



ਕੰਗਲਾ ਲਾਂਪੁੰਗ

KANGLA LANPUNG

SUMMER 2019

VOLUME XIII ISSUE I

ISSN (Print): 2321-2357

Published by:

RK Sanatomba Memorial Trust,
Palace Compound, Manipur

Can Orchid Industry Blossom in North-East India?

Rajkumar Kishor¹

Orchids are adorable. They are, no doubt, the most beautiful flowers on earth having myriad forms, shapes, sizes, colours, fragrances and habits. With an accepted 29,199 species (Govaerts et al., 2017) the angiospermic family ‘Orchidaceae’ is widely distributed from Equator to Arctic Circle and from lowland areas to almost up to snowline regions. The number of species keeps on increasing with new discoveries every year. Orchids are capable of growing in nearly every environment of the earth’s surface and on a variety of surface ranging from soil or rock; perching on tree trunks; and even on dead organic matter (saprophytes). They may or may not have chlorophyll, while some even do not have leaves.

1. Orchid trade

¹ Dr. Rajkumar Kishor is the Managing Director & Chief Scientist of Kwaklei and Khonggunmelei Orchids Pvt. Ltd. (DSIR recognized), Sagolband Vijaygovind, Imphal-795001. He can be reached at rajkumarkishor@yahoo.com.

Apart from their appeal to scientists on account of diversity, taxonomic and conservation interests, orchids are of prime importance as a floricultural entity. They are one such crop which has been into trading for centuries, either legally or illegally for a variety of reasons. Due to their elite floricultural traits they attained a high niche in the international flower trade. Presently orchid occupies sixth position among the top ten cut flower crops internationally, accounting 10% of the trade (De and Debnath, 2011). Besides, potted orchids which may be either species or hybrids are also in high demand. They are also used in preparation of herbal medicines and handloom and handicrafts. Generally orchids are traded for their aesthetic values as species and hybrids.

1.1. Species

Many amateurs and specialist orchidists are die hard collectors and growers of a number of species. A hobbyist would pack his small orchid house or balcony with a variety of species and feel proud to add many more. Some may survive and some die in the learning process till the art is mastered with experience. It will be difficult to collect all the existing 29000+ species at one place, however major botanic gardens in many countries houses orchidaria to preserve these beautiful gems. Atlanta Botanic Garden, USA has a collection of 1600+ orchid species; Royal Botanic Garden, Kew is having 1300+; and the National Orchid Garden of Singapore Botanic Garden has a collection of 500+ species (Botanic Garden Conservation International, 2017). Trade of the artificially propagated orchid species is flourishing as indicated by the report that between 1996-2005 many species of *Dendrobium* (92,482,163), *Phalaenopsis* (31,572,618) *Cymbidium* (24,672,878), *Oncidium* (7,077,873), *Cattleya* (2,375,391) and *Vanda* (1,130,662) were commercially traded (Hinsley et al., 2018).

1.2. Hybrids

In orchids there is the possibility of production of even multi-generic hybrids involving parents which are not so closely related. More than 150,000 hybrid orchids have been registered with the Royal Horticultural Society, London. Thus, production of hybrid orchids for commercial purpose far exceeds the number of natural species available in the wild across the globe. This shows how important orchids are in the floriculture sector. The global orchid market has passed the \$1 Billion mark in 2010. The leading orchid producing countries in 2010 were Japan (\$280 Million), USA (\$170 Million), Taiwan (\$130 Million), China (\$70 Million), Brazil (\$60 Million), UK (\$45 Million), Thailand (\$35 Million) (www.orchidsociety.com).

1.3. From Hobby to Industry

It would be motivating to learn how orchid industry evolved in Thailand and Taiwan from being hobby to large scale industries which ultimately became national income generators. Thailand is a natural habitat for about 1,129 species belonging to 178 genera of orchids (Thammasiri, 2015). For about 100 years, orchid growing was considered a hobby for the high class society. The introduction of *Dendrobium* Pompadour proved to be a landmark that brought popularity of orchid cultivation amongst the common people in Thailand. Cut flower export started in 1966 from Thailand to some European countries and within the next decade, the country became one of the world's leading producers and exporter of orchids. In 2012, the total Thai growing areas of production was 7,420 acres and cut-flower exports of 2.1 billion 63.6 billion US\$ to 148 countries and plant export to 160 countries (17.8 million US\$) (Thammasiri, 2015).

Taiwan also becomes an international centre of orchid breeding, production and cultivation. Its genesis can be traced back in the 1970s as initiated by the hobbyists. During that time there was rapid economic expansion, while some groups of dedicated enthusiasts started accumulating and crossbreeding species. Their unique creations attracted high prices in the domestic market among fellow collectors and floral designers. In the mid-1980s, the state-run Taiwan Sugar Corp. (Taisugar) took notice and set about transforming the niche pastime into big business. The following decade, Taisugar had introduced modern greenhouse/protected cultivation systems from the Netherlands and started mass production of orchid clones using micropropagation. As demand rose and production costs fell, more enterprises joined the sector, leading to the development of a complete orchid supply chain. Today, orchids comprise 35 percent of Taiwan's floriculture industry, with local growers shipping US\$178.3 million worth of the flowers to more than 80 countries and territories in 2018 (Her, 2018).

