APAARI PUBLICATION : 1997/1

Orchids in Thailand

A SUCCESS STORY

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New Delhi-110003

Printed in May, 1997

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Foreword

Success of orchids in Thailand projects a commitment on the part of the Asia-Pacific Association of Agricultural Research Institutions (APAARI) to promote information base among the member nations through publication of their success stories in agriculture besides exchange of scientific and technical know-how, strengthening of research organization and their management capabilities. This is the third success story in the series, following the Transformation in Korean Farming and the Cotton Production in Pakistan, which have been brought out as a follow-up of the recommendations of the APAARI Executive Committee in its February, 1996 meeting held at New Delhi and the first to be published in 1997.

The management approach for orchid production and trade followed in Thailand clearly depicts a balance between the analytical and catalytic measures taken to improve economy and global competence in promoting a non-food commodity which is truly in line with the APAARI goals and objectives and which the Association would like other member countries to follow in order to promote similar technologies in the region.

The story of success for orchids in Thailand also highlights a favourable combination of several factors, such as, natural climates, plant genetic resources, leadership in direction, willingness to adopt improved technology, efficient communication networks and maintenance of international standards. Whereas all these factors are essential for an integrated, system based approach to development through research, these have been judiciously accessed and effectively harnessed too. APAARI is further committed to provide a strong, institutional support for research, training and human resource development. The concerned

member countries are suggested to adhere to a strict quality control along with maintaining a price line that would favour balance between the demand and supply as well as the domestic consumption and export.

I am sure that the information presented in this booklet is both informative and useful and also highlights the positive, analytical, catalytic and suggestive role of APAARI in the region that bridges the information gap and provides analysis for further improvement.

(R.S. PARODA)
Executive Secretary
APAARI

New Delhi
May 5, 1997

Prelude

Orchids rank highest among the several tropical ornamental crops, especially cut-flower crops, that are important to the Thai agriculture and economy. Orchid growing started as a hobby in Thailand about 80 years ago; until 1966, only a small amount of orchid cut-flowers were exported from Thailand to some European countries; but the country attained the status of the world's leading producer and exporter of orchids in a little over a decade and it continues to hold the top ranking since 1979.

This story tells the success of orchid growing and trade, including export, for high income earning from cut-flowers and orchid plants, through concerted national efforts in respect of germplasm resource management, research, training, extension and technology application.

An assortment of orchid consignment for trade

Background

Thailand, with the current population of nearly 60 million and a total land area of around 5.14 lakh square kilometers, is located in the humid tropical zone of the Southeast Asia. Being suitable for the cultivation of many tropical commercial crops and ornamentals, the country produces several ornamental cut-flower crops, such as, orchids, jasmine, lotus, marigold, rose, chrysanthemum, aster, gerbera and gladiolus, in the respective decreasing order of farm area (Table 1). Many of these cut-flower crops are produced abundantly, some up to several million units. Among these, only orchids, hold economic importance both for local uses and export (Table 2) whereas others are consumed mainly in the local market.

TABLE 1: The growing area and number of farms of major cut-flowers in Thailand, 1994.

	Commodity	Growing area (rai)*	No. of farms
1.	Orchid	14,412	1,965
2.	Jasmine	5,326	3,626
3.	Lotus	4,400	483
4.	Marigold	4,028	2,736
5.	Rose	3,911	1,343
6.	Chrysanthemum	998	1,086
7.	Aster	409	621
8.	Gerbera	368	825
9.	Gladiolus	225	408

Source: Department of Agricultural Extension, Ministry of Agriculture and Cooperatives.
* 6.25 rais = 1 hectare

TABLE 2: Numbers and yields of Thailand cut-flower production, 1994.

