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New Cultivar

A new *Dendrobium* cultivar: *Den.* 'Aurora's Orange Hana'

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Abstract

Dendrobium is a large genus of orchids containing more than 1800 species spliced in some sections and many are very attractive such as the group Nobile from section *Dendrobium.* They are an easy-to-cultivate ornamental group with pseudobulbs cane-like, mostly hard, erect, covered by the bases of the leaves and flowering in almost all internodes. In this work, we tried to develop a cultivar of small size with floriferous plants. The hybrid *Dendrobium* Aurora's Orange Hana was produced and showed compact and floriferous plants with varied colours among the offspring. Three superior clones were selected due to a better display, architecture, three to four flowers per node, and vibrant colours. This new cultivar can be easily grown in pots or on living supports, forming compact and very flowering clumps.

Keywords: breeding, Floriculture, orchid, pot plant.

Resumo

Um novo cultivar de Dendrobium: *Den* 'Aurora's Orange Hana'

Dendrobium é um grande gênero de orquídeas contendo mais de 1800 espécies divididas em algumas seções e muitas são muito atraentes, como o grupo Nobile da seção *Dendrobium.* É um grupo ornamental de fácil cultivo, com pseudobulbos em forma de cana, em sua maioria duros, eretos, recobertos pelas bases das folhas e florescendo em quase todos os entrenós. Neste trabalho, procuramos desenvolver um cultivar de pequeno porte com plantas floríferas. O híbrido *Dendrobium* Aurora's Orange Hana foi produzido e apresentou plantas compactas e floríferas com cores variadas entre os descendentes. Três clones superiores foram selecionados devido a uma melhor exibição, arquitetura, três a quatro flores por nó e cores vibrantes. Esta nova cultivar pode ser facilmente cultivada em vasos ou em suportes vivos, formando touceiras compactas e muito floridas

Palavras-chave: floricultura, melhoramento, orquídeas, plantas de vaso.

Introduction

Dendrobium (*Den.*[2]) is a large genus of orchids containing more than 1800 species spliced in some sections *Aporum, Breviflora, Bolbidium, Caldetia, Calcarifera, Calyptrochilus, Conostalix, Crumenata, Dendrobium, Densiflora, Desmotrichum, Diplocaulobium, Distichophylla, Formosa, Fugacia, Fytchianthe, Grastidium, Herbacea, Holochrysa, Latouria, Phalaenanthe Platycaulon, Pedilonum, Spatulata Strongyle, Stachyobium,* and *Stuposa* (Chiang et al., 2012; Teoh, 2021; Xiang et al., 2013).

Since 1957, Jiro Yamamoto has started improving the quality of *Dendrobium nobile* through hybridisation. He noted that tetraploids were healthy, easy to grow, and resistant to insects and disease, and most of them produced larger flowers. He worked with polyploid parents, and in more than 50 years, he created about four thousand types of *Dendrobium nobile*, the Royal Horticultural Society (RHS) named his hybrids of ' Yamamoto type' (Teoh, 2021). Among the Yamamoto hybrids the *Den.* Oriental Smile 'Fantasy' has orange flowers with a light lilac brush on the tips of the petals and *Den.* Spring Dream 'Apollon' has pure white flowers, a greenish-yellow eye, and a relatively small

(2) *Den.* is the abbreviated form of *Dendrobium* according to Abbreviations of scientific names followed the rules of Royal Horticultural Society for orchid genera and hybrids (RHS, 2017)

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plant size, a great characteristic for commercialisation and hybrids from this famous collection (Yamamoto, 2010).

Breeding new varieties of ornamentals has many variations, but nowadays, such varieties must be well balanced between crop production, environmental sustainability and conservation (Bugallo and Facciuto, 2023; Datta, 2022, Zuo et al., 2023). Although *Dendrobium* breeding it is not new, neither in the world (Yi et al., 2022; Zheng, et al., 2018; Rao et al., 2021) nor in Brazil (Cardoso et al., 2020, Cardoso, 2012; Faria et al., 2011; Faria et al., 2009), but in Brazil is relatively recent. This program aims to obtain new cultivars with agronomic importance, such as resistance to pests and diseases, rapid growth and quality and durability of flowers, economic viability to be competitive with other species of orchids of ornamental importance such as *Phalaenopsis* and *Dendrobium* imported cultivars and hybrids (Cardoso, 2012).

