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CYTOMIXIS IN *HEVEA BRASILIENSIS* (WILLD. EX ADR. DE JUSS.) MUELL. ARG.

Transmission of chromatin materials from one cell to another through cytoplasmic connections was first observed by Koernicke (1901) in *Crocus*. Gates (1911) studied this phenomenon in *Oenothera gigas* and *Oenothera bienis* and coined the term 'cytomixis'. Since then cytomixis has been recorded in a very wide range of taxa (Omara, 1976; Narain, 1979; Siddiqui *et al*, 1979; Bauchan et al, 1987; Jayabalan and Rao, (1987). However, this phenomenon has not so far been reported in *Hevea*. This communication reports the occurrence of cytomixis in the pollen mother cells of *Hevea brasiliensis* (Willd. ex Adr. de Juss.) Muell. Arg. which was observed during cytological analysis of male sterile clones.

The plant was a resultant of seed irradiation (3000 r). After the treatment, the treated seeds were germinated in the normal way and the sprouted ones were raised in ground nurseries. Those seedlings which showed morphological variations were propagated vegetatively through budgrafting and the budgrafts were planted in the field. Young floral buds of appropriate stages were fixed in modified Carnoy's fluid (ethyl alcohol: glacial acetic acid : chloroform, 3: 1: 1, by volume). Anther columns were dissected out and kept in 1 per cent acetocarmine. Microscopic preparations were made following the usual techniques. A total of 500 pollen mother cells (PMCs) were observed. In addition, fresh materials at the appropriate stage were also observed.

Cytological analysis of the PMCs revealed cytomixis in 30 per cent cells. Cytomixis was observed in the PMCs of both fresh and fixed anthers suggesting that it was not an artifact. Cytomixis was observed at telophase II (Fig. 1). Cytoplasmic bridges were clearly visible in all cases, which, however, were not seen in normal cells

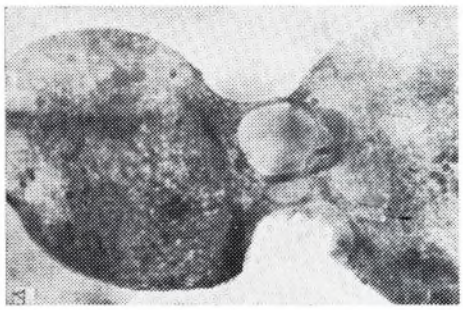

Fig. 1. Telophase II showing cytoplasmic connections x 3000

(Fig. 2). In 15 per cent of the male flowers observed, meiocytes showed cytomixis (Fig.3). In some flowers most of the PMCs showed this phenomenon, while PMCs of other flowers did not show cytomixis. One or

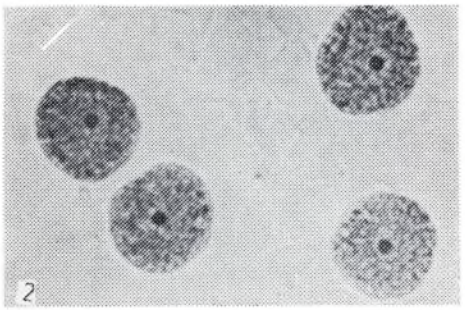

Fig. 2. Normal microspores x 2400

two megapollen were noted in 0.5 per cent of flowers examined. However, in all cases the mature male flower showed empty, non-stainable and sterile pollen grains.

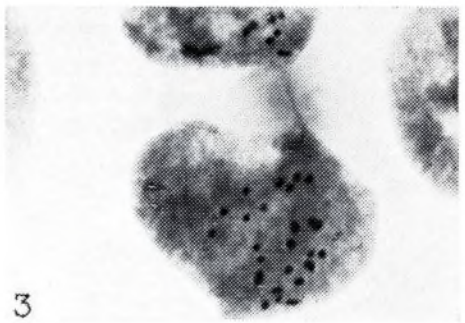

Fig. 3. Late Metaphase I-Cytoplasmic connection showing initiation of chromosome movement x 3000

The factors responsible for cytomixis are obscure. It has been interpreted variously by different workers (Narain, 1979; Mantu De and Sharma, 1983). However, the commonly accepted explanation about cytomixis is genetic imbalance. Whealan (1974) suggested that these intermeiocyte connections might serve as channels in the exchange of cytoplasmic organelles and in extreme cases the exchange of nuclear material. Some cytologists consider cytomixis as an extremely abnormal phenomenon (Bauchan *et al*, 1987). Cytomixis in the present study appears to be spontaneous, expressed by an unbalanced genetic system resulting from gamma irradiation.

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