Commodity	No.of sold flowers (million flowers)	Yield (flowers / rai*)
1. Orchid	994	69,000
2. Rose	331	90,600
3. Marigold	206	50,000
4. Chrysanthemum	101	101,700
5. Gerbera	0	64,000
6. Lotus	19	45,000
7. Jasmine	14	4,000
8. Anthurium	2	0,000

Source: Department of Agricultural Extension, Ministry of Agriculture and Cooperatives.
* 6.25 rais = 1 hectare

Thailand has a long history of orchid trade, especially for export (Figure 1). It is estimated that 54 per cent of the orchids produced are exported and the rest 46 per cent consumed in the domestic market. The export of orchid cut-flower was initiated in 1963 with a few hundred-thousand sprays of mostly *Dendrobium* Pompadour sent to European markets. The quantity of export increased continuously and the export value increased sharply, from a little over $ 0.4 million to about $ 14 million, between 1970 to 1979, followed by a gradual increase, stabilizing at a value of over $ 30 million in 1995. The export of orchid cut-flowers still predominates, but that of orchid plants has also been on a rapid increase, figuring at a little over $ 4 million in 1995 (Table 3).

TABLE 3: Export-import quantity and value of ornamental plant products of Thailand, 1991-1995.

Item	1991		1992		1993		1994		1995	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Export										
Orchid plants	920	90.5	939	86.5	911	81.5	13,362	93.3	13,251	104.7
Other plants	643	21.9	778	31.2	950	25.1	5,225	28.6	5,967	20.9
Orchid flowers	12,399	662.4	11,142	701.3	12,375	748.6	11,897	782.4	11,849	760.2
Other flowers	35	1.5	9	0.5	9	1.0	20	1.3	6	1.1
Dried flowers	680	53.7	971	57.7	601	40.5	588	43.1	843	98.9
Fresh leaves	45	0.3	87	2.7	95	13.3	517	6.2	800	5.8
Dried leaves	325	13.6	336	13.7	582	19.3	419	18.0	556	22.3
Total	15,047	843.9	14,260	893.6	15,523	929.3	32,028	972.9	33,272	1,013.9
Import										
Plants	81	14.9	21	12.2	62	22.1	1,832	21.5	-	-
Flowers	363	31.4	503	40.0	471	37.2	894	63.1	908	59.4
Total	444	46.3	524	52.2	533	59.3	2,726	84.6	908	59.4

Source: Department of Business Economics, Ministry of Commerce.
Qty = quantity (metric ton)
Value = million baht (25 baht ≃ 1$)

Dendrobium Pompadour

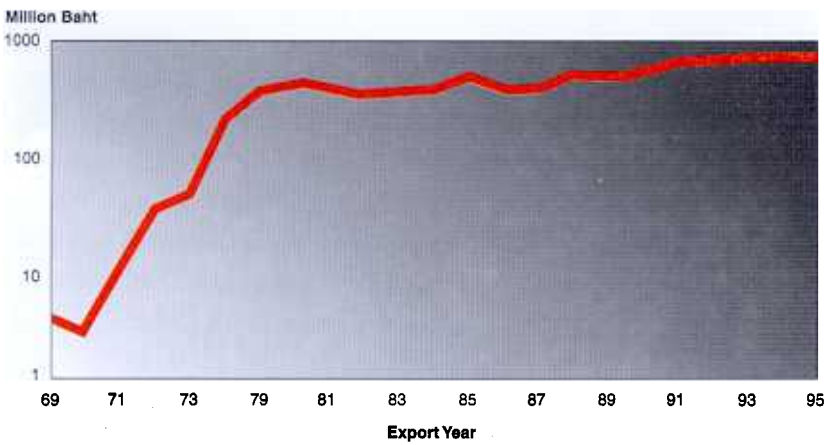

Fig 1: The growth of Thai orchid cut-flower export, 1969-1995

Development of an Orchid Culture

Although Thailand is a natural habitat for several diverse species of orchids, yet the interest to grow cultivars of economic value was first recorded in 1913 with the introduction of some exotic materials by a foreigner working in Thailand. Having a hobby to grow orchids, he brought cattleyas and some other genera to Bangkok all of which were subsequently sold to Krommamerntivakornwong. Several other high ranks and files in the country also became interested in orchid growing as a hobby during the same period. The interests of orchid growing, being an expensive hobby suitable only for the rich and the elite, were served by a small group comprising of high-ranking officials and old rich people of Thailand.

