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EVALUATION OF *DENDROBIUM* HYBRIDS FOR GROWTH AND YIELD IN THE EASTERN GHATS REGION OF ANDHRA PRADESH

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Abstract

The agroecological conditions of the Eastern Ghats region of Andhra Pradesh with modest temperatures, high rainfall, and relative humidity provide immense opportunities for orchid farming. By considering the favourable climatic conditions available in the Eastern Ghats region of Andhra Pradesh, an experiment on the evaluation of different *Dendrobium* orchid hybrid varieties *i.e.* Sonia-17, New Pink, Queen Pink, Apricot, Venus, and Anna was conducted so as to recommend suitable orchid varieties in the Eastern Ghats region of Andhra Pradesh. The experiment was conducted at Dr YSRHU-Horticultural Research Station, Chintapalle during 2017-2020 with six hybrid varieties of *Dendrobium* in Complete Randomized Design with three replications. Amongst the six commercial *Dendrobium* orchid hybrids evaluated, the maximum plant height was recorded by the variety New Pink (60.23 cm) followed by Queen Pink (55.80 cm) whereas, the minimum plant height was noticed in Apricot (36.38 cm). The highest number of florets per spike was recorded in the variety New Pink (13.75) followed by Queen Pink (11.60). Spike length was the highest in variety New Pink (51.81 cm) followed by Queen Pink (48.07 cm). The highest number of spikes per plant per year was recorded by New Pink (5.90) followed by the varieties Sonia-17 (5.10) and Queen Pink (5). Based on the observations, three hybrids *i.e.* New Pink, Queen Pink, and Sonia have been found suitable for cultivation in the Eastern Ghats Region of Andhra Pradesh.

Introduction

ORCHIDS ARE one of the most distinctive plants of nature and are highly priced in the international flower trade due to their incredible range of diversity in size, colour, shape, forms, appearance, pollination mechanisms, and long lasting qualities of flowers even after harvesting (De and Pathak, 2020; Prakash and Pathak, 2020a,b, 2022). Orchids belong to the family Orchidaceae and it is one of the largest families of flowering plants representing 705 genera (POWO, 2023) with 29,481 species (WFO, 2023). These plants are distributed worldwide, barring a few isolated islands and frozen continent of the Antarctica but their major diversity occurs in Tropical American, Indo-Malayan, and the East Himalayan regions of India (Prakash and Pathak, 2019). India is known for its rich biodiversity and one of its dominant plant families is Orchidaceae consisting of about 1,256 species in 155 genera occurring in diverse phytogeographical conditions ranging from tropical, subtropical, and temperate conditions with varying microclimates (Singh *et al*., 2019). NorthEast India is rich in genetic diversity and one of the eight mega biodiversity centres in the world which hosts nearly 56.85 per cent of the orchid taxa in India (Singh *et al*., 2019). The Eastern Ghats of Andhra Pradesh are also considered as one of the rich biodiversity hotspots for many terrestrial and epiphytic orchids. In peninsular India, about 200 species are present, of these, 73 are found in the state of Andhra Pradesh (Singh *et al*., 2019). Raju *et al*. (2008) reported 77 orchid species from Andhra Pradesh, Misra *et al*. (2008) 88 species in 40 genera which included 5 genera and 17 species as new record for the State and Rao *et al*. (2009) reported 56 orchids from the Eastern Ghats of Andhra Pradesh with 11 from the Talakona sacred grove. Padma *et al.* (1997) reported 19 epiphytic and 14 terrestrial orchids from the Eastern Ghats of Andhra Pradesh.

Amongst the different orchid genera, *Arachnis, Cattleya, Cymbidium, Dendrobium, Mokara, Oncidium, Phalaenopsis,* and *Vanda* are considered as economically important (Hew, 1994; Laws, 1995). Out of these commercially important orchid genera, *Dendrobium,* an epiphytic and tropical orchid is the dominant genus and is widely used in commercial cut flower production in the tropical humid regions. Good quality flowers and year round production of this orchid is possible when grown under protected structures as there will be better control over the environmental factors. Orchids have good decorative value among the people of Andhra Pradesh and it has good market potential and the demand for orchids is expanding in the state. However, the commercial cultivation of orchids is still in the infant stage and only a few commercial units exist in Andhra Pradesh. Keeping this in view, an experiment was initiated to identify the suitable *Dendrobium* hybrids for commercial cultivation in high altitude region of Andhra Pradesh.

