BODY WEIGHT GAIN AND SURVIVAL OF FASTED HEAT STRESSED BROILERS

M.O. Smith[1] and R.G. Teeter[2]

Story in Brief

Periodic fasting is a management tool available to broiler producers to enhance bird survival during hot summer months. A study was conducted to determine if different fasting regimes would depress body weight gain severely enough to make this practice uneconomical. Broilers exposed to a temperature regimen similar to summer conditions showed no reduction in weight gain when fasted for 6.5, 9.5 or 12.5 hours. Survival was enhanced when birds were fasted for 12.5 hours.

(Key words: Fasting, Survival, Heat Stress, Weight Gain).

Introduction

The detremental effects of the annual heat wave in the Southeastern United States are monumental. Broiler producers and consumers are similarly effected in that great economic loss to both is the usual result.

The drought conditions in 1986 and the accompanying high temperatures resulted in a decrease in broiler live weight from the average 4.25 pounds in June to 4.07 pounds in July. The combination of reduced live weight and decreased survival is a recipe for potentially devastating economic loss for the producers. Fasting broilers (McCormick et., 1982) and turkeys (Kohne et al., 1973) prior to the onset of heat stress has been shown to enhance the survival of these birds. The potential use of fasting as a management tool to enhance the survival of heat stressed poultry is well worth investigating; however if fasting these birds result in lowered live weights, then some of the observed benefits could be negated.

The objectives of this study were (1) to investigate the effects of fasting on body weight gain, and (2) to evaluate the use of fasting as a tool for increasing survival of broilers during growth-limiting high temperature stress.

Materials and Methods

Three hundred and eighty-four commercial broiler chicks were sexed at four weeks of age, weighed and randomly allotted to treatments within a thermostatically and humidistatically controlled environmental chamber. Six chicks (3 males, 3 females) were housed in each wire floored grower battery compartment and compartments randomly assigned to treatment groups to provide 16 replicates per treatment. All birds were fed a grower diet (Table 1) determined to be nutritionally adequate by National Research Councils' Standards.

---

[1]Research Associate [2]Associate Professor

Table 1. Composition of basal diet.

Ingredient	%
Ground Corn	56.8
Soybean Meal	36.0
Fat	3.0
Dical. Phosphate	2.35
Calcium Carbonate	.90
Salt	.50
Vitamin Mix	.25
Trace Mineral	.10
DL-Methionine	.10
Total	100.00

Ambient temperature within the environmental chamber was allowed to cycle between 80 and 98F over a 24 hour period, thereby simulating normal summer conditions. On three treatments, feed was removed at 0, 3 or 6 hours prior to the onset of growth-limiting heat stress, defined as 92F, while for the fourth treatment, feed was not removed. All birds were again placed on feed when the chamber temperature reached 92F on the downward part of the cycle. Mortality was recorded for the duration of the three week experiment and survival determined at the end. Body weight gain and feed consumption were calculated.

Results and Discussion

Fasting heat stressed broilers for up to 12.5 hours per day for the final 21 days prior to marketing did not significantly depress weight gain (Table 2). There was also no difference in daily feed consumption, therefore it would appear that birds consumption pattern was forcibly shifted to the cooler portions of the day when feed was available. Birds fasted 12.5 hours enhanced their water consumption by 22% ($P<.05$).

Withdrawal of feed 6 hours prior to the onset of heat stress initiation significantly increased ($P<.10$) survival for the three weeks experimental period (Table 3). This increased survival may be a response to the reduction of the digesta load in the gastrointestinal tract and the increased water consumption. Both factors may serve to reduce body temperature, since feed removal reduces the diet whereas water may serve as a "sink" for body heat dissipation.

Careful examination of these results indicate that the implications are good for the potential enhancement of broiler meat production. The U.S. Department of Agriculture Outlook Report indicated that poultry consumption would surpass beef (Brown, 1986). Projected increases in per capita poultry consumption from 73.8 to 78.8 pounds and a concomitant reduction in beef consumption from 78.1 to 73.6 pounds, would cause poultry consumption to exceed beef for the first time ever in 1987. This 6.8% projected increase in poultry meat consumption could be partially met by an increase survival during the summer months.

Several measures employed by producers to reduce broiler mortality or the enhance weight gain during heat episodes in summer fail to

Table 2. Body weight gain, feed consumption and water consumption of birds relative to fasting period.

Time of feed withdrawal relative to stress initiation	Fasted Period (Hrs)	Daily Feed Consumption (g)	Daily water Consumption (g)	Body Weight gain (g)
Not withdrawn	0	87.5	203[b]	569
Withdrawn at stress initiation	6.5	87.2	205[b]	550
3 hrs before	9.5	86.2	213[ab]	561
6 hrs before	12.5	84.1	247[a]	556

[ab]Means in columns with unlike superscripts differ (P<.05).

Table 3. Survival rate of heat stressed broilers relative to fasting period.

Time of feed withdrawal relative to stress initiation	Fasted Period (hrs)	Survival (%)
Not withdrawn	0	94[b]
Withdrawn at initiation	6.5	94[b]
3 hrs before	9.5	97[ab]
6 hrs before	12.5	99[a]

[ab]Means in column with unlike superscripts differ (P<.10).

achieve the desired result. Deaton (1986) observed that broilers reared in houses equipped for evaporative cooling are more susceptible to heat prostration on the way to market that those reared under a normal summer cyclic temperature regimen. Since fasting enhances survival while at the same time causes no significant weight reduction, this management tool could be used as a method of increasing broiler production during heat stress.

Literature Cited

Brown, R.H., 1986. Poultry consumption may surpass beef sales in 1986. Feedstuffs. 58(38):27.

Deaton, J.W. et al., 1986. High environmental temperature and broiler livability. Poultry Sci. 65:1268.

Kohne, et al., 1973. The effect of feed consumption on the survival time of adult turkey hens under conditions of acute thermal stress. Poultry Sci. 52:1790.

McCormick et al., 1979. Fasting and diet affect the tolerance of young chickens exposed to acute heat stress. J. Nutr. 109:1797.