OBSERVATIONS ON THE COMPARATIVE GROWTH PERFORMANCE OF NIGHT FED AND NIGHT FASTED BROILER FINISHERS

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Received 23 September 1993; Accepted 18 March, 1994

ABSTRACT

Four-week old broiler finishers were raised in 8 deep litter pens under two treatments, night feeding and night fasting. The birds were fed *ad libitum* during the day and equally exposed to all necessary management practices. The trial was conducted to observe the comparative body weight gain (BWG), feed intake (F.I) and feed utilization (F.U) between the birds under the two treatments, as well as the body weight shrinkage arising from the night fasting by the night fasted birds. There was no significant difference ($P > 0.05$) in BWG between birds in the two treatments except at week 5. An equivalent of 62% of the day time BWG was lost to fasting by the night fasted birds. The loss was, however, adequately compensated during the day time feeding. Body weight shrinkage due to the night fast increased with age and was most pronounced between 9-10 weeks of age. No significant difference ($P > 0.05$) was observed in F.I. between the night fed and night fasted birds. For the former, F.I. was higher during the day from ages 5 to 8 weeks and higher during the night at ages 9 and 10 weeks. night fasted birds utilised feed averagely better than the night fed ones. Results from this study show that there is no significant advantage in feeding broiler finishers at night.

KEY WORDS: Fasting, Growth, Broiler finishers.

INTRODUCTION

Broilers are usually fed *ad libitum* on adequate diets to exploit their maximum growth potential. Different views have been expressed on the effects of withdrawing feed and water on broiler performance. When feed and water were withdrawn for some hours from 5-7 week

old broilers, McDonald and Patil (1984) reported that it resulted in loss of body weight which was greatest in the first three hours. Live weight shrinkage which increased with the length of withdrawal time was also reported by Benibo and Farr (1985).

In a study on the response of broilers to a restriction in feeding time where the birds were restricted daily from feed intake for five hours, Azahan (1984) reported that there were no significant differences in weight gain up to the age of 8 weeks among the birds. Pinchasov *et al.* (1985) fed chicks of a heavy bodied strain on alternative days and discovered that after an adaptation period of two weeks, the relative growth rate of the intermittently fed chicks exceeded that of the control. Pokniak *et al.* (1984) reported that broilers on 55% of free feed intake restriction evoked compensatory growth having body weight equivalent to control when refed for 42 days thereafter. Planvnik and Hurwitz (1985) supported this earlier report that refeeding of feed-restricted birds improved feed efficiency. Chaudhary *et al.* (1985) and Planvnik *et al.* (1985) buttressed the manifestation of compensatory growth in feed restricted birds.

The objective of this study is to compare the daily feed intake and utilization between the night fed and night fasted birds, the feed intake between the day and night time for the night fed birds and the body weight gain at the end of each day. The loss in body weight after each night fast will also be observed. This study is intended to confirm or otherwise the rationale for feeding broilers at night rather than allow them to rest like other livestock, if there is the possibility of compensatory growth.

MATERIALS AND METHODS

Six individually tagged 4-week old broilers were kept in each of eight equidimensional deep

litter pens measuring 1.1 x 1.6 sq.m. The birds were placed on two treatments, night feeding and night fasting in a randomised complete block design. The former which is *ad libitum* feeding also served as control. Each pen therefore constituted a replicate. Birds in four of the pens were fasted at night by removing their feeders and drinkers in the evening at 7.00 p.m. and replacing them in the morning at 7.00 a.m. The birds were also kept in darkness at night. Control birds in the other four pens were fed *ad libitum* both day and night. They were all uniformly fed on a farm formulated standard broiler finisher diet.

The birds were weighed individually twice daily. In the morning at 7.00 a.m. they were weighed to determine weight gained during the night time by the night fed birds and weight loss by the night fasted ones. They were also weighed in the evening at 7.00 p.m. to determine the body weight gains during the day by birds on both treatments. Feed supplied as well as feed remaining in the feeders were similarly weighed twice daily to monitor feed intake. The birds were kept for six weeks on the trial until they were 10 weeks old.