2. The Indian Scenario

In India, the orchid diversity is represented by 1,331 species belonging to 186 genera (Misra, 2007; Chowdhery, 2010). About 200 orchid species are found in North-Western Himalayas, 876 in North- Eastern India while about 300 orchids occur in the Western Ghats. The north-eastern (NE) region of India is considered as the cradle of flowering plants and identified as a proverbial treasure house of variety of orchids. The region once richly endowed with luxuriant forest growth and rich genetic diversity of orchids is vanishing day by day due to human interference. However, this natural orchid wealth of the country as a whole and the NE region in particular is yet to be judiciously

utilized and managed to harvest economic benefits. Most of the work carried out in India especially in Kerala, Sikkim, Arunachal Pradesh, Manipur and Meghalaya is focused on germplasm, propagation, and conservation of orchids. There is an urgent need to harness the commercial potential of the horticulturally significant orchids of these regions for economic upliftment of the local cultivators as well as boosting export. It is necessary to select the valuable orchid wealth of India and utilize sustainably through genetic improvement (classical breeding as well as molecular breeding).

3. Present Status in Northeast India

Orchid enterprises started in North-East India including Sikkim since late 1970s through initiation of breeding. With the registration of India's first hybrid orchid *Bulbophyllum* Kalimpong in 1997 by GM Pradhan, orchid breeding has been continuing at certain pockets of NE India as well as in South India (Kumar *et al*, 2015). Some other breeders including UC Pradhan also continued with breeding works. Similarly breeding work was also started at State Forest Department of Arunachal Pradesh. In Manipur, breeding orchid started as the doctoral program of Rajkumar Kishor during 1999-2003 and continued till now. He has so far registered 12 orchid hybrids with Royal Horticultural Society, London, which is the international authority of orchid hybrid. Some of them are shown in Figure 1. With the establishment of M/s Kwaklei and Khonggunmelei Orchids Pvt. Ltd., breeding orchid on commercial scale gets the momentum in Manipur. However, looking at the overall development of orchid industry in NE India there has not been the desired rise in log phase of the growth pattern. India Carbon Limited which was based in Guwahati started cultivation of commercial *Dendrobium* orchids in 1993 and continued for over a decade. State governments, under National Horticulture Mission also promoted cultivation of commercial *Dendrobiums* sometimes during late 2000 and early 2010s; however, the program could not be very successful as hardly 5% of the enterprises/farmers continued with the enterprise.

Most of the orchid enterprises in NE India depend upon Thailand, Taiwan, Singapore and Malaysia for the plant materials, which are mostly warm loving varieties of tropical origin. In NE India where the climate is mostly sub-tropical to temperate these are difficult to adapt and thus decline in their performance after 2-3 years of cultivation. Hence, there is the requirement for establishment of a principal Orchid Breeding Centre in NE India to continuously cater to new varieties of orchids suitable for commercial cultivation in NE India.

Unlike any other floriculture crops orchid industry requires long incubation period to become successful. First, breeding has to be initiated using elite parents, followed by seed set and development till they attain the appropriate stage for in vitro

germination. Next, the immature or mature embryos have to be germinated in vitro and grow them until large enough for deflasking and hardening (Fig. 2). After successful hardening the plants will grow for another 4 years or more till flowering. The flowering population shall be observed and select the elite genotype for clonal propagation of the commercial varieties of the particular hybrid. The whole process of breeding to clonal selection takes more than 10 years to get a good commercial variety of hybrid orchid.

4. Strengths of Northeast India for a Flourishing Orchid Industry

The north-eastern (NE) region of India is considered as the cradle of flowering plants and identified as a proverbial treasure house of variety of orchids. The existence of varied agro-climatic and microclimatic zones within this region is one of the key strengths for possible cultivation of different orchids which may be warm loving, cool loving or moderate types. A natural orchid wealth of over 800 species in this region shows that commercial orchid cultivation can be successfully implemented there. A wide range of species particularly belonging to the genera *Arachnis*, *Cymbidium*, *Dendrobium*, *Holcoglossum*, *Pleione*, *Phalaenopsis*, *Paphiopedilum*, *Renanthera*, *Rhyncostylis* and *Vanda* (Fig. 3) are known to have high floricultural traits. However, this natural wealth of the NE region is yet to be judiciously utilized and managed to harvest economic benefits. Most of the work carried out in India especially in Sikkim, Arunachal Pradesh, Assam, Manipur, Mizoram and Meghalaya is focused on germ-plasm, propagation, and conservation of orchids. There is an urgent need to harness the commercial potential of the horticultural significant orchids of these regions for economic upliftment of the local cultivators as well as boosting export. It is necessary to select the valuable orchid resource of NE India and utilize sustainably through genetic improvement (classical breeding as well as molecular breeding). The elite genotypes of the hybrids may be micropropagated for production of clones for mass cultivation. It is important to keep in mind that only species and hybrids which will thrive well in a wide climatic conditions of India needs to be emphasized for the breeding and micropropagation. Various government as well as NGOs in India have been purchasing plantlets of orchids mainly *Dendrobium* Sonia, *Den.* Singapore White, *Den.* Candy, various *Vanda* and *Phalaenopsis*, etc. from countries like Thailand, Singapore, Malaysia, Taiwan, The Netherlands, etc. This activity has popularized orchid business of cultivation in India; however, it will be difficult to compete with the dominating producer countries in the production of these orchids.

