

# VINE CHILLY—A COMPARATIVE MORPHOLOGICAL AND CYTOLOGICAL STUDY

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IN a recent article an unusual vine chilly plant was reported by Narasimhan<sup>2</sup> on the basis of the material collected near Goribidnur, Mysore State. A new variety, viz., *Capsicum frutescens* var. *scandens* has been proposed for its accommodation. In designating the new variety, a comparative account of the anatomy of the leaves, stem and roots, as also the sizes of the stomata and pollen of the vine chilly plants and the local varieties grown near Goribidnur were taken into account by Narasimhan. Since no appreciable differences were manifest, he concluded that the scandent habit of the vine chilly plants must have arisen by way of simple gene mutation. As there were no cytological studies made to confirm this interesting feature, the writers undertook the study of the chromosome numbers and their behaviour, an account of which is presented here. A detailed morphological study of the male and female gametophytes of the vine chilly plants and of the normal plants grown locally were made with a view to institute further comparisons.

The material for study was collected from the same vine chilly plants which formed the material for study by Narasimhan. From the same locality, the material for the normal chilly plants, which served as control, were collected. Material for microscopic study was fixed in "Craf" recommended by Randolph with pretreatment in Carnoy's fluid for ten minutes. Sections were stained with Newton's iodine gentian violet method. Chromosome studies were also made in aceto-carmine smears.

As regards the structure and development of the microsporangium, no differences have been observed between the vine chilly plants and the local varieties which were taken as controls. In fact the microsporangium in both the cases is quadrilocular, the development of the pollen from the initial stages proceeding according to the normal type. The distinction between the wall layers and the endothecium is not apparent. The tapetal cells in both the plants are enlarged even to the extent of being slightly hypertrophied, the cells showing two conspicuous nuclei and deeply staining

cell contents. However, in the vine chilly plants the tapetal cells are slightly globoid and abutting on the sides, as against the isodiametric tepetal cells of the control plants (Figs. 1 and 4).

