TABLE I

Frequency of chromosome associations, chiasmata, lagging chromosomes and disjunction bridges in the different botanical varieties

Sl. No.	Botanical group	Growth stage	Mean No. of I	II	III	IV	Chiasmata	Lagging chromosomes	Disjunction bridges
1.	Spanish	I	0·03	18·08	0·03	1·00	29·06	0·06	0·00
		II	0·10	18·19	0·04	0·85	30·35	0·06	0·08
2.	Valencia	I	0·08	18·45	0·05	0·94	25·3	0·10	0·00
		II	0·68	17·30	0·17	1·18	31·4	0·14	0·25
3.	Virginia bunch	I	0·27	18·14	0·26	0·85	25·4	0·10	0·00
		II	0·09	18·20	0·06	0·88	26·4	0·10	0·05
4.	Virginia runner	I	0·21	18·54	0·05	0·71	25·97	0·05	0·00
		II	0·58	17·96	0·10	0·67	27·38	0·26	0·27
	Mean	I	0·15	18·30	0·09	0·89	26·43	0·08	0·00
		II	0·36	17·87	0·10	0·89	28·88	0·14	0·16

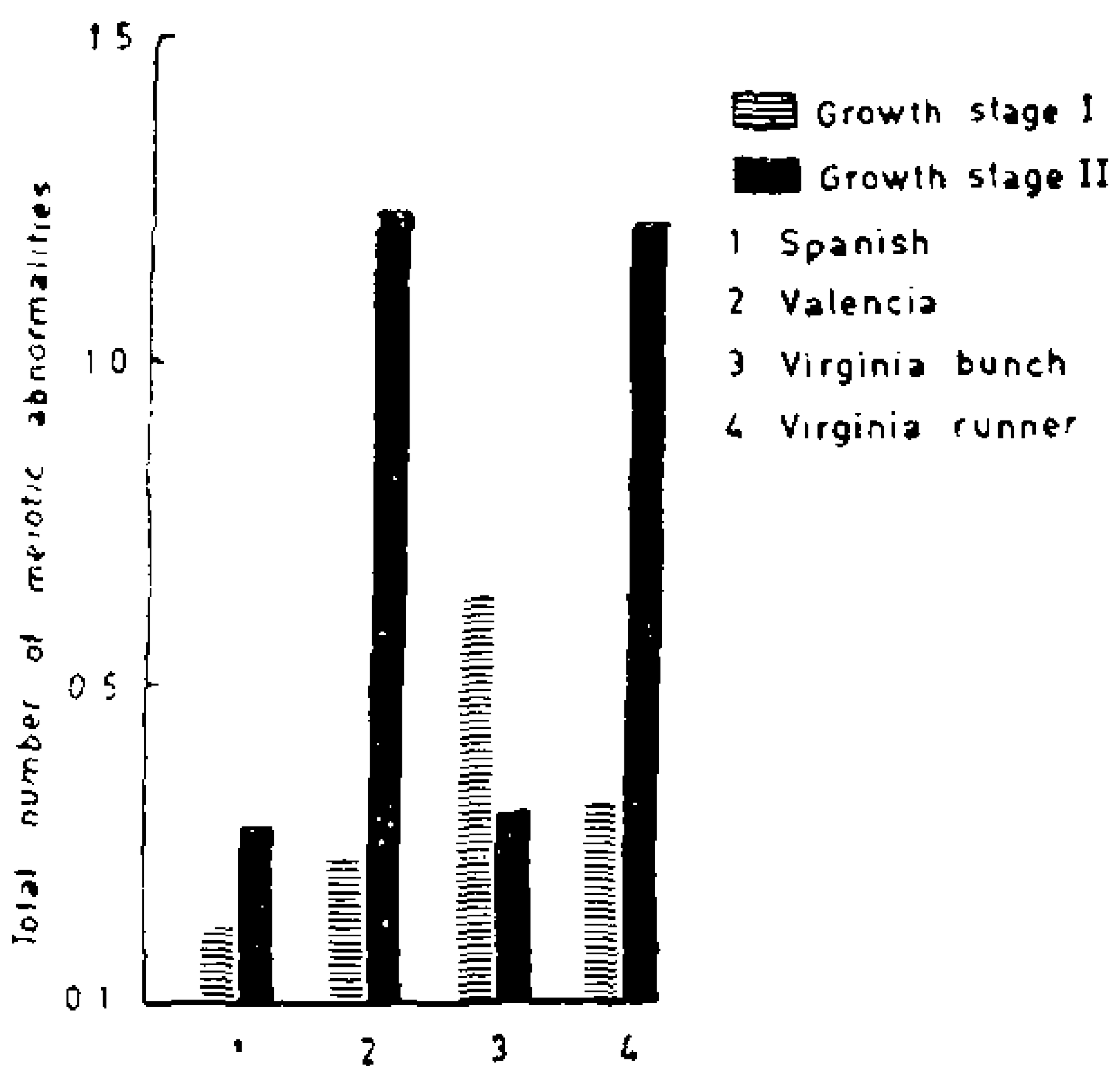


FIG. 5. Comparison of the total number of meiotic abnormalities (Univalents, trivalents, laggards and disjunction bridges) in the four botanical varieties of *Arachis hypogaea*.

The occurrence of meiotic abnormalities in a species that is normally fertile and productive indicates the existence of some homoeostatic mechanism related to survival. The increase in the frequency of chiasmata also points out to the capacity for release of variability by the organism. The wide adaptability of *Arachis hypogaea* genotypes to diverse agroclimatic regions of the world lends support to such a conclusion.

December 15, 1980.

