TABLE I

Effect of phosphate buffer at different pH on the mechanical transmission of yellow mosaic disease of lablab

Sl. No.	pH	Number of plants infected*	Percentage of transmission	Incubation period in days
1	6·6	17	68·0	9–15
2	6·8	13	52·0	9–15
3	7·0	19	76·0	7–14
4	7·2	18	72·0	7–11
5	7·4	23	92·0	7–10
6	7·6	25	100·0	7–10
7	7·8	23	92·0	7–10
8	8·0	25	100·0	7–11

* Number of plants inoculated; 25.

percentage of transmission ranged from 52·0 to 76·0 and 92·0 to 100·0 in the pH range of 6·6 to 7·2 and 7·4 to 8·0 respectively. The infection by the virus generally seems to be favoured by alkalinity of the buffer used for extraction. In all mechanical transmission tests, uninoculated control plants developed no symptoms of the disease.

Mechanical transmission of white fly-transmitted viruses causing yellow mosaic diseases has been reported in other countries—*Euphorbia* mosaic virus on seedlings of *Euphorbia prunifolia* and *Datura stramonium*[2], yellow mosaic on *Leonurus sibiricus*[3] and golden mosaic disease agent and *Euphorbia* mosaic disease agent[6]. This is believed to be the first report of the mechanical transmission of a white fly-transmitted virus causing yellow mosaic of lablab in India. The studies on the properties of the yellow mosaic virus of lablab are in progress.

We are thankful to Dr. T. K. Kandaswamy, Professor and Head of the Department of Plant Pathology, for providing necessary facilities and for his valuable suggestions and guidance.

K. S. SUBRAMANIAN.
P. NARAYANASAMY.

Department of Plant Parhology,
Tamil Nadu Agrl. Univ.,
Coimbatore 641 003,
July 2, 1977.

1. Capoor, S. P. and Varma, P. M., *Curr. Sci.*, 1950, 19, 248.
2. Costa, A. S. and Bennett, C. W., *Phytopathology*, 1950, 40, 266.
3. — and Carvalho, A. M. B., *Phytopath. Z.*, 1960, 38, 129.
4. Nariani, T. K., *Indian Phytopath.*, 1960, 13, 24.
5. Nene, Y. L., *Res. Bull. No. 4*, G.B. Pant University of Agriculture and Technology, Pantnagar, U.P., 1972.
6. Meiners, J. P., Hawson, R. S., Smith, F. F. and Diaz, A. J., "Mechanical transmission of white fly (*Bemisia tabaci*) borne disease agents of beans in El. Salvador," In : *Tropical Diseases of Legumes* (Julio Bird and Karl Maramorosch, ed.), Academic Press, New York, San Francisco, London, 1975, pp. 61–69.

SHOOT FORMATION IN *CATHARANTHUS ROSEUS* (L.) G. DON CALLUS CULTURES

INTEREST in the group of plants known as Periwinkles has increased in the past few years, because of the isolation of vincaleucoblanthanine from *C. roseus*. This alkaloid has been tested clinically and is currently used in the treatment of Hodgkin's disease and chloriocarcinoma[1]. More than 66 alkaloids have been reported in *C. roseus*. Amongst these alkaloids, ajmalicine, a principal alkaloid of stem, and vinodoline, have been identified in stem and leaf callus cultures[2].

