J. Orchid Soc. India, 29: 31-37, 2015 ISSN 0971-5371

VALUE ADDITION IN ORCHIDS

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Abstract

Value addition in floriculture increases the economic value and consumer appeal of any floral commodity. In floriculture, value addition is made through genetical changes, processing or diversification. Orchid is a highly diversified flower crop and indigenous species of *Aerides, Bulbophyllum, Calanthe, Coelogyne, Cymbidium, Paphiopedilum, Rhynchostylis, Renanthera* and *Vanda* are used as breeding materials. They are adapted to diversified climate and grow as epiphytes, terrestrials and as lithophytes; these are grown organically with locally available resources by the growers. Many of these can be grown on rocks and logs for placing in the landscape. Hybrids of *Aranda, Cattleya, Cymbidium, Dendrobium, Mokara, Oncidium, Paphiopedilum, Phalaenopsis, Renantanda, Vanda* etc. with different colour and forms are used as cut flowers, and as floral displays and exhibits. Tribal people of NorthEastern hill region use wild orchids for a variety of folk medicine as these plants are rich in alkaloids, flavonoids, glycosides, carbohydrates and other phytochemicals. Fragrant orchids including *Aerides multiflora, A. odorata, Cattleya maxima, Coelogyne cristata, C. ochracea, Dendrobium chrysotoxum, Rhynchostylis retusa* and *Zygopetalum intermedium* are delightful in outdoor living areas. Leaves, tubers and pseudobulbs of different species are used for edible purposes. Vanilla- a major spice crop and source of vanillin comes from *Vanilla planifolia*. *Anoectochilus* leaves are used as vegetables in Indonesia and Malaysia. Pseudobulbs of *Cymbidium madidum* and *Dendrobium speciosum* and tubers of *Microtis uniflora* and *Caladenia carnea* are also eaten. Miniature cymbidiums can be used as value added packed items. Bright flowers of orchid genera like *Cattleya, Cymbidium, Dendrobium, Paphiopedilum, Pholidota* etc. can be used for drying. Among orchids, *Cymbidium, Dendrobium,* and *Phalaenopsis* are excellent for wedding counter-pieces.

Introduction

VALUE ADDITION is the way taken to increase the value of a raw product anytime between harvesting and sales of the final product. A typical value addition includes processing in some ways like cleaning, cutting, packaging, smoking, drying, freezing, extracting or preserving. Value added products give a higher return, open new markets, create brand recognition and add variety to a farm operation and value addition does not offer any guarantee on profitability. Careful planning and management are required to promote profitability. The key factors for the success of value added enterprises include quality products, good marketing and sufficient capital. Other factors required for value added enterprises are: a unique product; an enthusiastic promoter of the product; the right kind of labeling and packaging; aggressive marketing; a full time presence on the farm; strong agricultural or livestock knowledge; ability to cater to customers; assistance from agencies and universities; a strong relationship with the local community; safe food handling and food safety regulations; and product liability insurance.

Value addition in floriculture increases the economic value and consumer appeal of any floral commodity. In floriculture, value addition is made through genetical changes, processing or diversification. The profitability of a commodity is increased when a raw material is converted into a unique product. Although it requires more time, labor and skill but can significantly increase the net cash return of a small scale floriculture enterprise. Value addition gives high premium to the grower as well as it provides quality products for the domestic and export market. Recently, the consumption pattern is getting diversified towards value added products such as essences, perfumes and other by-products from flowers. There is an urgent need for value addition in floricultural products through processing, packaging and supply chain management to increase farm income and generate employment. The value added products from non-conventional floricultural crops like essential oils of rose, tuberose, jasmine, marigold and plant extracts used in medicines and pharmaceutical industry are unique and have export-import potentialities.

Orchids comprise one of the largest families of flowering plants with 25,000 to 35,000 species belonging to 600-800 genera and covers 6.83% of the flowering plants. They are prized for their incredible diversity in the size, shape and colour and attractiveness of their flowers and high keeping qualities even upto 6 weeks. Most of the orchids have originated from tropical humid forests of Central and South America, India, Sri Lanka, Burma, South China, Thailand, Malaysia, Philippines, New Guinea and

Received : August 25, 2015; Accepted : October 5, 2015

Australia. Brazilian *Cattleya*, Mexican *Laelia* and Indian *Cymbidium, Dendrobium* and *Vanda* have played a major role in developing present day beautiful hybrid orchids which numbers more than 2,00,000. In the international trade, amongst top ten cut flowers, orchids rank the sixth position and amongst orchids *Cymbidium* ranks the first position and in floricultural crops it accounts for 3% of the total cut flower production.

