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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. Lonquist'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.

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2. Cytological study on maize inbred lines.

Seven inbred lines (N6, L289, M75, M11, SA24, M14 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.