Aromatic Orchids Promotion in the World – an Overview

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Abstract
Orchids are extremely diverse not only in color, size, and bloom shapes, but also in the way they smell. Orchid fragrance is a relatively volatile substance found in plants. It is stored as essential oils in special cells (osmopheres) at the periphery of flowers, leaves or roots. It has been estimated that as many as 75% of all orchids are fragrant. The emit detectable chemical compounds – some extremely fragrant while in some instance they are extremely repulsive smells. Only some of the odoriferous compounds released by flowers are detectable by the human sense of smell, since these are complex substances closely related to the body chemistry of the pollinators, they are supposed to attract. Nowadays due to increasing awareness towards aromatic products, there is tremendous pressure on all regions belonging to aromatic plants. Almost orchid's fragrances are sweet and pleasant, but some can even be revolting and smell of rotting meat. For some of them, the potential risk of over-exploitation led to their inclusion in CITES. In this review, we will talk about some varieties that are best known for their pleasant smelling fragrance. Only small amounts are present as the substance can be toxic. Being volatile, they readily change into vapour at ordinary temperature, which allows us to smell them. Since people are under stress especially in crowded cities, growing aromatic plants is necessary as a main factor to decrease the mentally pressures.
***Keywords*: Scent, olfactory, Fragrance, Chemical investigation.**

Introduction

The aim of trapping and analyzing orchid scents, is to gain as clear an insight as possible into the composition of these scents and the structures of the individual scent information caries. It is still not possible, despite the highly sophisticated analytical system currently available, to identify all the olfactorily important composition in the scent. Over 25000 known orchid species represent at least 7-9% of all flowering plants. Thereby constituting the family with the greatest number of species. More than 94-95% of species concentrated in the tropics and subtropics which suitable for raising in Iran, especially near populous cities. Some 5% of orchid species are located in temperature zone. By the 1970s, methods of instrumental analyses-particularly capillary gas chromatography and mass spectrometry had reached such a high level of sensitivity that the scent given off by the living flower could be captured directly and the resulting samples subjected to analytical investigations (Roman Kaiser, 1993). Being volatile, it readily changes into vapour at ordinary temperature, allows us to smell them. Among angiosperms, the orchids possess exquisite flowers of myriad shapes, sizes, and colors and represent one of the largest and highly evolved groups of flowering plants with unmatched ornamental potential. Besides contributing tremendously to the growth and development of international trade in floriculture, the orchids are also highly reputed for their therapeutic properties and are extensively used in the local systems of medicine to cure a variety of human ailments. Some species are self-compatible but largely outcrossing and the strong, sweet floral scent is important to attract pollinators. In a recent investigation, six scent compounds (mostly aromatics) were shown to elicit electrophysiological (EAD) responses in olfactory neurons of pollinator insects, and one of these compounds (phenylacetaldehyde) was also found to attract pollinators in the field (Karin Gross, 2016).

Since time immemorial Himalaya is famous for its rich medicinal and aromatic plant biodiversity, which many of them are orchids with different scents. Nowadays due to increasing awareness towards herbal products, there is tremendous pressure on Himalayan medicinal and aromatic plants. In this region no serious attempts are made for commercial scale cultivation of these important plants, especially medicinal and aromatic plants of high altitude areas (Pandey *et al.,* 2015).

Orchids fragrance is a relatively volatile substance found in plants. It is stored as essential oils in specials cells (osmopheres) at the periphery of flowers, leaves or roots. Only small amounts are present as the substance can be toxic to the plants. These fragrance oils consist of volatile compounds (table 1). Being volatile, is readily changes into vapor at ordinary temperature, allows us to smell them.

Table 1. Important aromatic chemicals and fragrant in some orchids.

Aromatic species	Aromatic chemicals
Brassavola nodosa, B. digbiana	Cineole medicinal (citronellol rose-like)
Cycnoches chlorochilon, C. ventricosum, C. varscewizii, C. loddigessi, Stanhopea grandiflora, S. reichenbachiana, S. tricornis	Benzyle acetate (jasminae)
Catasetum discolour	d-carvone (rye bread)
Catacetum collare, C. candida, C. gnomus	Methyl salicylate (wintergreen)
Catasetum roseum, Gongora quinquenervis, Stanhopea saccata	Methyl cinnimate
Gongora quinquenervis	Eugenol
Stanhopea cirrhata	1, 8-cineole
Brassavola digbiana, Gongora quinquenervis	Linalool

Moreover, about 21,000 plant species, most of them orchid and cacti species, are subject to CITES controls. For an extended period of time, the rationale for including plant species in one of the CITES Appendices has been almost exclusively their threat owing to international horticultural trade (table 2). Recent years have seen a growing awareness of the threats faced by plant species used as a source of medicines, herbal remedies, cosmetics and dyes. The unprecedented boom in the demand for plant-based medicines, the increasingly global nature of trade, the surprisingly high proportion of wild-harvested plant species, and their relatively low prices have resulted in growing pressure on the wild plant populations. For some of them, the potential risk of over-exploitation led to their inclusion in CITES. Not less than seven additional plant species involved in medicinal and aromatic plant trade were included in the CITES Appendices at the 9th and 10th CITES Conferences of the Parties in 1994 and 1997.(Lange Dagmar and Uwe Schippman. 2000; Uwe Schippmann, 2001)

Table 2. Number of species in plant groups listed in CITES and II

Plant group	Appendices I	Appendices II
Succulents	108	2424
Orchids	53	17500
Carnivorous plants	5	82
Other horticultural plants	43	789
Medicinal plants	1	13
Timber producing taxa	7	6
Total	217	20814

The German Federal Agency for Nature Conservation has developed a training module on medicinal and aromatic plant species included in the CITES Appendices to assist national CITES authorities in efficiently implementing the Convention (Lange, 1998, Uwe, 2001).

