FEEDING CHINESE RINGNECK PHEASANTS FOR EFFICIENT REPRODUCTION

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Summary

Two trials were conducted each using 240 Chinese Ringneck pheasant breeder hens (Phasianus colchicus torquatus) to determine the economics of feeding various levels of Brewers Dried Grains (BDG) on egg production, fertility, hatchability, and feed consumption. Four treatment diets containing 0, 15, 30, and 45% BDG were fed to 3 replicate pens each, beginning 1 week prior to the onset of lay. Egg production and fertility from BDG fed hens were found to be lower than from control fed hens. Hatchability of fertile eggs was higher ($P<.05$) in hens fed diets containing 30 and 45% BDG. Based upon number of live chicks produced per hen, economic advantage was highest in groups receiving 30% BDG in the diet. The inclusion of BDG in the diets of pheasant breeder hens had a favorable influence on hatchability and total number of live chicks produced per hen.

I. INTRODUCTION

The pheasant is one of the most. commonly produced gamebirds in North America, both for food consumption as well as for sport hunting. Relatively little research has been published which attempts to improve the reproductive performance of pheasants in order to aid in reducing the costs of producing these birds.

Improving reproductive performance can be achieved in several ways. Increasing egg production, fertility, and hatchability are common methods used, as well as lengthening the breeding season or double cycling of breeders (Woodard and Snyder, 1978; Mashaly and Keene, 1979; Cain, 1979). Storage of pheasant eggs beyond seven days has been shown to significantly decrease hatchability (Woodard and Morzenti, 1975).

A by-product of beer brewing which has been shown to improve reproductive performance of chickens and turkeys, is brewers dried grain (BDG) and is relatively inexpensive. Kienholz and Jones (1967) reported satisfactory increases in fertility and hatchability from chickens and turkeys fed breeder diets containing BDG. Thornton (1962) noted an improvement in growth and egg production in laying hens fed BDG. No work has been found on the effects of feeding BDG to pheasants. Due to the high crude fiber content of BDG (15%), its use in diets for domestic poultry has been generally overlooked. Pheasants, however, remaining as yet a wild bird, may have increased capabilities of fiber digestion and therefore may be considered to better utilize BDG than other species of birds.

The objective of the study was to evaluate the economic feasibility of feeding BDG to pheasant breeder hens through a measure of performance of reproductive traits and cost of chicks produced.

II. MATERIALS AND METHODS

Four treatment diets (Table 1), 3 replicates each, consisting of 0, 15, 30 and 45% brewers dried grains (BDG) were fed in mash form to 228 Chinese

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Ringneck pheasant breeder hens (Phasianus c. torquatus) in trial I (4 treatments x 3 replicates x 19 hens); and 240 hens in trial II (4 treatments x 3 replicates x 20 hens) beginning one week prior to the onset of lay. Breeders were 41 and 38 weeks of age in trials I and II respectively. Natural mating procedures were followed with one cock per pen (19 or 20 hens). The birds were housed in floor pens in a pole shed type house and allowed only natural daylight for a 4 month period of 1 April through 31 July. Daily egg production was recorded as well as fertility, hatchability, and feed consumption.

Table 1. Composition of experimental pheasant breeder diets for Trial I and Trial II studies

Ingredient	1	2	3	4
	%			
Ground yellow corn	66.0	59.2	52.5	45.65
Soybean meal (44% protein)	25.0	16.7	8.3	0
Brewers dried grains	0	15.0	30.0	45.0
Lysine (L-Lysine, 85%)	0	0.12	0.23	0.35
Deflourinated phosphate	1.05	1.05	1.05	1.05
Limestone, ground	7.0	7.0	7.0	7.0
Trace mineral mix[1]	0.05	0.05	0.05	0.05
Salt	0.4	0.4	0.4	0.4
Methionine (MHA)	0.2	0.2	0.2	0.2
Vitamin premix[2]	0.3	0.3	0.3	0.3
Total	100	100	100	100
Calculated analysis				
Fat	2.73	3.47	4.18	4.9
Protein	18.1	17.4	17.2	16.8
Lysine	0.86	0.86	0.85	0.85
Methionine and Cystine	0.8	0.8	0.79	0.8
Calcium	2.08	3.09	3.12	3.14
Phosphorus	0.5	0.5	0.5	0.5
Fiber	2.4	3.7	4.9	6.2
Metabolizable energy (Kcal/kg)	2814	2753	2688	2630

*The above diets have a calorie/protein ratio of 155.

1 Trace mineral mix provided the following per kilogram of diet: Mn, 50 mg; Fe, 50 mg; Zn, 50 mg; Ca, 45 mg; Cu, 5 mg; I, 1.5 mg; Co, 0.5 mg; Se, 0.1 mg.

2 Vitamin mix provided the following per kilogram of diet: vitamin A, 2177 IU; vitamin D3, 817 IU; vitamin E, 2.4 IU; vitamin B_{12}, 0.002 mg; riboflavin, 1.37 mg; niacin, 13.6 mg; d-pantothenic acid, 3.8 mg; choline, 177 mg; menadione, 0.18 mg; folic acid, 0.27 mg; pyridoxine, 0.55 mg; thiamine, 0.28 mg; d-biotin, 0.03 mg.

Eggs were collected twice daily for 16 weeks and stored large end up in plastic flats without turning for 1 to 14 days at 12.8°C and 75% relative humidity. At biweekly intervals, eggs were dry cleaned and set small end down in Robbins IH-A incubators. Incubator conditions were maintained at 37.5°C and 50% relative humidity for 21 days. On day 21, eggs were candled

to determine the number of infertiles and early dead embryos. All live embryos were then transferred to the hatcher. Hatcher conditions were maintained at 36.9°C and 70% relative humidity. All treatments were randomized within setters and hatchers to minimize location effects within the machine. Eggs were incubated by pen so as to determine fertility by pen, but were hatched by treatment group. The hatches were removed on day 25 and 10% of the unhatched eggs were broken out and observed for age at embryo death and malpositions.