India is a major orchid habitat of the world and with its perfect climate, it is home to 1331 species including 400 endemics (Misra, 2007); the terrestrials are located in humus rich moist forest floors under tree shades in North Western India, Western Ghats harbour the small flowered orchids and epiphytic orchids are common in NorthEastern India which grow upto an elevation of 2000 m from sea level. Indian orchids with high ornamental values used as breeding materials are *Aerides multiflora, A. odorata, Arundina graminifolia, Arachnis* spp., *Bulbophyllum* spp., *Calanthe masuca, Coelogyne elata, C. flavida, C. corymbosa; Cymbidium aloifolium, C. lowianum, C. devonianum, C. hookerianum, C. lancifolium,; Dendrobium aphyllum, D. chrysanthum, D. densiflorum, D. nobile, D. farmeri, D. fimbriatum, D. jenkinsii, D. moschatum; Paphiopedilum. hirsutissimum, P. insigne, , P. spicerianum, P. venustum; Phaius wallichii, Pleione praecox, Renanthera imschootiana, Rhynchostylis retusa, Thunia alba, Vanda cristata, Vanda coerulea* and *Vanda coerulescens* (Singh, 1990).

Orchids and Their Various Uses

Orchids are found in nearly every environment in the world. Epiphytic orchids like *Aerides, Aranda, Aranthera, Bulbophyllum, Calanthe, Cattleya, Coelogyne, Dendrobium, Laelia, Phalaenopsis, Thunia,* with thick leaves and succulent stems have CAM and are drought tolerant with higher water use efficiency. Rhizomatous orchids like *Eulophia, Habenaria, etc.* require terrestrial climate. Each orchid genus has different requirements for potting medium, collected from locally available organic sources. It is very important to have the suitable medium for each type of orchid, depending on whether it is terrestrial or epiphytic. Growing media commonly include fir bark, coconut husk, sphagnum moss, tree fern fibre, coco peat, saw dust and perlite, and more frequently, it is a mixture of two or three of these materials. All orchids potted in a typical bark medium need to be repotted every 18 to 24 months, depending on the requirement of the individual plant.

Orchid scaping is the use of orchids permanently planted into specially prepared beds or attached to trees, shrubs or rocks in the appropriate spot in the garden. Combined with other traditional ornamentals such as palms, ferns, flowering perennials, shrubs, trees and herbs *etc.*, it is easy to create some of the most interesting and beautiful gardens imaginable, depending upon the cost involvement and micro-climatic factors. Many orchids can be grown on rocks and logs for placing in the landscape. They are attached to either cut wooden logs, coconut logs or living trees and shrubs. Once the orchids are established, they will attach to the trees and logs (Teoh, 2005). In order to create the visual impact in landscaping, the orchids should be planted in a single bed of one type and of one colour. If somebody has only one or two plants of a type, it is advisable to grow these in pots. Almost all spider orchids (*Arachnis* and their intergeneric hybrids, terete and semi-terete vandas, *Phaius tankervilliae*, *Calanthe* spp., and Lady Slippers) perform well, if they are grown on the ground in full sun with liberal watering and fertilization. Sloping or flat ground with good drainage provides the ideal location for orchid beds.

