

Scope of Orchid Cultivation in Oil Palm Plantations

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Orchids play a crucial role as cut flowers and potted plants in floriculture and accounts 8 % of the floriculture trade in the world, where as Oil Palm is grown in the humid tropical belts with having an advantage of low input cost management with maximum gross returns/ha than any other major field crops. There is great possibility in oil palm orchards to grow tropical orchids mainly epiphytic orchids, like success achieved in Coconut orchards in Kerala.

Introduction

Orchids belong to the family Orchidaceae, which comprises about 788 genera and more than 18,500 species in the worldwide, exhibiting widely varying sizes, shapes and colors. In India, 184 genera and 1229 species of orchids are available. The major physiographical regions for orchids in India are, (i) Northeastern Himalayas (ii) Peninsular region and (iii) Andaman & Nicobar Islands. The number of orchid species occurring in different regions in India was shown in Table: 1. The Indo-Burma-Malayan and Indo-China regions are said to be richest zones for habitat for orchids representing, high humid evergreen tropical forests and humid temperate climates respectively.

Orchids are known world wide for their aesthetic value and identity of beauty. Among the all commercial cut flowers, orchids rank 1st in global trade of tropical cut flowers and occupies 81st in the total cut flower trade in the international trade. Orchids occupy 8 %

of global floriculture trade, with worth US \$ 40 billion. Even though, India's share in the global floriculture trade is very less with 0.6 %, but the exponential growth rate was observed in recent years and emerged as major area of agribusiness sector. The exports from the floriculture trade are expected to touch Rs. 500 crores and domestic flower trade is expected to touch by Rs. 750 crores by the end of 10th Five Year plan.

With the advent of Hi-tech horticulture, more emphasis is now given on higher returns from the limited area of cultivation. In this view, one can easily suggest the cultivation of orchids mainly tropical orchids like *Dendrobium* and Vandaceous orchids in the plantation of the oil palm. Since most of the tropical orchids are epiphytic in nature and can be easily grown by placing on the trunk of the oil palm as well as the interspaces between the trees can also be utilized for orchids, without the wastage of land.

Table 1: Status of Orchid genetic resources in India

<i>Habitat</i>	<i>Species</i>
Northeastern India	675
Eastern Himalayas	730
Western Himalayas	255
Peninsular India	267
Eastern India	130
Andaman & Nicobar Islands	117
Central India & Gangetic plains	60

Types of Orchids

Depending upon their occurrence at different altitudes and varying climatic conditions with respect to their habitat, they were broadly classified as (i) tropical orchids (ii) subtropical orchids and (iii) temperate orchids.

- (i) **Tropical Orchids:** These are mostly epiphytes grown in high rainfall zones with an altitude range 100–1,000 m above MSL. The temperature range from 21–29° C at daytime and 18–21° C during night is essential.

Examples: Species of *Cymbidium*, *Dendrobium*, *Bulbophyllum*, *Phalaenopsis*, *Papilionanthe*, *Aerides*, *Acampe*, *Pholidota*, *Oberonia*, *Luisia*, *Rhynchostylis* and *Eria* comes under this category. In addition, a large number of terrestrial orchids like *Arundina*, *Tainia*, *Calanthe* and *Dendrobium* (Lithophytic species) also fall under this group.

- (ii) **Subtropical orchids:** These orchids were mostly found in subtropical forest areas like evergreen or semi-evergreen forests with cool and humid climate with an altitude range 1,000-1,800 m MSL, where they offer suitable conditions for the growth of mosses and humus rich forest floor. The temperature range from 18 – 21 ° C at daytime and 15.5 -18 ° C during night is essential.

Examples: *Cymbidium lancifolium*, *Cymbidium elegans*, *Anthogonium gracilis*, *Liparis*, *Phaius*, *Dendrobium moschatum*, *Coelogyne sp.*

- (iii) **Temperate orchids:** These orchids come up well in high rainfall, heavy

fog and severe winter regions at an altitude < 1800 m MSL. The temperature range from 15.5 – 21 ° C at daytime and 10-12.5 ° C during night is essential.

Examples: *Calanthe*, *Habenaria*, *Platanthera* and *Coelogyne* etc.

BSI (Botanical Survey of India) developed three 'National Orchidaria' representing the above types of Orchids for conservation; apart from many public and private research institutes and Universities working on orchids.

