

Study of pollinium of three beautiful Indian Orchids under electron microscopy

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Palynological observations of three corticolous Orchids. namely, Dendrobium transparens Wall es Lindl. Vanda tessellata (Roxb) Hook. f. ex G. Don and Cottonia peduncularis (Lindl.) Reich. f. were made under SEM with reference to the pollinia. Observations indicate that these pollinia vary in their shape, size, diameter and cellular structure. Connecting threads of elasto-visin were observed in Cottonia peduncularis (Lindl.) Reich. f.

Key words : Muri; Elastovisin thread; SEM

INTRODUCTION

Orchidaceae is one of the most highly evolved as well as most successful families of the monocots.

This large family covers 7-9 % population of flowering plants and 40% of the monocot. (Abraham, 1981). The was conducted under ESEM at RSIC of IIT Mumbai. The various morpho-taxonomical, environmental, model used was QUANTA 2000 FFI.

anatomical, physiological as well as genetical

peculiarities displayed by this group have attracted the attention of the orchidologists all over the world.

This strange fascinating group is also having interesting palynological peculiarities.

Much of the work on pollinia of orchids

under SEM has been done in western countries.

(Chardard 1958, 1969, 1971, Heslop-Harrison

1966, 1968 and Cocucci and Jenson 1969 in

Yeung 1987 and Williams and Broome 1976) but very

little work has been done in India (Arora 1985, Kapil andin

Arora 1990, Gupta 2003). Therefore, studies

were conducted on pollinia of three taxa or orchids, viz..

Dendrobium transparens Wall ex. Lindl. Vanda

tessellata (Roxb) f. ex G. Don and Cottonia

peduncularis (Lindl.) Reich. f. It is hoped that the

information gathered will be useful as a parameter in

taxonomical and phylogenetical studies.

MATERIAL AND METHODS :

The material was collected from various

localities in India. Dendrobium transparens Wall ex.

Lindl. was collected from Sikkim, Vanda tessallata

(Roxb.) Hook. f. ex. G. Don from Castle rock (at altitude

of 900 m) near Goa, and Cottania peduncularis (Lind.)

Reich. f. from Yawoor of Thane (at altitude 333.3 m) in

Maharashtra. SEM study of pollinia of the three orchids

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The corticolous ash-coloured Orchid possesses a

slender, pendant stem. Leaves 7.5 cm in length, 2.5cm

in width, lanceolate in shape Two - to three attractive,

pinkish white flowers on leafless node. Lip narrow at the

base. elliptic, pale pink with two purple blotches with

tattered rim. Pedicel 3.5 cm. Sepals 3.5 cm in length,

0.06 cm in breadth. Petals 3.5 cm in length and 1.5 cm

in breadth. The said orchid is confined to western and

estern Himalaya and Meghalaya.

Palynological Observations

Under L M. Pollinium semilunar in shape.

Under SEM Pollinium 1.5 mm in length, 6mm in breadth

(x 100). Surface cells smooth, varied in shape.

(Irregularly rectangular to polygonal in shape) (x 1000).

Cells 10-25 mm in length, 10-20 mm in breadth and

overlap each other (x 3000).

2. *Vanda tessellata* (Roxb.) Hook. f. ex G. Don.

DISCUSSION

Stem woody, 30-40 cm tall, 1 cm across. Strap-like above-described corticolous taxa of Orchids relate to shaped leaves, stiff, leathery, 15-20 cm in length, 1.5 cm shape, size, aperture, cellular structure on the pollinia wide, the apex irregularly praemorse with usually two and the connecting threads present therein. unequal rounded lobes and an acute one in between.

Three or four fragrant flowers arranged in racemose form. Flowers fleshy, long lasting. Flowers 5 cm across and size of pollinia.

