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BREAKDOWN OF SELF-INCOMPATIBILITY IN *DENDROBUIM PIERARDII* ROXB. (ORCHIDACEAE) FOLLOWING ULTRAVIOLET IRRADIATION OF POLLINIA

THIMMAPPAIAH*
Indian Institute of Horticultural Research,
Bangalore 560 080, India
Present Address: Central Mango Research Station,
B-53, Sector A, Mahanagar, Lucknow 226 001, India

THE occurrence of self-incompatibility in orchids was noted as early as 1865 by Scott. Eleven species were listed as self-incompatible but only the genus *Oncidium* has been well studied[1]. Though in *Dendrobium*, difficulties have been reported with self and cross fertilizations[2], only recently in *Dendrobium aggregatum* Var. *Majus* self-incompatibility was found to be the cause[3]. Another species of this genus *viz. Dendrobium pierardii*, a native of India, and found growing in regions of China, Burma, Thailand and Malayan peninsula was also observed to be self-incompatible. The present paper reports how in this species, self-incompatibility was overcome with ultraviolet irradiation.

The plants of *D. pierardii* grown in pots of osmunda fibre were used for the study. The pollinia collected from bagged but fully open flowers were spread in single layer and irradiated with a 90 cm, 40 watt, Phillips germicidal UV tube (254 nm) for 45 and 90 minutes. The pollen material was kept at a distance of 30 cm from the tube. The irradiated pollinia was immediately used for self-pollinating the emasculated flowers.

The untreated and treated pollinia were germinated in a standardized 1% sucrose solution by wet-blot method and their germination percentage and tube length were statistically compared.

D. pierardii flowers regularly under Bangalore climatic conditions, but pods fail to set whenever selfing was undertaken. The flowers remain on the plant for 7 to 10 days; later they wither and drop. Further stainability of the pollen material revealed 100% pollen fertility. Hence the species was presumed to be male fertile but self-incompatible. When pollinia were subjected to UV rays and used in pollination the pod set increased enormously (table 1). In the 45 min UV exposure the pod set ranged from 25 to 75% and in the 90 min UV exposure the pod set was up to 50%. Unlike in the control, the flowers pollinated with UV treated pollen, transformed into pods by clear swelling and enlargement of ovary. The pods so set, did not abscise even after three months of pollination. The mature pods on splitting were found to have enormous quantity of viable seeds, thereby indicating good seed set as well.

TABLE 1
Podset by various treatments

Pollination with	No. of flowers pollinated	No. of pods set
1. Normal pollen	25	0
2. Pollen irradiated in UV for 45 min	20	14
3. Pollen irradiated in UV for 90 min	20	10

Though in the past, other radiations were used to overcome the self-incompatibility barrier, the use of ultraviolet radiation for such a purpose was rare. The ultraviolet radiation was earlier used to overcome the self-incompatibility barrier in *Oenothera orgensis*[4]. Here only the stylar portion was irradiated and then pollinated with normal pollen so as to inactivate the stylar part of incompatibility reaction. Similarly in the present study, the UV rays appear to have inactivated the pollen part of incompatibility reaction, to

overcome the selfing barrier. Hence, the pollen could pass through style without any inhibition to effect fertilization. It was observed that in both control and UV treated, the pollen germination was low and there was no significant difference in pollen tube elongation (t = 1·0913 NS). This shows that the treatments did not affect pollen tube elongation.

In orchids, the phenomenon of self-incompatibility is widely operating. Crossing difficulties reported in the genus *Dendrobium* especially in intra-sectional crosses, like *Callista* × *Callista* and *Eugenanthe* × *Eugenanthe*[2], might be due to the phenomenon of incompatibility which is yet to be investigated. The recent study on *Dendrobium aggregatium* Var. *Majus*[3], and the present study support this theory. The selfing barrier observed in *D. aggregatum* was successfully overcome by gamma irradiation of pollinia. In such cases, ultraviolet irradiation is useful in understanding genome relationship of a genera.

