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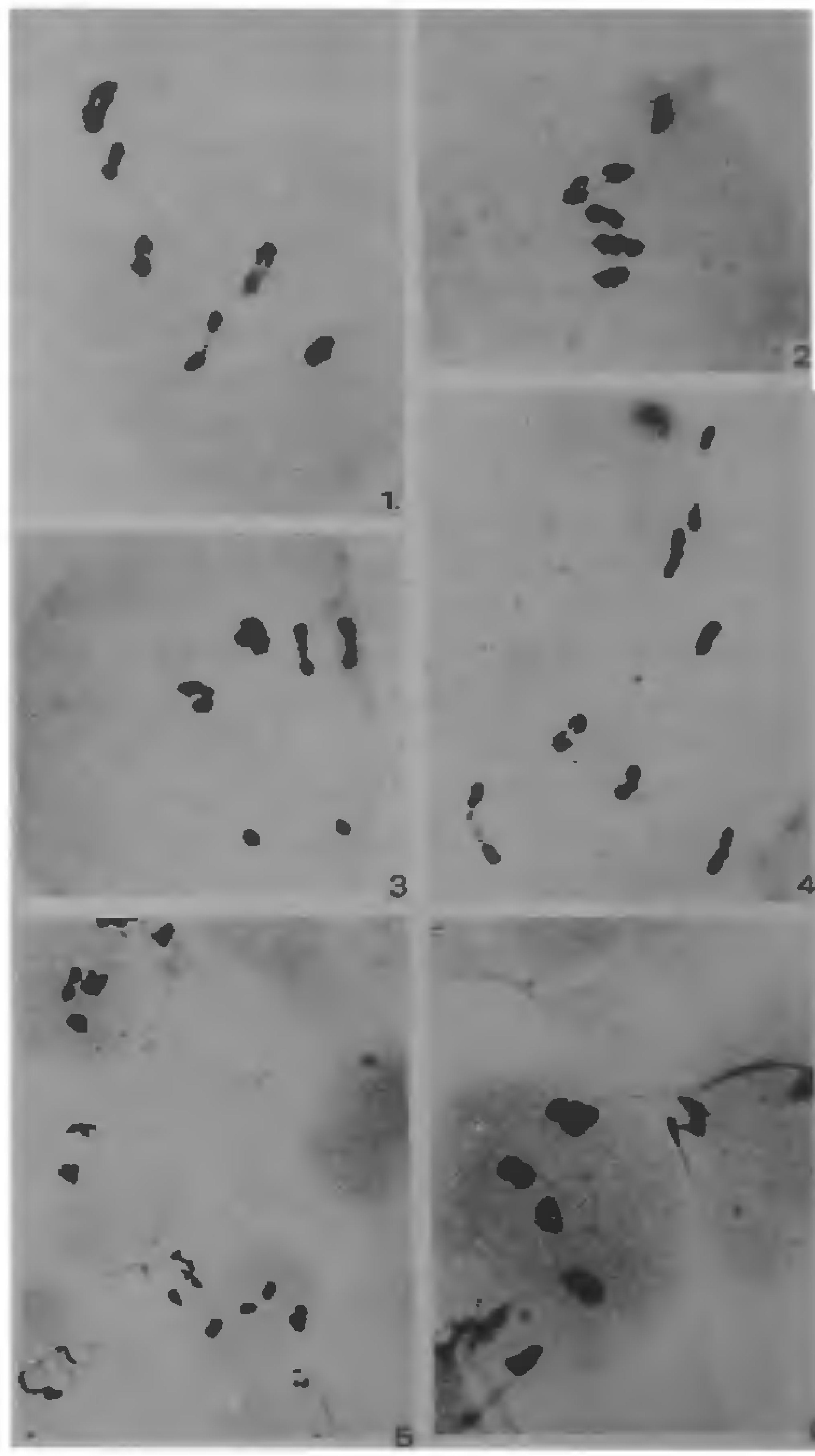
CYTOMIXIS AND CHROMOSOMAL VARIATION IN POLLEN MOTHER CELLS OF *SESBANIA AEGYPTIACA* (POIR.) PERS.

R. S. PARIHAR and S. N. ZADOO
Division of Plant Improvement,
Indian Grassland and Fodder Research Institute,
Jhansi 284 003, India.

SINCE its first observation in the genus *Crocus*[1] the phenomenon of cytomixis has been found to occur in many genera and has been reviewed from time to time[2–6]. Besides the pollen mother cells, cytomixis has been observed in mitotic cells of root tips[7–9].