In 1917, Prince Krompranakornsawanvorapinit translated and published "Orchid Growing", as the first book on orchids in the Thai language. The enthusiasm for orchid growing faded, for a little while in the Thai society with the passing away of some old orchidists. A further setback was received with the abrupt change in the country's political system in 1932. However, the introduction of *Dendrobium* Pompadour, in 1934, proved to be a landmark that also brought in popularity for orchid cultivation in Thailand. This particular species was found easy to grow and propagate by division, besides the fact that it produced high yield and had a long vase-life. Some useful publications, viz., "How to use fertilizers for orchids and other plants" and "Techniques in orchid growing, propagation and aseptic seed germination" were published in the '50s which proved quite useful to the orchid industry.

The Orchid Society of Thailand was founded, under the Royal Patronage, in 1957, by Rapee Sagarik who earlier became associated with growing and

studying Thai orchid species in 1947. Teaching orchid growing to the public has been encouraged, through regular classes, radio and television broadcasting initiated in the '60s; introduction of orchidology courses and initiation of research at the Kasetsart University also began during the same period. A collaboration, initially for three years, was taken up in 1962, between the University of Hawaii and the Department of Horticulture at Kasetsart University that helped strengthening of teaching and research work on orchid cytogenetics and breeding.

Orchid tissue culture work was started at the Chulalongkorn University, in 1967, on dendrobiums, cattleyas and *Rhynchostylis gigantea*, which was subsequently extended to the Kasetsart University and the Chiangmai University.

Thailand's first orchid library, the "Prof. Rapee Sagarik Library" opened in Bangkok on December 4, 1993, with 10,000 slides and 2,000 books donated by the world-renowned orchidist Rapee Sagarik. Equipped with an on-line computer system, this library is capable to serve for the networking among the local,

Rhyncostylis gigantea – typical form

Rhynchostylis gigantea alba

regional and international centers, such as, an Orchid Center of Southeast Asia. The library, set up under the collaboration of the Siam Commercial Bank Limited and the Department of Fine Arts would be fully electronic, providing slides stored in CD-ROM and graphics displaying the species origin.

Rhynchostylis gigantea

Orchid Cultivation Area

Orchid cultivation has been confined to Bangkok and the nearby provinces, where climatic conditions, water, transportation and marketing system are most favorable. The estimated total area for orchid cultivation in 1994 was about 2,300 hectares. Suitable environment, high orchid genetic diversity, efficient infrastructure, experienced growers, technology applications, extension, training, teaching and research, as well as business skills, have contributed enormously to the success of orchids in Thailand. Many

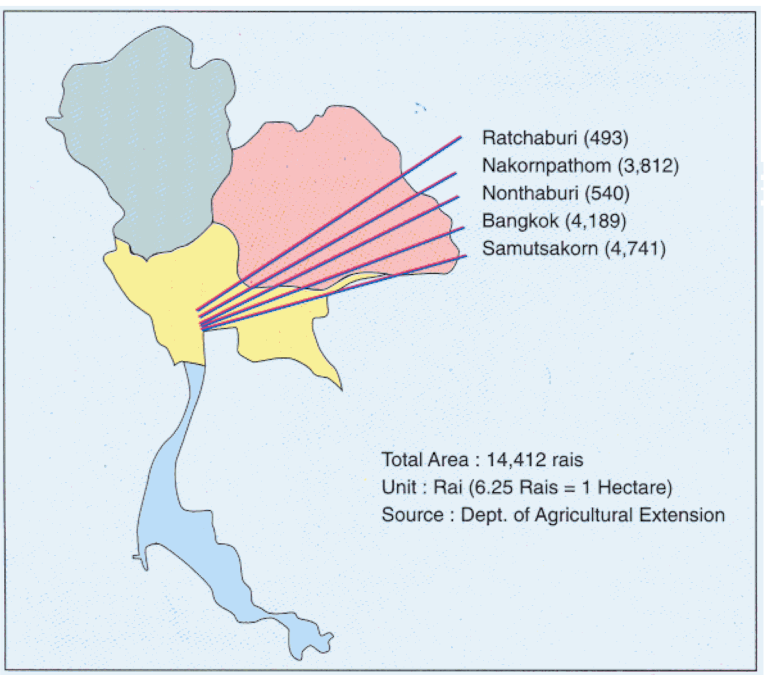

Fig 2: Major locations of orchid growing in Thailand, 1994

farmers have resorted to orchid growing as their main occupation, being a better earner than other crops. The orchid production is made easier by over 10 tissue culture laboratories and the marketing is facilitated for the common growers with over 50 export units engaged exclusively in orchids.

