76.0 (5.5)	70.7 (6.2)
Restricted	<u>56.2</u>	(11.0) <u>67.2</u>	<u>64.1</u>	(6.4) <u>70.5</u>	<u>64.5</u>
	60.7	(9.7) 70.4	66.1	(7.2) 73.3	67.6
Main effects					
Full-fed vs restriction			64.5	(6.2)	70.7
Protein, 13.9% vs 18.3%			65.6	(4.1)	69.7
Cal ME, 2500 vs 3300			63.4	(8.5)	71.9

¹Differences between adjoining values.

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I. Chickens--244 cases; 71 different diagnoses

<u>Diagnosis</u>	<u>Cases</u>
Lymphoid Leukosis	40
Cannibalism	32
Fatty Liver Syndrome	18
Hemorrhagic Syndrome	16
Peritonitis	12
Osteodystrophy	10
Marek's Disease	8
Coccidiosis	8
Salmonellosis (Typhoid-2; pullorum-1)	6
Encephalomalacia	5
Tuberculosis	5
All other diagnoses	78

II. Turkeys--86 cases; 39 different diagnoses

<u>Diagnosis</u>	<u>Cases</u>
Salmonellosis	10
<u>E. coli</u> infection	9
Airsacculitis	6
Osteodystrophy	5
All other diagnoses	56

III. Other poultry--14 cases; 9 different diagnoses

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