

# *Feed Value For Growing, Finishing*

# Oats for Turkeys

J. L. Sell, R. L. Bryant, R. J. Rose and  
W. C. Lockhart

Since about 80 per cent of the total feed consumed by heavy turkeys being prepared for market is eaten between 12 and 24 weeks of age, a special effort to trim ration costs during this period is warranted. Grain comprises 65 to 80 per cent of the rations for growing-finishing turkeys and any adjustment in grain used which results in money savings without adversely affecting performance would be justified.

Oats is a major crop in North Dakota, with about 100 million bushels produced annually, and the price of oats in relation to other feed grains is quite favorable during much of the year.

There is little information available concerning the relative feeding values of oats and corn for turkeys. Carlson and Kohlmeyer (1952) reported oats to be worth about 76 per cent as much as corn (on a pound for pound basis) when fed at levels of 10 to 80 per cent of turkey rations. Lockhart *et al.* (1960) found the metabolizable energy value of heavy oats (36 or more pounds per bushel) to be 80 to 86 per cent of that of corn for turkeys 2 to 3 weeks of age.

Five experiments have been conducted recently at the Poultry Research Center to evaluate the merits of using oats as a major portion of the ration for growing-finishing turkeys.

## Types Used

All turkeys were reared from one day to 12 weeks of age in floor pens in an enclosed building at the Poultry Research Center. The Broad Breasted Bronze turkeys used in trials 1, 2 and 3 and the California Royal (Buff) turkeys used in trial 4 were reared in this same facility from 12 to 24 weeks of age. Heavy-type white turkeys were used in trial 5 and these turkeys were reared from 12 weeks on-

ward in range areas equipped with shelters.

The growing-finishing period was divided into three 4-week intervals; 12-16, 16-20 and 20-24 weeks of age. Appropriate adjustments were made in ration formulas so that protein levels of 20, 17 and 14 per cent were fed during each respective interval. In trials 2 through 5, the rations fed within each age interval were kept isonitrogenous (equal protein levels). However, in trial 1 oats was substituted for corn on a pound for pound basis with no adjustments made to maintain isonitrogenous rations.

## Proportion Varies

In trials 1 through 4 oats was substituted for corn in the grain mixture (oats-corn) in such a manner that the proportion of oats varied from none to 100 per cent with increments of 20 per cent of oats substituted for corn in the intermediate mixtures. The grain mixtures (cracked corn and/or whole oats) were blended with a 37 per cent protein concentrate to yield balanced rations. The oats and corn used in the first 4 trials were from one batch within each trial, and the oats was of very good quality (36 pounds or more per bushel).

The rations fed in trial 5 differed from those of the other trials in that oats was substituted for corn so as to comprise 0, 50 or 100 per cent of the grain portion of turkey growing-finishing rations. Each of these three grain sources was mixed with a 40 per cent protein concentrate to form balanced rations containing the appropriate protein level for the various age intervals. To test the effects of method of feeding, these three rations were offered in the form of a complete crumble ration or as a blend of cracked corn and/or whole oats and concentrate. Thus, each ration was offered as a complete ration or as a grain-concentrate blend. No attempt was made to control the quality of oats used during trial 5.

The rations were fed free-choice in all trials. Weight gain, feed consumption and mortality data were recorded at the end of each 4-week interval during each trial.

*Dr. Sell is associate professor, Dr. Bryant is professor emeritus, and Dr. Rose is assistant professor, Department of Animal Science. Lockhart is presently at Oklahoma State University, International Programs.*

**Table 1. Weight gain and efficiency of feed use of turkeys from 12 through 24 weeks of age — trial 1.**

Per cent of the grain			Weight gain (pounds) <sup>1</sup>		Efficiency of feed use <sup>2</sup>
Corn	Oats	Number of turkeys	Males	Females	Combined
100	0	140 <sup>a</sup>	12.0a <sup>1</sup>	7.2a	5.84a
80	20	134	13.0ab	7.1a	6.05a
60	40	135	12.9ab	7.3a	5.82a
40	60	134	13.8b	7.4a	5.88a
20	80	135	14.0b	7.4a	5.64a
0	100	136	13.5ab	7.5a	6.14a

<sup>1</sup>Average 24 week weights of males ranged from 22.5 to 24.5 pounds and that of females from 14.8 to 15.2 pounds.