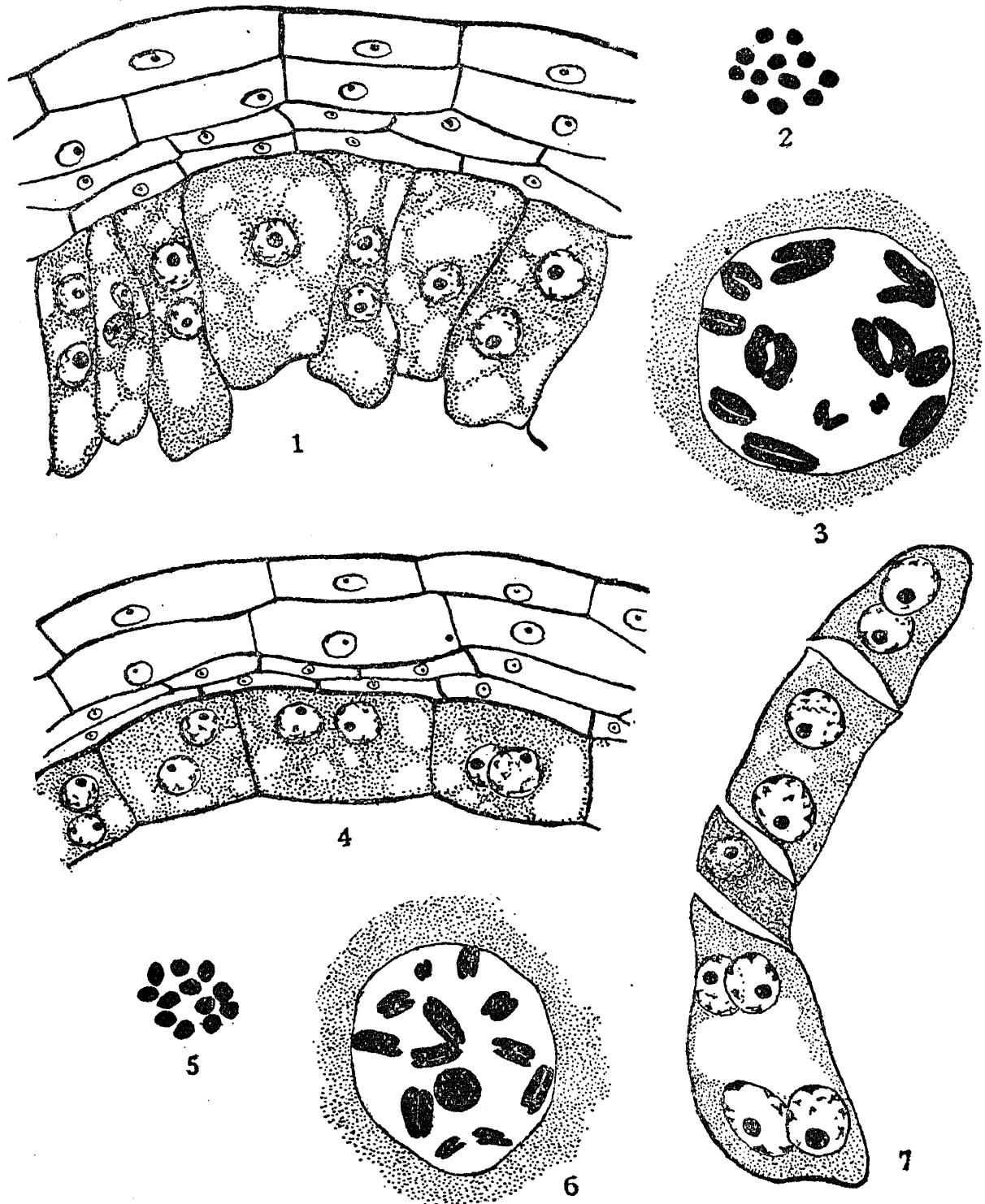


FIG. 1.—Tapetal cells of the vine chilly anthers  $\times 528$ . FIGS. 2 and 3. Metaphase plate and diakinesis in the pollen mother cells of the vine chilly plants.  $\times 1900$ . FIG. 4. Tapetal cells of the control plants.  $\times 528$ . FIGS. 5 and 6. Stages in the meiotic division of the pollen-mother cells in the control.  $\times 1900$ . FIG. 7. Showing the simultaneous development of all the megaspores in the vine chilly plants.  $\times 900$ .

The meiosis is normal in both the plants under investigation and neither lagging of the chromosomes nor other abnormalities associated with the heterozygous forms have been observed. The haploid number of chromosomes in both the plants is twelve (Figs. 2, 3, 5 and 6). This is in conformity with the number given by Dixit for *Capsicum annum*.<sup>1</sup> The length and the shape of the chromosomes as determined and seen at various phases of the nuclear divisions are identical in both the cases.

A comparative study of the megasporogenesis of the vine chilly and control plants indicated a similar type of development. The type of embryo-sac conforms to the normal 8-nucleate type. The ovules are anatropous with a single integument. It is not the object of the writers to give any detailed account of the gametogenesis but only a comparative account as regards the development of the gametophytes in the two plants. After the formation of the linear row of tetrads of megaspores only the chalazal megaspore is functional. As against this, in the vine chilly plants simultaneous development of all the megaspores up to the 2-nucleate-embryo-sac stage has been noticed occasionally (Fig. 7). But such differences in the development of the megaspores might not have any significance in differentiating varieties. In both the plants the antipodals in the mature embryo-sac are cellular and synergid-like. Fertilization is of the normal porogamous type.

From the above studies it becomes manifest that the vine chilly plants and the local varieties grown closely resemble each other as regards gametogenesis, size, shape and number of chromosomes. The minor differences noticed such as, shape of the tapetal cells, occasional development of all the megaspores in the vine chilly plants are not of such value in distinguishing the varieties. The homozygous nature of the vine chilly plants, and their close resemblance with the local varieties of chilly plants as regards their morphological and anatomical features as pointed out by Narasimhan, leads to the conclusion that the vine chilly plants must have arisen only by simple gene mutation.

#### REFERENCES

1. Dixit, P. D. .. "A Cytological study of *Capsicum annum*," *Ind. Jour. Agri. Sci.*, 1931, **1**, 419.
2. Narasimhan, M. J. .. "On a vine chilly in Mysore," *Cur. Sci.*, 1943, **12**, 330.