Scent production

Fragrance are reduced in specialized glands (osmopheres) which can be located anywhere on a flower or bud, depending on function. These are glands of intense physiological activity and are a large drain on the plants energy. When non-fragrance flowers became isolated geographically fragrance may evolve as a pollinator attractant. There is, for example, a fragrant form of *Phalaenopsis amabilis* from New Guinea, although all other known forms of the species from other lactations are without scent. All flower parts can produce odours, from sepals and petals to calluses and basal spurs Osmopheres in orchids may be diffuse and function only in very general attraction, or they are confined to certain regions of the flower so that pollinators are attracted to these specific areas and collect or deposit pollinia in the process (Roman Kaiser, 1993). Being volatile, it readily changes into vapour at ordinary temperature, allows us to smell them (De *et al*. 2015). Scent glands are most often situated on the lip - e.g. *Standhopea*, *Herschelia* and *Catasetum*. Members of the *Catasetinae* and *Gongorinae* subtribes produce the most voluminous quantities of scent knowns amongst orchids. The fragrance of *Catasetum* flowers is interrupted within a few ours pollination to conserve energy by limiting osmophoric activity. The intricate flowers of the scented Gongoras last only for 2 or 3 days compensate for these by several opening in succession. It is found that if the lip (where the scent is produced) is removed, the flower lasts for 2-3 weeks.

Examples of Aromatic Orchids

Aromatic Plants (APs) play a valuable and important role in economic, social, cultural and ecological aspects of local communities all over the world. Today, in many developing and transition countries these species make an essential contribution to health care, providing the only effective medicine for the significant proportions of the population, where other forms of medication are either unavailable or unaffordable. An estimated 80 percent of the population in Africa and Asia rely largely on these plant-based drugs for their health care needs, and the WHO (2008) has estimated that in coming decades a similar percentage of the world

population may well rely on plant-based medicines and aromatic (Elaine Marshall, 2011). *Aeranthes*, *Aerides multiflora*, *A. odoratum*, *Angraecum distichum*, *Bulbophyllum odoratissimum*, *Calauthron bicornutum*, *Cattleya maxima*, *Coelogyne cristata*, *C. ochracea*, *Cycnoches chlorochilon*, *Cymbidium ensifolium*, *Cyrtorchis arcuate*, *Dendrobium anomum*, D. *nobile*, *Diaphanante frantissima*, *Disacooperi*, *Epydendrum cristatum*, *E. floribundum*, *E. octurnum*, *Eria hyacinthoides*, *Lycaste* aromatics, and *L. cruenta*, *L. locusta*, *Masdevallia glandulosa*, *M. triangularis*, *Maxilaria tenuifolia*, *Mystacidium capense*, *M. venosum*, *Oncidium spaceolatum*, *Rhynchostylis retusa*, *Vanda cristata*, *V. tessellata Zygopetalum* are intermedium. (Leticia, 2015).

Some aromatic sources reported as perfume attractants for the *Euglossini* include tree trunks (Rebêlo and Garófalo 1991), rotting wood (Whitten *et al.,* 1993), roots (Ramírez *et al.,* 2002), fungi (Cappellari and Harter-Marques 2010), leaf surfaces (Pemberton and Wheeler 2006) and also the hind leg of conspecific males (Medicinal Plant Specialist Group. 2007, Carvalho Filho 2010, Pokorny *et al.,* 2013).

Orchids fragrance may change throughout the day both quantitatively and qualitatively from day to day: *Clowesia rocia* smells of Vicks Vapo rub in the morning and cinnamom in the afternoon. *Catacetum expansum* smells of turpentine in the morning and rye bread in the afternoon. Bee pollinated flowers are fragrant early in the day. *Cattleya luteola*, for example, is very fragrant between 4 & 8 am. Some orchids such as *Epidendrum difforme* are moderately fragrant throughout the day with a peak fragrance production at night. Other such as *Epidendrum falcatum*, change fragrance quality and intensity during the day, from the delicate, haunting scent of *jasmine* in the morning to a stronger note resembling that of Easter *lilies* or *narcissi* during the afternoon. Although *Vanilla planifolia* is one of the most important orchids in the world because of the aromatic and flavoring properties of their fermented pods, the medicinal use has faded over the centuries in Mexico. It is native to Mexico and is grown commercially in Veracruz on a small scale (Leticia *et al*. (2015).

Previous studies (Dodson *et al.,* 1962; Dressler, 1982), we cannot exclude the foraging for lipids from the glandular trichomes since both trichomes types are distributed on the same petal lobe region. These findings reinforce the hypothesis raised by Cappellari *et al.,* (2010) that the use of such lipids could prevent the loss of perfume through evaporation. This idea concurs with that of Eltz *et al.,* (2008), who stated that some orchid bees have quite an efficient mechanism of using and recycling lipids to dissolve the volatiles to accumulate and concentrate their perfume (Medicinal Plant Specialist Group. 2007).

In conclusion, for saving and developing aromatic plants especially orchid species, we find out that, *in vitro* culture techniques offer a viable system for true-to-type rapid mass multiplication and germplasm conservation of rare, endangered, threatened, aromatic and medicinal plants (Arora and Bhojwani 1989; Sharma *et al.,* 1991; Jawahar *et al.,* 2008b). Jumellea fragrans and Jumellea rossii, both named "Faham", are two epiphytic orchids endemic to the Mascarene Islands (Reunion, Mauritius) widely used for their aromatic and medicinal properties. Cultivation of these orchids is currently non-existent, so gathering and poaching in natural populations provide the supply (Roman Kaiser, 1993).

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