Data were collected for average daily body weight gain and feed intake during each week of the trial between the two treatments. Feed utilization (g. feed/g.body wt. gain) values were computed. Data were analyzed for variance between the two treatments for each week by using the student's t-test with multiple observations per replicate according to Snedecor and Cochran (1976). The average daily losses in body weight due to fasting by the night fasted birds were also computed for each week.

RESULTS

Body weight gain and loss:

The average daily body weight gain (BWG) of the night fed birds was significantly higher ($P < 0.01$) than the night fasted ones only at week 5 (Table 1). Table 2 compares the values of BWG recorded during the day with those at the night time for the night fed birds. The day

time BWG was significantly higher ($P < 0.05$) at weeks 5 and 10. There were no significant differences ($P > 0.05$) in BWG at weeks 6, 7, 8, and 9 between the day and night periods. However, higher values were recorded for the day time except at week 6. From an overall average, 57.5 and 42.5% of the BWG occurred during the day and night periods respectively.

Observation of the body weight shrinkage due to night fast (Table 3) by the night fasted birds shows a gradual increase in shrinkage values from weeks 5 to 9 and a sharp rise between weeks 9 and 10. About 62% equivalent of the day time BWG was lost to fasting at night.

Feed intake and utilization:

There were no significant differences ($P > 0.05$) in the average daily feed intake by the birds under the two treatments (Table 4) from week 5 to week 10. However, comparing the day and night time feed intake in Table 5, during the day time, feed intake was generally higher from weeks 5 to 8 and significantly so at week 5 and week 8. At weeks 9 and 10, night time intake grew higher than the day time and the difference between them was significant ($P < 0.05$) at week 10. An average of 51.0 and 49.0% of the total feed was consumed during the day and night respectively.

The night fed birds utilized feed (g. feed intake/g.body weight gain) significantly better ($P < 0.05$) only at week 5 (Table 6) while the night fasted ones were significantly superior ($P < 0.01$) at weeks 6 and 9. Night fasted birds averagely utilized feed better at weeks 8, 9 and 10.

DISCUSSION

The significantly lower body weight gain (BWG) by the night fasted birds at week 5 could be due to the initial effect of night fasting on the birds before their adaptation to fasting. Thereafter, from week 6, there was no more difference in BWG by the birds under the two treatments. This result is in agreement with Pinchasov *et al.* (1985) who reported improved relative growth rate of intermittently fed chicks

comparable and better than the control after an adaptation period of two weeks.

The higher BWG during the day could be due to a combination of the higher feed intake and greater body metabolism during the day. The body weight gains of the night fed and night fasted birds were not significantly different due to the day - time compensatory growth of the night-fasted birds. This compensatory growth phenomenon is in agreement with the reports of Pokniak *et al.* (1984), Chaudhary *et al.* (1985) and Plavnik *et al.* (1986).

Night fed birds consumed on the average, more feed per day than the night fasted ones probably due to *ad libitum* feeding. It could also arise from possible feed wastage because they were exposed to the feed for longer period than the night fasted birds. The higher average feed intake during the day from weeks 5 to 8 could be due to the greater activity of the birds during the day. However, at weeks 9 and 10, more feed was consumed at night than the day time. This could result from the birds' heavier weight and reduced activity during the day. In addition, the birds would consume more feed at night due to the cooler weather. Low house temperatures stimulate higher feed consumption than hotter environment (North, 1978); Oluyemi and Roberts, 1979).

The night-fasted birds here exhibited averagely better feed efficiency than the birds on *ad libitum* feeding. This could be due to better feed digestion and consequent compensatory growth after fasting according to Plavnik and Hurwitz (1985). Tur *et al.* (1985) reported that all digestive reflexes were increased by starvation, probably increasing the ability of deprived chickens to assimilate the feed. The results from this study, based on the body weight gain, feed intake and feed utilization indicate that there is no significant advantage in feeding broiler finishers at night.

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FASTING AND BROILER PERFORMANCE

Table 1 AVERAGE BODY WEIGHT GAIN BETWEEN THE NIGHT FED AND NIGHT FASTED BROILERS.

