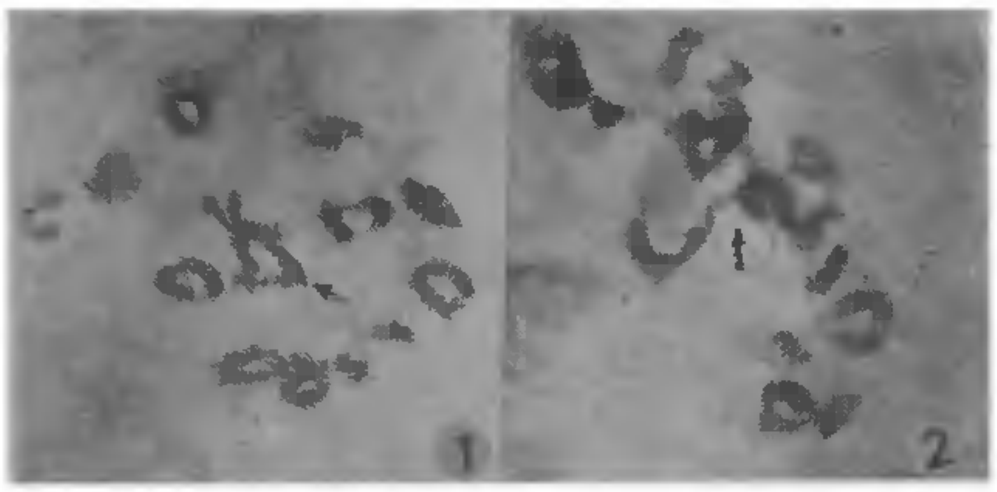
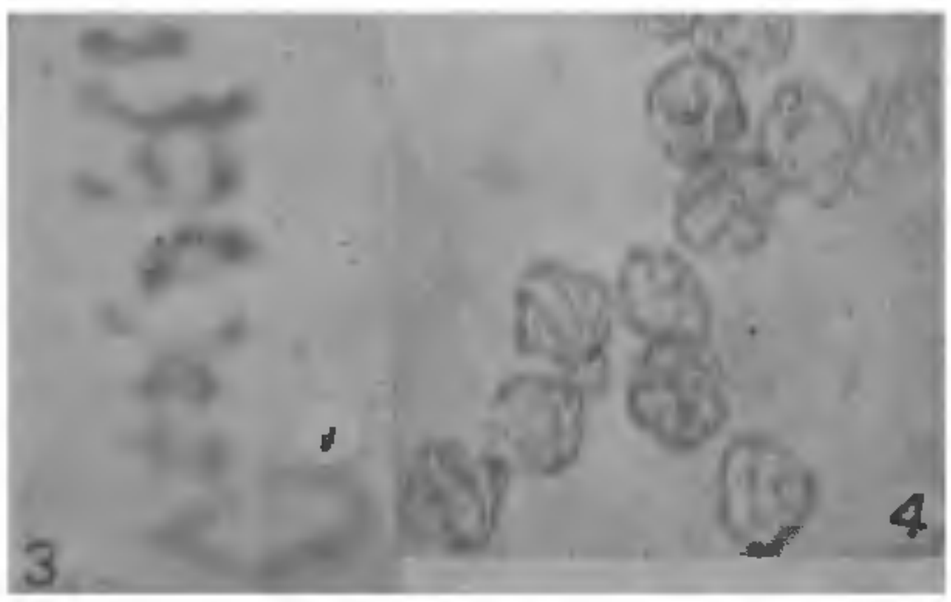
Spontaneous occurrences of haploid ($2n = 12$) and triploid ($2n = 36$) plants have been reported in these local collections of *Capsicums* by Thombre *et al.*[5] and Sonone *et al.*[4] respectively indicating that this collection of different *Capsicum* varieties is a source of different chromosome variant



FIGS. 1–2. 1, Diakinesis; 2, Late diakinesis (× 1150).



FIGS. 3–4. 3, Metaphase I showing a ring involving nonhomologous interchanges (× 1150); 4, Sterile pollen grains (× 450).