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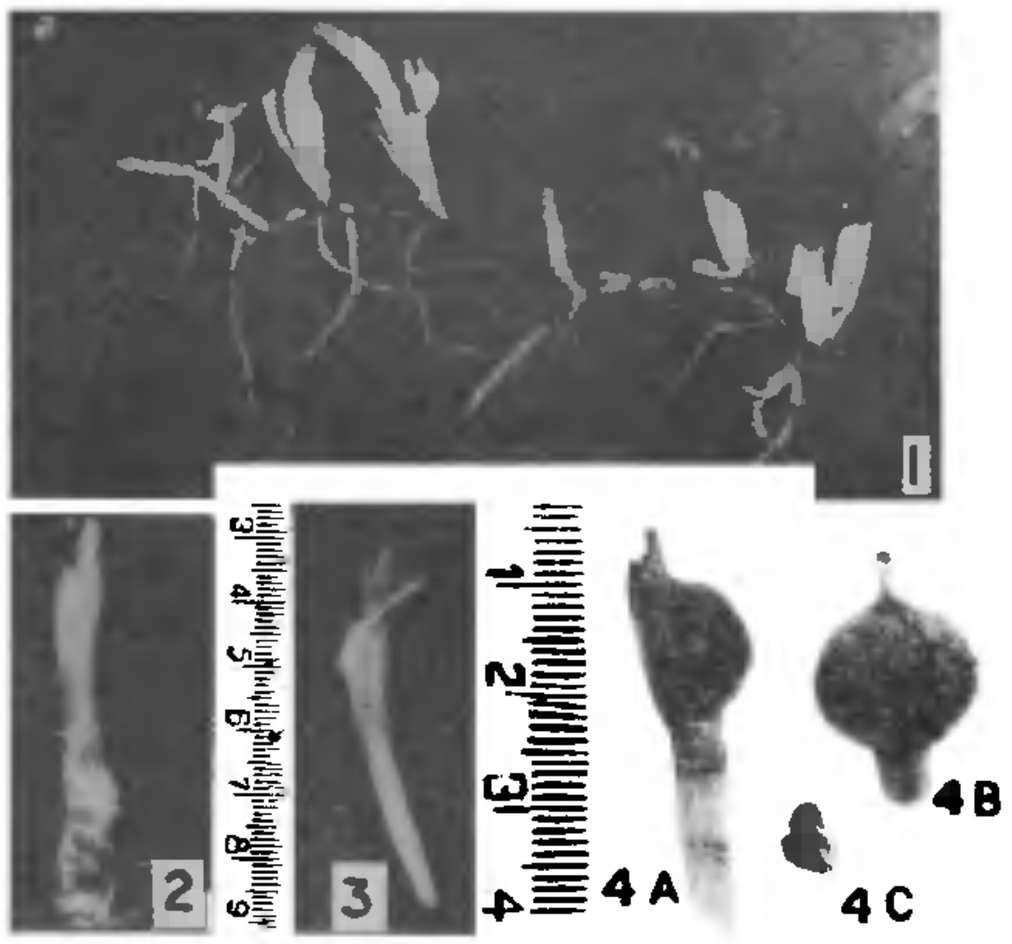
A NEW RECORD OF *THALASSIA HEMPRICHII* (EHRENB.) ASCHERS. FROM THE MAIN COAST OF INDIA

K. K. LAKSHMANAN AND M. RAJESHWARI
Department of Botany, Bharathiar University, Coimbatore 641041, India

THE first record of occurrence of *Thalassia hemprichii* (Ehrenb.) Aschers; belonging to the sub-family Thalassioideae of Family Hydrocharitaceae from Krusadai and Rameswaram islands near the main coast of India is presented here.

Thalassia hemprichii (Ehrenb.) Aschers. in Petermann's Geogr. Mitth. 17 (1871) 242.

Perennial aquatic herb; rhizome creeping; monopodial, 4–5 mm thick. Internodes 5–10 cm long, covered by triangular membranous scales. Root one at each node, unbranched (figure 1). Leaves ribbon-shaped; 4–8, distichously arranged on short lateral branches, 10-20 cm long; 10–12 nerves, margin entire, obtuse tip. Leaf sheath 6–9 cm long. Inflorescence pedunculate; uniflorous. Female flowers sub-sessile. Perianth segments 3, (figures 2, 3) elliptic. Ovary muricate, trilocular. Style 6. Fruit green in colour, globose, echinate, beaked, pericarp fleshy, covered by numerous stiff outgrowths (figures 4a, 4b). Seeds 10–12. Embryo at the shoot pole with conical, green cotyledon and lateral epicotyl (figure 4c). Hypocotyl disc-like with a primary rudimentary root at the distal end.



Figures 1–4C. *Thalassia hemprichii*: **1.** Habit. **2** and **3.** Young and mature female flowers. **4a, 4b.** Young and mature, warty fruits. **4c.** Mature embryo.

Distribution: Sudan, Eritrea, French Somaliland, Kenya, Tanzania, Mozambique, Seychelles, Aldabra Group, Madagascar, Saudi Arabia, Yemen, Thailand, Vietnam, Ryukku islands, Phillippines, Malayan Peninsula, North Borneo, Indonesia, Australian New Guinea, Carolines, Marshall islands, Bismark Archipelago, New Caledonia, Queensland[2].

Andamans (India): South Andamans, Reefland Island, December 1890. D. Prain (BM) Rangachang reefs April 1891, D. Prain (CAL) Great Cocos Island, 1890, D. Prain (CAL, K); idem 4-12-1895, D. Prain (BM)[2].

Krusadai island : Vegetative, fruit (MH; K; Department of Botany, P. G. Centre, Coimbatore) September 1979; Vegetative, female flower (K) September 1979; Vegetative, fruit (Department of Botany, P. G. Centre, Coimbatore) February 1981.

Rameswaram island: Vegetative (MH) September 1979; Vegetative, fruit (Department of Botany, P. G. Centre, Coimbatore) February 1981.

N.B. K– Kew Herbarium; MH– Madras Herbarium, India.

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