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Violet Angel: A New *Dendrobium phalaenopsis* Cultivar

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Dendrobium phalaenopsis, a tropical herbaceous perennial, is one of the most important cut flower and pot flower crops in the global floriculture industry. *D. phalaenopsis* is the most popular orchid all over the world because of its rapid growth; floriferous flower sprays; wide range of colors, sizes, and shapes; year-round availability; and long flowering life of several weeks to months (Kuehnle, 2007; Talukder et al., 2002).

D. phalaenopsis is mostly cultivated in the Southeast Asia region, such as Thailand, Singapore, and Malaysia, where temperatures are high year-round for growth (Gong et al., 2007). *D. phalaenopsis* has been commercially cultivated in China and some subtropical regions for potted flowers recently. However, in these regions, the lower temperature in winter will cause cold damage to plants, including leaves that yellow rapidly, leaf and flower senescence, and growth retardation (He et al., 2016). Because of these challenges, it is necessary to select and breed cultivars with high cold tolerance.

Since the beginning of 2010, the Tropical Crops Genetic Resources Institute–Chinese Academy of Tropical Agricultural Sciences (TCGRI-CATAS) has lunched breeding programs to develop new *D. phalaenopsis* cultivars with high cold tolerance to adapt to the climate in China and some subtropical regions. 'Violet Angel' is a promising hybrid with high cold tolerance and great ornamental characteristics.

Origin

The *Dendrobium* 'Violet Angel' originated from hybridization of *Dendrobium* 'Liberty White', the most popular commercial cut and potted cultivar with bluish white flowers, as the female, seed parent and *Dendrobium* 'Salaya Pink', the most popular potted flower with pink flowers, as the male, or pollen parent. The crossings were conducted in Sep 2016 and resulted in three fruits (100% successful). The mature fruits were harvested in Dec 2016 and germinated in the seed culture laboratory. A total of 500 young plantlets were transferred into potted trays in Jun 2017, transplanted into 15-cm pots in Oct 2017, and then flowered in Jul 2018. Three new hybrids '2016-03', '2016-8', and '2016-13', were selected and asexually reproduced using young lateral buds since Nov 2018 at TCGRI-CATAS, Danzhou, China. After 3 years (2019–21) of plant characteristics evaluation, such as growth characteristics, flower characteristics, cold tolerance, and flowering, 2016-13 was selected as a promising cultivar and designated as Violet Angel in 2021 and registered as *Dendrobium* 'CATAS Violet Angel' (Fig. 1) with the International Registration Authority for Orchid Hybrids, London.

Description and Performance

Morphological characteristics were described according to distinctness, uniformity, and stability test guidelines for *Dendrobium* of China (TG/209/1, UPOV), based on observations and measurements conducted on 20 plant samples grown in a 70% shaded greenhouse with 70% to 80% relative humidity in Danzhou, China (109°42′E/19°35′N). The colors of the flowers and leaves were described according to the Royal Horticultural Society Colour Charts (2015). The cold tolerance was tested under 5 °C in an artificial climate chamber (Lu et al., 2021).

Plant morphology. 'Violet Angel' has a medium plant height with 24.30 ± 2.48 cm in pseudobulb height and 1.37 ± 0.19 cm in pseudobulb diameter. The plant has nine leaves on average with 15.63 ± 1.27 cm in length and 4.51 ± 0.68 cm in width. It has two to four flower stalks with 24.0 cm in length per pseudobuld, and the average number of flowers per stalk ranges between 6 and 14 flowers (Fig. 2, Table 1).

Flower. The flower sizes and color of 'Violet Angel' were measured in terms of flower spread (Fig. 3, Table 1). The average horizontal length and vertical length of the flowers was 5.2 cm and 4.5 cm, respectively. The sepal color was the purple group 77C, and the lateral sepal was triangles with 2.6 cm and 1.4 cm on length and width, respectively, the middle sepal was oblong with 2.6 cm and 1.4 cm in length and width, respectively. The petal color was in the purple group N75A with 2.9 cm and 2.6 cm in length and width, respectively. The color of the exterior lip was in the purple group N75C and the interior lip as purple group 76A, and with 2.9 cm and 2.6 cm in length and width, respectively. The shelf life of the flower was ≈5 to 7 weeks, and the half-life of sprays was ≈70.0 ± 4 d.

