

Grain Sorghum in Poultry Diets

B. L. Reid and B. J. Hulet

Poultry rations in the Southwest ordinarily contain 50 to 70 percent grain sorghum, since these grains serve as the most economical source of energy and protein in this section of the United States. Sorghum is well adapted to semi-arid areas, but it can make good use of additional water and is grown extensively under irrigation in dry areas. As a cereal crop in the United States, sorghum is currently exceeded in production only by wheat and corn.

Within the past two years much interest has developed among poultry nutritionists relative to the evaluation of grain sorghum utilization in comparison with corn. Corn serves as the main grain component of poultry rations in other sections of the U.S.

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to two cents per pound less than for white-owned sheep at the same time of year. Indians have taken lambs to the public auction at Cortez, Colo., where they sell for 1½ to 2 cents less per pound than do white-owned lambs. Some persons with knowledge of the Arizona sheep industry feel that the price differential is even wider. One man says that Indians receive 3 to 5 cents less, while another feels they receive about 2 cents less.

The tribal councils and the Bureau of Indian Affairs are working on improving Indian sheep. Projects include buying and disposing of old ewes, furnishing high quality rams, and stressing better production and marketing practices. As a result, some of the Indian sheep are of high quality. As these improvement programs become more widespread in their effect, the price discount for Indian lambs probably will continue to decline.

Prices of lambs in Arizona tend to be highest during April and May and lowest during the October-January period. Keep in mind that these are average prices for all lambs. Thus, these prices reflect any seasonal variations in prices within grades as well

simply because it is plentiful, locally grown and economically priced.

Must Know Them Better

With the development of the various hybrids and numerous strains of grain sorghums, an evaluation of the nutrient content and utilization of them has become of vital concern to poultry feed manufacturers and poultrymen. Commercial feed operations ordinarily do not segregate their various shipments of grains with regards to nutrient content or strain.

It is possible, however, that the presence of sorghum of low nutritive value would not produce any dramatically adverse effects on total egg production, but would result in lowered production efficiency, poor feed utilization or reduced egg size.

One problem associated with the use of grain sorghums is the great variability in their protein contents. Our analyses have indicated values as low as 6 percent crude protein while

as seasonal variation in the grade make-up of lambs sold. The months characterized by higher prices correspond to the period of marketing of milk fat lambs by white producers. Months which have lower prices include the months during which the Indians market their feeder lambs.

Hit Different Markets

Factors which contribute to this large seasonal variation in prices are: (1) Whites sell their lambs during the time when prices of lambs are seasonally high for the state and the nation, while the Indians sell their feeder lambs in the fall when lamb prices are generally lower; (2) Indian lambs tend to be smaller, less meaty, and more variable in quality of wool than do white produced lambs; (3) Sales of Indian lambs occur in more remote areas and they are sold in smaller lots.

We can conclude that in general Indian producers do receive a lower price for their lambs than do white producers. The size of the difference is probably near 1 to 3 cents in any one year. About half of this difference appears to be due to differences in prices of fat and feeder lambs and in time of year when marketed. The other half of this difference is due probably to quality and distance to market.

Turn to Channel Six For Interesting Fare

We recommend to our readers in southern Arizona a discovery we have made — if you turn to Channel 6 you get interesting adult television, both network and local programs.

Channel 6, of course, is the University of Arizona "educational network" channel. This station — KUAT-TV — is accessible to viewers within 20 miles of the U of A campus, also to cable-serviced viewers on other channels at Nogales, Bisbee, Douglas and Fort Huachuca.

Dr. Ben Markland, head of the U of A Radio-TV Bureau, tells us if you'll write him you will receive a free monthly program guide, so you can plan ahead to watch the programs you will enjoy.

other samples have been found with protein contents as high as 15 percent. The crude protein content of corn generally varies to a lesser extent than grain sorghum, with values ranging from 6.5 to 10 percent.

One of the obvious differences between grain sorghum and corn is the lack of yellow xanthophyll pigments in the grain sorghums. The xanthophylls are deposited in the skin and egg yolks and result in the yellow pigmentation in these products. Birds fed a grain sorghum-based diet, without addition of a source of xanthophylls, produce eggs with creamy white yolks. Poultrymen and feed manufacturers, therefore, rely upon dehydrated alfalfa meal to a greater extent as a source of xanthophylls in diets containing large amounts of grain sorghums.

Sorghum Alone is Deficient

Experiments conducted by Dr. J. H. Quisenberry of Texas A & M University have indicated that the use of grain sorghum as the sole grain component in laying diets results in lowering of egg production and egg size when compared with similar diets containing corn. One theory which has been advanced to explain these results is based on the differences in linoleic acid content of corn and grain sorghum. Linoleic acid is one of the polyunsaturated fatty acids which is required by all animal species in small amounts. This fatty acid is present in the egg to the extent of 8 to 10 percent of the fat.