Origin

Dendrobium Aurora's Orange Hana was an offspring of the cross between *Den.* Oriental Smile 'Fantasy' X *Den.* Spring Dream 'Apollon'. The register occurred in the Royal Horticultural Society, under the number 27126, in May 2017. The capsule developed for six months and was collected when it showed the first signs of maturation. It was kept in an envelope of thin paper and allowed to ripe naturally in a chamber over a layer of silica gel (Seaton et al., 2018).

Seeds were disinfested for 10 minutes using a 5 g L^{-1} of sodium dichloroisocyanurate solution added with 100 µL of Tween 80 as a wetting agent and mixed by inverting the tubes by hand during this period (Oliveira et al., 2022). Afterwards, seeds were washed twice in distilled autoclaved water and sown in a ½ strength MS media with 20 g L^{-1} of sucrose and 8 g L^{-1} of agar; the pH of the media was adjusted to 5.6 before sowing The media was autoclaved and distributed in Petri dishes (80 mm of diameter) and Petri dishes were sealed with PVC film and transferred to a growth room at 25 ± 3 ºC on a 16 h light / 8 h dark cycle and light provided at 511 µE m^{-2} s^{-1} (Fileti et al., 2021). After 60 days, seedlings were transferred into flasks and allowed to grow for 90 days when the plants were replanted into another flask, repeating this procedure until the seedlings were ≥ 20 mm high. Seedlings were removed from the flasks, carefully washed off the agar debris, and immersed in a solution containing 2 g L^{-1} of methyl tiophanate for one hour. The solution was drained, and the seedlings allow to dry overnight.

The seedlings were planted in community pots using sphagnum moss as substrates and received weekly fertilisation using a hydrosoluble feed, a 20:20:20 formula at 1 g L^{-1}. If pests or diseases were found, the plants were sprayed with a proper insecticide or fungicide, normally imidacloprid and methyl tiophanate, respectively. After one year, the plants were transferred to individual pots (5 cm) filled with 1/3 of gravel and a pine bark potting mix of fine granulometry (<5mm) and chopped Sphagnum moss (1:1, v v^{-1}). When the plants were 10 cm height, they were transferred to 7.5 cm pots with 1/3 gravel and a medium granulometry (< 12 mm) until flowering, which happened two years after deflasking.

Morphological Description

Two years after deflasking, the offspring exhibited their first bloom and was named *Dendrobium* Aurora's Orange Hana (Figure 1). However, many criteria are relevant for selection, e.g., earliness and colour (Machado-Neto et al., 2022; Colombo et al., 2017; Machado-Neto, 2019). Three plants were selected because of their compactness, with an average of 15cm and denominated #1, #2 and #3. The number of flowers per spike ranges from three to four per node, and they remained in good condition for 21 days.

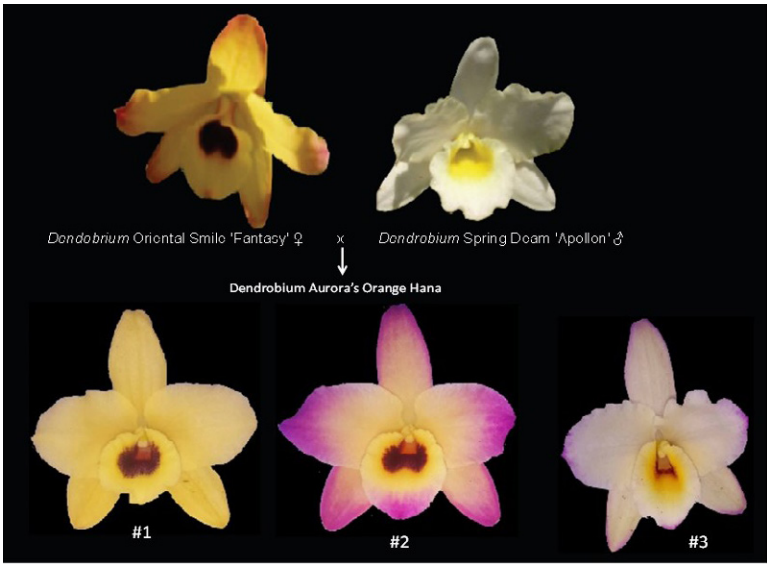

Figure 1. Parents and offspring registered as *Dendrobium* Orange Hana (Register number **27126,** RHS, 2017)

