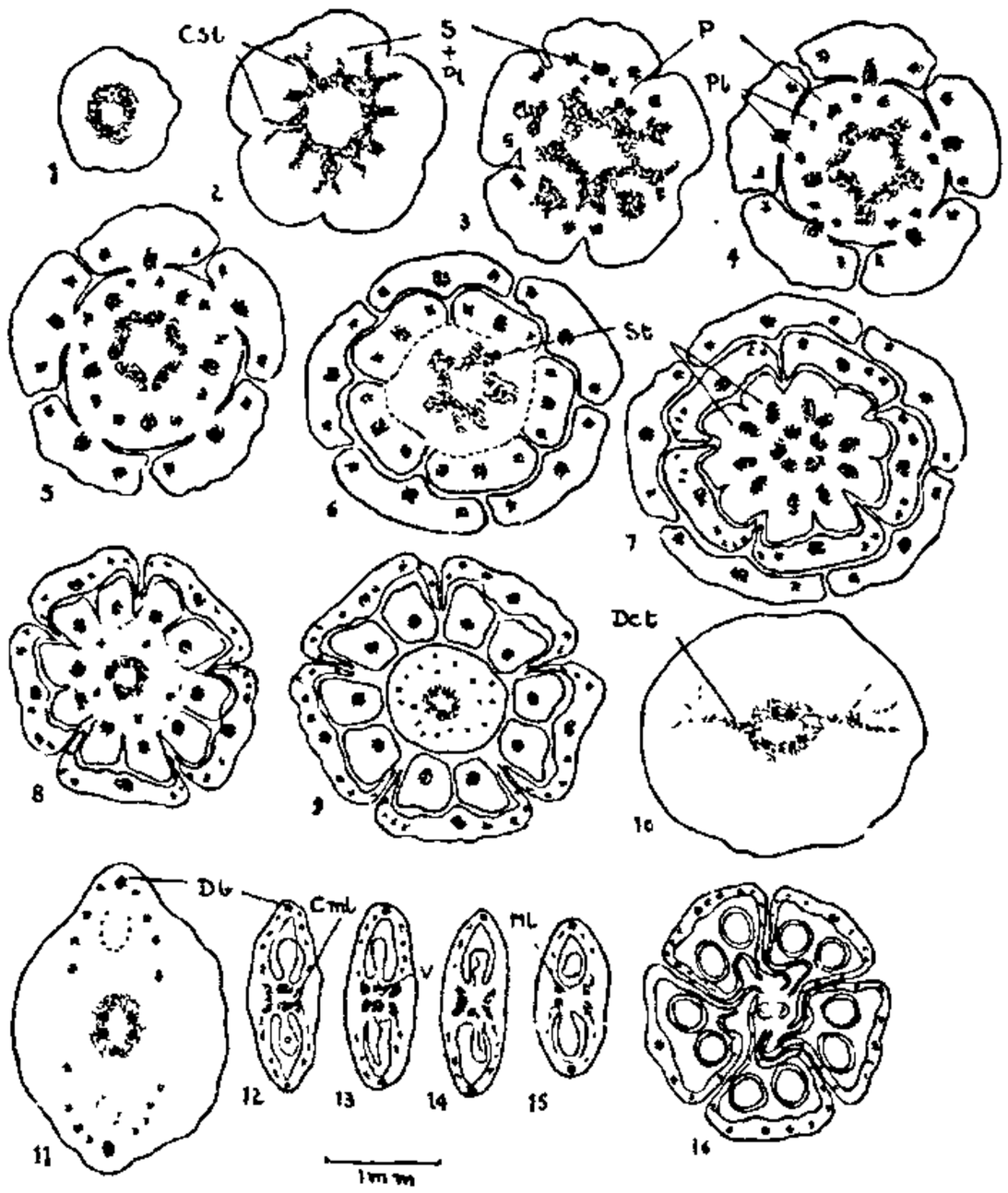

Figures 1–16. Serial transverse sections of flower bud showing the origin and distribution of traces to the different floral parts.
Abbreviations: CSl: Common sepal lateral; S: Sepal midrib; P: Petal trace; Pl: Petal lateral; St: Staminal trace; Dct: Dorsal carpellary trace; Db: Dorsal bundle; Cml: Common median lateral; Ml: Median lateral

preted as haplostemonous. There is no external or anatomical evidence of the suppressed antisepalous staminal whorl. However, in *T. thymifolia*, according to Saunders[2], there is suppression of the antipetalous stamens and duplication of antisepalous whorl. She also reported adnation between sepal midribs, petal laterals and antisepalous staminal traces in the same taxon.

