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A NOTE ON FLUORINE IN BIOTITE FROM A GRANITE-BIOTITE SCHLIEREN SUITE OF SIKKIM

P. K. VERMA§ AND P. VISHNOI*
Geological Survey Department, P. O. Box 50135, Lusaka, Zambia.

*C. D. S. Trainee, Hyderabad, A. P. India
§Permanent Affiliation: Department of Geology, University of Delhi, Delhi-110 007, India.

CHEMICAL affinity between various members of a migmatite suite has been amply demonstrated for metal ions[1]. However, very little is known on the behaviour of volatiles during migmatization. This is surprising in view of their role, especially that of fluorine, in petrogenesis[2]. Substitution of OH^- by F^- in hydrous silicates such as micas and amphiboles accounts for most of the fluorine content of the rock[3] A study on the chemical behaviour of fluorine in biotite during metamorphism and migmatization in West Sikkim, has been described in the present note.

The samples are from three localities within a migmatite terrain in the vicinity of Soreng, West Sikkim. A high grade sequence (Darjeeling Formation) consisting of foliated granite alongwith kyanite, garnet and biotite schists, biotite schlieren, quartzite and amphibolite characterize the area. The geologic setting is similar to that of the other Himalayan migmatite areas[4-6].

Both granitic and the schistose rocks maintain parallelism of foliation and their contacts are gradational. Many comparatively thin schist beds and numerous biotite schlieren are present within the granite. Granophyric intergrowths of quartz and feldspar, their segragation in discontinuous bands and the occurrence of kyanite in the *paleosome* indicate a very high temperature environment?

TABLE 1

Some physical and chemical characteristics of the biotites of the present study

Sample No	Source Rock	Specific Gravity	doo5 (A°)	F-Content (ppm)
SG1/2	Foliated Granite	3.34	2.02989	1400
SG7/36	Foliated Granite	3.52	2.00770	1260
SG1/1	Biotite Schlieren	3.30	2.00770	1260

Fluorine determinations were made on pure biotite fractions obtained by means of conventional mineral separation techniques. An Ionically Selective Electrode (Crytur, 09-17) was used alongwith a *pH* metre for making measurements. Comparison was made with a series of standard solutions of NaF with concentrations from 10^{-1}M up to 10^{-6}M. The sensitivity of the instrument was 1ppm. The results are presented in table 1.

The biotite samples have similar values of specific gravity, *doo5* spacings and also similar optical properties. The close resemblance between F values of table 1 can be explained when geologic setting of the sample source is considered together with the geochemical behaviour of halogens. The foliated granite and biotite schlieren, from which present determinations have been made, are believed to have a common sedimentary origin and have arisen during a stable thermal regime[8]. Initially all halogen species must have been present as pore fluids in sediments. Part of the halogens later on would get fixed by substitution for hydroxyl in hydrated minerals such as mica. The halogen content of a given mineral, should be characteristic of a given environment. According to Fyfe *et al*[9], who have discussed the behaviour of halogens during metamorphism at high temperatures, the reactions will involve molecular species of halogens instead of ionic.

Under such circumstances, fluorine will have the tendency to remain in the solid phase. Hence original constancy in F values of biotite is bound to be retained within a given environment. The data of the present study shows close similarities, confirming the above assumptions about the conditions of migmatization and nature of behaviour of fluorine.

The authors thank Dr. S. Varadarajan for his comments on the manuscript.