Age (Wk)	Body Wt. gain (g/bird/day)		SEM	LOS
	Night Fed	Night fasted		
5	23.3	18.6	1.66	**
6	34.3	33.0	1.48	N.S
7	37.2	35.4	1.62	N.S
8	38.2	37.6	2.01	N.S
9	41.2	41.4	2.28	N.S
10	42.9	42.5	2.87	N.S.
Aver.	36.2	34.8	4.55	N.S

SEM - Standard error of mean

LOS - Level of significance

** - Highly significant ($P < 0.01$; Tabled $t = 2.69$)

N.S - Not significant ($P > 0.05$; Tabled $t = 2.015$)

Table 2 BODY WEIGHT GAIN (G/BIRD/DAY) BETWEEN DAY AND NIGHT TIME FOR NIGHT FED BROILERS

Age (Wk)	Body Wt. gain		SEM	LOS
	Day	Night		
5	17.0	6.3	1.32	*
6	15.7	18.6	2.22	N.S
7	20.0	17.2	2.14	N.S.
8	20.5	17.7	2.49	N.S.
9	23.3	17.9	2.68	N.S.
10	28.1	14.8	3.58	*
Aver.	20.8	15.4		
%Total	57.5	42.5		

SEM - Standard error of mean

LOS - Level of significance

* - Significant ($P < 0.05$)

N.S. - Not significant ($P > 0.05$)
Tabled $t = 2.015$)

Table 3 AVERAGE DAILY BODY WEIGHT GAIN AND LOSS IN NIGHT FASTED BROILERS

Age (Wk)	Body Wt. gain (g/bird/day)	
	Day-time gain (A)	Night time loss (B)
5	50.2	31.5
6	76.6	43.7
7	85.1	49.5
8	98.2	60.8
9	105.0	63.6
10	132.7	90.4
Average	91.3	56.6
B/A (%)	62.0	

Table 4 AVERAGE DAILY FEED INTAKE (G/BIRD/DAY) BETWEEN NIGHT FED AND NIGHT FASTED BROILERS

Age (Wk)	Feed intake		SEM	LOS
	Night Fed	Night fasted		
5	52.6	47.7	2.70	N.S.
6	73.6	68.4	3.70	N.S.
7	89.0	84.3	4.19	N.S.
8	100.0	91.7	3.75	N.S.
9	116.6	106.1	6.03	N.S.
10	124.1	110.2	7.77	N.S.
Aver.	92.7	84.7	14.59	N.S.

SEM - Standard error of mean

LOS - Level of significance

N.S. - Not significant ($P > 0.05$, Tabled $t = 2.447$)

Table 5 AVERAGE DAILY FEED INTAKE (G/BIRD/DAY) BETWEEN DAY AND NIGHT TIME

Age(Wk)	Feed intake		SEM	LOS
	Day	Night		
5	30.5	22.1	1.10	**
6	38.8	34.8	2.62	N.S.
7	47.6	41.4	2.82	N.S.
8	53.9	46.1	2.13	*
9	55.6	61.0	2.72	N.S.
10	57.5	66.6	3.00	*
Aver.	47.3	45.3		
%Total	51.0	49.0		

SEM - Standard error of mean

LOS - Level of significance

** - Highly significant ($P < 0.01$, Tabled $t = 3.707$)

* - Significant ($P < 0.05$, Tabled $t = 2.447$)

N.S. - Not significant ($P > 0.05$)

Table 6 FEED UTILIZATION BETWEEN NIGHT FED AND NIGHT FASTED BROILERS

Age (WK)	Feed utilization		SEM	LOS
	Night fed	Night fasted		
5	2.25	2.57	0.068	**
6	2.15	2.07	0.024	*
7	2.39	2.40	0.096	N.S.
8	2.63	2.45	0.130	N.S.
9	2.84	2.57	0.107	*
10	2.91	2.61	0.138	N.S.

SEM - Standard error of mean

LOS - Level of significance

** - Highly significant ($P < 0.01$, Table^d $t = 3.707$)

* - Significant ($P < 0.05$, Tabled $t = 2.447$)

N.S. - Not significant ($P > 0.05$)