The Effects of Precision Feeding on the Behavior of Adult Cockerels[1]

D. FRASER and I. R. SIBBALD

Animal Research Centre, Agriculture Canada, Ottawa, Ontario, Canada K1A 0C6

(Received for publication May 2, 1983)

ABSTRACT The behavior of 15 precision-fed (PF) cockerels was compared with that of 15 normal (N) and 15 fasted (F) birds. In the 10 min after feeding, the PF birds had a higher incidence of beak movements ($P<.01$) than N and F birds. Five PF birds retracted their heads and necks, and 3 made regurgitation-like movements, but the effects were generally slight and fleeting. When a flock of 48 PF birds was observed more casually, only 2 birds showed abnormal behavior. The low incidence of conspicuous abnormal behavior, after precision feeding, in contrast to that reported by Wehner and Harrold (1982), is probably due to the shorter time required to administer the feed.
(*Key words:* behavior, precision feeding, cockerel)

1983 Poultry Science 62:2224–2226

INTRODUCTION

Precision feeding, the placement of a known quantity of feed in the crop at a known time, is an integral part of several avian bioassays (Sibbald, 1983). One study has reported behavioral symptoms of "stress" among precision-fed birds, particularly when dry pellets or dry ground feed were used (Wehner and Harrold, 1982). Therefore, it seemed appropriate to examine more closely the effect of precision feeding on bird behavior.

MATERIALS AND METHODS

The experiment involved three treatments and 15 replications in a complete randomized block design. The treatments comprised full-feeding under maintenance conditions (N), a 24-hr fast (F), and precision feeding of 30 g of dry crumbs after a 24-hr fast (PF). No more than three replications were completed on any one day in order for the observer to maintain a high degree of concentration when watching the birds. The experimental unit was an adult, Single Comb White Leghorn cockerel housed in an individual wire cage 30 × 40 × 50 cm high in a windowless room provided with 12 hr of light daily. Birds were maintained under *ad libitum* feeding and had water available from overhead nipples.

The experiment was started by removing the feed but not water from two-thirds of the flock. Twenty-four hours later, birds were randomly selected one at a time and transferred from the home cage to an observation cage. Birds of treatment N were drawn from the fed portion of the flock and those of treatments F and PF from the fasted portion. The precision feeding took place about 30 sec before placing the PF birds in the observation cage.

The observation cage was of the same dimensions and construction as the home cage of the bird but was located in a room that contained no other birds or cages, nor was it equipped with a source of drinking water. The cage was illuminated by a 100-W bulb, 150 cm overhead. The observer sat in a shaded part of the room and watched the bird through a narrow slit in a screen 180 cm from the cage. The observer was behind the screen when birds were delivered to the cage and had no knowledge of the experimental treatment. A single observer collected all the behavioral information.

Each bird was watched closely for the first 10 min in the cage, and its behavior was recorded by the observer speaking quietly into a tape recorder. Records included every occurrence of the following activities: step, peck, crow, feather ruffling, head shake, wing stretch, wing flap, jump, and excretion. All vocalizations other than crowing were classed simply as calls, and the bird was scored as having called or not during each 15-sec interval of the test. "Head down" was scored each time the bird lowered its head below the mid-line of the body. "Beak movement" was scored when the bird opened and closed its beak several times in rapid succession over 1 to 3 sec. "Beak stretch" was scored when the bird held the beak open in

[1] Contribution Number 1158.

an exaggerated way for about 1 sec. "Stand or sit motionless" was scored once for every 15-sec interval in which the bird made no visible movement.

The observer also judged whether a bird had shown any of the seven categories of unusual behavior listed in Table 1. The categories are based on nine activities listed by Wehner and Harrold (1982). It is not clear whether their category "head pulled back and downward towards the breast" (p.597) was intended to be equivalent to their category "retracted head and neck" (p.596). We used the latter description to encompass all movements of this type. The category "lack of normal movement" was not used because the main components of body movement were recorded quantitatively.

In addition to the detailed behavioral study, a series of more cursory observations were made during the course of a bioassay for true metabolizable energy. Birds were maintained in the lower tier of a two-deck system of wire cages. After fasting for 24 hr, a bird was selected, precision-fed with 30 g of dry fish meal and housed in a cage of the upper tier. The procedure was repeated until 48 birds were housed in alternate cages. The observer scanned the fed birds from the time of housing the first bird until 1 hr after housing the 48th bird. All observed occurrences were noted for the activities listed in Table 1, for "beak movements" (as defined), and for any other unusual behavior.

TABLE 1. *The incidence of seven categories of unusual activity in each of three treatment groups*[1,2]

Activity	Treatment		
	Normal	Fasted	Precision fed
Crouched standing posture	1	0	1
Slumped recumbent position	1	0	1
Retracted head and neck	0	0	5
Regurgitation	0	0	3
Sitting on posterior part of shank	0	0	0
Eyes closed	4	1	2
Pale wattles and comb	1	2	0

[1] There were 15 birds in each treatment group.