Most of the orchid growing areas are located in the Central Plain, mainly in Bangkok and its nearby provinces (Figure 2), where climatic conditions, water, transportation and marketing system are the most favorable. Orchid production abounds mainly in three provinces, i.e. Samutsakorn (>750ha), Bangkok (~675ha) and Nakornpathom (>600ha) (Figure 3) followed by the nearby central provinces and a little bit in the North and the South of Thailand.

Several orchid growers recently expanded or relocated their orchid farms to the adjoining provinces of Bangkok, viz., Nonthaburi (90ha), Ratchaburi (80ha), Kanchanaburi (25ha), Ayutthaya (20ha), Pathumthani (20ha) and Chonburi (10ha), due to sky-rocketing escalation in price of land in Bangkok besides the water and air pollution in the existing orchid cultivation area which caused low production and deterioration of flower quality.

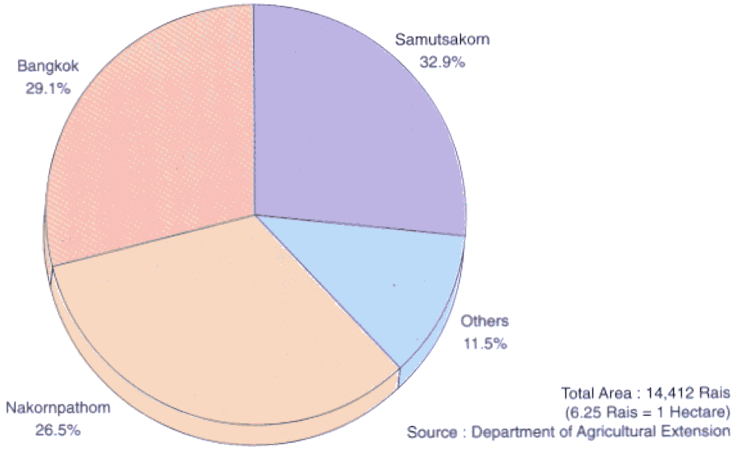

Fig. 3: Locations of orchid prouction in Thailand, 1994

Orchid Trade

Import of ornamental plants and flowers, especially orchid plants and cut-flowers has been relatively low (Table 3). because Thailand has a large variety of indigenous tropical orchids which are inexpensive and also of good quality.

The total orchid export value in Thailand is over $ 32 million. The export of orchid cut-flowers still predominates that of orchid plants, but the latter is also increasing rapidly. The number of countries importing Thai orchid cut-flowers and orchid plants in 1995 was over 50 and over 70, respectively. The major importing countries for orchid cut-flowers from Thailand have been Japan followed by Italy, U.S.A., Germany and Taiwan (Table 4) whereas Japan, Singapore, Philippines, U.S.A. and South Korea (Table 5) were the major orchid plants importing countries.

TABLE 4: Export value of orchid cut-flowers from Thailand to major importing countries, 1991-1995.

Sl. No.	Country	Value 1991	1992	1993	1994	1995
1.	Japan	363.0	361.1	432.9	447.0	437.9
2.	Italy	78.2	89.1	82.4	90.2	76.3
3.	U.S.A.	51.7	64.7	60.8	71.2	67.6
4.	Germany	36.6	41.9	38.5	40.0	40.7
5.	Taiwan	11.0	17.3	23.2	26.3	36.9
6.	S. Korea	4.7	14.4	15.3	14.2	15.9
7.	Netherlands	28.1	32.8	25.9	23.1	15.0
8.	Canada	6.0	7.6	9.3	9.3	11.0
9.	United Kingdom	11.0	10.8	8.7	11.2	10.5
10.	Hong Kong	18.2	14.8	11.6	10.5	10.5
Total		608.5	654.5	708.6	743.0	722.1
Others		53.8	46.8	40.0	39.4	38.0
Grand Total		662.3	701.3	748.6	782.4	760.1

Source: Department of Business Economics, Ministry of Commerce.
Value = million baht

Soaking before grading

TABLE 5: Export value of orchid plants from Thailand to major importing countries, 1991-1995.