26 April 1982; Revised 12 October 1982

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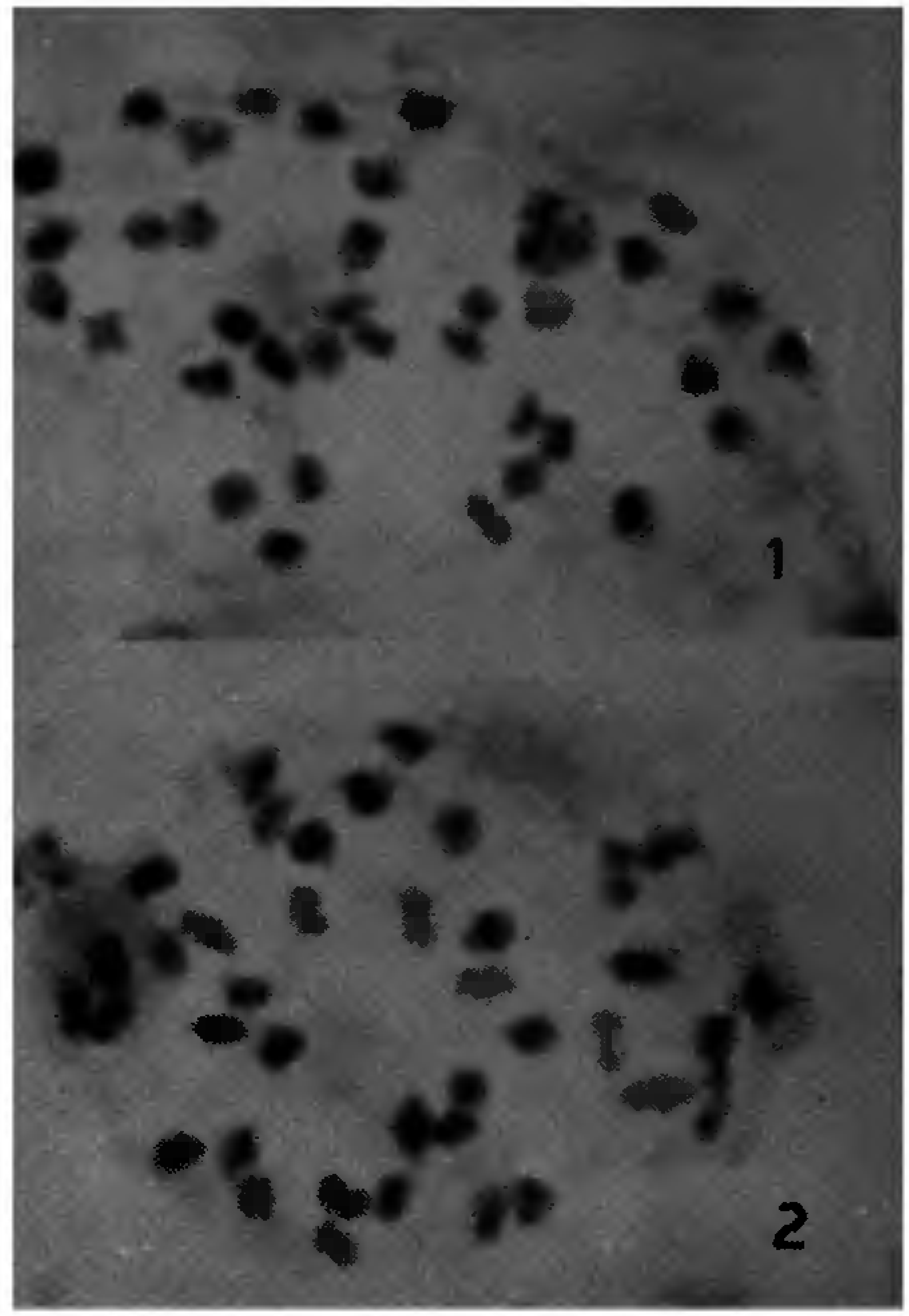
INTRASPECIFIC POLYPLOIDY IN *MIMOSA PUDICA* LINN.

M. A. Nazeer and K. J. Madhusoodanan*
Rubber Research Institute of India, Kottayam 686 009, India.
*Indian Cardamom Research Institute, Kailasanadu 685 553, India.

The genus *Mimosa* Linn. (Mimosaceae) is indigenous to Tropical America and contains nearly 300 species[1]. *Mimosa pudica* Linn., the sensitive plant grows commonly in all hot, moist localities and is naturalised more or less throughout India as a gregarious weed. While screening a large collection of the species from different localities, in addition to earlier reported' tetraploidy, hexaploid cytotypes were also identified for the first time. The meiotic behaviour of the hexaploid type is described in this communication.

For the present study, materials were collected from different districts of Kerala. Young floral buds were fixed in Carnoy's fluid (6:3:1). Following the conventional techniques, the buds were stained and squashed in 1% iron-acetocarmine. In each collection screened, fifty pollen mother cells were analysed. At diakinesis and prometaphase, 39 bivalents could be counted clearly (figures 1 and 2). In general, ring bivalents with terminal chiasmata were preponderant. Occasionally a few rod bivalents were found to disjoin precociously. Metaphase I was not clear due to characteristic stickiness of the chromosomes. However, anaphase I and subsequent divisions were quite normal and pollen stainability was 98%. Profuse pod formation was also noted.



Figures 1 & 2. 1. Diakinesis—39 II. **2.** Prometaphase—39 II. (All × 1500).

Previous reports of chromosome number in *M. pudica*[2-6] shows $2n = 52$ as the somatic number. Mimosaceae is polybasic[7] and $2n = 52$ seems to be tetraploid, based on $x = 13$; the basic number found in most of the modern genera of the family which itself may be of polyploid derivation[8]. Unlike the other species of the genus, so far there is no report of diploidy or any other ploidy level for *M. pudica*. The present count shows a somatic number of $2n = 78$ and is probably a hexaploid. The absence of any multivalents and occurrence of 39 complete bivalent formation indicates the allopolyploid nature of the taxon. The present taxon with its perennial rhizomatous