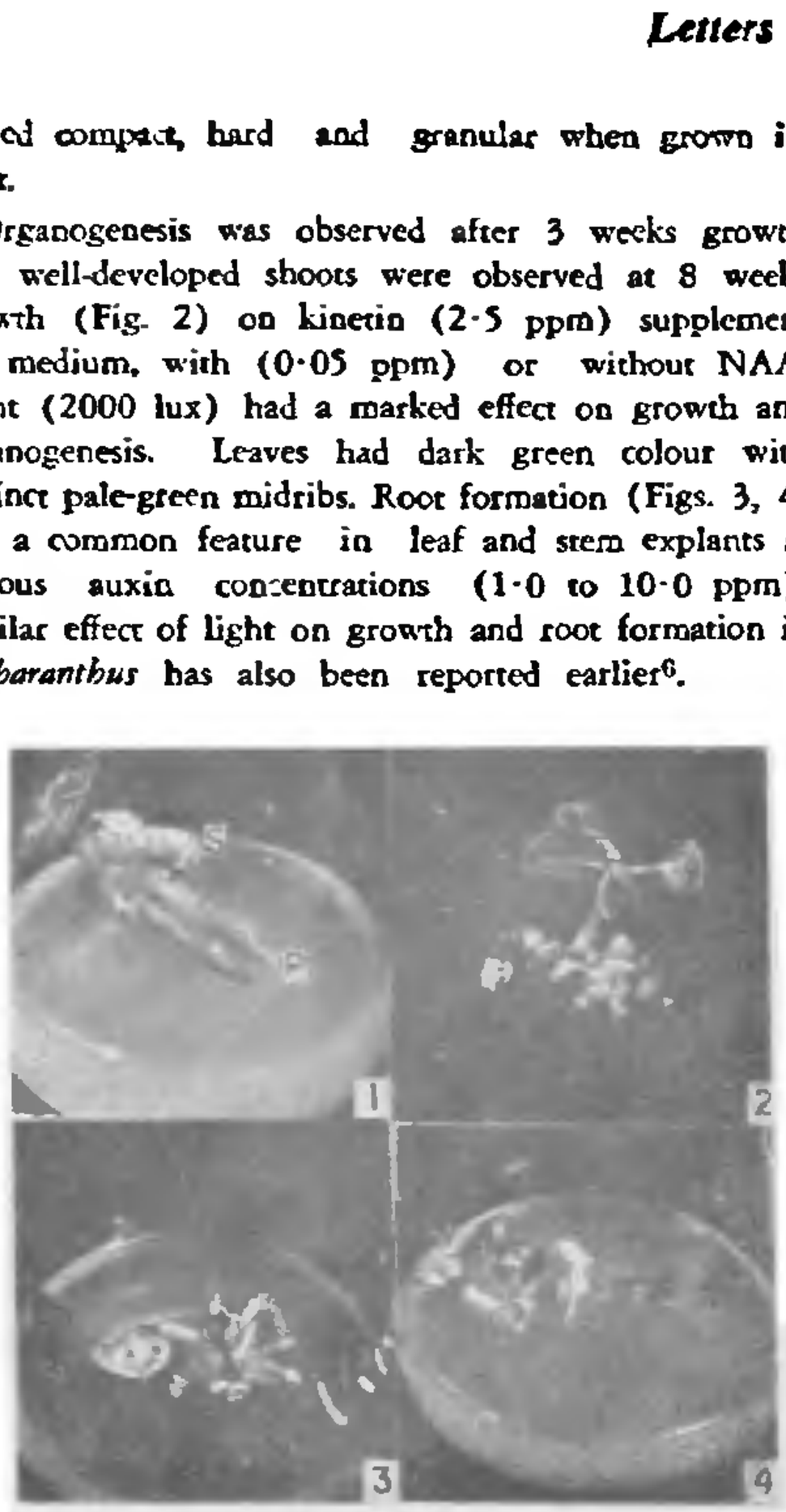
Physical, morphological, genetic and biochemical factors affect the growth and metabolism of plant tissue culture. This results in biosynthetic potentialities of the tissues[3]. During the tissue culture studies on medicinal plants of arid and semi-arid areas, *C. roseus* has been cultured. In this communication we report the shoot formation in *Catharanthus* callus cultures.

Callus tissues were raised from stem explants and the culture conditions were similar to *Crotalaria* cultures[4]. Tissues were grown and maintained on Murashige and Skoog's (MS) medium[5]. Various concentrations of kinetin, α-naphthalene acetic acid (NAA) and malt extract (ME) were incorporated in the medium before autoclaving.

Callus development from stem and pods (Fig. 1) were observed on MS medium. Callus tissues grew well on MS medium supplemented with NAA (0·25 to 5·0 ppm) and kinetin (0·25 to 1·0 ppm). The maximal wet weight (4·0 g) was obtained at 4 weeks growth on medium supplemented with NAA (1·0 ppm) and kinetin (0·5 ppm). The dark grown tissues were soft, fragile and yellowish-brown and tissues turned yellowish-green to brown in light. At higher kinetin concentrations (1·0 to 2·5 ppm) tissues

turned compact, hard and granular when grown in light.

Organogenesis was observed after 3 weeks growth and well-developed shoots were observed at 8 weeks growth (Fig. 2) on kinetin (2·5 ppm) supplemented medium, with (0·05 ppm) or without NAA. Light (2000 lux) had a marked effect on growth and organogenesis. Leaves had dark green colour with distinct pale-green midribs. Root formation (Figs. 3, 4) was a common feature in leaf and stem explants at various auxin concentrations (1·0 to 10·0 ppm). Similar effect of light on growth and root formation in *Catharanthus* has also been reported earlier[6].



FIGS. 1–4. Fig. 1, Callus induction from stem explant (S) and pods (P) of *C. roseus* on MS medium, in 3 weeks. Fig. 2, Shoot formation from stem callus, 8 weeks growth, on MS medium supplemented with kinetin (2·5 ppm) without auxin. Fig. 3, Root formation from stem explants in 5 weeks growth. Fig. 4, Rooting from stem explant without callus development, 3 weeks growth.

It has been concluded that light and cytokinin affect markedly the growth and organogenesis in callus tissues of *Catharanthus roseus*. Similar effect of light and cytokinin was also observed in *Crotalaria*[4] and *Ephedra*[7] tissues in our laboratory. Further work is in progress.

Tissue Culture Laboratory,
Department of Botany,
University of Jodhpur,
Jodhpur 342 001,
September 3, 1977.

