The ameiotic gene on chromosome 5 was shown to be more closely linked with $\underline{A}_2$ than with $\underline{Bt}_1$. Ameiotic segregated independently from Pr, which is in the long arm of chromosome 5. Good agreement between F_2 coupling and F_2 repulsion data indicated that 32-36% recombination occurred between Am and $\underline{A}_2$.

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8. Cytological studies with ameiotic and normal sibs.

Cells undergoing mitotic divisions were observed by Sinha (1960, Ph.D. thesis, Indiana Univ.) in ameiotic anthers. He concluded that a mitotic division replaced meiosis in ameiotic plants. Recently, we have made a cytological comparison of ameiotic and normal sibs. in which anther length was chosen as the most reliable criterion in identification of stages. The nuclear divisions in ameiotic, which previously were considered to be a substitute for meiosis, are now believed to be the last premeiotic mitosis. Thus, ameiotic plants do not undergo a normal or a modified meiosis. Anthers from 1.2 - 2.1 mm. in length, collected from either ameiotic or normal plants, contain sporogenous cells in the last premeiotic mitosis (Table 1). The chromosomes in mitotic prophase are characterized by a marked elongation of the chromonemata, as compared to the chromosomes of somatic cells in prophase. It is not certain whether there is a particular orientation of the chromosomes at this stage as has been suggested. In the anaphase cells from both ameiotic and normal plants which we have examined there was no indication of premeiotic pairing. After telophase in normal plants there is a long interphase before the first meiotic stage, leptonema, is evident. However, in ameiotic plants after telophase, the interphase condition persists and the diameter of the nucleus and cell remains the same even though anther elongation continues. The frequency of sporogenous cells found in prophase-telophase was low in normal plants, while a higher (2-3 fold) frequency was found in ameiotic plants. However, larger populations of premeiotic nuclei are needed to confirm this observation. Further studies are in progress.

Table 1

Anther length and the cytological stage in normal and ameiotic sib plants.

Anther length (mm.)	Normal	Ameiotic
0.8 - 0.9	interphase	interphase
1.0 - 1.1	interphase	interphase
1.2 - 1.3	interphase, mitosis	interphase mitosis
1.4 - 1.5	interphase, mitosis	interphase, mitosis
1.6 - 1.7	interphase, mitosis	interphase, mitosis
1.8 - 1.9	interphase, mitosis	interphase, mitosis
2.0 - 2.1	interphase, mitosis, leptonema	interphase mitosis
2.2 - 2.3	interphase, leptonema	interphase
2.4 - 2.5	interphase, leptonema, zygonema	
2.6 - 2.7	leptonema, zygonema	
2.8 - 2.9	leptonema, zygonema, pachynema	
3.0 - 3.1	zygonema, pachynema, metaphase I	
3.2 - 3.3	zygonema, pachynema, metaphase I	
3.4 - 3.5	pachynema, M I, diplonema, diakinesis, A I	
3.6 - 3.7	M II, A II, quartets	
3.8 - 3.9	A II, quartets	
4.0 - 4.1	quartets	interphase

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