With a view to developing an orchidscape, gardener should be aware of the flowering period of each orchid. Some gardeners enjoy seasonal burst of colour. For them, cymbidiums and dendrobiums which flower from winter to spring should be the first choice (Friend, 2004). Winter flowering orchids include *Bulbophyllum hirtum, B. putidum, Cymbidium lowianum, C. mastersii, Eria bambusifolia, Paphiopedilum fairrieanum, P. insigne, P. spicerianum, Pleione maculata,* and *P. praecox.* Spring Flowering Orchids include *Ascocentrum ampullaceum, Calanthe plantaginea, Coelogyne cristata, Cymbidium devonianum, C. eburneum, Paphiopedilum hirsutissimum, P. villosum, Phalaenopsis lobbii, Pleione humilis.* Summer flowering orchids include *Coelogyne corymbosa, C. cristata, C. nitida, C. ochracea, Cymbidium aloifolium, Dendrobium fimbriatum, D. heterocarpum, D. nobile, Pleione. mannii, P. hookeriana, Phaius flavus, P. tankervilliae, Renanthera imschootiana, Rhynchostylis retusa, Spathoglottis plicata, Vanda coerulea, V. cristata, V. stangeana,* and *V. tessellata.* In Balcony gardens, lithophytic orchids can be grown by attaching them in free standing rocks or to the balcony's masonry walls. Genera suitable for shady location may include *Bulbophyllum, Coelogyne, Eria, Maxillaria*, some oncidiums, *Sarchochilus* hybrids, *Phalaenopsis* and *Cattleya* hybrids. According to Taylor (2009), an orchid tree is a variation on mounting orchids except the placement of many orchids on a branch or branches to give a completely natural look. It is used in those areas of the country where orchids are grown outdoors, most of the year. Usually, the larger plants are

attached to the bottom and the smallest on the upper portions for aesthetic reasons and to provide extra weight at the bottom to balance the weight of the structure. It is better to select those plants which require similar light, temperature and humidity conditions. Another factor that has to be considered is flowering times to get different colours on the tree throughout the year. The chosen plants are mounted on the tree with sphagnum moss and fishing wire. Proper misting and maintenance of humidity are essential for a month to establish the plants on the structure.

Potted orchids last for longer than cut flowers, their shelf life being three weeks to four months depending upon species and hybrids (Nagrare and Ram Pal, 2008). Tall growing monopodial orchids are best grown in large clay pots upto 30 cm in diameter. Terrestrial and semi-terrestrial plants like *Cymbidium* and *Paphiopedilum* perform better in deep pots. Orchid plants, as a rule are to be grown near one another to aid a microclimate higher in humidity. Basket culture is useful for those orchids like *Arachnis*, *Rhynchostylis,* and *Vanda* with pendent flower spikes and long dangling roots. Clay pots are the best suitable for terrestrial orchids. Plastic pots are used for epiphytes. Slabs or logs of tree fern are effective for cool growing orchids. Important orchid genera used as potted plants in the international market are *Ascocenda, Brassia, Cattleya, Cymbidium, Dendrobium, Epidendrum, Miltonia, Oncidium, Paphiopedilum, Phalaenopsis,* and *Vanda* (Lopez and Runkle, 2005).

Several local species of *Ascocentrum, Calanthe, Cymbidium, Dendrobium, Paphiopedilum* and *Vanda, etc.* are in great demand in international market for breeding materials (Bose and Bhattacharjee, 1980; Kumar and Sheela, 2007).

Orchid hybrids of *Aranda, Cattleya, Cymbidium, Dendrobium, Mokara, Oncidium, Paphiopedilum, Phalaenopsis, Renantanda, Vanda etc.*, with different colour and forms are used as cut flowers, floral displays and as exhibits (Bhattacharjee and De, 2005; De, 2011; De *et al.*, 2013).

Table 1. Common varieties and hybrids under different genera of orchids.