There is a great range of variation in the shape of pollinia. Pollinium in *Dendrobium transperans* Wall. ex. Lindl. is semilunar, 1.5 mm in length and 0.6 mm in breadth. In *Vanda tessellata* with violet inside. Midlobe lilac, blue. Anther 4 x 2 mm (Roxb.) Hook f. ex. G. Don. pollinium is circular in oblong-obovate, truncate base, apex mucronate, white, shape., 1.1 mm in diameter, but pollinia in *Cottania penduncularis* (Lindl.) Reich f. are quite different. They are confined to Madhya Pradesh, Gujarat, Konkan and subcontinent, retuse at apex, 900 mm in length and North Canara. 600 mm in breadth. This indicates that pollinium in

Dendrobium transperans Wall. ex. Lindl., is much larger UNDER LM Pollinia two in number, circular in size (1.5 mm) than in *Cottania penduncularis* (Lindl.) Reich. f., (900 mm), whereas pollinium in *Vanda tessellata* (Roxb.) Hook. f. ex G. Don is 1.1 mm in size, shape.

UNDER SEM Pollinia circular, 1:1 mm in diameter, hairy with a large slit-like structure, followed by a vertical cleft (x 150). Surface cell varies in shape (irregularly rectangular to polygonal) Muri 8 mm in thickness, with a depression in the centre and overlapped taxa are irregularly rectangular to polygonal in shape. In *Cottania penduncularis* (Lindl.) Reich. f., cells are large (50 mm long and 25 mm broad). In *Dendrobium transperans* Wall. ex. (Lindl, cells are small in size (10-25 mm in length and 10-20 mm in breadth.) Cells in

Hence, pollinia in *Vanda tessellata* (Roxb.) Hook. f. ex G. Don are intermediate among these three taxa. The surface cells of pollinia among these three taxa are irregularly rectangular to polygonal in shape. In *Cottania penduncularis* (Lindl.) Reich. f., cells are large (50 mm long and 25 mm broad). In *Dendrobium transperans* Wall. ex. (Lindl, cells are small in size (10-25 mm in length and 10-20 mm in breadth.) Cells in

3. *Cottania penduncularis* (Lindl.) Reich. f.

Stem of this corticolous orchid is woody, 20-30 cm long, scrambling. Leaves linear, 15 cm in length, 2.5 cm in breadth, coriaceous, keeled on the underside and abruptly ending in 2 unequal round lobes with a broad acute sinus in between. Flowers on branched panicles with very long peduncles, 30 cm long. Flowers 1.5 cm across. Pedicel with ovary 1.5 cm long. Sepals and petals greenish yellow, faintly striped with pink or purple, strong inflexed, Midlobe of lip fiddle-shaped, deep purple almost black, with yellow hairy sides. Anther 2 celled subcontinent, broadly retuse at apex. The underside reddish brown with a central blue-black streak on the upper half and yellow on the lower half, pollinia 2, yellow waxy, ovoid, Caudicle 1 mm long with a small, somewhat square gland. This Orchid is confined to low elevations in the Western Ghats South India and Sri Lanka.

Depressions in the cells are distinct and large in *Cottania penduncularis* (Lindl.) Reich. f., indistinct in *Dendrobium transperans* Wall. ex. Lindl, and slightly distinct in *Vanda tessellata* (Roxb.) Hook. f. ex. G. Don. A very distinct large slitlike aperture is seen in *Vanda tessellata* (Roxb.) Hook. f. ex. G. Don. But no such aperture is seen in pollinia of the remaining two taxa. Only the corticolous taxon, namely, *Cottania penduncularis* (Lindl.) Reich. f. indicates the presence of viscous connecting threads on the surface. They are formed by elastoviscin (Gupta 2001)

UNDER LM Pollinia 2, yellow, waxy, ovoid.

UNDER SEM Pollinium 900 mm in length, 600 mm in breadth, (x 300). Surface cells varied in shape (rectangular to polygonal in shape) and overlap

Prominent depressions at the centre (x 1200), Cells 50 mm in length, 25 mm in breadth, Muri 7.5 mm with depression at the centre (x 1600). Connecting glandular threads of elastoviscin (Gupta 2001) on the surface of pollinium. The author's thanks are due to Prof. S. P. Vij, Botany Department, Panjab University, Chandigarh, for encouragement., to Dr. P. K. K. Nair, Director, Environmental resources Research Centre, Thiruvananthapuram, for help in identifying the pollinium.

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