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1. Animal response to diets containing opaque-7 endosperm proteins.

Following establishment of the high lysine character of the opaque-7 endosperm mutant, a small feeding trial was conducted to obtain evidence of animal response to this maize mutant.

In the experiment, net protein utilization (N.P.U.) was measured for 3 diets each fed over a 10-day test period to three groups of 4 Wistar albino rats. The diets were meals prepared from opaque-2 maize (S.U. hi lysine synthetic), opaque-7 maize (W22 inbred stock) and normal endosperm maize (W22 inbred isoline). The diets were formulated to an equi-nitrogen level and each contained 7.806% protein. The opaque-2 diet contained 93% opaque-2 maize meal and 7% of a salts, vitamins, and cellulose mixture. The opaque-7 diet contained 85% opaque-7 maize meal, 7% salts, vitamins, and cellulose and 8% maize starch. The normal endosperm meal contained 79% of meal, 7% salts, vitamins, and cellulose, and 14% maize starch. Net protein utilization was calculated from the relation (Miller and Bender, 1955, Br. J. Nutrition 9: 382):

$$\text{N.P.U.} = \frac{B - B_k + I_k}{I} \times 100\%$$

where B = body nitrogen of the group of rats fed the test protein,

I = nitrogen intake of the group of rats fed the test protein,

B_k = body nitrogen of the group of rats fed a nearly nitrogen-free diet, and

I_k = nitrogen intake of the group of rats fed the "nitrogen free" diet.

The "nitrogen free" diet used in the experiment contained 0.308% protein, and was fed to two groups of 4 rats for the purpose of obtaining estimates of B_k and I_k .

N.P.U. values were calculated for each group of 4 rats separately, thus giving 3 estimates of N.P.U. for each diet. These estimates were averaged to give mean N.P.U. values for the three diets as follows:

<u>Diet</u>	<u>N.P.U. Value (%)</u>
Normal endosperm (W22)	46.3
opaque-7 endosperm (W22)	56.28
opaque-2 endosperm	59.89

Analysis of variance showed that N.P.U. value for normal endosperm maize was significantly lower than the values obtained for opaque-2 and opaque-7, but there was no difference between the opaque mutants.

The advantage of N.P.U. as a measure of biological activity of a protein is that diets may be fed over a short test period, and the N.P.U. value is not influenced by differences in feed intake. Diets are fed at the same level of protein, and differences in N.P.U. reflect differences in protein quality and not differences in protein quantity.

These data, therefore, suggest that opaque-7 is superior to normal maize and equal to opaque-2 maize in nutritive value.

This preliminary experiment does not establish the biological value of opaque-7 endosperm proteins, but it does suggest a thorough analysis of the feeding value of opaque-7 maize to be worthwhile.

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1. Effect of position within the tassel on crossover frequency in microsporocytes.

Using bridge and fragment frequencies at anaphase I in plants heterozygous for inversion 5083 as an assay of crossover frequency, the following results were obtained: In five out of five tests (four within first flowers and one within second flowers) significant differences ($P \approx .025$) were found between sporocytes from main spike and lateral branches. In four of the five tests (three for first flowers, one for second) crossover frequency estimates were greater for cells from the main spike than for laterals, but in the fifth case (from first flowers) crossover frequency estimates were