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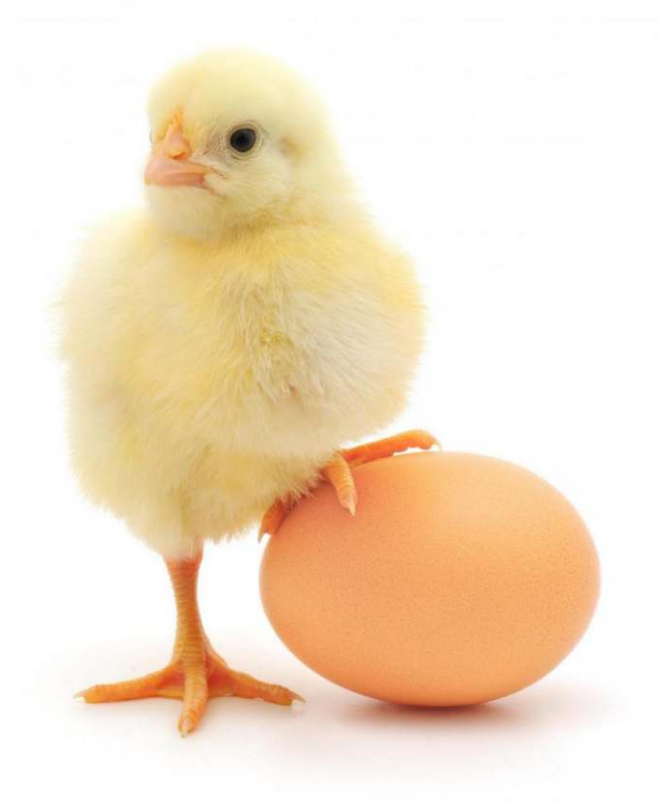

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A Study on Determining Protein Level in Diet of Partridge (*Alectoris chukar*) During Growing Period (0-4 Wk)

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Abstract: This study was conducted to determine growth performance of partridge (*A. chukar*) fed by diets include different level of CP through 0-4 weeks of age. First, second, third and fourth groups had 28, 26, 24 and 22 % CP in diet, respectively. At the end of 4 weeks of growth period, live weights of group 1, 2, 3 and 4 were 125,8, 128.6, 124.6 and 120.4 g for males, 113.4, 111.3, 110.3 and 105.2 g for females, respectively. Protein levels in diet had significant effect on live weight at 1st and 3rd week of age only. However, sex had significant ($P<0.001$) effects on live weight of the birds through growth period. Different CP level in diet did not affected weekly and cumulative feed consumption significantly. Through 0-4 week of age, cumulative feed consumption of the groups was 194.7, 190.8, 195.6 and 185.5 g for group 1st, 2nd, 3rd and 4th, respectively. Differences among the groups in terms of FCR were significant ($P<0.05$) at 1st week of age only, and birds fed by diet includes 26 % CP had the best FCR at this week. FCR of the 1st, 2nd, 3rd and 4th treatment groups were calculated as 1.85, 1.81, 1.83 and 1.89, respectively. As a result, it could be said that 28, 26, 24 and 22 % CP level in diet did not affect growth performance of partridges through 0-4 weeks of age when taking account live weight, feed consumption and FCR of the partridge.

Key words: Protein level, fattening period, partridge

Introduction

One of the important problems of partridges reared for meat purpose is the nutrition subject at growing, fattening and breeding period. Researches done on this issue are not enough for satisfaction. Especially, to figure out needs of required nutritional material of partridges in different growing period is very important. Information given by some reports about this subject is not satisfied and not agreed to each other. For that reasons, diet used for intensive partridge production is usually recommended or calculated like in other poultry nutrition. Specially, needs of energy and protein level of the diet have to determined firstly, then optimal partridge feeding has to be done according to actual needs.

At feeding of partridges, especially at 0-4 or 0-6 week of age has an effect on mortality decrement and growth performance of partridges in the future. If observed rapid growth till 6 weeks of age was taken account, significance of feeding the partridges at this period will come out. Besides, one of the materials to increase cost in diet is protein. So, high level of protein in diet affects feed cost negatively.

