

## VARIABILITY IDENTIFICATION OF PAPHIOPEDILUM, ANTHOGONIUM AND SOME VANDACEOUS SPECIES (ORCHIDACEAE) GENOTYPES - THEIR MAINTENANCE AND PROPAGATION TECHNOLOGY

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### ABSTRACT

The paper deals with the variability in the Indian species of the orchid genera *Paphiopedilum*, *Anthogonium*, *Aerides*, *Phalaenopsis* and *Vanda* along with their cultivation and propagation techniques.

### INTRODUCTION

Orchidaceae is one of the largest monocotyledonous families in the plant kingdom with about 30,000 species belonging to about 800 genera. There are about 1300 species of orchids in about 185 genera reported so far from India of which about 870 species in about 150 genera are found in N.E. India including Sikkim.

Orchids have a great importance in the field of floriculture because of their multi-coloured curious shaped flowers with long lasting quality. Some of the species exhibit lot of variation in the wild populations which are very much useful for the breeding programmes to develop hybrids of commercial value in the International market. In the present paper, different variants of Indian species of *Paphiopedilum*, *Anthogonium*, *Aerides*, *Phalaenopsis* and *Vanda* have been briefly described.

### PAPHIOPEDILUM Pfitz.

*Paphiopedilum* species are popularly known as 'Lady's Slippers' due to the shoe-shaped labellum of their flowers. *Paphiopedilums* are highly sought after and quite expensive plants. Their flowers are large, multi coloured and lasting up to 60-90 days on the plant. There are about 60 species of *Paphiopedilum* in the world of which 8 are found in India and 7 in N.E. India. Variants have been reported in six N.E. Indian species which are as follows.

#### 1. *Paphiopedilum fairieanum* (Lindl.) Stein

This is a terrestrial species, grows at an altitude ranging 1200-2000 m, flowers during September to December. Found in Arunachal Pradesh and Sikkim in India and further distributed to Bhutan.

Seven variants have been recorded among natural populations of *P. fairieanum* (Table. 1).

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Table.1 : Variants of *Paphiopedilum fairieanum*

Sl. No.	Name of variant	Identification characters
1	giganteum	Dorsal sepal large, orbicular with undulate base, densely reticulated with purple and green.
2	nigrescens	Dorsal sepal small, elliptic, pure dark wine-red with white margins.
3	pradhanianum	Dorsal sepal white with 9 distinct vertical crimson veins without any reticulation; lateral margins rolled back.
4	alba	Perianth creamy white with green reticulation.
5	red ned	Dorsal sepal ovate, blotched with crimson.
6	red	Dorsal sepal undulate at subterminal margins, blotched red.
7	flavum	Sepals and petals white with yellow veins. Lip yellow.

Table.2 : Variants of *Paphiopedilum hirsutissimum*

Sl. No.	Name of variant	Identification characters
1	album	Perianth green. Petals creamy white at tips.
2	esquirolirene	Dorsal sepal, yellowish green overlaid with dark brown in the centre.
3	chiwuanum	Flowers small with petals only up to 2.6 cm long

Table.3 : Variants in the populations of *Paphiopedilum insigne*

S. No.	Name of variant	Identification characters
1	maulei	Dorsal sepal large, evenly spotted with brown in rows. Lip long, narrow and paler.
2	chantinii	Synsepalum long, acute, green with purple spots, white along the margins. Perianth less undulate.
3	sanderiae	Flowers yellow with green veins and few purple specks on dorsal sepal.
4	sanderianum	Flowers bright creamy yellow and white, lack of purple spots.
5	bonhoffianum	Dorsal sepal shaded with purplish brown, without any spots.

## 2. *Paphiopedilum hirsutissimum* (Hook.) Stn.

Found as terrestrial as well as epiphytic. Grows at an altitude of 700-2000 m. Flowers during February to March. Distributed in Meghalaya, Mizoram, Manipur and Nagaland in India and further distributed in S.W. China, Burma and Thailand.

So far three variants have been reported in the wild populations of *P. hirsutissimum* which are listed in Table.2 with identification characters.

In addition to above, some plants with

2-labellum flowers are also been observed among wild populations from Meghalaya ( Plate 1, Fig. 2).