The chromosome in *C. annuum* being uniformly medium in size (Cheenaveeraiah[3]), the particular bivalents involved in interchange could not be detected. The plant is vegetatively maintained.

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SEQUENCE OF STOMATAL MERISTEMOID FORMATION IN SOME LEGUMINOSAE

ZIEGENSPECK[1] distinguished two patterns of stomatal differentiation in plants, basipetal and mixed. According to Pant[2], the differentiation may be mixed, gradate or simultaneous. Most wide leaved plants, *e.g.*, ferns, gymnosperms, dicots and some monocots with reticulate venation show mixed type of stomatal formation, with new meristemoids developing between older ones in successive generations. Among the gradate types are the narrow leaved forms, *e.g.*, Lycopodiales, some ferns, most monocots with parallel veins and a few dicots. These show a basipetal differentiation. In *Psilotum* and *Tmesipteris* the stomata develop in an acropetal sequence.

While studying the development of stomata in *Erythrina* (with Professor Pant), it was found that differentiation of stomatal meristemoids was almost simultaneous. Based on this observation, Pant[2] has pointed out a parallelism between the developmental types of fern sori and stomata.

Subsequent studies on *Erythrina indica* and some other Leguminosae have confirmed the presence of a simultaneous or almost simultaneous mode of stomatal development in these plants. In epidermal peels of leaflets, it was found that all the young stomata in a particular preparation were almost at the same stage of differentiation.

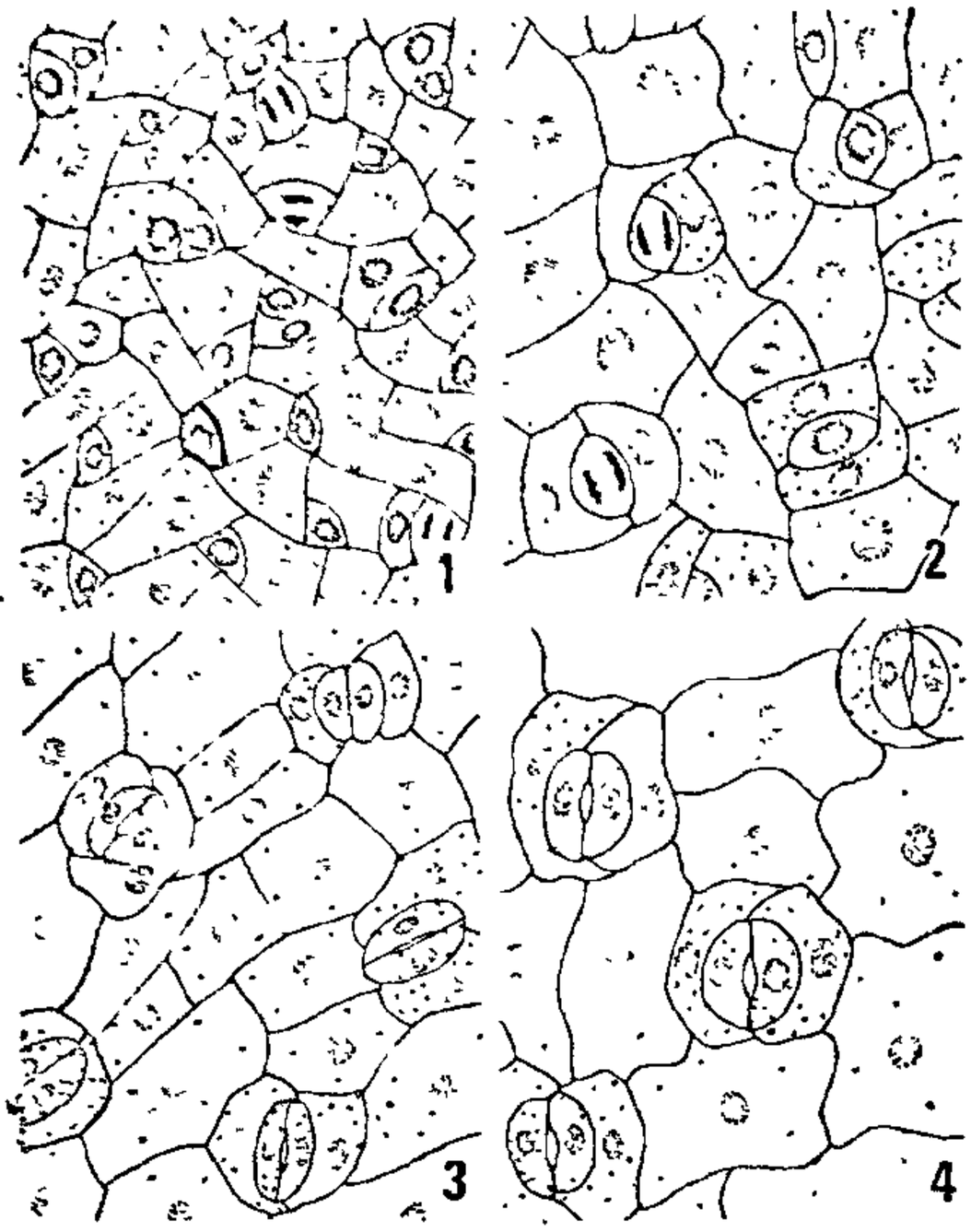
The stomata in these plants are of the mesogenous paracytic type and a peel from a young leaflet may show only triangular initials, or meristemoids with one or both subsidiary cells or with guard cell mother cells having two parallel subsidiaries, or with the guard cell mother cells divided into the guard cells (Figs. 1–4). Rarely, a stoma in a particular preparation is in a different stage of development from that of others.