Sl. No.	Country	Value				
		1991	1992	1993	1994	1995
1.	Japan	47.5	42.0	39.9	43.0	51.8
2.	Singapore	2.9	3.5	3.0	6.3	7.8
3.	Philippines	4.0	8.2	7.2	9.0	7.7
4.	U.S.A.	5.5	7.6	8.8	11.4	7.1
5.	South Korea	7.9	8.0	5.7	8.1	6.1
6.	Netherlands	1.1	0.3	2.0	2.4	3.8
7.	Taiwan	2.7	2.2	3.0	2.5	2.9
8.	Hong Kong	0.6	1.2	1.9	1.8	1.4
9.	Malaysia	6.2	2.1	1.2	0.6	1.2
10.	Germany	0.1	0.8	0.5	0.4	0.9
Total		78.5	75.9	73.2	85.5	90.7
Others		11.9	10.7	8.2	7.8	14.1
Grand Total		90.4	86.6	81.4	93.3	104.8

Source: Department of Business Economics, Ministry of Commerce.

Value = million baht

Richness of Orchid Genetic Resources

Thailand is a natural habitat for about 1,000 species of orchids. The country has a large variety of tropical orchids which are cheap and of good quality. Dendrobiums are the most popular ones, comprising about 80 per cent of the total orchids grown, the other 20 per cent being represented by the genera *Arachnis, Aranda, Aranthera, Mokara, Oncidium* and *Vanda*. Many new outstanding cultivars of dendrobiums and vandas have been developed over the last two decades. Breeding of attractive cultivars using rich genetic resources has been the major key to success of the orchid trade.

Some exotic cultivars of economic value were first introduced into the country, in the beginning of this century. A few cattleyas, *Oncidium lanceanum*, *Schomburgkia* and *Dendrobium* were among the species imported in the early phase. *Dendrobium* Pompadour was imported in the '30s and became very popular because it was easy to grow, and had high yield and long vase-life. Thailand started exporting *Dendrobium* Pompadour as cut-flowers to European markets in mid-sixties and around the same period *Dendrobium superbiens*, a natural hybrid, and also some other first generation *Dendrobium* hybrids were grown for cut-flowers. In 1972, some orchid cultivars, such as, *Aranda* Wendy Scott, *Aranda* Christine, *Arachnis* Maggie Oei and *Oncidium* Golden Shower, were further imported in '70s from Singapore and Malaysia, to grow for cut-flowers in addition to *Dendrobium* Pompadour. In a few years since then, many new cultivars of dendrobiums and vandas, along with their high production technology, were produced in Thailand.

The new cultivars developed by well-known Thai orchid hybridizers exhibit a wide range of flower color, shape and size. Several experienced orchid growers

have also resorted to developing hybrids of their own for export. Effective utilization of germplasm resources and value addition through crossing, selection and cultivation have been successfully deployed for the orchid improvement and thereby the prosperity of the orchid industry which, together with processing and export, constitute a complete cycle of orchid trade.

Orchid germplasm – flowers

Orchid germplasm – seedlings

Orchid Production Technology

Thai orchidists, from both public and the private sector, have developed and improved the orchid production technology in relation to plant improvement, propagation, tissue culture, pest control, post harvest management, etc., which helped to increase yield and quality, thereby directly enhancing production, quantity of export and the export value over the last 30 years.