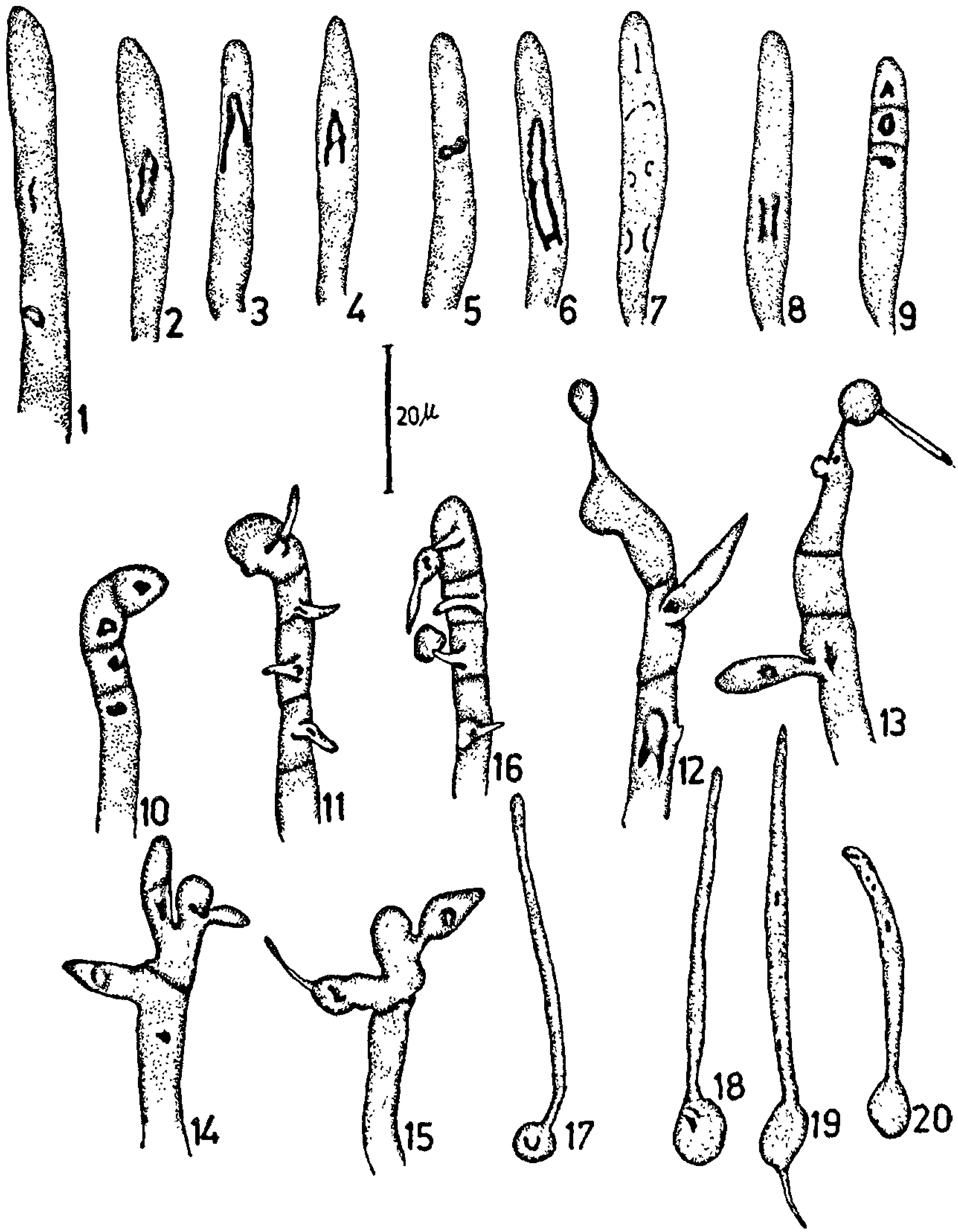
1. Gregory, W. C., Gregory, M. P., Krapovickas, A., Smith, B. W. and Yarbrough, J. A., In *Peanuts—Culture and Uses*, APREA INC. Stone Printing Co. Va., 1973, p. 47.
2. Husted, L., *Am. Nat.*, 1931, 65, 476.
3. —, *Cytologia*, 1933, 5, 109.
4. —, *Ibid.*, 1936, 7, 396.
5. Raman, V. S., Cytogenetics and breeding in *Arachis*, Today and Tommorows Printers and Publishers, New Delhi, 1967.
6. Stalker, H. T., *Proc. Int. Groundnut Workshop* ICRISAT Centre, Hyderabad, 1980.

TELIOSPORE GERMINATION AND NUCLEAR BEHAVIOUR IN *RAVENELIA TANDONII* SYD. ON *ACACIA CATECHU* WILLD.

S. D. PATIL AND (Miss) K. G. DATE
Botany Department, University of Poona
Pune 411 007, India

Ravenelia tandonii Syd. is characterised by witches' broom-like appearance due to uredial infection on *Acacia catechu* Willd. However, teliospores are rarely observed.

Meiotic divisions in the promycelium, mitotic division(s) in the basidiospores and the aberration during the germination of *Ravenelia tandonii* are encountered in the present studies.



FIGS. 1–20

Teliospores of *Ravenelia tandonii* germinate within sixty hours. The germination is 70%. A stout promycelium emerges out through the germ-pore along with the cytoplasm and nucleus. Figs 1 to 4 indicate the pachytene stages, as in *Ravenelia sumatti*[1]. Fig. 5 indicates metaphase plate. Metaphase advances and pairs of nuclei in anaphase (Figs. 6 and 7). Then two daughter nuclei are formed (Fig. 8) which in turn divide to form 4-nucleated stage (Fig. 10). The divisions of two daughter nuclei are not synchronous thus as a result 3-nucleated promycelium is formed (Fig. 9) as in *Puccinia sorghi*[2], *Scopella gentilis*[3], Then sterigma formation takes place (Fig. 11). In Fig. 14, the promycelium is 2-celled and from the apical cell two sterigmata are developed. At the tip of the sterigmata basidiospores are formed and the formation is not synchronous. The basidiospores germinate *in situ* or *in vitro* (Figs. 12, 13, 16 and 17). The nucleus in the basidiospore divides mitotically within the basidiospore itself to form 2 nuclei (Fig. 18), which occasionally form 4 nuclei (Fig. 20). Vary rarely bipolar germination is seen (Fig. 19), having two nuclei in long germ tube.