According to results of different publications, recommended crude protein (CP) level in diet of partridges is varied and ranged 18 to 28 % (Leclerc *et al.* 1984; Çetin and Kirikçi, 2000). Ensminger (1980) reported that 22-24 % CP in beginner (0-6 wk) diet was sufficient for Hungarian gray partridges. However, 26-28 % CP in beginner (0-6 wk) diet was suggested by Woodard *et al.* (1978). Similar suggestion was reported by Sarica *et al.* (1998) for starter diet of partridges as 27-28 % CP. Besides, Çetin and Kirikçi reported that 28 % CP in starter diet was good enough for partridges. In other report, necessary CP in diet has to be changed respect to ME in diet, for instance, if starter diet (0-4 wk) has 2600, 2800 and 3000 ME/kg , satisfactory CP in diet would be 17.6, 19.0 and 20.4 %, respectively (Leclerc *et al.* (1984). CP in diet of partridges affects total protein and cholesterol in blood serum (Özek and Bahtiyarca, 2004). On the other hand, 28 % CP in diet of partridges for first 2 weeks, 24 % CP for following 4 weeks, and overall 25 % CP were suggested by Woodard (1982).

Different level of CP (16, 20, 24 and 28 %) in starter diet of partridges (*Alectoris chukar*) had significant effect on 8 weeks live weight, diet contains 16 % CP had lowest live weight; however, that differences were disappeared at the and of 16 weeks of age. In the same report, there were no significant differences between groups in terms of daily feed consumption in 0-8 and 0-16 weeks of age, but feed consumption rate (FCR) in first 8 weeks of age (Özek *et al.*, 2003). Hermes *et al.* (1984) reported that plant or animal source of protein did not differ growth performance of rock partridges.

This study was conducted to figure out percentage of protein need in diet of partridges at first 4 week of age.

Materials and Methods

In this trial, total 120 day old partridges were *(Alectoris*

Table 1: Composition of the diets used in the experiment

	Diets			
Row Materials	I	II	III	IV
Corn	300	345	390	445
Soybean meal-47	306	282	259	232
Wheat	170	170	170	170
Full-fat soybean	115	102	86	58
Fish flour-70	80	70	60	58
DCP	12	13.5	15	16
Marble powder	9	8	9	8
Lysine	0.5	1.5	3	4.5
Methionine	0.5	1	1	1.5
Vit-Min Premix	2.5	2.5	2.5	2.5
Salt	2.5	2.5	2.5	2.5
Anti coccidial	1	1	1	1
Growth factor	1	1	1	1
Total	1000.0	1000.0	1000.0	1000.0
Crude protein	28	26	24	22
ME/kg	2900	2900	2900	2900
Crude fat	4.00	4.40	4.65	4.75
Ash	6.20	6.23	6.40	6.44
Crude fibre	2.62	2.70	2.80	2.82
Calcium	0.90	0.90	0.90	0..90
Phosphorus	0.77	0.78	0.77	0.78
Methionine	0.57	0.56	0.57	0.57
Lysine	1.66	1.65	1.65	1.65

Vitamin-mineral premix: Per 2.5 kg contains; Vitamin A: 12.000.000 IU, Vitamin D3 :3.000.000 IU, Vitamin E: 35.000 mg, Vitamin K3: 5.000 mg, Vitamin B1: 3.000mg, Vitamin B2: 6.000mg, Vitamin B6: 5.000mg, Vitamin B12: 30 mg, Niacin: 40.000 mg, Cal. D- Pantotenat 10.000mg,kolin chloride: 450.000 mg, Folic Acid 1.000 mg, Biotin 75 mg, Mn: 80.000 mg, Fe: 40.000 mg, Zn 60.000 mg, Cu 5.000 mg, Iodine 5.000 mg, cobalt: 500 mg, Selenium: 150 mg, antioxidant: 10.000 mg. Anti coccidial: contains monensine sodium, anticoccidial 100.000 mg/kg. Flavophospholipol 5 000 mg kg used as growth factor

chukar) used and kept in natural air ventilated house. Day old chicks were wing banded and weighted before settle in brooder for a week. Chicks were divided in to four groups (n=30) randomly and placed in floor pens with wood shave litter at 8th day of age, and then they were kept in these pens till end of trial. There were 3 replicates in each group. 0.8 m^2/bird space was provided for the birds. They were supplied with *ad libitum* access to water and feed until end of the experiment. Chicks were exposed to light 23.5 h daily from beginning to the end of experiment. Experiment was done between June and July for 4 weeks.

The diet of first, second, third and fourth group contained 28, 26, 24 and 22% CP, respectively. All the diets contained 2900 ME/kg. Diets used in this experiment were given in Table 1.

Live weight and fed consuming were done weekly. The data were analyzed by SPSS 9.0 packet program. Multiple comparisons of the means were done by Duncan test.

