**Table 2** *t values of comparisons of mean frequencies of various chromosome associations between amphidiploids and autotetraploids*

| Comparison | Bivalents (rods) | Bivalents (rings) | Quadrivalents |
|---|---|---|---|
| *S. indicum* × *S. integrifolium* vs *S. integrifolium* | 1.2261 | 2.6165** | 0.9181 |
| *S. indicum* × *S. integrifolium* vs *S. indicum* | 1.3765 | 1.2316 | 2.0981* |
| *S. integrifolium* × *S. indicum* vs *S. integrifolium* | 2.2603* | 4.1691** | — |
| *S. integrifolium* × *S. indicum* vs *S. indicum* | 0.0207 | 2.4595* | 1.2078 |
| *S. integrifolium* × *S. melongena* vs *S. melongena* var *insanum* | 4.4602** | 2.8031** | 5.3516** |
| *S. integrifolium* × *S. melongena* vs *S. integrifolium* | 9.8778** | 3.3991** | 1.2350 |

* Significant at 5% level  ** Significant at 1% level

prevalent to greater extent in this amphidiploid than in the rest of the amphidiploids. It can also be inferred from the above observations that the level of chromosome differentiation between the genomes of *S. integrifolium* and *S. indicum* is at a lower degree (table 2).

*S. surattense* is supposed to have played an important role in the origin of *S. melongena*[14]. In the amphidiploid *S. surattense* × *S. melongena*, nonavailability of the required number of chiasmata could have resulted in a lower quadrivalent and a high rod bivalent frequency; possibly the association of four chromosomes could have broken into two rod bivalents.

Thus, *S. melongena*, *S. indicum* and *S. surattense* form a closely related group. *S. integrifolium* is farther apart from *S. melongena* and closer to *S. indicum*. It is also not very close to *S. surattense* because obtaining a hybrid with it is very difficult. These relationships are not surprising because *S. integrifolium* is an exotic species.

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## CYTOMIXIS IN MULBERRY

R. C. VERMA, A. SARKAR and B. C. DAS
*Central Sericultural Research & Training Institute, Berhampore 742 101, India.*

GATES[1] first observed a frequent migration of chromatin material from one PMC to another in *Oenothera biennis* and *O. gigas* and called it cytomixis. Since then, this phenomenon has been observed in several other plants[2,3]. We report here the occurrence of this phenomenon in mulberry.

Cytomixis is generally observed in genetically unbalanced types such as hybrids, haploids, triploids[4]. At this Research Institute, triploid mulberry (*Morus*) was evolved by crossing induced tetraploids with diploids[5]. Triploids are superior to other varieties in leaf yield


**Figures 1–4.** Cytoplasmic connections during meiosis in morus (× 1750). **1.** Prophase I, **2.** Metaphase I, **3.** Anapahase I, and **4.** Anaphase II.

and nutritive value, qualities which are of prime importance in silkworm feeding. However, they are highly sterile apparently because of their triploid nature. During a study of the male meiosis in certain triploid lines, a plant was isolated which exhibited cytomixis during all stages of meiosis.

The chromosome number of mulberry is $2n = 28$. A total of 286 cases showing cytomixis at various stages of meiosis were recorded. At prophase I of meiosis, 75 pairs of cells were found to be connected with each other by a cytoplasmic bridge (figure 1). In 25 cases of prophase I, 3 cells were found connected with each other and in 15 cases 4 cells were involved. Even more than 4 cells were involved in 6 cases. At metaphase I, 33 cases were recorded of which 2 cells were involved in 30 cases (figure 2) while 3 cells were involved in 3 cases. At anaphase I, cytoplasmic connections between two cells were recorded in 15 cases (figure 3). At anapyase II, the frequency of cytomixis was found to be much higher than at M I and An I. As many as 70 such cases were recorded (figure 4). Besides the above cases where the cytoplasmic connections were found between cells in the same meiotic stage, those involving two different stages were also recorded. Other abnormalities like multinucleolate cells, anucleate cells, abnormally large cells, triads, pentads and hexads were also observed. Though cytomixis has been observed in many plants, the causes leading to it are not clear[6–12]. It is important to note here that the parent tetraploid was itself a hybrid of *M. indica* 'X' × *M. alba* Var. Mandalaya. Therefore, cytomixis observed here may be because of its initial hybrid nature coupled with triploidy, conditions found to be particularly favourable for giving rise to cytomixis[4]. It was observed that different chromosome numbers ranged from one bivalent to 26 bivalents at diakinesis/metaphase I of meiosis. This is because of migration of chromosomes at a very early stage of prophase I which has been found to be most favourable for the cytomixis[7]. The present record appears unusual in the sense that later stages of meiosis such as anaphase II were as susceptible to cytomixis as earlier stages. Though triploids in general are sterile, cytomixis observed in the present case is also responsible for this because of unbalanced number or total absence of chromosomes in pollen resulting from cytomixis.

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## *PETASITES TRICHOLOBUS* FRANCH. (ASTERACEAE): A NEW RECORD FOR INDIA

G. S. RAWAT and Y. P. S. PANGTEY
*Botany Department, D.S.B. College, Kumaun University, Naini Tal 263 002, India.*

SINCE the publication of J. D. Hooker's "Flora of British India" (1872–1897), a large number of species have been reported from India, either as new to science or as new records to the region[1–4]. During the course of studies on alpine flora of Kumaun Himalaya, a very interesting plant was collected. After a critical study, it was identified as *Petasites tricholobus* Franch of the Asteraceae, originally described from Mongolia. A perusal of the literature indicates that the same plant had been described as a new species from Nepal[5] and named *P. himalaicus* by Kitamura, which was later reduced to synonymy under *P. tricholobus*. There is no published report regarding its occurrence in India and hence it is recorded in this note. A short description along with other relevant information is provided.

*Petasites tricholobus* Franch. in Nouv. Arch. Mus. Hist. Nat. Paris Ser. 2(6): 52, 1883; Toman in Folia Goebot. Phyt. 7:386, 1972; *P. himalaicus* Kitamura in Acta Phytotax. Geobot. 15:108, 1954; Kitamura in Fauna & Fl. Nepal Himal. 1:206, 1955.

Plants dioecious. Rhizomes creeping with numerous fibrous roots. Leaves basal, orbicular, margin mucronate-serrate, 6–15 × 8–12 cm, coriaceous. Petioles 6–9 cm long, pilose. Scape 10–12 cm long, scaly, bearing several corymbose heads. Heads all tubular. Flowers pink. Achenes linear, 3–4 mm long with short barbellate pappus. Flowers in June-July and fruits in October. Rare, in forest margins and shady ravines, at an elevation of 3,400 m in Pithoragarh District at Garbiyang. The collection has been deposited in the Herbarium, D.S.B. College, Naini Tal with Herbarium No. 1079.

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## SELECTION DUE TO ABO INCOMPATIBILITY OF MATING COUPLES

SUMITA SARKAR
*Department of Anthropology, University of Calcutta, Calcutta 700 019, India.*

AT present, to the clinician, ABO incompatibility between husband and wife is a well-recognised cause of haemolytic disease of the new-born. Of course, erythroblastosis due to ABO incompatibility is observed only in a small proportion of the children[1–2]. It now appears that a much larger amount of selection takes place at an earlier stage of pregnancy which is manifested by selective abortion of incompatible foetuses.

The present communication reports an attempt to investigate the selection due to ABO incompatibility in a sample of Bengalee population. For this purpose, ABO blood group of 2759 Bengalee women coming to the Ramakrishna Mission Seva Pratisthan Hospital, Calcutta, for routine antenatal check-up was re-