While carrying out meiotic analysis of some species of the genus *Sesbania* Scop, cytomixis was observed in pollen mother cells of *S. aegyptiaca* (Poir.) Pers. var. *bicolor* [= *S. sesban* (L.) Merr. var. *bicolor*] after anthers were squashed in 1% aceto-orcein solution following the usual methods.

Cytological analysis of var. *bicolor* revealed it to be a diploid with $2n = 12$ chromosomes based on $x = 6$ (figure 1). Six bivalents were more or less a regular feature observed at metaphase-I followed by normal course of meiosis. However, a few cells (7.2%) with lower i.e. $2n = 10$ (figures 2 and 3) or higher number i.e. $2n = 14$ (figure 4) were also observed in the material. The cells with lower chromosome numbers showed the occurrence of 5 bivalents (figure 2) or 4 bivalents + 2 univalents (figure 3), whereas the cells with higher chromosome numbers showed the occurrence of 7 bivalents at meiotic metaphase-I (figure 4). In the same



Figures 1–6. Meiosis in *S. aegyptiaca* var. *bicolor*; **1.** Metaphase-I showing 6 II; **2.** Metaphase-I showing 5 II; **3.** Metaphase-I showing 4 II + 2I; **4.** Metaphase-I showing 7 II; **5 and 6.** Groups of cells showing transfer of chromatin material.

material some groups of cells with intercellular chromatin connections were observed at meta-anaphase-I (figures 5, 6). In a few cases the whole chromatin material was observed to have been transferred, although cells with double the amount of chromatin material were not observed in their close vicinity (figure 5).

The observations made during the present study appear to be of significance as PMC's with lower and higher than the normal chromosome number have been reported earlier in the genus *Sesbania*[10,11] Baquar and Akhtar[10] reported pollen mother cells with $n = 6$ and 7 in *S. sesban* var. *bicolor*, $n = 6, 7$ and 8 in *S. sesban* var. *sesban* and var. *concolor*, but individual plants with varying chromosome numbers were not observed, as is also the case with the present studies. However, Bir *et al*[11] while reporting chromosomal variations in *S. sesban* and *S. bispinosa* (Jacq.), clearly identified plants with aneuploid and euploid chromosome numbers. In the plants showing $2n + 1$ and $2n + 2$, additional chromosomes were marked out for the latter species[12].

Keeping in view the isolation of aneuploid plants by Bir *et al*[11] and Bir and Sidhu[12] and the occurrence of cytomixis and chromosomal variations in PMC's of the genus *Sesbania*, it appears that cytomixis could be an effective mechanism for numerical changes of chromosomal complements in this genus. The extra chromosomes have been observed to be whole chromosome additions as revealed by the karyotypic and meiotic studies[11,12].

Variation in the chromosome number in different cells has been recorded in a number of species[4,6]. A few cells with higher or lower numbers encountered in the present studies could be ascribed to cytomixis at an early meiotic stage. Kihara and Lilienfeld[13] and several others[7] have observed cytomixis to occur generally from meiotic leptotene to metaphase-I. In the present case, cytomixis has been observed at meta-anaphase-I as clearcut chromatin connections between groups of cells indicating passage of chromatin material from one cell to another, which include some cells wherein the whole of the chromatin material has been transferred. The existence of cells with 5 bivalents and complementary 7 bivalents, however, indicates that this phenomenon might have taken place during the early meiotic stages. The frequency of cells with 7 bivalents was much less than the ones with 5 bivalents. The loss of chromosomes or of total chromatin material is not always accompanied by corresponding increase in the nearby cells.

The present studies along with those of Baquar and Akhtar[10], Bir *et al*[11], and Bir and Sidhu[12] indicate that the phenomenon of cytomixis in the genus *Sesbania* may be of evolutionary significance.

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INHIBITORY EFFECT OF LYCORINE ON SPORE GERMINATION AND GAMETOPHYTE DEVELOPMENT OF *POLYPODIUM VERRUCOSUM* WALL.

SADHANA ROY and S. K. ROY
CAS in Botany, Banaras Hindu University, Varanasi 221 005, India.

LYCORINE $C_{16}H_{17}NO_4$ is a known alkoid[1] which acts as an inhibitory agent against growth of higher plants. It has also been shown to prevent germination of spores and development of gametophyte in Pteridophyta[2]. Lycorine has an inhibitory effect on the growth rate and on the normal morphogenesis of adventitious shoots, but by adding ascorbic acid this effect was reversed: the growth was stimulated and shoot growth tended to be normal[3]. Lycorine affects biosynthesis of ascorbic acid in plants[4,5]. In eukaryotic cells lycorine inhibits protein synthesis by keeping off the peptide bonds[6]. At 10^{-5} M concentration of lycorine the gametophytes of *Polypodium verru-*