- (I) Temperate Orchids: Shillong, Meghalaya.
(II) Subtropical Orchids: Kolkata, West Bengal.
(III) Temperate orchids: Yercaud, Tamilnadu.

Orchids Industry at Global level

In the global export trade of tropical orchids, Thailand is dominating in both production and export with 87 % share in exports, followed by Singapore, Malaysia, Indonesia and Srilanka (emerging) in recent years. The countries like Japan and European countries are the major importers for tropical orchids as cut flowers with a fetching price range from Rs. 100-3000 per single entity in terms of Indian currency. New Zealand stands first in production and export of temperate orchids, followed by Australia and South Africa. Gradually, there is a demand even for potted orchids globally. Many of the tropical orchid species are good for pot culture besides many hybrids.

Orchid Industry In India

The emerging orchid export trade in India is still at infancy, as the commercial planting materials of orchids were imported and depending on Thailand, Singapore, Malaysia,

Australia, New Zealand and Japan. But, in future it can play a major role, due to the added advantage of large native orchid biodiversity and ability to produce in varying agro climatic regions. The commercial growers of temperate orchids were mainly grown in Sikkim, Darjeeling (WB), Arunachal Pradesh and other northeastern states. The tropical orchids were mainly grown in Kerala (Trichur, Trivandrum, Kozhikode & Quilon), Karnataka (Mangalore), Maharashtra (Pune, Mumbai & Aurangabad), Tamilnadu (Chennai-Natural synergies), Goa and Andhra Pradesh (West Godavari District).

The tropical orchids are grown in coconut orchards in Kerala since long time. The recent initiation of growing orchids in rubber plantations has been proved in Assam and paved for new innovative dimension and pick up of commercial growers in that state in large scale. Hence there is a considerable scope for cultivation of orchids, especially tropical orchid hybrids such as Dendrobiums and Vandaceous orchids.

Climatic Requirements of Oil Palm

Oil palm (*Elaeis guineensis*) is the highest oil yielding plant among the perennial oil yielding crops, grown in 11 states in India. It is mainly cultivated in humid tropical climate with temperature range 29-33 °C (maximum) and 22-24 °C (minimum) with rainfall 2,500-4,000 mm with relative humidity more than 80% and not less than 5 Hrs sunshine/day. It can be grown up to 900 m above MSL. Soils with moist, deep, loamy and alluvial soil rich in organic matter with water permeability are best suitable for cultivation.

Oil palm requires sufficient irrigation, as it is fast growing with high productivity

and biomass production. A palm of 3 years and above requires a minimum of 150 litres/day and in case of older plantations especially in summer seasons require around 200 litres/day. Generally orchids require minimum care and it can be grown successfully in oil palm plantations. The requirement of nutrients is very less for orchids but it requires frequent feeding as foliar application.

Tropical Orchids in Oil palm Plantations

The climatic requirements of both tropical orchids and oil palm are same and further, as the orchids are basically shade-loving plants there is a good scope for growing tropical orchids in oil palm plantations. The humid microclimate created by oil palms inside the orchard plantations makes compatible for growing of tropical orchids. Since most of the tropical orchids are epiphytic in nature and thus can be successfully grown in the trunks of the oil palm plants.

Recommended tropical orchid species for oil palm plantations:

1. *Dendrobium* Hybrids- Sonia Galaxy, Sonia 17m (Dark purple), Pramont, Toshiko, Intuwong, Nantavarn, Joan kushima, Karen No. 4. (Purple), Asahi Pink, Sakura Pink, Pompadour (Light pink); Kyomi Beauty (Dark pink), Boonchoo Gold (Yellow Red Lip); Kimiyo Kondo (Red Antelope Type), Burana Green (Green); B.B White, Water Oumae, Jaquelyn Thomas (White); Mary Mak, Lowana Nivoka (Yellow).
2. Vandaceous orchids *such as Aranda* (Hybrids like Iskander (Yellow); Christine Alba (White/Red Spot), K C

- Pink, Pata, Pani, etc.) and *Arachnis* Hybrids.
3. *Mokara* Hybrids like MK Chark Kuan Orange, MK Chark Kuan Pink, MK Chark Kuan Yellow, MK Chark Kuan Red MK New Nora Blue.
 4. *Oncidium* hybrids like *Oncidium* Gower Ramsey, *Oncidium* Taka, and *Oncidium* Sharon Baby Pink With Spots.

