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ON THE OCCURRENCE OF *PHYSALIS* *ANGULATA* L. IN TAMIL NADU

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THE species of *Physalis* are well known for their edible fruits. The genus is characterized by inflated fruiting calyces that enclose the berry. In Tamil Nadu, taxonomists have recognised¹⁻³ only two species of *Physalis*, i.e. *P. minima* L. and *P. peruviana* L.

P. peruviana has restricted distribution. It grows in regions of high altitude of Nilgiris and Palani Hills. *P. minima* is common throughout. During the field survey of the Cauvery delta (Tiruchy, Attur, Tanjore, Chidambaram and Kumbakonam) we could collect two morphologically distinct forms of *Physalis*. One is a prostrate herb, sparsely hairy (BDUH 47), with small yellow flowers which lack maculations (dark/brown) in the corolla throat. The anthers are yellow. This is in agreement with the Hooker and Gamble's description of *P. minima*^{1,2}. It grows in disturbed habitats such as garbage tips, near farm and domestic water outlets, on the edges of paddy fields and road sides. The other one (BDUH 56) is a glabrous, angular stemmed, erect and highly branched plant, producing yellow flowers with pale-purple maculations in corolla throat. The anthers are purple tinged. The calyces and leaves typically have purple coloration on their prominent net-veining. The latter is identified as *P. angulata* L. which was reported only from the northern parts of India^{4,5}. The present specimen was collected along the banks of Cauvery river. This species grows mainly in moist places such as edges of the paddy fields, river banks and waste lands.

Gamble² treated the latter as a variety under *P. minima*. Reciprocal crosses were performed be-

tween these two species to verify the biological species concept⁶. It was found that they were not crossable with each other, thereby demonstrating their genetic distinctiveness. Furthermore, the accessions of *P. angulata* collected from Meerut and Tamil Nadu were found to be identical in their morphological features. Also, they were easily crossable to produce normal fertile hybrids which showed regular meiosis. In the light of these findings, it is suggested that *P. angulata* L. be included in the flora of Tamil Nadu along with *P. minima* and *P. peruviana*.

Key to the identification of *Physalis* species

- i. Corolla > 1.3 cm in diameter with 5 dark-brown maculations in the throat, stems and leaves are dark-purple tinged and densely vil-lous. Anthers and style deep-purple. Grows in high altitude regions/mountains only ... *P. peruviana*.
- i. Corolla < 1 cm in diameter; plants glabrous/subglabrous ... ii.
- ii. Plants short with spreading branches, corolla < 0.6 cm in diameter without macula-tions; anthers yellow, fruit calyces green and as long as broad; stems and leaves subglabrous ... *P. minima*.
- ii. Plants tall, erect and much branched with angular stem; Corolla > 0.6 cm, but < 1 cm in diameter. Stems and leaves glabrous with purple patches ... *P. angulata*.

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DIRECT PLANTLET FORMATION IN COTYLEDON CULTURES OF *CAPSICUM FRUTESCENS*

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A prerequisite for the improvement of any crop through tissue culture techniques depends upon the success in plant regeneration. Embryos^{1,2} and seedling explants^{3,4} have been used to raise complete plants in a large number of genera of Solanaceae. *Capsicum frutescens* is an important crop plant and earlier studies on tissue culture of this species concern plant regeneration from seedling explants of a hybrid variety (Bharath)⁵ and anther culture⁶. The aim of the present study was to initiate tissue cultures of *C. frutescens* using seedling explants and to establish conditions for successful plant regeneration from cotyledons.