Adaptability (climate, regional and pest tolerances)

Den. Aurora's Hana have been cultivated in the west São Paulo Region, with a hot (26.6 ºC mean temperature, with peaks of 32 ºC) and rainy summer and a dry winter (~21 ºC mean temperature, with very uncommon frosts), and 1314mm of annual rainfall (Figure 2, Climate data, 2023).

Selection of Superior Clones, Conservation and Multiplication

The superior clones *Den.* Aurora's Orange Hana were selected based upon the criteria described above, were separated and included as parents in our breeding program and are described in Table 1.

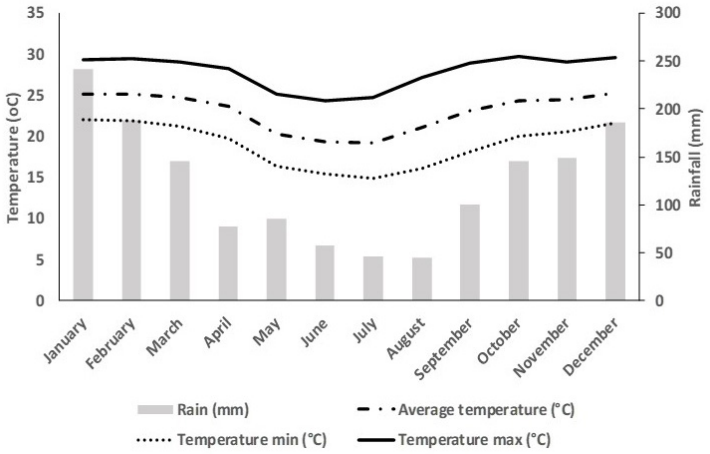

Figure 2. Weather conditions of Taciba, São Paulo State, Brazil.

Table 1. Selected clones of *Dendrobium* Aurora's Orange Hana and their floral characteristics.

Clone	Predominant colour	Natural Diameter	Flower length	Labellum width	Labellum length
Hana #1 – Ceci	Yellow with a purple throat in the labellum	53	44	19.5	17.5
Hana #2 – Lara	Yellow with the tips in light-pink and purple throat in the labellum	64	54	23.5	23.0
Hana #3 - Eva	White with a hint of pink in the tips and the labellum with a yellow throat	69	63	25.5	25.2

Material Characteristics

Den. Aurora's Orange Hana is a small-sized plant (maximum 25 cm high). The flowers are up to four in each bunch. The flowers are small-medium sized, from white with hints of pink to yellow and a dark mid-purple blotch in the labellum.

Growing Conditions

The plants are currently maintained in black plastic pots filled with broken macadamia nut shells in a shade house (50% of shadow), fertigated once a week with a 15-05-15 NPK (0.24 g m^{-2}) plus secondary macro and micronutrients (PETERS Excell Mag®). The commonly used phytosanitary practices for orchid cultivation were applied.

Performance (productivity data and comparison with commercial cultivars)

The plants are shorter in size but keep the floriferousness compared with both parents. *Den.* Aurora's Orange Hana grows well either as pot plants or in living supports, developing nice clumps full of flowers in the winter/springtime.

Availability

The plants are maintained in the private Orquidário Aurora, located close to the state highway SP483, in Taciba, São Paulo State, Brazil.

Originality

This article is original, prepared and submitted just to this Journal.

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Conflict of interest

The authors declare no conflict of interest. The founding sponsors had no role in the study's design, the collection analysis or interpretation of data, the writing of the manuscript, or the decision to publish the results.

Author Contribution

NBMN, CCC: conceptualisation. **JYM**: data acquisition. **JYM, NBMN, CCC**: design of methodology and data analysis. **NBMN, CCC, JYM**: prepared the draft of the manuscript, revised the manuscript and approved the final version.

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