The carpels are 5-traced. The dorsal carpellary traces give off a pair of lateral branches which divide forming smaller bundles, some of which extend into the ovary wall (figures 10, 11). The common median laterals and the fused ventral bundles are organised as four bands, two lateral and two opposite the loculi (figures 12–14). While the ventral bundles are completely utilised in the ovular supply, the common median laterals give off branches into the ovary wall and divide radially demarcating the median laterals of adjacent carpels (figures 12–15). The placentation, interpreted as axile on anatomical basis, is consistent with Puri's[3] view. The dorsal bundles, which extend into the style, divide in a fan-wise fashion in the stigmatic region (figure 16).

The available floral anatomical data on Tremandraceae[2] do not indicate a relationship to the families under Polygalinae[4], Geraniales[5], Pittosporales[6,7] and Polygalales[8,9]. However, basing on wood anatomical findings[10] it was suggested that the family has pittosporacious affinity while according to Cronquist[8] the family fits well into the order Polygalales, which includes Polygalaceae and a few other families.

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ANTHER CULTURE FOR PRODUCTION OF POLLEN HAPLOIDS IN *TROPAEOLUM MAJUS*, LINN.

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THE methodologies, the success achieved and the economic aspects of anther culture for androgenic haploids have been highlighted by several recent investigators. Information on ornamental plants is very much restricted and there is a general opinion that

the ornamental species are less responsive to the technique than their wild relatives[1]. The present communication is a brief account on anther culture in horticulturally important species, *Tropaeolum majus* Linn.

Flower buds having anthers with nonvacuolate uninucleate pollens were subjected to cold treatment[2] at 4 C for 4 days prior to excision and inoculation of anthers under aseptic conditions in MS medium[3] supplemented with NAA and BAP at the concentration of 2.5 mg/l. The cultures were maintained at 22 ± 2°C under diffuse light source of 2000 lux (16 hr/day).

The cultured anthers gradually swelled up in volume during initial days of culture and showed various stages of multicellular tissue enclosed inside the pollen walls (figure 1). The growing white calli free from pollen wall peeped out of longitudinally dehisced anther lobes only after 3½ months. The anther wall then slowly shrivelled and dried. The callus was subsequently subcultured regularly at intervals of 20 days. Its growth was quite rapid during the first week of subculture (figure 2) followed by cessation of growth during subsequent days.

The subcultured callus started producing numerous green shoot buds after continuous subculture for two months (figure 3). The buds when isolated and subcultured grew rapidly producing tiny shoots. Root induction was observed only from the base of well grown shoots (figure 4).

Cytological studies showed the majority of cells of the callus to contain haploid set (14) of chromosomes, though cells with hypo- and hyperhaploid numbers were also met with.