Workers at Washington State University have shown that the feeding of linoleic acid or vegetable oil

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Vocational Agriculture Is Growing in Value

R. W. Cline

"The program of agricultural education in public schools, when properly organized under the direction of an effective teacher, makes significant contributions to both the vocational and general educational needs of the pupils enrolled."

This statement was used as the initial conclusion by Joe P. Bail who listed guiding principles and recommendations from the findings of his

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sources of this material (corn oil or safflower oil) increases egg size. It has, therefore, been suggested that the lower linoleic acid content of the grain sorghums would tend to reduce egg size as a result of inadequate amounts of linoleic acid.

There are a number of other factors known to be involved in the control of egg size. Most important among these is probably dietary protein level. With variability encountered in the protein content of the grain sorghums, experimental work must involve careful control and measurement of dietary protein content in order to arrive at a true estimate of the value of the grain sorghums in relation to corn.

U of A Experiments

The Poultry Science Department of The University of Arizona has been conducting studies on the use of grain sorghum in the diets of laying hens. One study involved the feeding of diets which contained 14.5% protein with energy levels of 960 Calories P.E./lb. using either 65% corn or 62% grain sorghum as the grain component. The linoleic acid content of the corn diet was 1.71% while that of grain sorghum was 1.58%. The protein content of each diet was determined every time the diets were mixed.

Birds were fed the experimental diets for a period of 44 weeks. The corn diets supported a production rate of 67.8% as compared with 67.3% obtained with the feeding of

recent study entitled "Agricultural Education at the High School Level in Arizona."

Why Study Was Made

This research was timed to provide working information for further de-

Dr. Cline is head of the Department of Agricultural Education. Dr. Bail, who is quoted above, is chairman of the Division of Agricultural Education at Cornell University. He was on sabbatic leave during the first half of 1964 and served as visiting research professor of Agricultural Education at the University of Arizona.

the grain sorghum diet. Egg size was not significantly different. Pounds of feed required to produce a dozen eggs was slightly better for the grain sorghum diet.

The grain sorghum used in this experiment was a mixture of a number of varieties obtained from a commercial feed mill and would approximate the grain component present in commercially-produced feeds. These data suggest that no detrimental effects should be expected from the use of grain sorghums in the diet of laying hens when thought is given to the protein content of the grain, and feeds are formulated with consideration for the differences in amino acid composition between corn and grain sorghum.

Additional studies with several varieties of grain sorghum will be undertaken.

Now We Use Computers

Poultry feed formulation has become an increasingly important problem. Evaluation must be made of a large number of nutrients which are required by poultry in addition to the ingredients available as economic sources of these nutrients.

The use of computers for least-cost-formulation of feeds has become widespread in the U.S. The effective use of such systems is vitally dependent upon accurate knowledge not only of the nutrient composition of feedstuffs but on the degree of utilization of the feedstuff by poultry. For this reason, studies of the type cited above continue to become increasingly essential for improvement of poultry production efficiency.

Mystery Picture

Answer

That mystery picture on Page 11 is really simple to figure out — if you turn it upside down. Then you get a steer's eye view of the curving loading ramp at the large new T & C Feedyards up in Pinal County.

development of occupational training in agriculture under provisions of the federal Vocational Education Act of 1963.

Purpose of the study was to develop a list of valid guidelines for use in modifying and improving programs of agricultural education to serve the needs of high school youths. Attempts were made to find answers to such questions as (1) What are the strong and weak points of present programs? (2) What groups of students are not being served by present programs? (3) What additional groups of students may profit from instruction in agriculture? (4) What special programs may be developed to serve potential drop-outs and other disadvantaged youths? (5) What contributions, if any, can agricultural instruction make to the general educational development of high school students?

Aided by Committee

The study was conducted cooperatively by the Agricultural Education Department of The University of Arizona and the Arizona Department of Vocational Education, under direction of a 15-member advisory committee of leaders in agriculture and education. Lynn Sharp of Mesa served as chairman of the committee. Others are J. R. Cullison, Carlos H. Moore, Warren R. Langfitt, James J. Malloy and E. L. Wilson of Phoenix; F. J. Benedict and Gordon G. Hall of Tempe; R. Clair Decker of Tolleson; Loren H. Curtis of Casa Grande; Emil M. Rovey of Glendale; Drs. Harold E. Myers, Darrel S. Metcalfe, R. W. Cline and B. P. Carden of Tucson.

Data used in the study were obtained by conferences, interviews and questionnaire, involving 276 selected individuals who were acquainted with high school departments of vocational agriculture in Arizona. Those supplying factual information and opinions included school administrators, teachers of vocational agriculture, guidance counselors, school board members,

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