Cold tolerance. The cold tolerance of 'Violet Angel' was measured at 5 °C in an artificial climate chamber for 8 d. The plants were grown normally with all leaves remaining green (Fig. 4A); the seed parent 'Liberty White' showed severe cold damage (Fig. 4B), and the pollen parent showed slight damage (Fig. 4C).

Availability

'Violet Angel' has been propagated by the tissue culture laboratory of TCGRI-CATAS in Hainan, China. Plants for research purposes may be obtained directly from the author

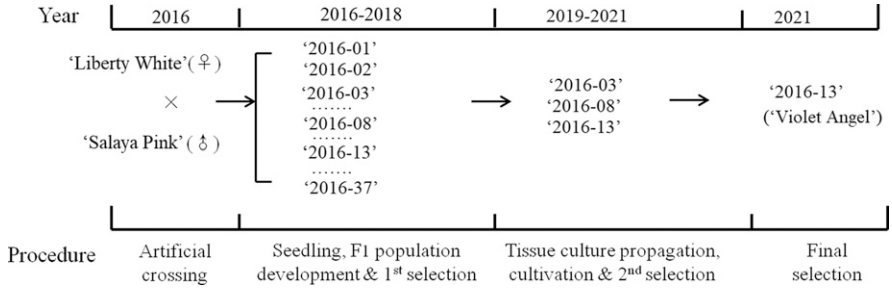

Fig. 1. Pedigree and timeline of breeding procedures used in the development of *Dendrobium* 'Violet Angel'.

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Fig. 2. The plant morphology of *Dendrobium* 'Violet Angel'.

Table 1. Characteristics of Denphal-type *Dendrobium* 'Violet Angel' (based on 20 plants). All of the plants were grown in a 70% shaded greenhouse with 70% to 80% relative humidity in Danzhou, China (109°42′E/19°35′N).

Pseudobulb height (cm)	24.3
Sprays per pseudobulb (number)	3–4
Scape length (cm)	13.23 ± 0.60
Spray length (cm)	10.73 ± 2.98
No. of flowers per spray	5–8
Flower length (cm)	4.50 ± 0.14
Flower wight (cm)	5.20 ± 0.23
Sepal color	77C
Sepal length (cm)	2.61 ± 0.43
Sepal wight (cm)	1.35 ± 0.17
Petal color	N75A
Petal length (cm)	2.93 ± 0.47
Petal wight (cm)	2.61 ± 0.07
Lip color	76A
Lip length (cm)	2.64 ± 0.19
Lip wight (cm)	2.68 ± 0.13
Percent bud drop (%)	0.00
life of flower (days)	40.16 ± 13.17
Half-life of sprays on plant (days)	72.80 ± 4.77

Fig. 3. The flower of *Dendrobium* 'Violet Angel'.

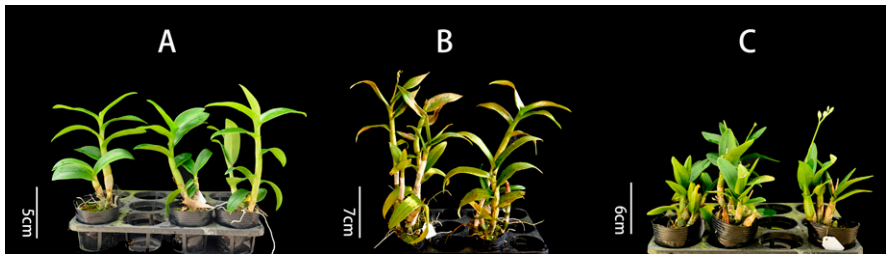

Fig. 4. The phenotype of *Dendrobium* 'Violet Angel' (**A**), 'Liberty White' (**B**), and 'Salaya Pink' (**C**) under 5 °C cold treatment for 8 d.

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