

Utah State University

DigitalCommons@USU

---

UAES Bulletins

Agricultural Experiment Station

---

5-1953

## Bulletin No. 361 - How Much Barley for Turkeys

C. I. Draper

Follow this and additional works at: [https://digitalcommons.usu.edu/uaes\\_bulletins](https://digitalcommons.usu.edu/uaes_bulletins)



Part of the [Agricultural Science Commons](#)

---

### Recommended Citation

Draper, C. I., "Bulletin No. 361 - How Much Barley for Turkeys" (1953). *UAES Bulletins*. Paper 316.  
[https://digitalcommons.usu.edu/uaes\\_bulletins/316](https://digitalcommons.usu.edu/uaes_bulletins/316)

This Full Issue is brought to you for free and open access by the Agricultural Experiment Station at DigitalCommons@USU. It has been accepted for inclusion in UAES Bulletins by an authorized administrator of DigitalCommons@USU. For more information, please contact [digitalcommons@usu.edu](mailto:digitalcommons@usu.edu).



# How Much Barley For Turkeys

by C. I. DRAPER

Bulletin 361

Agricultural Experiment Station  
Utah State Agricultural College  
Logan Utah

May 1953

# How Much Barley For Turkeys<sup>1</sup>

C. I. Draper<sup>2</sup>

**D**URING recent years high energy turkey diets containing corn as the sole source of ground grain have been fed extensively. Corn has been used as the grain part of the mash because of its high energy, low fiber qualities, and because its deficiencies in amino acids, vitamins, and minerals have been determined by research. Supplements to overcome these deficiencies have been added to high energy corn diets. Excellent results have been obtained when adequate supplementation of vitamins, amino acids, and minerals were made.

In this area frequent inquiries are made as to the possibilities of substituting barley for part or all of the corn. These inquiries are undoubtedly made because barley is generally cheaper than corn. It is a product that is grown locally and yields are above other grains on local irrigated farms.

Poley and Wilson<sup>3</sup> found "no appreciable differences in the rate of growth when turkeys received either corn, wheat, oats, or barley in growing rations." No soybean oil meal was fed as a protein concentrate in their feeding trials. However, since their investigation, new vitamins necessary for growth have been discovered. Alder<sup>4</sup> found that barley could replace a large part of corn in the turkey diet. However, all barley diets were not included in his investigations.

The objectives of this investigation were to study the effects of substituting ground barley for ground corn on a pound for pound basis in the turkey growing mash.

## HOW THE TURKEYS WERE RAISED

**F**OURTEEN lots of 13 female Bronze turkeys were raised in confinement from 12 to 180 days of age. They were started in 14 electrically heated battery brooder pens and transferred to 14 unheated battery pens of similar construction at approximately 5

<sup>1</sup>Report on project 345—State.

<sup>2</sup>Professor and head of the Department of Poultry Husbandry.

<sup>3</sup>Poley, W. E., W. O. Wilson. Cereal grains in turkey rations. S. Dak. Agr. Exp. Sta. Bul. 330. 1939.

<sup>4</sup>Alder, B. Unpublished data. Utah Agr. Exp. Sta. 1945.



Table 1. *Average weight, efficiency of feed utilization, and mortality of Bronze turkey hens fed diets containing varying amounts of corn and barley*

Diet no.	Grain part of mash		Scratch		Average weight of duplicate lots after feeding		Feed required per lb. of gain for experimental period	Mortality
	Corn	Barley	Wheat	Barley	84 days	168 days		
	<i>percent</i>	<i>percent</i>	<i>percent</i>	<i>percent</i>	<i>pounds</i>	<i>pounds</i>	<i>pounds</i>	<i>percent</i>
1	40	0	50	50	6.4	14.7	3.79	8
2	30	10	0	100	5.6	13.4	4.00	12
3	20	20	0	100	5.7	13.7	3.96	0
4	10	30	0	100	5.4	13.3	4.05	19
5	0	40	0	100	5.2	13.1	4.36	6
6	0	40	50	50	5.1	13.4	4.39	4

weeks of age. At 10 weeks the birds were transferred to sheltered pens with slat floors. An all mash diet was available to the birds at all times during the first 84 days of the experiment. Mash and grain were fed ad lib during the growing period. Duplicate lots of birds were fed each diet except four lots were fed diet 5.