5. Weaknesses

The major weakness for successful development of orchid enterprises in this region is lack of a viable policy of the Central as well as the respective State Governments. Secondly, people residing in the region are economically backward and even the interested individuals are not able to start an orchid venture since investment won't yield a good return immediately. Therefore, they usually opt for quick earning cultivation such as vegetable or other seasonal crops. Majority of the people of NE India are less interested in orchids, perhaps, because they grow as grass in this region. This bio-resource, which is a goldmine, can be successfully translated into economy, only if these people are made aware of it. Unavailability of good commercial orchid varieties suitable for the local climate is another weakness towards a successful orchid venture in NE India.

Suggestions for a successful orchid industry in NE India

- A Govt. policy-program extending 15-20 years for implementation till the entrepreneurs become self-sustainable may be necessary for crops like orchids which require long gestation period.
- For a self-sustainable orchid entrepreneurship focus should be made on (a) Breeding, (b) Tissue culture, (c) Cultivation for cut-flower and potted plant, (d) Plant protection, and (e) Post harvest technology and transport.
- It may be encouraged to start orchid entrepreneurship along with other horticultural crops for sustainable income generation during the incubation period.
- A dedicated orchid breeding program has to be initiated to develop unique orchid hybrids suitable for commercial cultivation under different agro-climatic condition of NE India.
- Orchid shows of national and international standards be organized quite often.
- Cultivation of medicinal orchids may also be encouraged.

Reference

- Botanical Garden Conservation International (2017): "Orchids:2017", Global Ex situ Collections Assessment.
- Chowdhery, H.J. (2010): "Orchid Diversity in North-Eastern States of India," *Journal of Orchid Society of India*, Vol 24, No 1&2, pp 19-42.
- De, L.C. and Debnath, N.G., (2011): Vision 2030: National Research Centre for Orchids, Pakyong, Sikkim, India.
- Govaerts R, Bernet P, Kratochvil K, Gerlach G, Carr G, Alrich P, Pridgeon AM, Pfahl J, Campacci MA, Holland Baptista D, Tigges H, Shaw J, Cribb P, George A, Kreuz K, and Wood JJ. (2017). World checklist of Orchidaceae. Kew: Facilitated by the Royal Botanic Gardens. Available at: <http://apps.kew.org/wcsp/> (accessed 14 June 2019)
- Her, Kelly (2018): "Blossoming Industry," *Taiwan Review*, Vol.68, No 6, pp 12-21.
- Hinsley A., Hugo J de Boer, Micheal, F. Fay, Stephen, W. Gale, S.W., Gardiner, L.M., Gunasekara, R.S., Kumar, P., Masters, S., Metusala, D., Roberts, D.L., Veldman, S., Wong, S., and Phelps. J. (2018): "A Review of the Trade in Orchids and its Implications for Conservation," *Botanical Journal of the Linnean Society*, Vol 186, No 4, pp 435–455.
- Kumar, C.S., Saleem, M. and Kumar, P.C.S. (2015) "Orchid breeding in India- Prospect, Possibilities and Constraints", TBGRI: Thiruvananthapuram, India
- Misra, Sarat (2007): *Orchids of India - A Glimpse*, Dehradun: Bishen Singh Mahendra Pal Singh.
- Thammasiri, K (2015) "Current Status of Orchid Production in Thailand" *Acta Horticulture*, Vol 1, No 1078, pp 25-33.

Annexure:

Figure 1: Some of the hybrid orchids synthesized and re-synthesized by Dr Rajkumar Kishor. A. *Aeridovanda* Shiv Sidhu, B. *Renantanda* Momon Shija, C. *Papilaenopsis* Crestwood Rose, D. *Renantanda* Prof. G. J. Sharma, E. *Renantanda* Kebisana Shija, F. *Renantanda* Pikkolo, G. *Rhynchonopsis* Ruben



Figure 2: An orchid tissue culture laboratory with acclimatization and growth facility



Figure 3: Some of the orchid species of NE India having commercial potential either as species or use as parent for hybridization. A. *Holcoglossum amesianum*, B. *Phalaenopsis manii*, C. *P. lobii*, D. *Renanthera imschootiana*, E. *Vanda motesiana*, F. *V. cristata*, G. *V. coerulea*, I. *V. testacea*, J. *V. ampullacea* var. *auranticum*, K. *V. pumila*, L. *V. stangeana*

