

## Versatility of orchids – Exotic bloom

**Orchids are one of the largest families of flowering plants and are globally distributed. With a delicate, sculptural beauty and historical rarity, these exotic blooms carry an unrivalled symbol of refinement, luxury and mystery. There are more than 25,000 different types of orchids existing naturally among which 99% are accessible and available for cultivation, while 1% of tropical varieties still grow in virtually inaccessible habitats and have only been seen a handful of times.**

ORCHIDS come in every colour of the rainbow, with the exception of one. Whatever the occasion or mood, it is likely that there is a colour of orchid to express it. Orchids bloom in every colour—from deep fuchsia to white to green—except black and although they're rare, there are even true-blue orchids, and ones that bloom in dual colour combos like lavender and pink or green and yellow. That's just one of many reasons why orchids can be so versatile, acting as stand-alone centre-pieces or as exotic additions to other arrangements.

### Cultural ornamental uses

Chiefly orchids cultivation has come in vogue for the enjoyment of flowers. Along with all tropical and subtropical orchids, some of the temperate species like *Ophrys apifera* (bee orchid), *Gymnadenia conopsea* (fragrant orchid), *Anacamptis pyramidalis* (pyramidal orchid) and *Dactylorhiza fuchsii* (common spotted orchid) are also available in the market. Orchid flowers admiration both for ornamental value and cultural, religious ceremonies too is evinced since time immemorial. For example, flowers of *Dendrobium maccarthiae* Thwaites are used as special temple offerings in Sri Lanka, and flowers and pseudobulbs of species of *Laelia* Lindl. are used in Mexican Day of the Dead ceremonies. Owing to augmented trend of growing unusual small-flowered orchids often referred as 'Botanical orchids' in parallel with common 'Florist' orchid, enormous species (around 1700-2000 species) of *Pleurothallis* and *Bulbophyllum* are now added in the wishlist of orchid hobbyists to nourish their aesthetic sense.

### Cultural symbolism

Orchids have many associations with symbolic values. For example, the orchid is the City flower of Shaoxing, China. *Cattle yamossiae* is the National Venezuelan flower, while *Cattleya trianae* is the National flower of Colombia. *Vanda* var. 'Miss Joaquim' is the National flower of Singapore, *Guarian theskinneri* is the National flower of Costa Rica and *Rhyncholaelia digbyana* is the National flower of Honduras. *Prosthechea cochleata* is the National flower of Belize, where it is known as the 'black orchid'.

*Lycaste skinneri* variety 'alba' is the National flower of Guatemala, commonly known as 'Monja Blanca' (White Nun). Panama's National flower is the 'Holy Ghost orchid' (*Peristeria elata*). *Rhynchostylis retusa* is the State flower of the Indian state of Assam where it is known as Kopou Phul. Furthermore, *Bulbophyllum auricomum* Lindl. is the National flower of Myanmar while its similar species, *B. sukhakulii* Seidenf. is often used for hair adornment purpose.

### Medicinal uses

The orchid family is probably the most vital plant families from a horticultural point of view. Other than its horticultural contribution, this family is notably lacking in species from which products are derived. Once an expensive and highly demanded commodity, orchids were believed to have healing, disease-fighting and protective properties. The reconnaissance and ethnobotanical survey made in Kasungu and Mzimba districts of Africa during 2009 revealed that 61% orchids are used for treating a number of diseases. For instance, tubers of *Disa englerian*, *D. robusta*, *D. zombica*, *Hebenaria clavate*, *Satyrium ambylosaccos*, *S. buchananii*, *S. cursonii*, etc. are used for treating fortanelle, coughing, abdominal pains, heart attack, eye sores, ring worm, rheumatism and kidneys. In traditional Chinese medicine, the orchid is employed to aid in cure coughs and lung illnesses. In ancient Greece, there was a myth that to preserve the family tradition, orchid flowers have inestimable value owing to their virility and male fertility properties. 'Aztecs', a drink made of mixture of *Vanilla* orchid flowers and chocolate, for strength issues while the Victorians were so mystified by the orchid's irresistible beauty that they collected and displayed them like treasures.