The control diet was a high energy type diet that had given excellent results with commercial flocks. It consisted of the following:

	lbs.
Ground yellow corn	40.0
Wheat standard middlings	5.0
Fish meal (65 percent protein)	7.5
Meat meal (50 percent protein)	10.0
Soybean oil meal (44 percent protein)	25.0
Corn gluten meal	3.0
Alfalfa leaf meal (20 percent protein)	2.0
Multiple vitamin concentrate*	5.0
Calcium carbonate	1.0
Defluorinated rock phosphate	1.0
Salt	0.5
Manganese sulfate	25 mg. per lb.

---

Total pounds 100.00

\*Vitamin concentration per pound as follows: Vitamin A, 100,000 I U; Vitamin D, 22,700 AOAC chick units D3, ribobavin 31.78 mg., pantothenic acid 40z mg., and niacin 180 mg.

All ingredients of the experimental mashes were the same as the control mash except the replacement of the ground corn in the control mash with ground barley as shown in table 1.

The protein content of all mashes was approximately 27 percent since the corn and barley had practically the same amount of protein. This high protein mash encouraged consumption of whole grains during the growing period.

Data on weight of the birds and feed consumption were collected at 28-day intervals. All birds that died were posted to determine the cause of death.

The effects of substituting barley for corn were measured by rate of growth, mortality, feed conversion, and market quality.

## RESULTS AND DISCUSSION

**T**HE average weight of Broad Breasted Bronze hen turkeys fed mashes containing 0 to 40 percent barley are shown graphically in fig. 1. Additional information on average weights, feed



conversion, cost of production, and mortality is presented in table 1.

Replacing the ground corn in the mash with ground barley resulted in decreased rate of growth and efficiency of feed utilization.

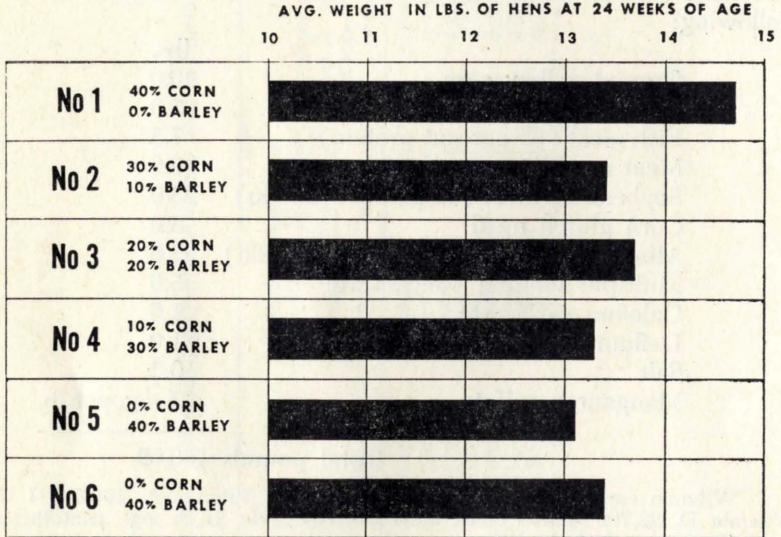


Fig. 1—Average weight of Bronze hen turkeys. All ingredients of the mash were the same except for cereal grain part as shown above. All other lots received barley only

After twelve weeks of feeding the experimental diets the turkeys fed the all-mash, high-energy diet averaged seven-tenths of a pound per bird more than the next heaviest group, and one and three-tenths pounds more than the lightest group. Except for the lot of turkeys fed diet 3 (20 percent corn and 20 percent barley), there was a consistent decrease in the twelve-week weight as the amount of barley in the diet increased.