Plant Improvement

At the beginning, the introduced species *Dendrobium superbiens*, *Dendrobium* Pompadour and other dendrobiums were used as parents for hybridization. Selections of the offsprings were carefully conducted and further micropropagation carried out to grow on a large commercial scale. *Dendrobium* Pramot 'No.1' and 'No.3', *Dendrobium* Waipahu, *Dendrobium* Intuwong, *Dendrobium* Ekapol 'Panda No.1', 'Panda No.2', *Dendrobium* Sonia 'No.16', 'No.17' and 'No.28', *Dendrobium* Sabin and *Dendrobium* Kasem Gold provide good examples of successful *Dendrobium* breeding.

Dendrobium Sabin

Dendrobium Sonia – No. 28

Vanda coerulea

Vanda Rothschildiana (*Vanda coerulea* x *Vanda sanderiana*) was adopted as the first *Vanda* cut-flower cultivar about 40 years ago. It took 6 years from seedling to flowering and produced low yield. Later, *Vanda* Varavuth (*Vanda* Lenavat x *Vanda coerulea*) was registered in 1973 which took only 4 years to flower. Further, *Vanda* Wirat (*Vanda* Madame Ratana x *Vanda coerulea*) and *Vanda* Mahakkaphongs (*Vanda* Boonchoo x *Vanda coerulea*) were registered in 1979 and 1982, respectively. Both cultivars took 3 years to flower, produced bright purple flowers and long sprays and a high yield of 8-10 sprays per year.

Vanda Wirat

Vanda Mahakkaphongs

Apart from *Dendrobium* and *Vanda*, other species used for self, intraspecific, interspecific and intergeneric hybridization included indigenous Thai orchid species, viz., *Rhynchostylis* spp., *Ascocentrum* spp., *Aerides* spp., etc., and some introduced genera such as *Cattleya* alliances, *Mokara, Ascocenda, Aranda* and *Renanthera*, etc.

Ascocentrum ampullaceum

Ascocentrum miniatum

Tissue Culture and Asexual Propagation

Success for propagating orchids through tissue culture was first achieved in 1960 in case of *Cymbidium* species. Later in 1967, the successful development of the technique for tissue culture of *Dendrobium* species provided a breakthrough for the Thai orchid cut-flower business, since this species has contributed the most in cut-flower production. At present, successful propagation through tissue culture or micropropagation has been achieved in over 80 genera of orchids.

Tissue culture room

Asexual propagation by division or cutting is also practiced but mainly as a hobby and not for a large scale production because multiplication is slower in such cases. This method is, however, unavoidably used when tissue culture fails to work.

Transfer room

Orchid tissue culture work is currently being undertaken at the Chulalongkorn, the Chiangmai and the Kasetsart Universities and also at over 10 commercial orchid tissue culture laboratories. Millions of tissue cultured plants are raised per year for domestic growing and also for export.

The tissue culture in orchids remains an indispensable tool for the commercial production of elite selections in Thailand because of low cost, uniformity, fast propagation and high yield in a short period of time. Most cut-flower orchids, *Dendrobium, Oncidium, Mokara, Aranda, Ascocenda,* and *Cattleya* alliances are propagated successfully through tissue culture. Within 1-2 years, one young pseudobulb multiplies to over 10,000 plants from the laboratory and is ready to grow in the greenhouse at the cost of about 8 cents per plant.

Greenhouses

Air movement is the key factor for successful orchid growing. Most greenhouses are open at the sides to facilitate proper air circulation and also to prevent

heat accumulation due to the high temperature of 30-40 °C during day time. Greenhouses for orchid growing in Thailand were made of teak wood during early period, which lasted long and was resistant to termites. The roofs, made of about 1 inch thick teak wood strips spaced 1 inch apart allowed 50 per cent sunlight to penetrate in a sufficient quantity as required by the orchids. These teak-wood greenhouses lasted over twenty years. Later, due to steep escalation in teak wood prices and its shortage, other hard wood were substituted, but due to their high cost the orchid growing remained an expensive preposition. Bamboos were also used for shading of orchids, which lasted only 2-3 years.

Presently, netted nylon, called "saran", is used for shading, at the top and sides of greenhouses, also known as "saran houses". The saran lasts over 5 years and distributes uniform sunlight with 30-80 per cent shading depending upon the range of nets. Many advantages are attributed to saran, for example, very low price, ease to install or remove, light weight and low labour input. Galvanized pipes are used for poles, and galvanized strings or plastic coated wires to fix the saran. These rust-proof construction materials help maintain the greenhouse for longer period.