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Material and Methods

A field experiment was carried out at Dr YSRHU-Horticultural Research Station, Chintapalle under 50% shade net conditions during 2017-20 so as to select suitable *Dendrobium* hybrids for cultivation in Eastern Ghats region of Andhra Pradesh. The experimental site was located at an altitude of 933 m amsl and the geographical coordinates are 170.132 N latitude and 840.332 E longitude. The average rainfall ranges from 1200-1400 mm, the maximum temperature ranges from 17 to 35°C and the minimum temperature ranges from 3 to 24°C. The experiment was conducted in a Complete Randomized Design with six hybrids *i.e.* Sonia-17, New Pink, Queen Pink, Apricot, Venus, and Anna with three replications so as to evaluate them for growth and yield traits. Fifteen months old tissue culture raised plants were used as planting material. The plants were planted in coconut husk blocks (one square foot) by keeping four plants in a block. Observations were recorded on plant height (cm), leaf length (cm), leaf width (cm), days to harvest of spike, number of florets per spike, spike length (cm), and number of spikes/plant/year. The data was statistically analyzed following Panse and Sukhatme (1985).

Results and Discussion

Three years of pooled data (2017-20) on the performance of six diverse commercial hybrids of *Dendrobium* spp. revealed that there was a significant variation for all growth and yield parameters (Table 1). Amongst the varieties evaluated, the maximum pseudobulb height was recorded with the hybrid New Pink (60.23 cm) followed by the varieties Queen Pink (55.80 cm) and Sonia (41.20 cm) whereas, the minimum pseudobulb height was noticed in Apricot (36.38 cm). This finding is supported by earlier reports of Thomas and Rani (2008) and Thirugnanavel *et al.* (2019) in *Dendrobium* orchids. The longest leaf was produced by Queen Pink variety (14.50 cm) followed by New Pink (13.69 cm), while the shortest leaf was observed in variety Anna (12.95 cm) preceded by Apricot (13.11 cm) which were at par with each other. The leaf width was highest in Queen Pink (5.42 cm) followed by New Pink (55.80 cm) and these two were at par with each other. The minimum leaf width was observed in variety Venus (4.25 cm) proceeded by Anna (4.35 cm). Similar variations for leaf characters in orchids were earlier observed by Roy *et al.* (2004). The number of florets per spike, spike length, and number of spikes per plant are commercially important traits and they decide the quality and significance of the variety in terms of commercial value in the market. The highest number of florets per spike was recorded in New Pink (13.75) followed by Queen Pink (11.60), whereas, the lowest was recorded in Anna (5.85). Spike length was highest in New Pink (51.81 cm) followed by Queen Pink (48.07 cm). The highest number of spikes per plant per year was recorded in the variety New Pink (5.90) followed by variety Sonia-17 (5.10) and variety Queen Pink (5). Such a wide range of variability for flower characters and spike length amongst the varieties seems to be mainly due to the genetic nature of the variety, growing situations, and environmental conditions. Similar results were earlier reported by Sudeep *et al.* (2018); Sugapriya *et al.* (2012) and Thirugnanavel *et al.* (2019), in *Dendrobium* orchids.

Conclusion

The present data indicates that the *Dendrobium* hybrids New Pink, Sonia-17, and Queen Pink are superior for vegetative and flower characters and hence can be recommended for cultivation in the Eastern Ghats Region of Andhra Pradesh.

Tabel 1. Performance of *Dendrobium* hybrids for different growth and yield traits.

Dendrobim hybrid	Pseudo bulb height (cm)	Leaf length (cm)	Leaf width (cm)	Days to harvest of spike	Number of florets per spike	Spike length (cm)	Number of spikes/ plant/year
Queen Pink	55.80	14.50	5.42	37.15	11.60	48.07	5.00
New Pink	60.23	13.69	5.17	39.56	13.75	51.81	5.90
Venus	38.61	13.51	4.25	46.84	7.15	37.83	4.13
Sonia-17	41.20	13.72	4.44	35.99	8.00	38.68	5.10
Anna	38.16	12.95	4.35	43.57	5.85	34.64	4.00
Apricot	36.38	13.11	4.57	45.23	6.85	33.13	3.88
CD @ 5%	4.76	0.73	0.77	3.79	0.97	6.48	0.79
SE (m) ±	1.56	0.24	0.25	1.25	0.32	2.13	0.26
CV	6.93	3.55	10.73	6.03	7.21	10.47	11.15

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