The authors are grateful to Dr. S. B. David, Head of Botany Department for facilities. Junior author is also thankful to CSIR authorities for financial help.

December 8, 1980.

1. Patil, S. D. and Date, K. G., *M.V.M. Patrika*, 1977, 12, 58.
2. Pavgi, M. S., *Cytologia*, 1975, 40, 227.
3. Payak, M. M., *Ph.D. Thesis*, Poona University, 1957, pp. 161.

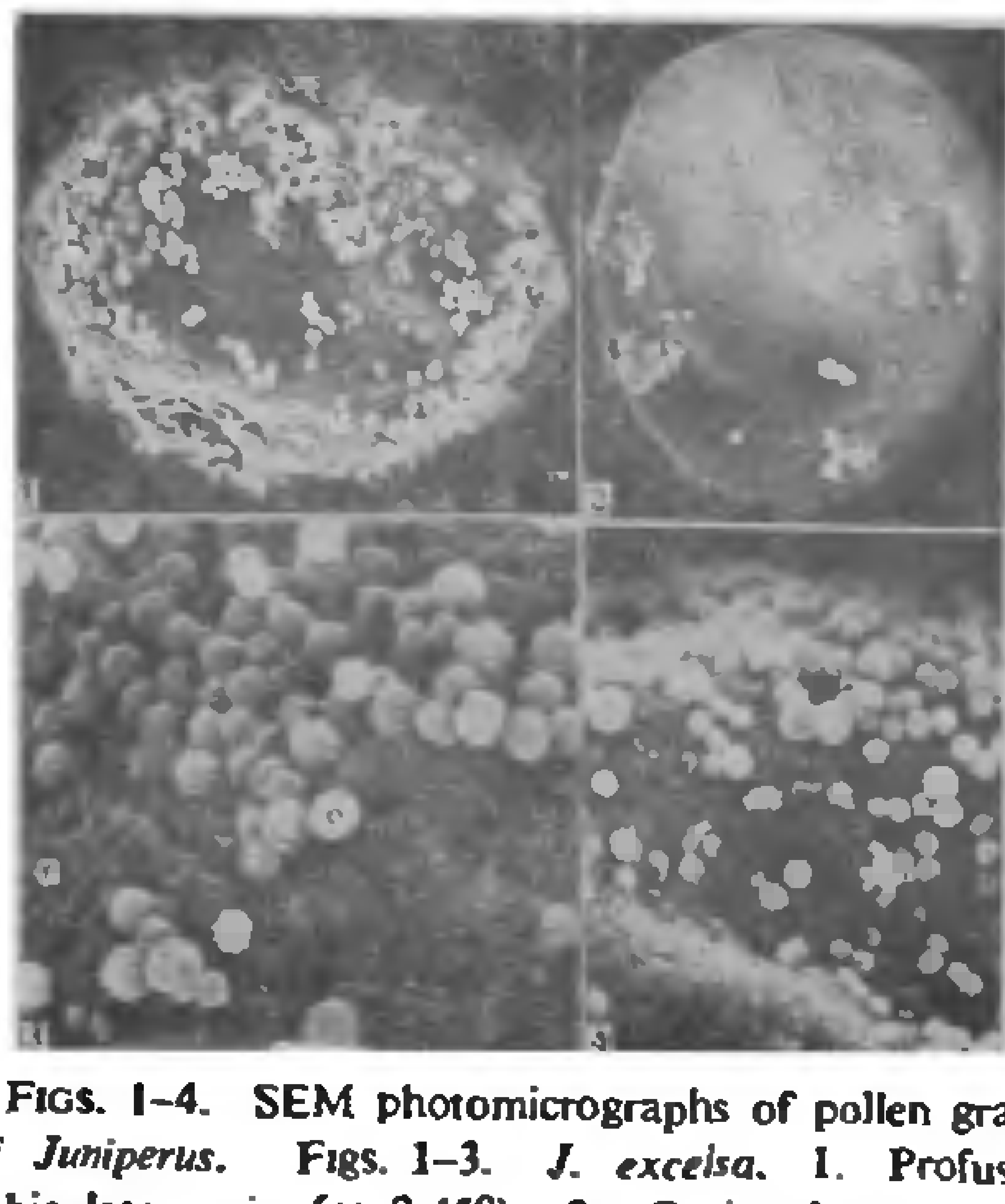
STUDIES IN THE POLLEN GRAINS OF *JUNIPERUS* L.