## 3. *Paphiopedilum insigne* (Lindl.) Pfitzer

Generally terrestrial and sometimes found as lithophytic; grows at an altitude ranging from 1000-1500 m.; flowers during October to December. Distributed in Meghalaya in India and extended to E. Nepal and Bangladesh. Five variants have been recorded so far in the wild populations of *P. insigne* and they are listed in table.3.

## 4. *Paphiopedilum spicerianum* (Masters & T. Moore) Pfitzer

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Table.4 : Variants of *Paphioedilum spicerianum*

S.No.	Name of variant	Identification characters
1	biflorum	Scape with 2 unequal flowers.
2	negrescens	Flowers small. Lip with dark brownish hue.
3	alboviridae	Perianth pale green. Dorsal sepal without or with very faint mid vein.

Table. 5 : Variants of *Paphiopedilum venustum*

S.No.	Name of variant	Identification characters
1	Bhutanensis	Leaves elliptic, deep purple on lower surface.
2	measuresianum	Leaves with green mottling. Flowers pale yellow with green reticulation, lack of maroon spots.
3	Pardinum	Petals rich yellow with copper coloured hue towards apex.
4	Rubra	Petals deep wine-red. Lip wine-red with dark green reticulation.
5	Spectabile	Dorsal sepal rosy red at tip. Lip greenish yellow tinged rose.
6	Teestaensis	Leaves sparsely spotted with purple on lower surface. Petals broad and deflexed at apex, brownish pink.
7	Aureum	Petals white at apex, yellow with green veins in lower half. Lip yellow with green veins and reticulation.

Table. 6 : Variants of *Paphiopedilum villosum*

S.No.	Name of variant	Identification characters
1	boxallii	Dorsal sepal boldly spotted. Petals purple marked.
2	annamense	Leaves narrow and sub-erect, 2.5 cm wide. Flowers smaller.

Table. 7: Interspecific Natural Hybrids of *Paphiopedilum* in N.E. India

S.No.	Natural hybrid	Parentage	Distribution
1	P. X venusto-insigne	p. venustum X P. insigne	Meghalaya
2	P. X spicero-venustum	p.spicerianum X P. Venustum	Assam
3	P. X Pradhanii	P. fairieanum X P. venustum	Arunachal Pradesh

Grows as terrestrial as well as lithophytic at an elevation of 300-1500 m., flowers during October to December. In India it is reported from Mizoram and Manipur. It is also found in China and N.W. Burma. Three variants have been reported in this species which are explained in Table.4.

5. *Paphiopedilum venustum* (Wall.) Pfitz. ex

Stein

Terrestrial, grows at an altitude ranging 500-1500 m., flowers during December-February. Distributed in Arunachal Pradesh, Meghalaya and Sikkim in India. Also found in Nepal, Bhutan and Bangladesh. Seven variants of *P. venustum* are known so far in the wild which are explained in Table. 5 .

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### 6. *Paphiopedilum villosum* (Lindl.) Stein

Generally terrestrial and some times found as epiphytic. Grows at an elevation of 1000-2000 m. flowers during January-March. In India it is found in Assam and Mizoram. Also distributed in Burma, Laos and Thailand. Two variants have been reported in the wild populations of *P. villosum* which are described in Table. 6.

### INTERSPECIFIC NATURAL HYBRIDS OF PAPHIOPEDILUM IN N.E. INDIA:

Besides above variants among individual species populations, three natural hybrids at interspecific level have been reported involving 3 species of *Paphiopedilum* in N.E. India which are tabulated in Table 7.

### CULTIVATION OF PAPHIOPEDILUMS:

Shade and humid conditions are favourable for *Paphiopedilum*s. Under 50-60 % shade, 50-80% relative humidity, temperature of 18-25° C in summer and 10-15° C in winter are ideal for cultivation *Paphs*.

Containers need not be very deep but should have enough holes at bottom and sides to drain out the water.

Potting mixture should have the qualities of providing proper aeration to roots, retaining of moisture and slow decomposing. Mixture of *Osmunda* fibre chopping, *Spagnum* moss and polystyrene in 2:1:1 ratio or Pumice stone, *Spagnum* Moss and dry leaves of silver oak chopping in 2:1:1 ratio or Sand, Charcoal and top soil in 2:2:1 ratio is ideal for cultivation of *Paphiopedilum*s. Epiphytic species may be mounted on rough barked wooden block or tree fern block with sphagnum moss with nylon thread and may be mounted on rough barked wooden block or tree fern block with sphagnum

moss with nylon thread and may be hanged in shady and airy place.