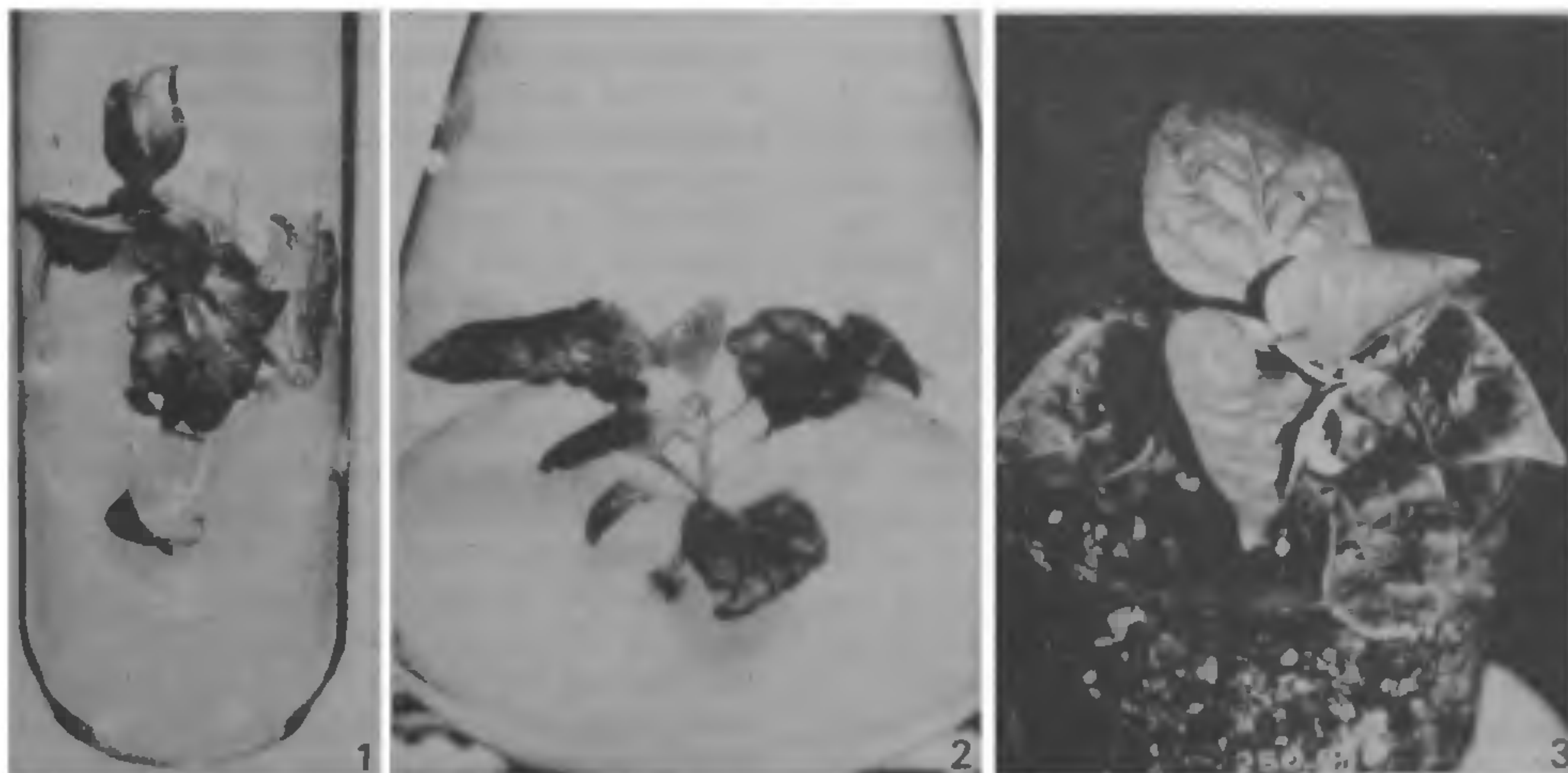
Seeds of *C. frutescens* obtained from the Southern Regional Plant Introduction Station, USA were germinated aseptically. Root, hypocotyl and cotyledon segments, measuring 0.5 to 1.0 cm in length, were excised from 4-week-old seedlings and implanted on Murashige and Skoog's medium

(MS)⁷. Various auxins and cytokinins were added to the medium. The pH of the medium was adjusted to 5.8 before the addition of agar (1%). All the cultures were maintained under white fluorescent light for 16/8 h photoperiod at $25 \pm 2^\circ\text{C}$.

All the explants callused efficiently on MS supplemented with 2 mg/l 2, 4-D and 1 mg/l Kn. Callus initiation was first noticed in root segments followed by hypocotyl and cotyledons. Compact, cream coloured calli were produced at the cut ends of cotyledon and hypocotyl. The entire root formed nodular callus which later turned brown. All the three explants implanted on MS + 0.5 mg/l NAA + 2 mg/l Kn or MS + 1 mg/l NAA + 1 mg/l Kn produced 15–20 roots, in addition to callus. Rooting first appeared in cotyledon cultures, followed by root and hypocotyl segments.

Cotyledon explants showed direct plantlet formation (figure 1) on MS + 1 mg/l NAA + 1 mg/l Kn. However, the percentage of regeneration was low (about 10%). The plantlets were maintained on MS basal medium for 2 weeks (figure 2) and then transferred to a vermiculite irrigated with mineral nutrient solution (figure 3).

Thus it was possible to raise full plants from cotyledons in *C. frutescens* with a single hormonal combination. Efforts are being made to optimize conditions to increase the frequency of regeneration, and make the method efficient for quick multiplication of this crop plant.



Figures 1–3. 1. A four-week-old culture showing direct plantlet formation from cotyledon on MS + 1 mg/l NAA + 1 mg/l Kn; 2. A five-week-old plant on MS basal medium; 3. Seven-week-old plant in vermiculite.