(Mrs.) Mithilesh Chaturvedi
Palynology Laboratory
National Botanical Research Institute
Lucknow 226 001, India

According to Mehra[1], the genus *Juniperus* L. (Cupressaceae) contains nine species in the Himalayas. The present investigation relates to the pollen morphological studies of populations of 5 species namely, *J. excelsa* Bieb. (one population) *J. macropoda* Boiss. (two), *J. pseudosabina* Fisch. et Mey. (three), *J. squamata* Buch.-Ham. (one) and *J. wallichiana* Hook. f. (one).

The pollen morphological studies have been made both with light microscope (LM) and scanning electron microscope (SEM). For LM studies, unacetolysed, saffranin-stained pollen grains form the basis, and for SEM studies, natural air dried, unacetolysed pollen grains have been processed and photographed in the JEOL JSM 35c SEM.

The studies made under the light microscope are summarized in Table I. Pollen grains of *Juniperus* are inaperturate. As seen in the SEM, in pollen mass of each species there are two types of grains. In one type, the surface is profusely orbiculate (Fig. 1; *cf.* orbicules, Gulvag[2]) and in the other type either the surface is devoid of orbicules or scantily orbiculate (Fig. 2). Such types could be observed even under LM. Orbicules have minute spinous excrescences (Figs. 3 and 4). The largest orbicules occur in *J. excelsa* (Fig. 3) and the smallest occur in *J. macropoda* (Fig. 4). In *J. excelsa*, one feature of exine surface which makes it distinct from other species, is the presence of reticulate folds at places in orbiculate grains forming lumina-like depressions (Fig. 3). The region between the orbicules is coarse, being finely granulate, in all the species. The exine thickness is 1·6 μm in *J. excelsa* and 1·11 μm in other species. Another feature which may be mentioned is the pollen size. Although in general pollen morphological investigations, pollen size is not given much credibility in demarcating various taxa, in the case of three populations of *J. pseudosabina* two populations found in the Western Himalayas have an average pollen size of 22 μm (range 17–31 μm and 17–24·4 μm), while the third population which occurs in the Eastern Himalayas (Sikkim) has bigger grains, size being 29·8 μm (24·4–34 μm). Incidentally, in this population, the percentage of shrivelled grains is also nil, while in those of the Western Himalayas, it is 56 and 73 respectively. These percentages are higher than those of other species investigated (Table I) The highest percentage of shrivelled grains occurs in the pollen of a monoecious population of *J. pseudosabina*. In two populations of *J. macropoda*, the pollen size is almost stable being 24 μm and 24·7 μm and the percentages of shrivelled grains being nil and 3, respectively.



Figs. 1–4. SEM photomicrographs of pollen grains of *Juniperus*. Figs. 1–3. *J. excelsa*. 1. Profusely orbiculate grain (× 2,458). 2. Grain almost devoid of orbicules (× 2,458). 3. A magnified pollen surface showing orbicules and reticulate folds of outer lamella (× 8,600). Fig. 4. *J. macropoda*: A magnified pollen surface showing orbicules (× 8,600). *O*. orbicule, *r*. reticulate folds.