Watering thrice a week in summer and twice a week in winter may be followed depending upon the moisture content of the compost.

Fertilizers like Orchid care (Growth), multiplex (Growth) may be applied along with wetting agent, as foliar spray (1 gm/2 lit) in growth stage of the plants and Orchid Care (Flower) Multiplex (Flower) during flowerings stage of the plants, once in a week soon after watering. Micro-nutrients solution may be sprayed once a month.

Insecticide Sumicidin or fungicide Indofil may be applied as and when the plants are infected with insects or fungus. Biopesticide 'pestoneem' also can be applied.

### PROPAGATION OF PAPHIOPEDILUMS:

*Paphiopedilum* plants can be propagated vegetatively by splitting the well grown up clumps into 2 or 3 divisions. Each new division should have one old shoot of previous year and one newly growing shoot with new roots. This is a slow process and it may generally take 4-5 years to get 2 or 3 new plants from the mother plant.

For propagation on large scale, in vitro culturing of seeds or tissue on a standardized agar culture medium, in laboratory sterile conditions is to be adopted.

### ANTHOGONIUM Lindl.

This is a terrestrial orchid genus with a single species viz. *A. gracile* Lindl. Rose purple flowers are common in this species. However, among the populations, particularly in temperate regions plants with

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white flowers ( albino ) are observed in Arunachal Pradesh ( Plate. 1, figs. 3 ).

### AERIDES Lour.

This is an epiphytic monopodial genus with about 7 species in India and 4 in N.E. India. Out of 4 N.E. India species, one species viz. **Aerides rosea** exhibits one variant in the wild populations which is known as **Aerides rosea var. williamsii**. This variant is different from **A. rosea** in having pure white flowers instead of rose colour. This variety is found in Arunachal Pradesh ( Plate 1, fig. 1 ).

### PHALAEOPSIS Bl.

An epiphytic monopodial genus with 6 species in India and 3 in N.E. India. Out of the three species of N.E. India, one species viz. **P. mannii** Rchb.f. has been reported with one variant in the wild. This variant differs from the type in having flowers with yellow coloured lips instead of white colour ( Plate 1, Fig.4 ). This is found in Sikkim and Arunachal Pradesh.

### VANDA R.Br.

This is an epiphytic monopodial genus with about 9 species distributed in India and about 7 are found in N.E. India. Among the N.E. Indian Vanda species one species viz. **V. cristata** Lindl. is reported with one variant **var. multiflora**. This variant is different from the type in having 3 to 5 smaller flowers per a scape instead of 1 or 2 large flowers. This is reported from Sikkim and Darjeeling.

### CULTIVATION OF VANDACEOUS ORCHIDS:

All the species of above vandaceous genera are epiphytic and require shade and

humidity for their successful cultivation. The temperature can be maintained maximum up to 30° C and minimum 15° C.

They can be tied to the branches of living trees or on wooden blocks supporting with moss around the base of roots. For pot cultivation, the containers should have enough holes for proper drainage of water because the stagnation of water inside the pot would cause root rotting and subsequently orchid death. The potting mixture of Charcoal pieces, Brick pieces and dried leaf or coconut fibre choppings in 2:2:1 ratio is ideal. Watering may be carried out thrice a week in summer and twice a week in winter. For application of fertilizers and pesticides, the same as noted above for Paphiopedilums may be followed.

### PROPAGATION OF VANDACEOUS ORCHIDS:

Generally, it is not possible to propagate monopodial orchids vegetatively as they never produce side stems or branches like sympodial orchids. They have only one stem which continues growth throughout the life of the plant by producing lateral inflorescence and roots at intervals. However, in **Aerides** and **Vanda**, the removal of apical growth tip would lead to emergence of 2 or 3 roots. In the case of Phalaenopsis, Sometimes the old inflorescence produces off shoots at nodes which may be separated from the plant. These orchids can be propagated on large scale through micropropagation of seeds or tissue in laboratory conditions.

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VARIANTS IN SOME ORCHID SPECIES OF N. E. INDIA



White flowered and pink flowered forms of *Aerides rosea*



*Paphiopedilum hirsutissimum*  
(Flower with two labellums)



*Anthogonium gracile*  
(Plants with purple flowers and white flowers)



Flowers with yellow labellum & flowers with white labellum in *Phalaenopsis manni*

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