Feed consumption data was gathered at 4 week intervals at which time males were rotated within treatment groups to minimize the effects of preferential mating.

Data were analyzed using the General Linear Models (GLM) procedure of SAS (SAS Institute Inc., 1985). When significant (P<.05) differences were detected, means were separated using Tukey's test (Steel and Torrie, 1980).

III. RESULTS AND DISCUSSION

The addition of BDG to the diets of pheasant breeder hens appears to have no significant effect on egg production when added at 15, 30, and 45% of the ration (Table 2). Fertility levels appeared lower in BDG fed birds with a significant (P<.05) reduction observed only at the 15% level in trial I (Table 2). Fertility in both trial I and II was lowest in 15% BDG fed birds. It appears as though there may be a minimum and maximum level of BDG to be included in pheasant breeder diets to obtain optimum fertility results.

BDG fed at 30 and 45% of the ration significantly (P<.05) improved hatchability' of fertile eggs in both trials I and II (Table 2). During hatches 7 and 8, overall hatchability was abnormally low (P<.05) during both trials; however, treatment 3 and 4 performed much better during these stressful periods than did controls. It was noted that hatches 7 and 8 were from eggs produced and incubated at the end of the hens' laying cycle, as well as during periods of high ambient temperature. BDG fed in the ration improved hatchability overall while yielding the greatest improvements during the late season stress periods. This suggests the possibility of some unknown factors in BDG which have a strengthening effect on the embryo, allowing it to better survive through these stressful periods.

Because of the increase in feed consumption coupled with a simultaneous decrease in egg production of hens fed BDG, feed efficiency as measured by kg of fed per dozen eggs was also lowered (Table 2). However, due to the increased hatchability of eggs, despite losses in fertility, feed efficiency as measured by kg of feed per 100 live chicks was improved (Table 2).

The "bottom line" net income difference was $1993.00 in favor of 30% BDG This translated into an added increase of 15% profit per hen or $4.00 per' hen in this example. This increase in profit is subject to variations in ration cost, chick price, size of breeder flock, etc., although the 15% increase would probably remain about the same.

BDG partially replaces corn and soybean meal in the ration, functions as a protein source, and can be purchased for approximately half of the cost of soybean meal.

Feed consumption was significantly higher (P<.05) in BDG fed birds as was expected considering the lower energy levels of the BDG diets. The most significant effect of feeding BDG in the diets of pheasant breeder hens appears to be the increased (P<.05) hatchability of eggs obtained from hens fed BDG at 30 and 45% of the diet. Late season low hatchability problems

Table 2. Effect of diet on egg production, fertility, hatchability, feed consumption, and feed efficiency of pheasant hens for a 16-week breeding season[1]

	Egg production	Fertility		Hatchability		Feed consumption	Feed efficiency	
% BDG	Trial I % hen-day	Trial I % fertile	Trial II % fertile	Trial I % HFE	Trial II % HFE	g/bird/day	Trial I kg/doz	Trial I kg/100 chicks
0	73[a]	90[a]	87[a]	45[c]	48[b]	62[c]	1.02	19.92
15	71[a]	83[b]	80[a]	48[bc]	53[ab]	63[bc]	1.07	22.02
30	71[a]	85[ab]	83[a]	57[a]	55[a]	66[ab]	1.08	17.41
45	68[a]	84[ab]	83[a]	54[a]	55[a]	67[a]	1.19	20.09

[1] Means followed by a different letter are different ($P<.05$)

Table 3. Feed consumption in grams/bird/day by treatment by 4-week time period[1]

Time period	Treatment % BDG 0	15	30	45	Mean by time period
1	60	57	61	64	60.5[b]
2[a]	63	67	68	70	67.0[a]
3	61	64	66	65	64.0[ab]
4	63	64	67	67	65.3[ab]

1 Means followed by a different letter are different (P<.05)

Table 4. Cost comparison of control diet versus 30% brewers dried grains diet for a 16-week period of lay

	Control	30% BDG
Number of hens	500	500
% Hen-day egg production[1]	73.1	71.0
Eggs produced	40936	39760
% Fertility[1]	90.4	85.1
Number of fertile eggs	37006	33836
% Hatchability[1,3]	45.3	56.8
Number of live chicks	16764	19219
Price per chick	0.80	0.80
Chick revenue	$13411.00	$15375.00
Feed consumed/100 chick (kg)[1]	19.92	17.41
Total feed consumed (kg)	3339	3346
Price per kg feed[2]	0.158	0.149
Total feed cost	$527.56	$498.55
Chick revenue	$13411.00	$15375.00
Less feed costs	$ 528.00	499.00
Income over feed costs	$12883.00	$14876.00
Gross profit per hen/16 wk period	$ 25.77	$ 29.75*

* By feeding a 30% BDG breeder ration, a 15% increase in profit per hen was obtained.

1 Reproductive factors such as % hen day egg production, fertility, hatchability, and feed consumption are based on actual treatment mean values of this study.

2 Price per kg of feed is based on an average of prices received from three local Colorado feed vendors. Price is based on a bulk delivered basis.

3 Hatchability values were recorded from the CSU hatchery, Fort Collins, elevation 4500' (1475 m). Altitude differences may affect hatchability results.

may be reversed by the addition of BDG to the diet. BDG also appears to be helpful during periods of heat stress or excessive hen age.

IV. REFERENCES

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