UNIVERSITY OF NEBRASKA
Lincoln, Nebraska
Department of Agronomy

1. Development of trisomic stocks in maize.

Seventeen second generation progenies of colchicine-treated plants of the line CC5 were grown in the field in 1962. Pollen samples were taken from all the plants and microsporocyte samples in many cases. Preliminary cytological observations on 25 plants indicated that four were trisomic and seven were heterozygous for a translocation.

Other material included 14 progenies derived from ears, found in Dr. J. H. Lonnquist's breeding material, which segregated for seeds of different sizes. Five progenies segregated for the trisomic condition. Chromosome 10 was involved in two cases; chromosomes 2, 4 and 5 were tentatively identified in the other cases.

Rosalind Morris
Mustafa H. Isikan

2. Cytological study on maize inbred lines.

Seven inbred lines(N6,L289,H75,K41,SA24,N14 and KYS),which had been maintained by self pollination for from eight to 14 generations, were found to have an unusually high frequency of ears with sterility or defective seeds in 1961. Progenies from these abnormal ears and also from normal ears of each line were grown in 1962. One-fifth of the plants in progenies from normal ears and one-third of the plants in progenies from abnormal ears segregated for abnormal pollen. Observations on individual anthers of all plants in an L289 progeny gave wide variations in amounts of abnormal pollen among anthers of the same plant. The frequencies of ears with sterility or defective seeds were similar in progenies from normal and abnormal ears. Meiotic observations on 30 plants in progenies from abnormal ears showed no deviations in chromosome number and no definite structural changes. The early separation of members of one or more bivalents at diakinesis and metaphase I was observed in 18 out of the 30 plants and in all except one of the lines. Lagging univalents were observed at later stages of meiosis and micro-nuclei occurred in a small percentage of the quartets (See Table 1).

It is possible that pairing irregularities contributed to the ear abnormalities assuming that the same type of behavior occurred in the megasporocyte.

Table 1. Frequencies of cells with univalents at various stages of meiosis in five plants representing different inbred lines.

Inbred line and plant no.	% cells/univalents		% cells/lagging univalents		% quartets with micronuclei
	Diakinesis	Metaphase I	Anaphase - Telophase I	Anaphase - Telophase II	
L289-5	1.5 (400)[1/]	12.8 (117)	6.1 (82)	5.0 (317)	5.5 (201)[2/]
K41-3	19.0 (100)	33.7 (89)	17.5 (114)	7.3 (246)	5.1 (217)
SA24-3	10.9 (46)	24.2 (251)	4.0 (50)	10.1 (128)	4.1 (295)
M14-2	22.2 (99)	4.7 (107)	2.0 (150)	6.1 (147)	4.5 (133)
KYS-2	2.6 (76)	23.6 (351)	12.5 (88)	8.4 (155)	10.7 (93)

1/ Number of cells observed.

2/ Number of quartets observed.

Rosalind Morris
Mustafa H. Isikan

3. Location and phenotypic expression of Hs (Hairy sheath).

Previous studies have placed Hs in chromosome 7, with recombination values of 32% between Hs and ra, 43% between Hs and gl_1 (Der Zuchter 3: 333-338. 1931). An Hs stock was crossed with T6-7S.73 also carrying gl_1, and the F_1 Hs semisterile plants were testcrossed to gl_1. From 71 testcross progeny plants classified in 1962, recombination values were obtained as follows: 50.7% for T to Hs, 49.3% for Gl to Hs and 4.2% for T to gl. These data would place Hs in the distal part of the long arm of chromosome 7.

The segregation of the three characters in the testcross progenies (Hs vs. normal, Gl vs. gl and T vs. normal) gave a good fit to a 1:1 ratio in each case although close to the borderline ($.10 > P > .05$). It was noticed that the expression of Hs in the F_1 plants was clear although not as pronounced as in the Hs stock. However, the expression of Hs in the testcross progenies was less distinct than in the F_1. Often careful examination of various parts of the stem, leaf sheaths, and tassel stalks had to be made to decide if extra hairs were present.