<sup>2</sup>Pounds of feed per pound of weight gain.

<sup>3</sup>Four pens per ration treatment with males and females equally represented.

<sup>4</sup>Means not followed by the same superscript letter are significantly different ( $P < 0.05$ ).

### Response To Diet

In trial 1, as the proportion of oats in the ration increased, average weight gain of males from 12 through 24 weeks of age increased (Table 1). The gains made by males fed 60 or 80 per cent oats in the grain mix was significantly more than those of males fed only corn as the grain portion of the ration. Gains by females were not affected noticeably by the grain fed and there were no significant differences observed in efficiency of feed utilization as related to ration treatments.

The weight gains of turkeys in trials 2, 3 and 4 varied considerably in response to changes in proportions of oats and corn fed in isonitrogenous rations (Tables 2 and 3). However, in trials 3 and 4,

males fed 40 per cent or more of oats in the grain mixture gained significantly faster than those fed corn. Similar responses of females were observed in trials 2 and 3; in fact, the beneficial effect of increasing oats in the ration was very marked in the latter trial. Efficiency of feed use by male turkeys was not altered by ration treatment in trials 2 and 3, and the efficiency of feed use on a combined sex basis in trial 4 was not influenced noticeably by changes in grain mixture.

Seemingly contradictory results were obtained in trials 2 and 3 with regard to efficiency of feed use by females. In trial 2, there was an adverse effect on feed efficiency when oats was included at high levels in the ration while the opposite was true in trial 3.

**Table 3. Weight gain and efficiency of feed use of turkeys 12 through 24 weeks of age — Trial 4.**

Per cent of the grain			Weight gain (pounds) <sup>1</sup>		Efficiency of feed use <sup>2</sup>
Corn	Oats	Number of turkeys	Males	Females	Combined sexes
100	0	120 <sup>a</sup>	11.2a <sup>1</sup>	6.5a	5.88a
80	20	120	11.2a	6.9a	5.94a
60	40	120	12.1ab	7.5a	5.57a
40	60	120	12.1ab	6.8a	5.69a
20	80	120	12.5b	6.8a	5.74a
0	100	120	12.7b	7.4a	5.80a

<sup>1</sup>Average 24 week weights of males ranged from 21.4 to 22.9 pounds and that of females from 14.8 to 15.7 pounds.

<sup>2</sup>Pounds of feed per pound of weight gain.

<sup>3</sup>Four pens per ration treatment with males and females equally represented.

<sup>4</sup>Means not followed by the same superscript letter are significantly different ( $P < 0.05$ ).

**Table 2. Weight gain and efficiency of feed use of turkeys from 12 through 24 weeks of age — Trials 2 and 3.**

Per cent of the grain		Number of turkeys	Weight Gain (Pounds) <sup>1</sup>		Efficiency of Feed Use <sup>2</sup>	
Corn	Oats		Males	Females	Males	Females
Trial 2						
100	0	128 <sup>a</sup>	12.4a <sup>4</sup>	6.4a	4.61a	5.97bc
80	20	128	13.0a	7.0bc	4.60a	5.72ab
60	40	128	12.8a	7.4c	4.98a	5.88abc
40	60	128	13.6a	7.2bc	4.55a	5.64a
20	80	128	13.8a	7.0bc	4.62a	6.04cd
0	100	128	13.0a	6.9b	4.70a	6.33d
Trial 3						
100	0	131	13.2a	7.1a	5.12a	7.40a
80	20	130	13.9ab	7.4a	5.38a	6.58b
60	40	130	15.8bc	8.2b	4.92a	6.54b
40	60	130	15.3bc	9.0c	4.84a	6.10b
20	80	130	15.6bc	9.0c	4.96a	6.15b
0	100	130	16.0c	8.8c	5.19a	6.20b

<sup>1</sup>Average 24 week weight of males ranged from 24.8 to 27.6 pounds and that of females from 15.7 to 17.5 pounds.

<sup>2</sup>Pounds of feed per pound of weight gain.

<sup>3</sup>Two pens of males and 2 pens of females per ration treatment.

<sup>4</sup>Means not followed by the same superscript letter are significantly different ( $P < 0.05$ ).

Table 4. Weight gain and efficiency of feed use of turkeys from 12 through 23 weeks of age — trial 5.