Various other orchids are used for a variety of folk medicines and cures. In the West Indies, the bulbs of *Bletia purpurea* are boiled, and the liquid is thought to cure poisoning from fish. In Malaysia, women take a drink made from the boiled leaves of *Nervilia aragoana* to prevent sickness after childbirth. In Melaka, a state in western Malaysia, boils are treated with a poultice made from the entire plant of *Oberonia anceps*. In Chile, *Spiranthes diuretica* is known to be a strong diuretic. In



*Phalaenopsis bellina*



Vanilla orchid flower



*Bulbophyllum*



*Cattleya* orchid



*Dendrobium* orchid



*Laelia speciosa*

certain parts of Ecuador, the mucilage from *Catasetum* is thought to be good for broken bones. Various *Dendrobium* spp. received attention in Chinese traditional medicine particularly *D. catenatum* Lindl. (including *D. officinale* Kimura & Migo), *D. loddigesii* Rolfe, *D. moniliforme* (L.) Sw. and *D. nobile* (Lindl.). Other than the above, tubers of *Gastrodia elata* Blume (from which tian-ma is prepared), rhizomes of *Bletilla striata* (Thunb.) Rchb.f. (from which bai-ji is derived), the rhizomes and stems of *Anoectochilus* spp. (jin-xian-lian) and the corms of *Cremastra appendiculata* (D. Don) Makino, *Pleione bulbocodioides* (Franch.) Rolfe and *P. yunnanensis* (Rolfe) Rolfe (from which shan-ci-gu is prepared) too have some potential clinical significance.

Around 94 species of orchids counting *Crepidium acuminatum* (D. Don) Szlach., *Habenaria intermedia* D. Don, *Herminium edgeworthii* (Hook. f. ex Collett) X.H. Jin, Schuit., Raskoti & Lu Q. Huang and *Malaxis muscifera* (Lindl.) Kuntze have significant role in ayurvedic medicines. *Eulophia* spp. (*E. dabia* (D. Don) Hochr. & *E. spectabilis*) and

*D. hatagirea* are medicinally valuable in various parts of India, and is used to treat a range of ailments. The latter one is abundantly available in north-eastern Himalayan region of Sikkim while *Paphiopedilum druryi* endemic to South India become critically endangered for its relentless harvesting to meet the medicinal demand.

#### Edible orchids

Apart from its medicinal uses, orchids could also be utilized as source of foods for the nutrient rich content (Table 1) having global importance such as vanilla flavourings (extracts of *Vanilla* Plum. ex Mill.). The dried seed pods of *Vanilla* (especially *Vanilla planifolia*), are commercially important as a flavouring in baking, for perfume manufacture and aromatherapy. Except this species, the hybrid *Vanilla* × *tahitensis* J W Moore is the second most cultivated one. The principal vanilla-growing areas are Madagascar, Mexico, French Polynesia, Réunion, Dominica, Indonesia, the West Indies, Seychelles, and Puerto Rico.

Some other edible products are used on national and regional scales. Processed orchids are eaten either as relish or just as a snack. In south-eastern part of Africa, edible orchids are popular as ‘*Chinaka*’, a delicacy which shields from several diseases, and furnishes energy. The most preferred orchid species resides to 3 genera namely *Disa* sp. P.J. Bergius, *Habenaria* sp. and *Satyrium cursonii* L., but *Brachycorythis* Lindl., *Eulophia* R.Br. & *Roeperocharis* Rchb.f. could also be used to feed. In general, female orchids are preferred over male. Mixing of female and male orchids improve quality (texture and colour) and taste. The quality of ‘*Chinaka*’ is also influenced by expertise and experience in cooking. It involves cleaning the tubers and pounding them in a mortar using a pestle. The pounded tubers are then cooked together with a locally made baking powder ( $\text{NaHCO}_3$ ) for a few minutes until a hard-starchy substance is produced. Upon cooling, the starchy substance becomes thick and viscous followed by cut into small pieces and cooked with groundnut sauce, or tomatoes. The cooked pieces can also be simply eaten as a snack. On the other hand, few species of *Habenaria* Willd., called ‘Napssié’ also employed for preparing similar dish by Bayam people in Cameroon.