Sr. No.	Genus	Hybrids/Varieties
1	*Aeridovanda*	Doctor Poyck, Vieng Ping, 'Bensiri', 'Noreen', 'Early Bird', 'Shiv Sidhu', 'New Dawn', Harrison Luke Somsri Sunlight'
2	*Aranda*	Ang Hee Seng, Logtakjep, Bertha Braga, Christine, City of Singapore, Deborah, Federal Beauty, Hee Nui, Hilda Galistan, Iskandar of Johor, Kooi Choo, Lucy Laycock, Gaw Bon Chan, Majula Rimau, Mandai Gardens, Merry Maggie, Myrna Braga, Peter Ewart, Sweet Honey, Tan Mei Ying, Tan Theng Suan, Wong Bee Yeok, Chao Praya Beauty, Thailand Sunspot
3	*Arachnis*	Ishbel, Maggie Oei, 'Maroon Maggie', Bartha Braga'
4.	*Ascocenda*	Apinantat Red Berry, Pralor Tuyen, Pak-Kred, Bangkok, Surin, Karnada, Crownfox, Sundancer, Laksi 'Red Ruby',Guo Chia Long 'Spotty', Fuchs Angel frost
5.	*Cattleya* and allied genera	Lovely Bangkok, Admiration, Bob Belts, General Patton, Joyce Hannington, Little angel, Margaret Stewart, Nillie Roberts, Pearl Harbour, Primma Donna, Queen Sirkhit 'Diamond Crown', Secret Love, Ladda Belle 'Pink Pearl', Maikai, Pastoral, Robert, Prism Palette 'Tricolour Magic', Chinese Beauty Orchid Queen, Chia Lin New City, Ahmad Seikhi
6.	*Cymbidium*	Levis Duke Bella Vista, Madrid Forest King, Sparkle Late Green, Angelica December Gold, Sleeping Nymph, Pine Clash Moon Venus, Soul Hunt, Dr. H. C. Aurora, Susan Highes, Tia Gaig Suther Land, Miss Sanders, Amesbury, Kenny Wine, Red Star, Red Princess, Show Girl , Jungfrau 'Snow Queen', Jungfrau 'Dos Pueblos', Lilian Stewart 'Coronation', Lilian Stewart 'Party Dress', Orkney 'Pink Heather', Ensikhan 'Alpha Orient', Fire Storm Blaze, Bob marlin Lucky
7.	*Dendrobium*	Emma White, Thongchai Gold, July, Eruka, Sonia-17, Sonia-28, Kasem White, Madam Pompadour, Bangok Blue, Ann, Gold Twist,Candy Stripe Pink, Genting Blue, Bengal Beauty, Sakura Pink, Candy Stripe, Burana Charming, Blue Fairy, Channel, Nette White
8.	*Mokara*	Walter Oumae 'Seksan', Thailand, Sayan, Walter Oumae 'Royal Sapphire', Susan 'Orange', Walter Oumae 'Calypso' , Eng Ling, Madame Panne, Mak Chin On, Bangok Gold, Bibi, Chao Praya Gold, Chark Kuan Orange, Chark Kuan Pink, Chark Kuan Rose, Chark Kuan Super, Dinah Shore, Kelvin Red, Kelvin Orange, Luenberger Gold, Margaret Thatcher, Pink Star, Sayan, Sayang Pink, Walter Oumae, WTO, Jiti, Happy Beauty, Salaya Gold
9.	*Odontoglossum*	Carroll, Ismene, Cynthia Hill, Mayapan, Quito, Italian Job

Table 1. Common varieties and hybrids under different genera of orchids (contd.).