The most significant aspect of this preliminary study is the presence of simultaneous development only in genera having small or very small leaflets (Area between 3 to 50 mm^2).

In plants having normal sized or large leaves or leaflets, the difference in the size of leaf primordia and the mature organ is manifold and the leaf has to expand considerably in order to attain that size. With the expansion of the leaf, the stomatal meristemoids become situated away from each other and the inhibitory zones as envisaged by Bünning[3] are also displaced. A new meristemoid is formed in this non-inhibited zone.

In the plants which show simultaneous development (at least in this study) the ratio of the area of leaflet at initiation and size at maturity is not very great. It appears that the growth is mainly due to expansion of epidermal cells and not by the formation of additional stomatal meristemoids.

Could it be that in these plants there is only one generation of stomata, the subsequent generations



FIGS. 1–4. *Erythrina indica*. Portions of epidermis of leaves at different stages of development, showing almost simultaneous development of stomata (All × 450). Fig. 1. Young leaf showing meristemoids with only one mesogene subsidiary cell Fig. 2. Stage showing both subsidiary cells and guard cell mother cells, some of the latter showing division figures. Fig. 3. Young guard cells, some with pores. Fig. 4. Mature epidermis and fully differentiated stomata.

being cut short by the maturation of the leaf? This may be due to the fact that the leaves do not expand to such an extent as to make the "inhibitory zone" ineffective.

Clearly, there is need for an extensive study of the sequence of stomatal meristemoid formation in plants, both with large and small leaves and leaflets. Some studies are in progress and will be reported in detail elsewhere.

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USE OF WATER HYACINTH AS AN ADDITIVE IN BIO-GAS PRODUCTION

DIFFERENT organic wastes, including aquatic vegetative growths, can be used as supplements in the production of bio-gas through anaerobic fermentation of cattle dung[1,2]. Guha *et al.*[2] further reported that the rate of gas production is greater when water hyacinth is allowed to ferment anaerobically, either mixed with cattle dung or without it; the gas production starts earlier as compared to cattle dung alone. However, there is no mention of the variation in the pH level of the fermenting slurry and the nature of volatile fatty acids produced during the course of fermentation. It was thought, therefore, worthwhile to conduct an experiment with water hyacinth as an additive, mixed with cattle dung with a view to study the pattern of volatile fatty acid production, the pH levels and the gas produced during the above fermentation.