The underground tubers of terrestrial orchids [mainly *Orchis mascula* (early purple orchid)] are ground to a powder and used for cooking, such as in the polysaccharide-rich hot beverage ‘Salep’ or in the Turkish frozen treat ‘Dondurma’. The name *salep* has been claimed to come from the Arabic expression ‘asyu al-tha’lab’, ‘fox testicles’, but it appears more likely the name comes directly from the Arabic name ‘sa lab’. The similarity in appearance to testes naturally accounts for *salep* being considered an aphrodisiac. To prepare *salep*, tubers are treated with water, milk or ayran (a yoghurt-based drink) to make it enzymatically inactive followed by drying and pounding them into powder. It could be also used as ice cream called ‘*mara dondurma*’. At least 35 species of orchids are used to make *salep*, including species from the genera *Anacamptis* Rich., *Dactylorhiza* Neck. Ex Nevski, *Himantoglossum* Spreng., *Ophrys* L., *Serapias* L. and *Steveniella* Schltr.

Some saprophytic orchid species of the group *Gastrodia* produce potato-like tubers and are consumed as food by native people in Australia and can be successfully cultivated, notably *Gastrodia sesamoides*. Wild stands of these plants can still be found in the same areas as early aboriginal settlements, such as Ku-ring-gai Chase National Park in Australia. Aboriginal people located the plants in habitat by observing where bandicoots had scratched in search of the tubers after detecting the plants underground by scent. The dried, aromatic leaves of *Jumellea fragrans* and *J. Rossii* Senghas are used to flavour rum (trades as *Faham*) on Reunion Island and Mauritius. Leaves are also used for the production of ‘Bourbon tea’ (*thé de Bourbon*) or ‘Madagascan tea’ (*thé de Madagascar*).

Apart from this, in various parts of the world, certain orchids are also used for food or food supplements. In Malaysia, the leaves of one species of *Anoectochilus* are sold as a vegetable, and the leaves of *Dendrobium salaccense* are cooked as a seasoning with rice. In certain parts of the Asian tropics, the tubers of some species of *Gastrodia*

**Table 1.** Food composition of raw edible orchids

| Food component                  | Composition (in terms of 100 g of edible portion) | Measure    |
|---------------------------------|---------------------------------------------------|------------|
| Food energy                     | 115                                               | Calories   |
| Moisture                        | 70                                                | Per cent   |
| Protein                         | 1.3                                               | Grams      |
| Fat                             | 0                                                 | Grams      |
| Carbohydrates (including fibre) | 27.6                                              | Grams      |
| Ash                             | 1.1                                               | Grams      |
| Calcium                         | 48                                                | Milligrams |
| Iron                            | 7.8                                               | Milligrams |

are eaten like potatoes. Throughout the world, only few species of orchids are used as a glue substitute. In most cases, the glue is derived from the pseudobulbs. As for example, the mucilage extracted from pseudo-bulbs of *Prosthechea cochleata* (commonly known as ‘Black Orchid’), is used as glue for repairing wooden objects, ‘Tzauhtli’ is a type of glue extracted from the pseudo-bulb of *Laelia autumnalis*, an epiphytic orchid used as adhesive for feather mosaics.

### Novel fragrance genes of orchids

Orchids are devoid of any fragrance but still they are admired by the consumers owing to their unusual floral structure. But definitely the floral scent will be a supplemental component to enhance consumers’ preference and attract pollinators (like bees, wasps, humming birds etc.). Very recently, researchers found that TF PbbHLH4 regulates the geranyl diphosphate synthase gene for monoterpenoid synthesis in *Phalaenopsis bellina* while MYB1 has been identified as phenylpropanoid gene regulator in *Cymbidium* species. Both these genes are responsible for floral scent profiles.

### Future prospects

Versatility and diversity of orchid plants have clinched the attention to explore this unique group of plant in diversified arena. Despite having broad-array of socio-economical and ethno-botanical importance, its secured position is yet to be made in mainstream commercial trade. But illegal harvesting and non-sustainable use of majority of orchid species has noticeably put their existence in question. In this backdrop, to reap the utmost benefit of this taxonomically unique group of plants, appropriate conservation is mandatory. Their horticultural, nutritional, pharmaceutical and cultural importance may open several promising vistas to enrich the national economy. Hence, some stringent legal-regulatory action could strengthen orchid conservation which consequently will facilitate to unveil the potential of orchids at different scales.

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