Table 4

Treatment	Value		Number of Ears Examined
	Minimum	Maximum	
Control	8.2	13.2	20
15,000 r	7.2	14.2	29
7,000 r	8.0	15.4	38
Neutron (500 REP)	8.5	14.5	22

The variation range increased once more here. A definite evaluation of the experiment will be possible on the ground of the data from the X_3 and X_4 generations.

Summary

With various methods, lines with a high protein content were obtained from which in the meantime some promising single and double crosses have been produced.

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1. Pachytene pairing in auto-tetraploid maize.

A study of pachytene associations in the pollen mother cells of a colchicine induced auto-tetraploid maize showed that (1) pairing is between homologous parts only of pairs of chromosomes at any point and (2) the four homologues may form two separate pairs or one or two exchanges of partner may take place in an association.

The data on the frequency of different numbers of exchanges revealed that the occurrence of one exchange does not interfere with the occurrence of a second one in an association since different numbers of exchanges fit a Poisson distribution.

Of a total of 195 associations, 80 showed association of all four homologous centromeres, 35 of these being with no exchange elsewhere in the association. The centromere associations probably represent points of exchange of partners located at the centromere. This is supported by the following consideration. Analysis of metaphase I configurations in 60 nuclei revealed that 74% of the possible multivalents are formed. An essential requirement for multivalent formation is one or more exchanges of partners in the pachytene association followed by formation of appropriate number of chiasmata distributed at appropriate places along the paired chromosomes in the association. However, only 48.7% of the observed pachytene associations showed one or two exchanges of partner. In addition to these, 19% of the observed pachytene associations were those with association of all four homologous centromeres

with no exchange of partners elsewhere in the association. Only when these are also taken as representing an exchange of partners located at the centromere, the percentage of multivalents expected will be close to the observed.

It is also observed that the number of times an exchange occurs in an arm is proportional to its length. In the case of chromosome 6, however, the absence of exchanges from the short arm is significant ($P = 0.0024$). This is probably due to the special features of this chromosome; the short arm is the shortest in the complement and it is anchored to the nucleolus by the subterminal nucleolus organizer, both of which features hamper the formation of an exchange.

Although the exchange points show a random distribution along the length of the chromosome, they show a tendency to cluster in certain regions of the chromosome, which indicates that the initial points of pairing are probably mostly associated with the centromere, knobs and the ends of the chromosomes or with regions adjacent to them.

On the basis of data with respect to chromosomes 3, 6, 9 and 10 the mean length of the "pairing block" (the region paired between two consecutive exchange points or point of exchange and the end of the chromosome in single exchange cases) increases with increase in the length of the chromosome while the mean number of pairing blocks increases with increase in length of the chromosome up to a certain limit beyond which it decreases. In the case of chromosome 6, however, the rise in the length of the "pairing block" is not so sharp as in other chromosomes probably due to the special features of this chromosome.

J. Venkateswarlu

2. Chiasma frequency in colchicine-induced auto-tetraploid maize.

Chiasma frequency was determined from analysis of metaphase I configurations in the pollen mother cells of tetraploid sectors in the tassels of two colchicine-treated maize plants. The average number of chiasmata per nucleus was 35.7 and of half-chiasmata per chromosome was 1.785. The chiasma frequency in pollen mother cells of diploid flowers in the same inflorescence was 16.06 per nucleus and 1.61 per bivalent (half-chiasmata per chromosome).

The mean chiasma frequency per tetraploid nucleus is more than twice as great as that per diploid nucleus. A comparison between them was made by calculating

$$t = \frac{X_t - 2X_d}{\sqrt{V_{X_t} + 4\,V_{X_d}}}$$

where X_t and X_d are the means, V_{X_t} and V_{X_d}, the variances of the means respectively of the tetraploid and the diploid. The t value obtained was 7.6 and this gives a probability of less than one in a thousand that they could be equal and that the difference is a chance one. The mean chiasma frequency per tetraploid nucleus is thus significantly greater than twice that in the comparable diploid.

The number of rod bivalents was smaller than ring bivalents in the pollen mother cells of the diplod flowers while in those of the tetraploid flowers, the ring bivalents were fewer than the rod bivalents. Further, the half-chiasma frequency per chromosome in the bivalents of the tetraploid (1.49) was less than that in the bivalents of the diploid (1.61) and the half-chiasma frequency increases with increase in the number of quadrivalents. Thus the substantial increase in the chiasma frequency in the tetraploid is accountable solely by those chromosomes which form the multivalents.

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1. A new inhibitor of aleurone and plant colour.

Under the title "Pigmented silkscar" (MNL 36:104), we reported that this stock, which was collected locally, inhibited the aleurone pigmentation completely when crossed as the female parent with homozygous colored aleurone stock. In the reciprocal cross, there is only a partial inhibition of pigmentation. Since it is very unlikely that we obtain the pigmented silkscar phenotype again, we wish to disassociate it from the aleurone inhibiting effect. We propose the symbol I_2 (Inhibitor$_2$) to denote the factor(s) responsible for this effect. In addition, the I_2 I_2 stock also seems to possess the capacity to inhibit plant color. The tests made so far are summarized below:

Cross	Average pigmentation grade of kernels or plants	Remarks
A A C C R R X I_2 I_2	2.81/5	Partial inhibition of aleurone color.
I_2 I_2 X A A C C R R	1.00/5	Complete inhibition of aleurone color.
A A B B Pl Pl X I_2 I_2	3.66/5	Partial inhibition of plant color.
A A B B Pl Pl ⊗	4.94/5	
(I_2 I_2 Wx Wx X $\frac{\text{T7-9 wx}}{\text{T7-9 wx}}$) X A A C C R R wx wx	-	I_2 shows linkage with wx. Recombination 18.36%. (Data based on a single cob bearing 98 kernels.)