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Evaluation of *Dendrobium* Hybrids for Growth and Yield under Lower Hills of Nagaland

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ABSTRACT

An experiment was conducted to evaluate the tropical *Dendrobium* hybrids under lower hills of Nagaland for their performance at ICAR Research Complex for NEH Region, Nagaland Centre, Nagaland. Seven *Dendrobium* hybrids namely Snow White, Genting Blue, Genting Red, Woon Leng, Massaco, Pink Ruby and Juwita were evaluated for vegetative and flower characters. The results of the experiment revealed that Snow White recorded maximum pseudobulb height (53.7 cm), internode length (6.3 cm), leaf length (17.8 cm), leaf breadth (4.1), and number of florets per spike (8.4), whereas Juwita recorded maximum number of pseudobulbs per plant and Pink Ruby recorded the maximum spike length (39.7 cm). It is concluded that Snow white and Juwita were performed better under Nagaland Condition.

1. Introduction

Orchidaceae is one of the largest family representing 800 genera with 30000 – 35000 species, of which, Cymbidium, Dendrobium, Phalaenopsis, Oncidium, Vanda, Mokara, Arachnis and Cattleya are economically important (Hew, 1994 and Laws, 1995). Out of commercially important orchid genera, Dendrobium, an epiphytic orchid is the dominant genera and widely used in the commercial cut flower production. Good quality flowers and year round production is possible when grown under protected structures as there will be better control over the environmental factors. Northeast India is rich in genetic diversity and one of the eight mega biodiversity in the world which host for nearly 70 per cent of the orchid taxa in India (Kataki *et al*., 1984).

Nagaland is rich in orchid biodiversity which host 241 orchid species from 67 genera (Medhi and Chakrabarti, 2009). The climatic conditions prevailing in the state favours the natural habitat for a large number of orchid species and its growth. The maximum orchid diversity is found in Kohima, Mokokchung, Wokha and Tuensang where Mt. Japfu has the highest diversity. *Dendrobium, Bulbophyllum, Calanthe, Coelogyne, Liparis, Eria, Cymbidium, Oberonia, Pholidota, Goodyera, Habenaria*, and *Peristylus* are commonly found in Nagaland. The rare orchid species like *Arundina gramnifolia, Renanthera imschootiana, Rhynchostylis retusa, Vanda coerulex*, *etc.* are also found in hilly tracts of Nagaland.Floriculture has immense potential in Nagaland and demand for the cut flowers are rising. Orchids have good decorative value among the people and it has good market potential. However, the commercial cultivation of orchids is still in infant stage and only few commercial units are producing

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Dendrobium and *Phaleonopsis*. The demand for orchids is expanding in Nagaland, particularly Dimapur and Kohima districts. Keeping in view, an experiment was initiated to indentify the suitable *Dendrobium* hybrids for commercial cultivation in Nagaland.

2. Materials and Methods

The present experiment was carried out during 2011 – 12 at ICAR Research Complex for NEH Region, Jharnapani, Nagaland. The experimental site was located at 230 m above mean sea level and the dendrobium hybrids were kept under 50% shade net house. Seven Dendrobium hybrids, viz., Snow white, Juwita, Genting Blue, Genting Red, Woon Leng, Pink Ruby and Massaco were evaluated for their growth and yield (Figurea). The present experiment was laid out in completely randomized block design with three replications. The data on pseudobulb height, pseudobulb girth, number of pseudobulb per plant, number of leaves per pseudobulb, internode length, leaf length, leaf breadth, number of spike per plant, number of florets per spike, and spike length were collected. The data were subjected to statistical analysis as per the procedure suggested by Panse and Sukhatme (1985).