After feeding the experimental diets for twenty-four weeks the turkeys fed the high-energy diet averaged approximately one pound more per bird than the next heaviest group (20 percent corn and 20 percent barley), and one and six-tenths pounds more per bird than the lightest group. The weight trend at twelve weeks of age carried through to market age. The difference in weight of turkeys fed the high-energy diet (1) plus mixed scratch grain and those fed diets containing only barley possibly resulted

from inadequate supplementation of the proteins in the barley diet, the increased amount of fiber in the barley diets, and the absence of wheat in the scratch.

The pounds of feed required to produce a pound of gain increased as the amount of barley in the diet increased. The turkeys fed all barley diets consumed an additional six-tenths pound of feed for each pound of gain.

The data were analyzed by the method of covariance. After adjusting the average gains to a common feed intake the gains made by the turkeys fed the high-energy mash plus wheat and barley scratch grains were significantly greater than those made by the turkeys fed a diet containing only ground barley in the mash and barley scratch.

Turkeys fed diet 6 averaged three-tenths of a pound more than those fed diet 5. Both lots of turkeys were fed an all barley mash from a common mix. However, the turkeys fed diet 5 received only barley as scratch grain, while those fed diet 6 received a mixture of 50 percent barley and 50 percent wheat. The addition of wheat in the scratch of the turkeys fed diet 6 possibly accounted for the slightly larger birds.

Feed cost per pound of gain was twenty-two cents in the lots fed the high corn mash plus mixed scratch grains, and twenty-five cents in the lots fed all barley diets. The price spread between corn and barley at the time this experiment was conducted was thirty cents per hundred. This is an unusually narrow spread between the two grains for this area. The calculated equivalent values of corn and barley when used as the sole source of cereal grain in the mash (comparing diet 1 and 6) are shown in table 3. By referring to this table it will be noted that when the price of corn is \$4.00 per hundred, barley will be worth \$3.45. If the actual price of barley is below the figure listed in table 2, it may be advisable to replace the corn in the ration with barley.

When based on the amount of feed required to produce a pound of gain, the all-barley diet (5) had approximately 86 percent of the feeding value of the control diet (high energy yellow corn mash plus mixed scratch). This value is slightly lower than that reported by Poley and Wilson. However, the diet fed by these investigators contained no vitamin B<sub>12</sub>, antibiotics, or soybean oil meal, and the rates of growth obtained in their experiments were below those reported in this investigation.

There was a rather wide range in the mortality rate, but there was no definite trend. The mortality in the lots receiving



Table 2. *Calculated equivalent values per 100 pounds of corn and barley in turkey starting and growing rations*

When corn costs	Barley is worth	When corn costs	Barley is worth
<i>dollars</i>	<i>dollars</i>	<i>dollars</i>	<i>dollars</i>
3.00	2.60	4.10	3.53
3.10	2.67	4.20	3.62
3.20	2.76	4.30	3.71
3.30	2.85	4.40	3.80
3.40	2.93	4.50	3.88
3.50	3.02	4.60	3.97
3.60	3.10	4.70	4.06
3.70	3.19	4.80	4.14
3.80	3.28	4.90	4.23
3.90	3.36	5.00	4.31
4.00	3.45		

all barley diets was low compared to rates in commercial turkey flocks.

There was no difference in market quality of the birds fed the various diets.

The results of this experiment again demonstrate that carefully balanced diets cannot be altered by substituting feeds without decreasing the value of the diet. Undoubtedly high barley diets will give better results than were obtained in this investigation when the exact supplements necessary for this type of diet have been determined through additional research.

### SUMMARY

REPLACING ground corn in the mash and wheat in the scratch with barley resulted in a decreased rate of growth and more pounds of feed were required to produce a pound of gain. When based on efficiency of feed conversion, the all barley diets had approximately 86 percent of the feeding value of the higher energy control diet (corn base mash plus mixed scratch grains). Larger amounts of barley may give better results than were obtained in this investigation when the deficiencies of barley are determined and properly supplemented.