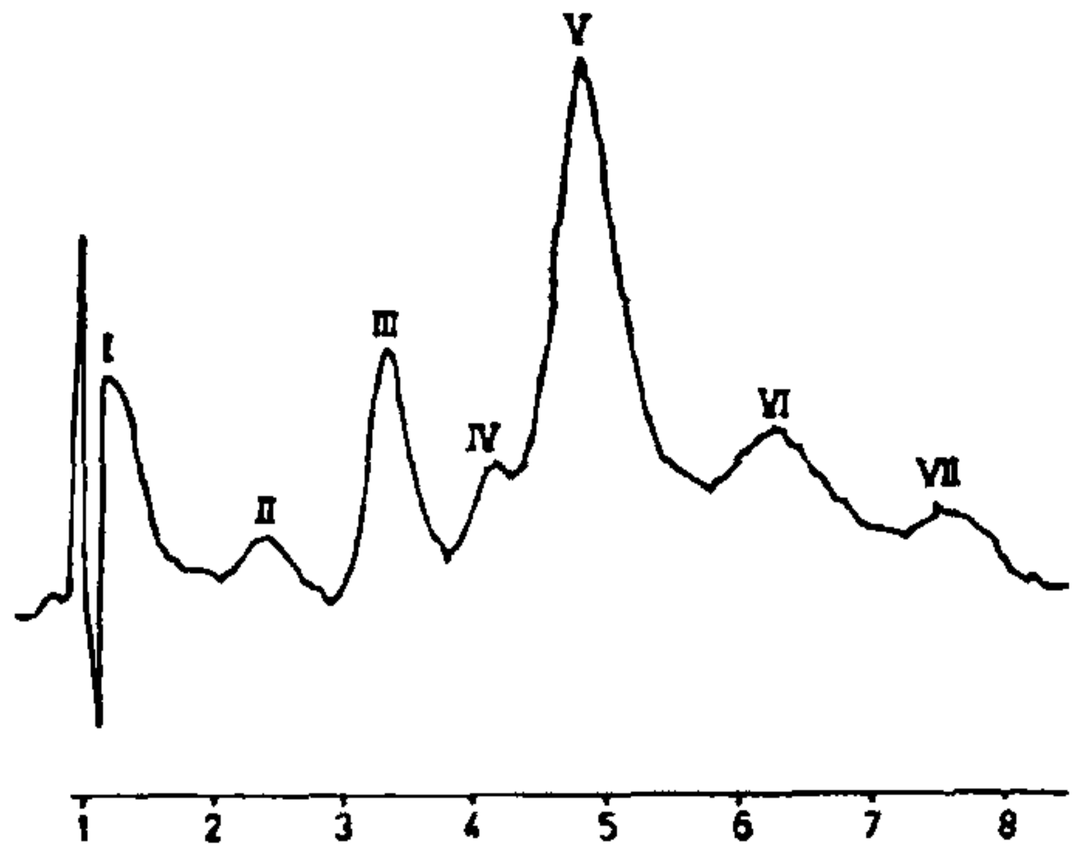

FIG. 1. VFA pattern on the 25th day in the fermenting slurry containing cattle dung and water hyacinth.

I, Disturbance due to water; II, Acetic acid; III, Propionic acid; IV, Isobutyric acid; V, Butyric acid; VI, Isovaleric acid; VII, Valeric acid.

Water hyacinth was sundried and 1 kg of the powder containing 9% moisture was mixed with 6·25 kg of wet cattle dung containing 80% moisture. This mixture was diluted with 17 litres of water and then charged into a laboratory scale model of gobar gas plant of KVIC design and allowed to ferment anaerobically for 60 days. The pH and temperature of the fermenting slurry was recorded daily. The bio-gas generated from this fermentation was measured and analysed daily. In order to find out the volatile fatty acid contents in the fermenting slurry, the sulphuric acid distillate was analysed daily. The analysis of bio-gas and that of distillate was done chromatographically on Toshniwal gas chromatograph using porapack Q column, with hydrogen as a carrier gas and thermal conductivity