3. Results and Discussion

The data on vegetative characters were presented in the table 1 revealed that significant variation was observed for vegetative characters. Snow White recorded maximum pseudobulb height of 53.7 cm, followed by Genting Red (49.3 cm) and the minimum pseudobulb height of 32.1 cm was recorded by Massaco, followed by Pink Ruby (39.8 cm). The maximum pseudobulb girth of 1.0 cm was recorded by Snow White and minimum pseudobulb girth of 0.8 cm was recorded by Genting Blue, Genting Red, Pink Ruby and Massaco. The variation in pseudobulb height and girth may be due to genetic character of hybrids and environmental conditions. The present findings are in accordance with the findings of Roychowdhury*et al*. (2004) and Thomas and Lekha Rani (2008) who reported variation in *Dendrobium* orchids for pseudobulb height from variety to variety. Maximum no. of pseudobulbs was recorded by Juwita (6.0) which was closely followed by Snow White (5.7) and minimum was recorded by Genting Red (3.0). Leaves are important for photosynthesis and they greatly influence the growth and yield of the plants. The no. of leaves per pseudobulb ranged from 4.8 to 6.5 and it did not vary significantly among the *Dendrobium* hybrids. Hybrid Snow White recorded the maximum leaf length (17.8 cm), followed by Genting Blue (17.2 cm). Hybrid Pink Ruby recorded minimum leaf length (14.0 cm), followed by Massaco (14.1 cm). Maximum internode length was registered by Snow White (5.1 cm) and minimum was registered by Massaco (3.3). This may be due to genetic nature of the hybrids, growing and environmental conditions. The findings of the present study are in accordance with Barman *et al*. (2007) in *Cymbidium* hybrids and Roychowdhury *et al*. (2004) in *Dendrobium* hybrids who reported variation in leaf length and breadth of *Cymbidium* hybrids and *Dendrobium* hybrids respectively.

The data on flower characters were presented in the table 1 revealed that significant variation was observed for the flower characters such as no. of florets per spike and spike length.

Table 1. Evaluation of Dendrobium orchids for vegetative and flower characters

Variety	Height of psuedobulbs (cm)	Girth of psuedobulbs (cm)	No. of psuedobulbs /plant	No. of leaves /psuedobulbs	Length of internode (cm)	Leaf length (cm)	Leaf breadth (cm)	No. of florets/ spike	No .of spike /plant	Spike length (cm)
Snow white	53.7	1.0	5.7	6.3	5.1	17.8	4.1	8.4	2.0	38.4
Juwita	44.6	0.9	6.0	6.5	4.9	15.4	3.7	7.5	1.7	31.0
Genting Blue	45.3	0.8	5.3	5.6	4.7	17.2	3.9	6.5	1.3	29.5
Genting Red	49.3	0.8	3.0	6.1	4.4	14.8	2.8	6.0	1.3	31.1
Woon Leng	46.9	0.9	4.0	5.6	4.7	16.3	4.4	4.2	1.7	28.5
Pink Ruby	39.8	0.8	4.0	4.8	3.9	14.0	2.8	5.1	1.7	39.7
Massaco	32.1	0.8	3.7	5.4	3.3	14.1	2.4	4.1	1.3	30.9
CD(5%)	7.936	0.126	1.480	NS	0.879	1.552	0.952	0.774	NS	32.747

However, the no. of spike per plant did not vary significantly among the hybrids. Number of florets per spike, no. of spike per plant and spike length is important which decides the quality and significance of the variety that affects the commercial value in the market. Snow White recorded the maximum of florets per spike (8.4) followed by Juwita (7.5 florets per spike). Minimum florets per spike was recorded by Massaco (4.1) followed by Woon Leng (4.2 florets per spike). This may due the genetic nature and growing conditions of the plant. The findings of this study are in accordance with the findings of Barman *et al*. (2007) in *Cymbidium* orchids and Roychowdhury *et al*. (2004) in *Dendrobium* orchids. The no. of spike per plant did not vary significantly and it ranged from 1.3 to 2.0. But, many researchers found significant variation in spike numbers per plant which may due to better environmental and growing conditions. Spike length is one of the prime most important characters which ultimately decide the cut flower value of orchids. In the present investigation, maximum spike length was found in Pink Ruby (39.7 cm) which was closely followed by Snow White (38.4 cm). Minimum spike length was found in Woon Leng (28.5 cm) followed by Massaco (30.9 cm). Variation in spike length with different varieties of orchids was also reported by Thomas and Lekha Rani (2008).

Conclusion

From the present study, it is concluded that the Dendrobium orchids Snow White and Juwita were found to grow better under lower hills of Nagaland based on the vegetative and flower characters.


Field View


Genting Blue


Genting Red


Juwita


Massaco


Pink Ruby


Snow White


Woon Leng

Figure a. Dendrobium orchids

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