Greenhouse shading using bamboos

Greenhouse using galvanized pipes

Growing in Saran house

Saran house

Water Resources

Thailand does not have problems of water shortage because most orchid growing areas, located in the Central Plains, are lowlands with high underground water level. Ponds, canals and rivers are also scattered all over the area. Thus there is no problem of water which is essential for orchid growing. The orchid growers pump the water directly from the natural water resources to the farm, or pump to the reservoir in the farm prior to supplying to the orchid plants. Rain water has the best quality followed by river water, canal water and tap water.

Watering

Industrial pollution of canal and river water in certain areas has rendered it unsuitable for growing several types of orchids, especially vandaceous orchids, which are sensitive to water quality. Many orchid farms have, therefore, been shifted to Ratchaburi, Pathumthani and other neighboring provinces, where the suitable quality water is available in plenty.

Planting Materials and Containers

Planting materials and containers have been gradually improved for producing high yield and quality flowers albeit at a low cost. The locally available, inexpensive, coconut husks are widely and successfully used, especially for *Dendrobium* cut-flower production. These are cut and compacted into 24x32 square centimeter blocks or cut to fit in small or large pot sizes or just cut longitudinally into chunks and put on the table in the greenhouses. The coconut husks last for about 3 years depending on moisture content.

Growing in osmunda

Growing in coconut husk

Orchids with large-root, such as, *Vanda, Aranda, Ascocenda, Mokara* and *Aranthera* need good aeration and drainage which is provided by charcoal and osmunda or by using large-size planting materials. Also, baskets or clay pots with more holes at the side are recommended for the large-rooted orchids to ensure good aeration as well as drainage.

Growing in coconut blocks

Growing in foam

The small-rooted orchids such as *Dendrobium, Oncidium* and *Cattleya* alliances need clay pots with holes at the side and filled with charcoal or coconut husks. Therefore, charcoal and osmunda which, although relatively more expensive and also rarely available, are replaced by coconut husks. Coconut-husk (although cheaper) cannot be used to grow large-rooted orchids. They can be used to grow only small-rooted orchids.. Alternately, these are grown

Growing in charcoal

on 24x32 square centimeter blocks of coconut husks. Clay pots are used for pot-plant sales, while coconut husk blocks are used for growing cut-flower orchids.

Use of plastic pots, especially designed for growing orchids, or of foams, as media and supporter, has also been successfully made in order to reduce the investment cost and weight of the media and containers for orchid growing.

Pest Control

In order to meet the international standards for good health as well as quality of orchid plants and flowers, prophylactic sprays are done periodically. Various diseases, insects and viruses, mostly occurring on orchids in Thailand have been identified and listed here to ensure quarantine or other safeguard measures.

Major diseases recorded on orchids in Thailand

- Black rot, *Phytophthora palmivora* Butl.
- Flower rusty spot, *Curvularia eragostidis* (P.Henn). A. Meyer
- Southern blight or crown rot, *Sclerotium rofsii* Sacc.
- Leaf spot, *Pseudocercospora dendrobii* Deighton, and *Phyllostictina pyriformis* Cash & Watson
- Anthracnose, *Colletotrichum* sp.
- Sooty mold, *Cladosporium* sp.
- Soft rot, *Pseudomonas gladioli*
- Virus diseases, tobacco mosaic virus - orchid strain (TMV-O), and cymbidium mosaic virus (CyMV)

Packaging

Major insects recorded on orchids in Thailand

- Thrips, *Thrips palmi* Karny, and *Dichromothrips corbetti* Priesner
- Mites, *Tenuipalpus pacificus* Baker, *Dolichotetranychus vandergooti*, *Brevipalpus californicus*, and *Brevipalpus phoenicis*
- Caterpillars, beet armyworm (*Spodoptera exigua* Hubn.), and cutworm (*Spodoptera litura* Fabr.)
- Scale insects, *Aulacaspis rosae*
- Chrysomelid beetle, *Lema pectoralis* Baly

Production, Postharvest and Packaging Technology

Useful research on postharvest technology for the last 15 years has helped to ensure the orchid cut-flowers and plants reach overseas fresh and also maintain long vase-life. Technology for pest control, harvesting, handling, use of chemical nutrients, reduced senescence, eradication of microorganisms on floral parts and packaging has been standardized.