Results

Live weights and growth curves of partridges fed by different level (22, 24, 26 and 28 %) of protein in starter diet for 4 weeks are given in Table 2. and Fig. 1. There were significant differences between male and female from beginning ($P<0.05$) to end of 4 weeks ($P<0.01$). Male partridges were heavier than females for all weeks. Different levels of protein in diet had significant effect on live weight of birds at 1st ($P<0.01$), 2nd ($P<0.01$) and 3rd ($P<0.05$) weeks of age. Live weight differences among the treatment groups were disappeared at 4 week of age. Males of 2nd group (26 % CP in diet) had higher live weight gain than other groups at the end of 1st week. While significant effect was disappearing among the group 1st, 2nd and 3rd at the end of 2nd week of age, males of 2nd group (26 % CP in diet) had significantly higher live weight gain than 4th group (22 % CP in diet). There was no significant effect among live weight of females of the groups at the end of 2nd week of age.

Live weights of the groups were significantly different at 3rd week of age. Live weights of 1st and 2nd group's male were significantly ($P<0.05$) higher than 3rd and 4th group's. Mean live weights of 1st group's male were similar to 2nd group's male, same as in between 3rd and 4th group.

Live weight differences of treatment group's male were disappeared at 4th week of age, and differences of females were not significant. So, different level of CP in diet did not affect live weight of partridges at the end of 4th week. Protein levels by sex interaction had significant effect on live weight through treatment period.

FCR, weekly and cumulative feed consumptions are presented in the Table 3. Weekly and cumulative feed consumption of the groups were observed as non-significant through treatment period. The highest and lowest cumulative feed consumption were observed in 3rd and 4th groups, respectively. Third group was consumed 10 g higher feed cumulatively. Cumulative feed consumption of groups for 4 weeks were 194.7, 190.8, 195.6 and 185.5 g, respectively.

When feed conversion rate was evaluated, a significant ($P<0.05$) difference could be observed 0-1 week of age only. The best FCR was observed in group 2, then group 1, 3 and 4 in this period. The worst FCR was observed in group 4 consumed 22 % CP in diet. FCR of group 1, 2, 3 and 4 were 1.85, 1.81, 1.83 and 1.89 respectively.

As a result, it could be said that different level of protein in diet did not affect growth performance of partridges through 4 week of age.

Discussion

To determine protein needs of partridges reared at intensive or semi intensive conditions at different growth period are very important. Up to now, observed results were not agreed to each other. While some researcher suggesting 26 % CP in diet for first 4 week of age (Woodard *et al.* 1978; Sarica *et al.* 1998; Çetin and Kirikçi 2000), others suggested less than 24 % CP in diet (Ensminger 1980; Leclerc *et al.*, 1984; Özek *et al.*, 2003). In this study, it was observed that 22, 24, 26 and 28 CP in diet did not affect growth performance of