[2] The categories of activity are based on those used by Wehner and Harrold (1982).

RESULTS

Only two of the categories of unusual behavior appeared to be characteristic of the PF birds in the main experiment (Table 1). Retraction of the head and neck was scored for 5 birds. One stood for several minutes with the head and neck pulled back towards the breast. The four others retracted the head and neck in discrete, jerky movements lasting about 1 sec. This occurred between 1 and 16 times for each of the four affected birds. Regurgitation was scored for three birds. The birds stood with the head and neck well extended, and made slight, jerky, regurgitation-like movements of the neck lasting about 1 sec. This occurred from 2 to 5 times for each of the 3 birds. No feed was seen to be regurgitated.

Of the seven most common activities (Table 2), only beak movements showed a significant ($P<.01$) difference among treatments. Major components of body movement (step, head down, peck) and vocalization (call, crow) occurred with similar frequency in all treatments. The PF birds had a higher mean score for standing or sitting motionless, but this was entirely due to one very inactive bird. Other activities occurred infrequently, at similar rates for the different treatments. Close inspection of the results showed that PF birds had rather low scores for stepping and crowing at the beginning of the observation period, but the differences disappeared after 2 to 3 min.

TABLE 2. *The seven most common behavioral activities and their mean incidence during a 10 min period*[1]

Activity	Normal	Fasted	Precision fed	Treatment effect[2]
Step	19.2	23.9	21.9	.77
Head down	9.3	9.9	7.6	1.32
Peck	2.2	4.5	3.0	.89
Call	12.1	12.2	10.1	1.21
Crow	9.2	9.3	6.2	.44
Stand or sit motionless	2.0	2.9	4.7	.13
Beak movement	1.9	1.9	5.7	6.86**

[1] There were 15 birds in each treatment group.

[2] Variance ratio (F) from a two-way analysis of variance after logarithmic transformation.

**$P<.01$.

Cursory observations on the 48 additional PF birds showed little behavioral disturbance. Most birds remained active during the 1 to 2 hr of observation. Five sat or stood in a crouched position part of the time, but the behavior appeared to be normal resting. No regurgitation or retraction movements of the head and neck were seen. Two birds opened and closed the beak repeatedly, often while shaking the head.

DISCUSSION

In the study by Wehner and Harrold (1982), precision feeding sometimes lasted for many minutes, depending upon the form of the feed. Dry pellets required an average of 12.5 min and, based on the occurrence of unusual behavior, resulted in a high proportion of birds judged to be "stressed". The most rapid feeding, with a slurry, required an average of 3.25 min and resulted in no observed "stress". It appears that the level of disturbed behavior was related to the time taken to complete the precision feeding. In our study precision feeding was usually completed within 30 sec and produced few behavioral symptoms.

Only three behavioral categories were noticeably affected by precision feeding. Regurgitation-like movements may have been caused by the sudden loading of the crop. Retraction of the head and neck, and the higher frequency of beak movements may have been caused by discomfort in those areas associated with the feeding device. Alternatively, the neck movements may have been an attempt to move the feed within the crop, and the beak movements may have been symptomatic of the need for water. However, apart from one bird that held its head and neck retracted for several minutes, the behavioral effects of precision feeding were fleeting; most would have been missed but for the close, continuous examination of the birds. The casual scanning of the 48 assay cockerels for 1 to 2 hr detected unusual behavior in only two birds.

The term "stress" has been used in conflicting ways by agricultural and veterinary workers (Fraser *et al.*, 1975; Hill, 1983). Here we shall not debate whether the behavioral features noted by Wehner and Harrold (1982) can rightly be said to denote "stress". It is clear, however, that their more lengthy feeding techniques cannot be recommended in that they are unnecessarily time-consuming as well as causing unusual behavior that may indicate suffering. Rapid techniques of precision feeding appear largely to eliminate these problems.

ACKNOWLEDGMENTS

The authors are grateful to B. A. Campbell and S. Tobin for their able technical assistance and to N. A. Cave and A. Grunder for helpful comments on the manuscript.

REFERENCES

Fraser, D., J.S.D. Ritchie, and A. F. Fraser, 1975. The term "stress" in a veterinary context. Br. Vet. J. 131:653–662.

Hill, J. A., 1983. Indicators of stress in poultry. World's Poult. Sci. J. 39:24–31.

Sibbald, I. R., 1983. The T.M.E. system of feed evaluation. Agric. Can., Ottawa, Ontario.

Wehner, G. R., and R. L. Harrold, 1982. The effect of feeding techniques on the true metabolizable energy value of yellow corn. Poultry Sci. 61: 595–597.