The inters pace left in oil palm plantations can be utilized for growing tropical orchids by making suitable following changes:

- i. Certain orchids of epiphytic in nature, by providing coconut husk can be grown on the trunk of oil palm by hanging with wires.
- ii. For obtaining quality blooms Poly house or shade house can be constructed in between the rows and orchids can be grown successfully.
- iii. Humidity during dry spells can be created with providing moist gunny bags or by sprinklers.
- iv. Water spraying at regular intervals
- v. Shade may be provided apart from natural shade provided by oil palm to obtain quality spikes.
- vi. Even though orchids are low feeders, giving poly nutrient sprays at regular intervals yields maximum results.
- vii. Along the bunds and near the base of trunks terrestrial orchids can be grown.
- viii. Potted orchids can also be grown under the shades, since the present day international market trend is growing for potted orchids besides cut flowers.

Input Requirement for Growing Tropical Orchids

- (I) **Planting Material:** It is the foremost requirement before starting any commercial and scientific research ventures. The initial cost of planting material is high. At present, commercial growers in India were interested in production of cut flowers for trade point of view and commercial supply of planting material is at juvenile stage and it is difficult to get required number of standard hybrid from any source. More over domestic cost of planting materials of orchids is costlier than importing from Thailand and Singapore.

Sources in India for planting materials and other information:

- i. M/s HAFI Orchids, HMT Junction, Kalamassery-683 104, Kerala
- ii. Seaside Farms, Trivandrum, Kerala
- iii. Toyo Floriculture Co., XXV/ 837, Thevally, Quilon-691 009, S. India.
- iv. Federation of Indian Floriculturists, Paulowa, T.C. 27/459-1, Gas House Road, Kunnukuzhi P.O., Thiruvananthapuram- 695 037. Kerala.
- v. ICL Flora Exotica, 6, Old Post Office Street, Kolkata-700 001, West Bengal.
- vi. Val Orchids Pvt. Ltd, GN Road, Bandra (W), Mumbai-50.
- vii. Head, Department of Floriculture and Pomology, Kerala Agricultural University, Trissur, Kerala.
- viii. Head, Division of Ornamental Crops, Indian Institute of Horticultural Research, Hesaraghatta lake Post, Bangalore-560 085.
- ix. Director, National Research Centre for Orchids, Pakyong, Sikkim-737 106

- (II) **Shade Houses:** Shade houses are required with opening from all sides for good ventilation. The shading of 60-65% is essential for *Dendrobium*, *Aranda* and *Mokara* and shading of 70-75% in *Oncidium*. It will depend on age of the plants, season and variety etc. All extra shade must be removed in rainy season to provide better aeration to control diseases.
- (III) **Water:** Rainwater is best suitable for growing orchids. Water pH should be 6.5-7.5 and electric conductivity less than 400 micromhos/cm. Approximately, the water requirement for tropical orchids per acre per day is 15,000-20,000 litres in summer and 8,000-10,000 litres in winter.
- (IV) **Nutrition:** All major (N, P, K, Ca, Mg, S) and minor (Fe, MN, Zn, Cu, Mo, Cl, Bo) nutrients in soluble and liquid fertilizers are required for proper development. In *Dendrobium*s, at the stage of shoot formation and its growth during summer, NPK fertilizer ratio 1:1:1 is recommended, where as for flowering stage and rainy and winter season, the ratio 1:2:2 at 0.50-0.75% concentration.

Problems Associated

- i. Availability of disease free quality planting material.
- ii. High initial investment.
- iii. Requires skilled manpower for propagation as well as for pre and

post harvest management of cut flowers.

- iv. Marketing, cool chain transportation to the nearest airport for export and improper cold storage facilities.

Conclusion

If the proper care and attention taken, there is abundant scope for growing tropical orchids in oil palm plantations. Before recommending to farming community, evaluation under scientific basis is very much essential. The growing of tropical orchards in oil palms on small-scale industry basis will not only provides job opportunities, but also increases per unit productivity. The climatic requirements of both tropical orchids and oil palm are more or less similar and shade-loving orchids can fit well in the humid microclimate created by oil palm plantations. Since, most of the tropical orchids are epiphytic in nature and thus can be successfully grown in the trunks of the oil palm plants. The success in oil palm is possible as it was proved in coconut plantations.

Because of change in purchasing power of the people and consumer preferences for natural flower decoration in houses and as well as in restaurants over artificial decoratives and growing popularity of orchid as hobby finds, orchids as 'angels of earth' and 'symbol of peace', which has got huge potential for export marketing in future.