K. G. RAMAWAT.
R. RAJ BHANSALI.
H. C. ARYA.

1. Farnsworth, N. R., *Lloydia*, 1961, 24, 105.
2. Krikorian, A. D. and Steward, F. C., Cited in *Plant Physiology*, Ed. F. C. Steward, Academic Press, New York, 1969, 5B, 277.
3. Arya, H. C. and Ramawat, K. G., Cited in *Environmental Physiology and Ecology of Plants*, Prof. U. N. Chatterjee Commemoration Volume, Ed. D. N. Sen, Dehra Dun, 1978 (in press).
4. Ramawat, K. G., Bhansali, R. R. and Arya, H. C., *Phytomorph.*, 1977, 27 (in press).
5. Murashige, T. and Skoog, F., *Physical Plant.*, 1962, 15, 474.
6. Dhruva, B., Ramakrishnan, T. and Vaidyanathan, C. S., *Curr. Sci.*, 1977, 46, 364.
7. Ramawat, K. G. and Arya, H. C., *Phytomorph.*, 1976, 26, 395.

PRESENCE OF STAMINODIA AND NECTARIFEROUS DISC IN *SMITHIA CILLIATA* ROYLE

Smithia cilliata Royla (Fabaceae) is distributed spe_ially in the temperate forest of Eastern Asia, China, Japan and Malaya. Specimens collected from Hazaribag, NEFA, Assam, Sikkim, Shillong and Darjeeling (India) were verified with the authentic specimens in the Central National Herbarium Section, Shibpore (Howrah). They showed almost complete sterility in alternate stamens to produce staminodia (Fig. 1, I). The fertile anther was 270 μ to 330 μ in length and 300 μ to 333 μ in breadth whereas the sterile anther was 180 μ to 195 μ in length and 90 μ to 165 μ in breadth. Besides, this plant shows cup-like nectariferous disc (Fig. 1. H) ; the diameter and the height were 750 μ and 450 μ respectively.

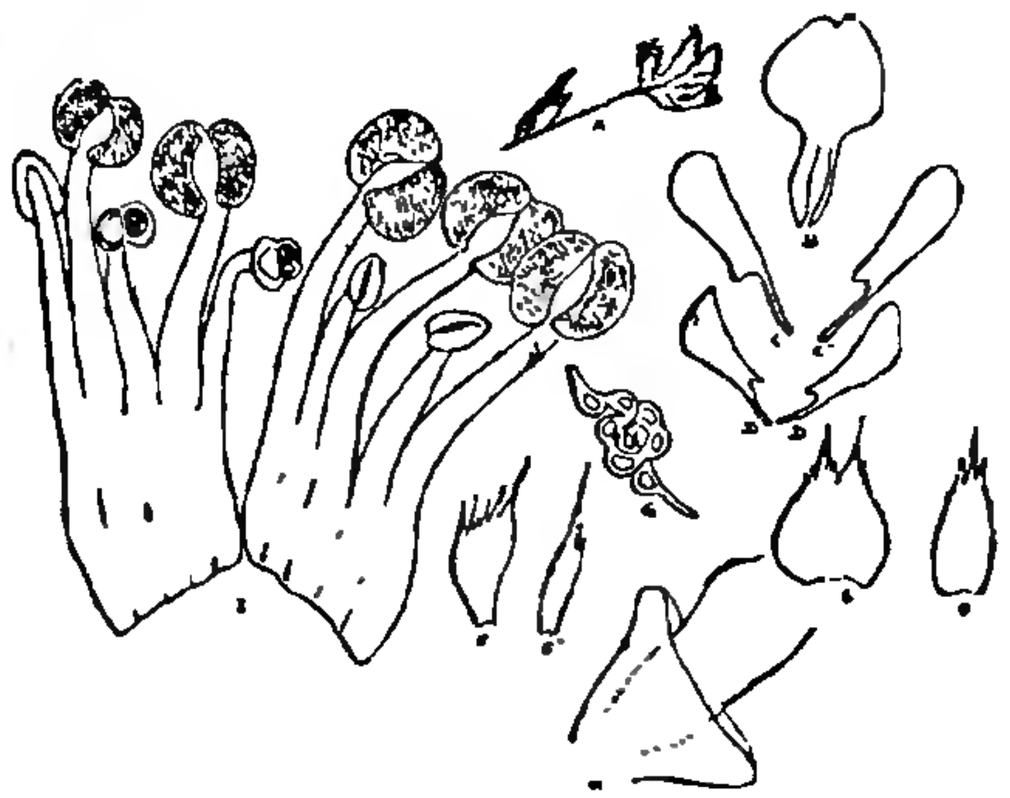


FIG. 1. *Smithia cilliata* Royle, A–I. A, Inflorescence. B, Standard ; C. C', Wing ; D, D', Keel ; E, E', Sepals ; F, F', Bracts ; G, Folded lomentum ; H, Nectariferous disc ; I, Stamens and Staminodia.

Uniformity of anther is a very important character in legume taxonomy. Presence of staminodia has not been mentioned in any of the taxonomic literature available so far. This character should therefore be taken into consideration at the time of taxonomic treatment of the genus *Smithia* Ait.