Sr. No.	Genus	Hybrids/Varieties
10.	*Oncidium*	Aloha Iwanga Dogasima, Goldiana, Gower Ramsey, Golden Shower, Sum Lai Who Jungle Queen, Taka H & R, Sharry Baby Sweet Fragrance AM/AOS, Golden Glow, Popki Red, Irine Gleason Red, Vision Brownish Red, Catherine Wilson x New Calidonia Brownish Red, Robson Orchid Glad
11.	*Paphiopedilum*	Niveum, Concolor, *P. rothschildianum* (3 to 5 flowers), *P. sanderianum* (3 to 5 flowers), Prince Edward of York, Michel Kooppwitz, Saint Swithin, Mount Toro, Sorcerers Apprentice, Grande, Don Wimber, Elizabeth March, Hanne Popow, Jason Fischer, Living Fire
12.	*Phalaenopsis*	Taisuco Crane, Taisuco Kochdian, Cygnus, Yukimai, Sogo Musadian, White Dream, Florida Snow, Nobby's Pink Lady, Minho Valentine, Minho King Beauty, New Cinderella, Taisuco Firebird, Sogo Smith, Carol Campbell, Emil Giles, Brother Lawrence, Taipei Gold, Golden Bells, Sogo Managers, Brother Passat, Be Glad, Cassandra, Vilind, Carmelas Pixie, Zuma's Pixie, Timothy Christopher, Be Tris, Quevedo, Strawberry, Detroit, Maki Watnabe, Kaleiodoscope
13.	*Renanthera*	Brookie Chandler, Manila T-Orchids, Kilauea, Mok Yark-Seng, Poipu, Tom Thumb, Datin Blanche, Red Leopard, '20th WOC Singapore-2011', 'Bart Motes'
14.	*Renantanda*	'Forever Yvonne', 'Inspiration Ng Teng Fong', 'Ladda Glow'; 'Polyetheramine Singapore', 'Momon Shija', 'Paul Gripp', 'Science Arts', 'Memoria Charles Darwin', 'Prof. G.J. Sharma', 'Kebisana Shija', 'Mary Motes', 'Kofi Annan'
14.	*Rhynchovanda*	'Wilton Hill', 'Jammie Harper', 'Apichart', 'Noo Noi', 'Peter Draper', ' Brighton's Albino', 'Prairie Lady'
15.	*Vanda*	Annette Jones, Antonio Real, Golamcos Blue Magic, Fuch's Charmer, Jimmy Millers RF Orchids, Keree Delight, Memoria Lyle Swanson, Motes Indigo x Merrillii, Motes Honeybun, Motes Primerose, Miss Joaquim,V. Rothschidiana, VTMA –Red, Pink, White, Vasco, Johnny Miller,Veerawan, Roberts Delight, Rasriprai, Pat Delight, Pakchong Blue, Mimi Plammer, Manuvade, Lumpini Red, Kultana Gold x Thongchai Gold, Fuchs Delight, Charles Goodfellow, Pine River, Adisak, Doctor Anek, John Club, Bill Sutton, Ellen Noa, Emily Notley, Evening Glow, Honomu, Honolulu, Hilo Blue
16.	*Vascostylis*	Paragon Joy x Kasems Delight, Precious, Veeraphool, Crown Fox 'Red Yen', Aroon Fairy, Viboon Velvet, Chao Praya Lime', 'Lanna Rosy', 'Jeans Delight', 'Bay Sapphire', 'Spring Hill'

Tribal people use wild orchids for a variety of folk medicine as orchids are rich in alkaloids, flavonoids, glycosides, carbohydrates and other phytochemicals (cf. Pathak *et al.,* 2010; Rao, 2004). Some of the common medicinal orchids are mentioned in Table 2.

Many medicinal orchids are rich in alkaloids. Experimental evidences have reported on the isolation of a number of alkaloids like anthocyanins, stilbenoids and triterpenoids from orchids. Orchinol, hircinol, cypripedin, jibantine, nidemin and loroglossin have been reported from orchids. Some of phytochemicals isolated from orchids along with active ingredient are listed in Table 3.

Fragrant orchids are delightful in the outdoor living areas. *Brassavola* species are perfumed at night and the Australian native dendrobiums perfume the air on warm spring mornings. Other aromatic orchids are *Aerides multiflora, A. odorata, Aeranthes, Bulbophyllum odoratissimum, Cattleya maxima, Coelogyne cristata, C. ochracea, Cymbidium densifolium, Dendrobium nobile, D. chrysotoxum, Epidendrum cristatum, E. floribundum, E. nocturnum, Phaius tankervilliae, Rhynchostylis retusa, Vanda cristata, V. tesselata* and, *Zygopetalum intermedium*.

Leaves, tubers and pseudobulbs of different species are used for edible purposes. Vanilla- a major spice crop and source of vanillin comes from *Vanilla planifolia*. *Anoectochilus* leaves are used as vegetables in Indonesia and Malaysia. Pseudobulbs of *Cymbidium madidum* and *Dendrobium speciosum* and tubers of *Microtis uniflora* and *Caladenia carnea* are eaten. The popular beverage called as *Faham* or *Madagascar Tea* on the islands of Mauritius and Madagascar is prepared from orchid *Jumellea fragrans*. The tubers from the orchid genera like *Acianthus*, *Dipodium, Glossodia, Lyperanthus, Prasophyllum* and *Thelymitra* have been used as food by the inhabitants of Australia. In Africa, the tubers of *Cynorchis, Disa, Eulophia, Habenaria* and *Satyrium* are used as food or to extract juice from them. Roots, tubers or rhizomes of

Table 2. Some of the common medicinal orchids.