Form of Ration	Per cent of the Grain		Number of turkeys	Weight Gain (Pounds) <sup>1</sup>		Efficiency of Feed Use <sup>2</sup> Combined sexes
	Corn	Oats		Males	Females	
Blend	100	0	128 <sup>s</sup>	16.0a <sup>4</sup>	9.4ab	4.32a
Blend	50	50	128	16.4a	9.1ab	4.71c
Blend	0	100	128	15.4a	8.6a	5.32d
Crumble	100	0	128	17.0a	9.4ab	4.27ab
Crumble	50	50	128	16.4a	9.6b	4.56bc
Crumble	0	100	128	15.8a	8.6a	5.20d

<sup>1</sup>Average 23 week weights of males ranged from 27.0 to 28.6 pounds and that of females 17.0 to 18.0 pounds.

<sup>2</sup>Pounds of feed per pound of weight gain.

<sup>3</sup>Two pens per ration treatment with males and females equally represented.

<sup>4</sup>Means not followed by the same superscript letter are significantly different ( $P < 0.05$ ).

The results of trial 5 appear to be inconsistent with those of the first four trials. The weight gain of females from 12 through 23 weeks of age was reduced significantly when oats comprised 100 per cent of the grain, regardless of the form in which the ration was fed (Table 4). At the same time, weight gain of males was decreased by feeding the high level of oats, although not significantly. Efficiency of feed utilization became significantly poorer as the level of oats in the ration increased, regardless of feeding method. Overall, feeding the ration in the complete, crumbled form showed no advantage over feeding the same proportions of grain and concentrate as a blend of whole grain and concentrate or vice versa.

Mortality during the growing-finishing periods was low in all trials and was not related to any ration treatment.

In general, the results of trials 1 through 4 show oats to be at least equal to corn on a protein equivalent basis for feeding heavy turkeys from 12 weeks of age to market finish. Gain in body weight by males and females fed 20 through 100 per cent oats in the grain mixture was at least equal to that of turkeys fed corn only. In the same trials, efficiency of feed utilization was not affected adversely by the use of high levels of oats except in the case of females in trial 2. All in all the results of the first 4 trials show heavy oats (36 pounds per bushel) to be a satisfactory grain for turkeys.

The results of trial 5 do not agree with those of trials 1 through 4 in that weight gain and efficiency of feed use were affected adversely when oats comprised 100 per cent of the grain in a ration. As mentioned previously, no effort was made to control oat quality during trial 5 and it was apparent from visual examination that the oats were of relatively poor quality. Lockhart *et al.* (1961) found that the metabolizable energy content

of oats was closely correlated with bushel weight. Probably the use of low quality, low energy oats in the last trial, coupled with the very rapid growth rates, caused the relatively poor performance of turkeys fed oats as the only grain.

### Feed Cost Savings

The poor performance of turkeys fed oats in trial 5 resulted in a slight increase in feed cost per pound of body weight gain when ration ingredient prices of early fall, 1967 were used to calculate feed costs. In contrast, calculations of feed costs on the same basis for trials 1 through 4 show that the substitution of oats for corn would have resulted in feed cost savings of 10. to 15 per cent. Results emphasize the importance of using high quality, heavy oats in order to obtain good turkey performance and feed cost savings. During these times of close profit margins, taking advantage of potential savings in feed costs can make a significant difference between profit and loss.

### SUMMARY

Oats can be a suitable replacement for corn in a turkey growing-finishing ration, giving a significant saving in feed cost. Since North Dakota produces large crops of oats and little corn, the substitution is a logical one. Trials indicate that gains made by oats-fed turkeys often equal or exceed gains made by turkeys on corn rations. The feeding trials show the need for feeding high quality oats. Substitution of oats for corn could result in feed cost savings of 10 to 15 per cent.

### LITERATURE CITED

- CARLSON, C. W. and W. KOHLMAYER, 1952. Oats for growing turkeys. South Dakota Farm and Home Research 3(2):42-45.
- LOCKHART, W. C., D. W. BOLIN, G. OLSON and R. L. BRYANT, 1960. Nutritive value of oats for turkeys. Feedstuffs 32(35):60-61.
- LOCKHART, W. C., D. W. BOLIN, G. OLSON and R. L. BRYANT, 1961. The metabolizable energy value for oats of various bushel weights. Poultry Sci. 40:327-333.