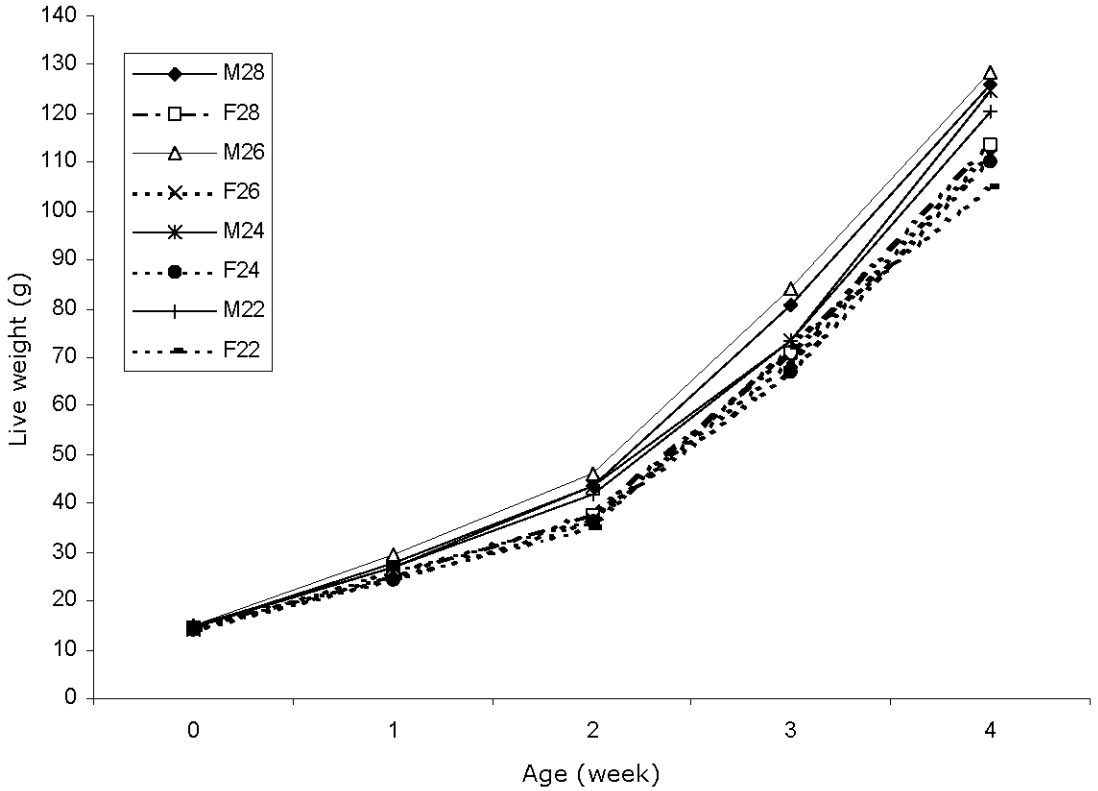

Fig. 1: Growth curve of male and female partridges fed by different level of protein in diet (M: Male, F: Female)

Table 2: Weekly live weight of males and females partridges fed by different level of protein in diet (g)

Wk.	Treatment groups											
	1		2		3		4		Variation source			
	Male	Female	Male	Female	Male	Female	Male	Female	SEM	P	S	P*S
0	14.7^{a}	14.1^{b}	14.8^{a}	14.0^{b}	14.6^{a}	13.9^{b}	14.6^{a}	13.9^{b}	0.1	NS	*	NS
1	27.6^{b}	25.3^{cd}	29.6^{a}	26.0^{bcd}	26.8^{bc}	24.5^{d}	26.7^{bc}	24.7^{d}	0.5	**	***	NS
2	43.4^{ab}	37.7^{c}	46.1^{a}	36.8^{c}	43.4^{ab}	36.1^{c}	41.7^{b}	35.0^{c}	1.2	**	***	NS
3	80.7^{a}	70.7^{b}	84.0^{a}	69.2^{b}	73.4^{b}	67.1^{b}	73.6^{b}	72.1^{b}	1.9	*	***	NS
4	125.8^{a}	113.4^{bc}	128.6^{a}	111.3^{c}	124.6^{a}	110.3^{c}	120.4^{ab}	105.2^{c}	2.6	NS	***	NS

^{abcd}: Means in same having different letters are significant. P: Protein level, S: Sex, P*C: Interaction. SEM: Standard means of error, *: P<0.05, **: P<0.01, ***: P<0.001, NS: Non significant.

Table 3: Feed conversion rate, weekly and cumulative feed consumption of partridges fed by different level of crude protein in diet

	Treatment Groups					
Wk	1	2	3	4	±SEM	
		Weekly Feed Consumption (g)				
0-1	14.4	14.8	14.5	14.6	0.41	NS
1-2	27.4	27.1	26.2	23.7	1.34	NS
2-3	57.9	56.8	56.0	58.8	1.86	NS
3-4	95.0	91.9	98.9	88.4	1.95	NS
		Cumulative Feed Consumption (g)				
0-1	14.4	14.8	14.5	14.6	0.41	NS
0-2	41.8	41.9	40.7	38.3	1.90	NS
0-3	99.7	98.9	96.7	97.1	2.61	NS
0-4	194.7	190.8	195.6	185.5	2.26	NS
		Feed Conversion Rate kg:kg				
0-1	1.19^{b}	1.12^{c}	1.25^{ab}	1.29^{a}	0.02	*
0-2	1.59	1.56	1.58	1.60	0.03	NS
0-3	1.63	1.59	1.61	1.65	0.03	NS
0-4	1.85	1.81	1.83	1.89	0.02	NS

^{abc}: means in same having different letters are significant, ±SEM: Standard error of mean. *: P<0.05, NS: non significant

partridges significantly for first 4 week of age. This result agrees to results of Ensminger (1980), Woodard (1982), Leclerc *et al*. (1984), Özek *et al*. (2003) reported that there were no significant differences between 20 and 28% CP in diet for growth performance of partridges for first 8 weeks of age.

Result of this study indicating that using high level of CP in partridge (*A. chukar*) diet is not necessary, and 22 % CP could be good enough for first 4 week of age.

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