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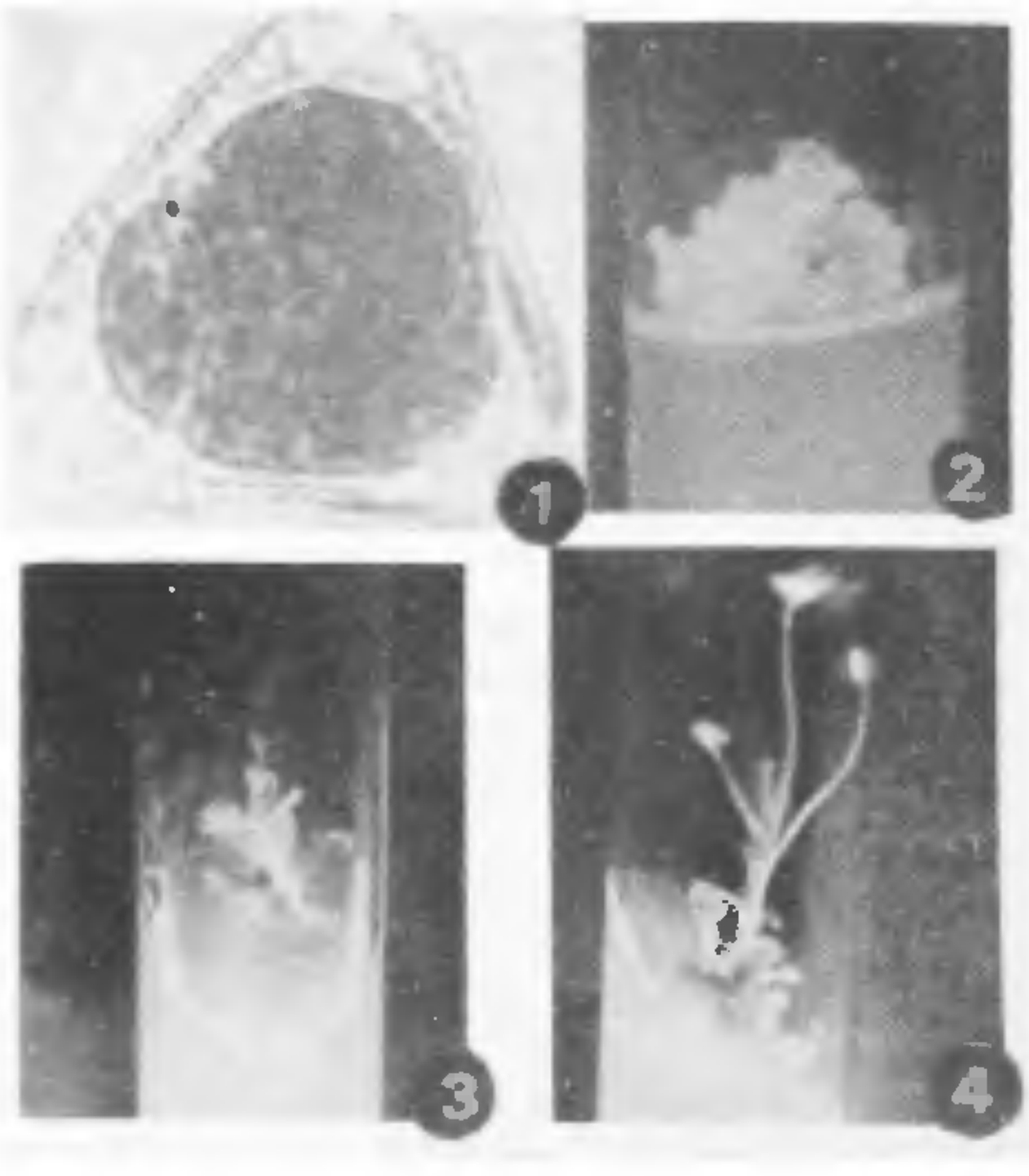

Figure 1–4. 1. Multicellular tissue included in pollen wall. × 1688. **2.** Well grown callus. **3.** Callus with differentiating shoot buds. **4.** Plantlet.

LEVELS OF SODIUM, POTASSIUM, CALCIUM, MAGNESIUM AND ZINC DURING THE EMBRYONIC DEVELOPMENT OF *CYPRINUS CARPIO*

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THE role of cations in biological processes is proved beyond doubt. It has been shown that the egg membrane is charged electronegative, hence the mobility of cations within the membrane is much higher than that of anions[1]. Exchange of cations across the egg membrane depends upon the requirement of developing embryo[2]. The present investigation deals with the levels of sodium, potassium, calcium, magnesium and zinc during the embryonic development of common carp, *Cyprinus carpio*.

Induced breeding and artificial fertilization of *C. carpio* was done following the method of Woynarovich and Horvath[3]. Egg samples at different developing stages (figure 1) were collected; washed with distilled water; dried and lyophilized immediately. Samples were digested with concentrated nitric acid for 24 hr at