by Parmelee[3] in the absence of loculi formed by fused paraphyses. It does not match the rust reported by Singh and Sharma[1] in which the teleutospores are slightly larger but much thinner, and the telia form "often around the uredia". In the present rust species it was found that telia may form independently of the uredinia, but they commonly form in the middle of the uredinia as the host approaches maturity.

The mesospores were found to be rarely formed. However, some workers[1-3] did not record their formation. Three- and four-celled teleutospores are reported for the first time.

The rust did not infect onion growing in vicinity of severely rusted garlic plants, however, *P. allii* (Syn. *P. porri*) is known to infect onion[2,4].

The species *P. blasdalei* Diet. & Holw. and *P. granulispora* Ellis & Gall., which bear close resemblance to *P. porri*[2], are distinct from the present rust in several characteristics.

From the foregoing account, it is apparent that the present rust species may be distinct from the one(s) already described[1-4]. Different workers placed the rust(s) infecting garlic in *P. allii*, although their descriptions on morphology varied significantly in some respects. If such differences can be ignored, the present rust species too would certainly belong to *P. allii* (DC.) Rud.

Although there are some taxonomic problems yet to be solved, this paper is certainly a first record of rust fungus on garlic in Punjab State.

30 July 1987; Revised 15 September 1987

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CYTOMIXIS IN MICROSPOROCYTES OF *RAUWOLFIA SERPENTINA* BENTH

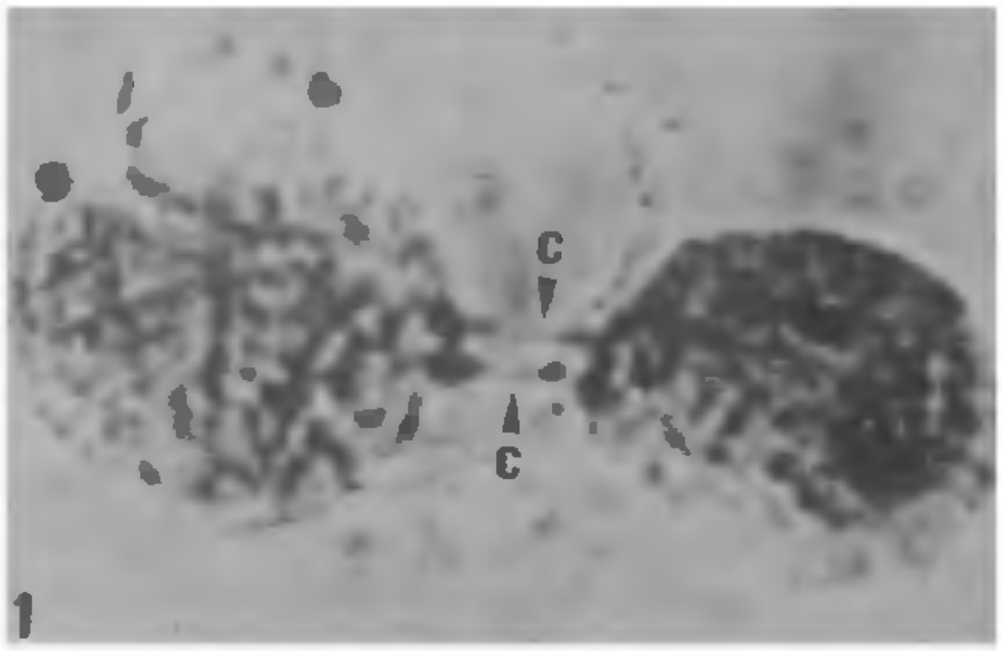
NIRMALYA BANERJEE and
ARUN KUMAR SHARMA
CAS in Botany, University of Calcutta, 35, Ballygunge Circular Road, Calcutta 700 019, India.

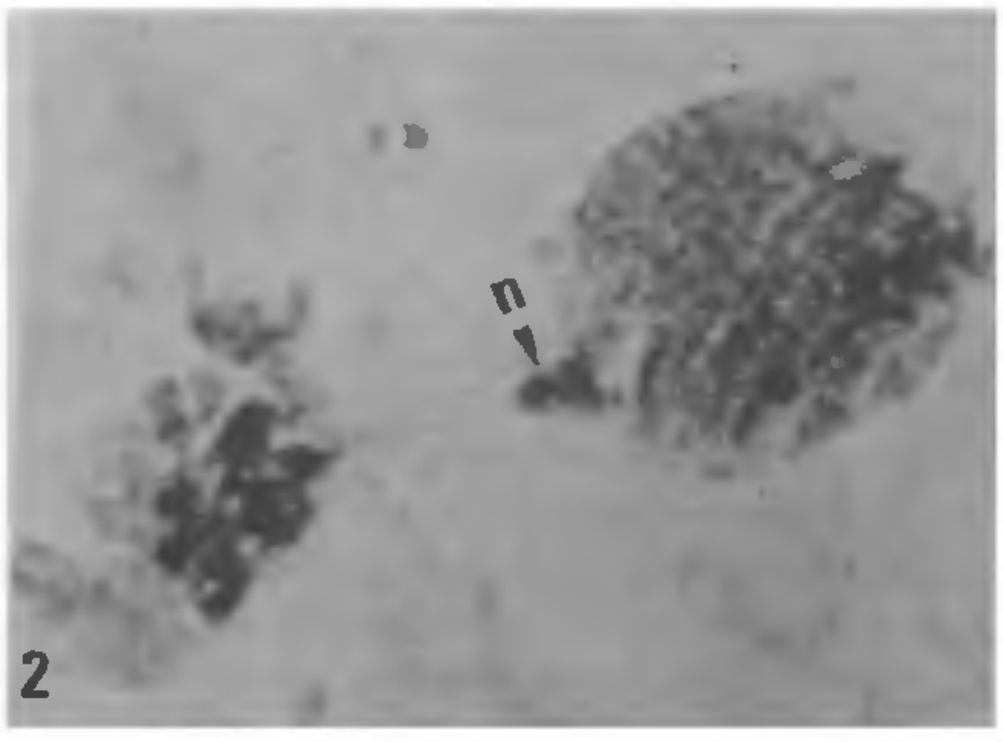
TRANSFER of nuclear materials into the cytoplasm of an adjacent cell has been termed cytomixis. Cytomixis was first reported to occur in *Galtonia candicans*[1]. Gates[2] studying the pollen development in *Oenothera gigas* and *O. biennis* recorded chromosome extrusions from the nucleus of one pollen mother cell, through the plasma strands into the cytoplasm of a contiguous cell. Since then it has been recorded in a wide range of taxa both in microsporocytes as well as in somatic cells[3-6]. Salesses[7] established cytomixis in both natural and artificial triploid hybrids of *Prunus spinosa* ($2n = 32$) × *P. ceracifera* ($2n = 16$), but not in diploid, tetraploid and hexaploid forms of *Prunus*.