Thai Packaging Center was established under Thailand Institute of Scientific and Technological Research (TISTR) in order to improve packaging, decrease losses, increase export efficiency and upgrade packaging standards, particularly of orchid fresh flowers, which are accepted internationally. Efficient media and concerned governmental organizations have been instrumental in dissemination of information on Technology to the orchid growers and exporters.

Factors Underlying the Success

Suitable Environments

The Central Plains of Thailand, such as Samutsakorn, Bangkok, Nakornpathom, Nonthaburi and Ratchaburi, provide a high light intensity, warmth and humidity that is favorable for the growth of tropical orchids. In addition, water is plentifully available all the year round due to which orchid production is very high and also maintains good quality. Investment on greenhouses is relatively low in this area because there is no need to install expensive equipments to control the environment inside the greenhouses for growing orchids.

Promising Orchid Germplasm

Thailand is considered to be the place of origin of about 4 per cent orchids numbering around 1,000 species in the family *Orchidaceae*. Several native species, e.g., *Vanda coerulea*, *Ascocentrum* spp., *Aerides* spp., *Rhynchostylis* spp., etc., constitute important parents in the crossing blocks that produce popular commercial cultivars of vandas, ascocendas and aerides.

Realizing the importance of indigenous orchid germplasm, its conservation has been done in both the governmental and the private sectors. Further, maintenance of endangered species, germplasm enhancement and use has been judiciously done so as to make good hybrids.

Efficient Communication Networks

Thailand, located in the center of Southeast Asia, is also a passway for the Asian, European, Australian and American continents, and has the efficient and modern international air-transport networks in Bangkok, Chiang Mai, Phuket

and Hat Yai. Moreover, telecommunication links, including Internet systems and other infrastructural facilities enable reliable and efficient import and export of orchids to worldwide markets. Accordingly, the country being the centre for international orchid trade, organizes good international delivery system for the Thai orchids.

Safe transportation

Orchid Teaching, Research, Extension and Technology Application

Orchid growing is taught to the public through the mass media. Also, orchidology constitutes an integral part of the curricula of many vocational colleges and universities. The Department of Agricultural Extension, Ministry of Agriculture and Cooperatives, through a nationwide survey, has consolidated 154 groups of orchid growers in Thailand down to the sub-district level. Recent orchid research findings and technology are further tested and disseminated to the benefit of orchid cultivation and trade. The experience of most orchid growers

On-farm training to orchid growers

who used to grow fruit and ornamental crops paid dividends in terms of intensive and timely work input, skillful use of various equipments for producing and quality determination, etc.

Secrets of Success

The key factors responsible for success of orchid production and trade vis-a-vis economy in Thailand may be summarized as below:

Favourable climates.

Availability of good quality water in plenty.

Leadership in adoption and popularization of orchid cultivation.

Richness of indigenous orchid genetic resources.

- Improved production technology, greenhouses, containers, post-harvest processing, quality control, packaging and transport and their application in orchid trade.
- Efficient communication networks.
- International acceptance vis-a-vis maintenance of standards.

Epilogue

The orchid industry in Thailand has a bright future. The export values are high and quite stable for the past over ten years. Orchids will continue to dominate other ornamental crops in Thailand due to better technology know-how, suitable climatic conditions, experienced and skillful growers and exporters as well as their nation wide popularity. Apart from all this, the orchids are a symbol of Thailand that reflects the country's pride internationally.

A success story of orchids in Thailand is a good example of development of an ornamental crop, which does not fall in the category of staple food, to have become the major crop of this country. It took a long time to be accepted gradually but firmly for earning high income and thereby enhancing the agrarian economy which can follow suit.

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