Species	Part(s) Used	Uses
Acampe papillosa	Roots	Used for curing rheumatism, sciatica and uterine diseases
Aerides multiflora	Tubers	Used as anti-bacterial
A. odorata	Fruits, leaves	The ground fruit is used for healing wounds; juice of leaves is used to heal boils in ear and nose
Anoectochilus formosum	Tubers	Used for curing hepatitis, hypertension, cancer
Arundina graminifolia	Stems	Bulbous stems are used to heal cracks
Bletilla striata	Pseudobulbs	Used as anti-bacterial, anti-inflammatory, demulcent, skin styptic
Calanthe discolor	Whole plant	Used for hair restoring
Cymbidium aloifolium	Whole plant	Ground plant is used to cure chronic illness, weakness of eyes, vertigo and paralysis
C. aloifolium	Rhizomes	Salep is used as nutrient and demulcent and as emetic and purgative
C. ensifolium	Rhizomes and Flowers	Used for curing eye sores
C. giganteum	Leaf juice	Used for blood clotting
C. longifolium	Pseudobulbs	Used as emetic and demulcent
Dendrobium chrysanthum	Leaves	Used as antipyretic, Immuno regulatory and for curing skin diseases
D. densiflorum	Leaves	Leaves are crushed into paste with salt and applied on fractured area to set bones
D. loddigesii	Leaves	Used as stomach tonic
D. moschatum	Leaves	Leaf juice is used as ear drops
D. nobile	Stems	Fresh and dried stems are used in preparation of Chinese drugs for longevity and as aphrodisiac, stomachic and analgesic
Habenaria acuminata	Roots	Roots are used as tonic
H. edgeworthii	Leaves and roots	Used for curing blood diseases
H. intermedia	Leaves and roots	Used for curing blood diseases
H. pectinata	Leaves and tubers	Used for curing arthritis
H. repens	Tubers	Used as aphrodisiac
Malaxis acuminata	Pseudobulbs	Used as tonic and as a cure for tuberculosis, burning sensation, fever and also for enhancing sperm production
Orchis laxiflora	Bulbs	Used for curing diarrhoea, bronchitis, convalescence
Pholidota chinensis	Pseudobulbs	Used for curing scrofula, toothache and stomachache
P. imbricata	Pseudobulbs	Psedubulbs are mixed with mustard oil and applied on joints for curing rheumatic pain
Rhynchostylis retusa	Roots	Roots are effective against rheumatism, asthma, tuberculosis, cramps, epilepsy, vertigo, kidney stone, menstrual disorder
Vanda coerulea	Leaves	Leaf juice is used against diarrhoea, dysentery and external application for skin diseases
V. cristata	Leaves	Leaves are used as tonic and expectorant
V. spathulata	Flowers	Used for curing asthma
V. teres	Leaves	Leaf paste to reduce temperature in fever
V. tessellata	Whole Plant	Used for curing fever, arthritis, rheumatism and bronchitis

Eulophia, Gastrodia, Habenaria, Orchis, Pholidota, Platanthera and *Spiranthes* are used as food in Asia. Tubers of *Disa engleriana, D. robusta* and *D. zambica, Habenaria clavata, Satyrium ambylosacco, S. buchananii* and *S. carsonii* are used as foods in Malaysia. In Bhutan, the inflorescence or the flowers and pseudobulbs of *Cymbidium* spp. are eaten.

Cilindra is a gift of a glass flute containing a flowering mini *Cymbidium* and Stylish setting is a festive packaging for special occasions like Birthday.

People of Assam and Arunachal Pradesh use *Aerides odorata*, *Papilionanthe teres, Rhynchostylis retusa, Vanda roxburghii,* and many *Dendrobium* species in

Table 3. Orchids and phytochemicals.