During the present investigation, cytomixis was recorded in microsporocytes of *Rauwolfia serpentina* Benth. This particular population was collected from Sukna, West Bengal, situated at the base of Eastern Himalayas. Flower buds of suitable size were fixed first in chilled Newcomer's fluid for 72 h and then transferred to a mixture of glacial acetic acid:ethyl alcohol (1:3). The buds were then kept for 10 min in 45% acetic acid. Anthers were smeared in 2% acetic carmine solution, slightly heated, the excess stain was blotted off and finally the slides were sealed.

The cytomictic connections between microsporocytes were distinct (figure 1) and the transfer of chromatin materials through those connections could be detected (figure 2). The frequency of cytomixis showed significant increase during monsoon months (9.62%). It was predominant in prophase to early metaphase.

Although cytomixis is recorded in many genera and species as a natural phenomenon, the underlying cause is not very clear. Several explanations have been put forward. Marechal[8] proposed that nuclear fragments and entire nuclei pass from one cell to the other *via* plasmodesmata. Heslop-Harrison[9] suggested the existence of 'communicating channels'. Salesses[7] suggested that cytomixis occurs in plants showing irregular physiological and cytological behaviour. However, cytomixis in meiotic normal species e.g. *Clitoria ternatea*, indicates that meiotic irregularities may not be the sole





Figures 1 and 2. Microsporocytes of *R. serpentina* Benth. **1.** Meiotic metaphase stages showing distinct cytomictic connections between them (×2388); **2.** Meiotic metaphase I stage showing cytomictic connections and mobilization of nuclear materials through those connections (×2100). [*n* = nuclear material, *c* = cytomictic connections.]

criterion. Bobak and Herich[10] induced cytomixis artificially in the root cells of *Vicia faba* through a herbicide trifluraline and concluded that it was caused by disturbances in the nucleocytoplasmic relationships. However, in *Hemerocallis*, cytomixis appears due to temperature anomalies leading to physiological disturbances.

But the regular occurrence of cytomixis in all the individuals of a particular population of *R. serpentina* in successive years suggests a genetic control, the manifestation of which depends on the physiological state of the tissue.

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PLANT REGENERATION FROM INFLORESCENCE CULTURE OF *BOERHAVIA DIFFUSA* L.

M. S. SUDARSHANA and C. SHANTHAMMA
Department of Botany, University of Mysore, Manasagangotri, Mysore 570 006, India.

ORGANOGENESIS has been demonstrated in a number of economically important plants[1]. The plant *Boerhavia diffusa* L. is an important source of alkaloid[2] as well as glycoside (unpublished work by the authors) production. *B. diffusa*, a perennial creeping herb, is well known for its anti-inflammatory activity[3] and contains punarnavine, an alkaloid which appears to exert a powerful effect on certain types of ascites, such as those due to early cirrhosis of liver and chronic peritonitis[4]. In view of its medicinal use[5], the present investigation was undertaken to find out the regenerative potentials of the inflorescence of *B. diffusa*.

Immature inflorescences of *B. diffusa*, collected from the campus of this University, were washed with tapwater and surface-sterilized with 0.1% mercuric chloride for 5–6 min, rinsed with absolute alcohol for 10 s, and again washed in sterile distilled water 7–8 times. Inflorescence bits were inoculated on Murashige and Skoog's[6] (MS) and Nitsch medium[7] (NM) containing 3% sucrose and 0.9% agar. Various concentrations of zeatin (0.1, 0.2, 0.3, 0.4, 0.5 mg/l) alone and combinations of BAP and NAA (2+1, 3+1, 4+1, 5+2 mg/l) were used. Callus tissues were subcultured once every fortnight on fresh medium. Cultures were maintained at 22±2°C with 16 h illumination and a relative humidity of 65–75%. For histological analysis microtome sections at (10 μm) thickness were prepared by conventional method and the sections were stained with aqueous haematoxylin.