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OBSERVATIONS ON THE CYTOLOGY OF THE MADRAS MINT

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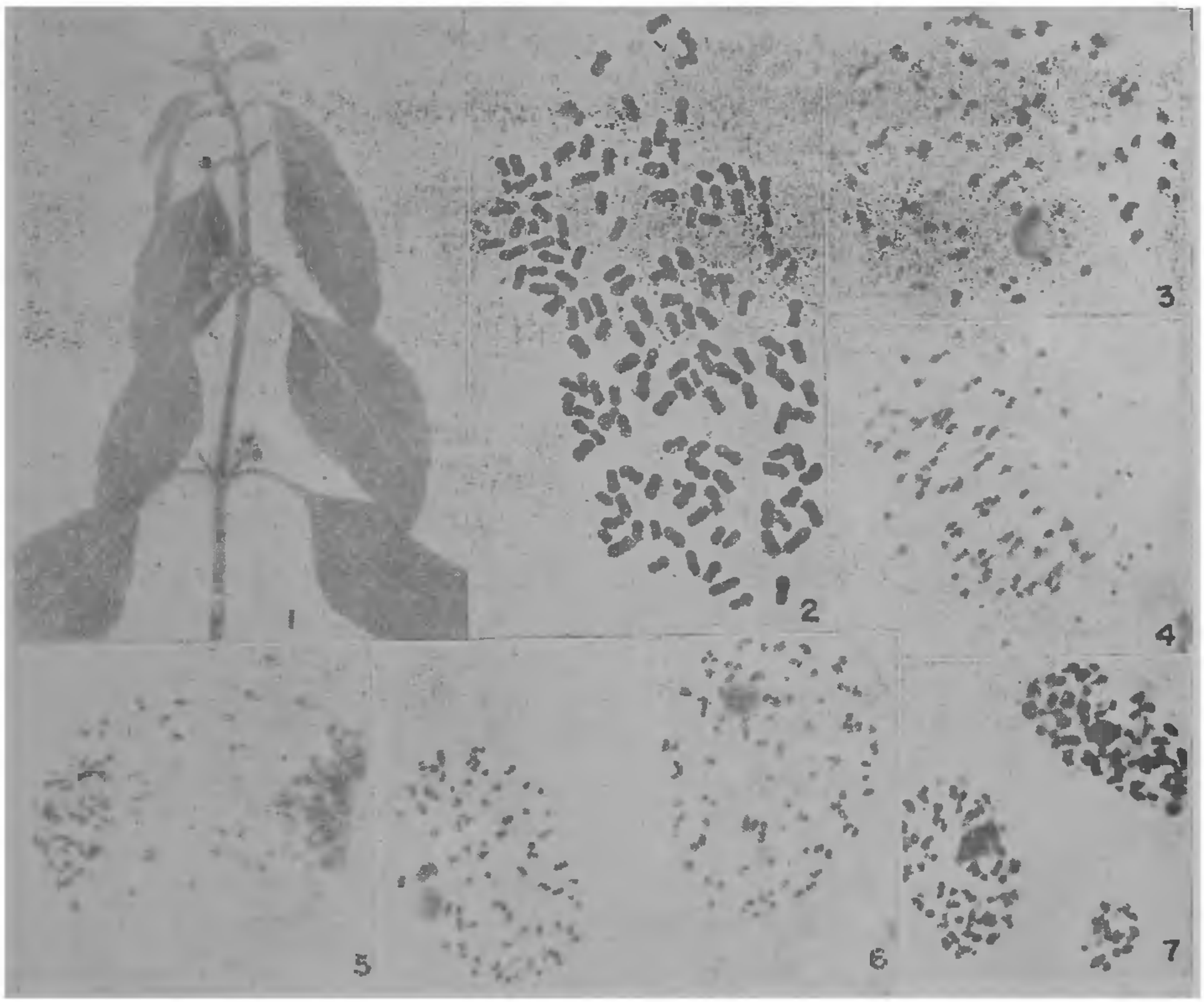
THE term mint, often applied to various species of *Labiatae*, is most frequently used to designate plants of the genus *Mentha* in which are included about 30 species of perennial herbs which are natives of the North Temperate Zone. Mints hybridize freely in nature, giving rise to integrating forms which make the limitations of certain species difficult. They have been in cultivation from ancient times for their aromatic oils which are used in culinary preparations, in medicine and perfumery.

Cytologically the genus *Mentha* falls into two well-defined groups. The *Pennyroyal* or *Pulegium* group with a basic number $x = 10$ which is confined to the Mediterranean region and the "*Spicata-Arvensis*" group with basic number $x = 6$ or $x = 12$ which has a much wider distribution. The lowest chromosome number of this group is found in *M. longifolia* which has 24 chromosomes. Polyploidy is common in this group with chromosome numbers $2n = 48$ and 72 in *M. piperata* and $2n = 96$ in *M. arvensis, M. citrata* and *M. aquatica* (Sobti, 1965). *M. arvensis* vari *piperascens*, popularly known as the "Japanese mint", was introduced into India and is now extensively grown for the production of menthol. A colchiploid of the Japanese mint with $2n = 192$ chromosomes was produced at the Regional Research Laboratory, Jammu, in 1960 (Janaki Ammal and Sobti, 1962). It is more robust but has thicker stems than the Japanese mint which is a disadvantage in commercial cultivation. To rectify this defect the Jammu mint was backcrossed with the Japanese mint. The progeny was found to be intermediate in vegetative characters (Fig. 1). Roots tip squashes of the hybrid showed $2n = 144$ chromosomes (Fig. 2), and it may therefore be considered as a "triploid" form of the Japanese mint. It flowered for the first time at the Botany Field Research Station of the University of Madras in 1970 and has thus been designated as the "Madras mint".

Meiosis was studied in pollen mother cells and the 144 chromosomes were found to be associated chiefly as bivalents and univalents

with occasional trivalents and quadrivalents (Figs. 3 and 4). Table I shows the chromosome associations observed in eight pollen mother cells. Univalents at anaphase were found to divide resulting in different chromosome numbers in daughter cells (Figs. 5 and 6). Univalents which failed to congress on the metaphase plate often formed micronuclei (Fig. 7). Anthers were non-dehiscent and were found to be completely sterile.



FIGS. 1–7. Fig. 1. Flowering branch of the Madras mint ($\frac{3}{4}$ natural size). Fig. 2. Root tip squash of the Madras mint showing 144 chromosomes (× 1,000). Figs. 3–4. Diakinesis and Metaphase showing univalents, bivalents and multivalents in PMCs (× 2,000). Fig 5. Anaphase in PMC showing division of univalents (× 2,000). Fig. 6. Telophase with unequal number of chromosomes (× 1,700). Fig. 7. Telophase with micronuclei (× 2,000).

TABLE I

Chromosome association in the Madras mint

S. No.	Quadrivalents	Trivalents	Bivalents	Univalents	Total
1	..	..	60	24	144
2	..	..	52	40	144
3	1	1	52	33	144
4	..	2	54	30	144
5	1	3	48	33	144
6	..	..	58	28	144
7	5	..	44	36	144
8	..	..	48	48	144

The Madras mint is being propagated at Madras and Coimbatore to study its oil content at different locations so that its potentiality as a commercial crop can be exploited.

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