Species	Phytochemical class	Phytochemical(s)
Aerides crispum	Phenanthropyran	Aeridin
Agrostophyllum brevipes	Triterpenoid	Agrostophyllinol
A. callosum	Triterpenoid	Isoagrostophyllol
		StilbenoidsOrchinol, 6-methoxycoelonin, imbricatin, flaccidin, oxoflaccidin, oxoflaccidin, isooxoflaccidin, flaccidinin, agrostophyllin, callosin, callosinin, callosumin, callosuminin, callosumidin
Anoectochilus formosanus	Glycoside	Kinsenoside
Arundina graminifolia	Stilbenoids	Arundinan
Bulbophyllum gymnopus	Phenanthrene	Gymopsin
Cypripedium calceolus, C. pubescens	1-4 phenanthrenequinone	Cypripedin
Dendrobium macraei	Alkaloid	Jebantine
D. moschatum	Phenanthrene	Rotundatin and moscatin
D. nobile	Bibenzyl	Gigantol Bibenzyl Moscatilin Alkaloid Dendrobine
Dracula chimaera	Anthocyanins	
Eulophia nuda	Phenanthrene	Nudol
Nidema boothi	Triterpenoid	Nidemin
Orchis latifolia	Glucoside	Loroglossin
Vanda roxburghii	Glycoside	Melianin

their religious and cultural festivals. In Assam, the flowering spike of *Rhynchostylis retusa* known as *Kopou Phul* is used by the girls to adorn their hair during the spring festival. The flowers of some other orchids like *Coelogyne nitida* and *Vanda roxburghii* are also used to adorn hair of girls of Assam and Arunachal Pradesh in local festivals. The flowers of *Papilionanthe teres* are offered to Lord Buddha and spirits by the Khamtis and other Tai ethnics of Assam and Arunachal Pradesh. In Kameng district of Arunachal Pradesh, *Dendrobium hookerianum*, *D. nobile* and *D. gibsonii* are considered as the symbol of purity and sanctity by the local people. Monpas consider the flowers of *Cymbidium grandiflorum* important for holy worship. The young naga women of Manipur wore the orange flowers of *Dendrobium densiflorum* behind their ears. Similarly, the flowers of *Vanda coerulea* are used by the women of Manipur in hair during the autumn puja festival. In several countries, orchid species and hybrids are used as National Flowers. For example, *Vanda* Miss Joaquim in Singapore, *Peristeria elata* in Panama and *Lycaste skinneri* var. *alba* in Guatemala. Orchids are depicted on stamps of several countries like Venezuela, USA, New Zealand, Australia, Indonesia, India, Singapore, Japan, Russia, Thailand, Malaysia and many others (Bhattacharjee and Das, 2008).

As orchid flowers are highly attractive, delicate and available in variety of colours, they can also be preserved by drying for their use in flower arrangement and dried flower craft. These can be dried best using silica gel for microwave drying or by freeze drying. Drying orchids is a challenging task as these flowers are considered difficult to be preserved. Dried orchids are used for different purposes such as the dried orchids, for use in vases and baskets and sometimes in shadow boxes. Bright flowers of orchid genera like *Cattleya, Cymbidium, Dendrobium, Paphiopedilum* and *Pholidota etc*. can be used for drying.

As the orchids symbolize wealth, beauty and social status, orchid flower arrangements are used for good table decorations and venue decorations during weddings. Amongst orchids, *Cymbidium, Dendrobium* and *Phalaenopsis* are excellent for wedding counter-pieces. An arch decorated with chic white silk combined with white orchids can be considered as an

admirable orchid flower arrangement. In home, they can be displayed in three ways *i.e.,* single flower vases, plants in pots and traditional mixed flower arrangements. In Philippines and New Guinea, the stem of some Dendrobium species is used to make baskets and bracelets. In some tribes, *Cattleya labiata* var. *autumnalis* sap is used as glue for musical instruments. In Central America, the schomburgkias empty pseudobulbs are used to make horn.

Conclusion

The cut-flower industry is one of the higher industries in many developing and underdeveloped countries. The orchids are marketed both as potted plants and as cut-flowers. In the past few years, the orchid trade has increased both in volume and value throughout the world. In floricultural crops, orchids account for 3% of the total cut-flower production. As the orchids symbolize wealth, beauty and social status, the use of orchid flower arrangements has increased tremendously for good table decorations and venue decorations during weddings and other functions. Besides this aspect, orchids are also used by local populations for curing a variety of ailments. An orchid grower should be very careful while selecting the potential species to be grown in a particular region, their perfect growth conditions and suitable potting substrate for the suitable growth and production of these floriculturally and medicinally important species.

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