THE ORCHID SOCIETY OF KARNATAKA

e- Newsletter
TOSKAR

21st June 2016

From the Editor's Desk

21st June 2016

The highlight of this issue is the much awaited write up on the exclusive Terrace Garden of our dear friend Nageshwar whose weekly posts of exquisite photographs of the orchids he nurtures in his roof top garden are a feast to us all at TOSKAR.

Looking at the profusion of those eye-catching photos week after week, I presumed Nageshwar must be living in a spacious farm house. Imagine my bewilderment when I visited his home in Basavangudi when he asked me to step into a tiny elevator to reach his terrace.

UNBELIEVABLE! INCREDIBLE!
Space was no constraint at all for him.
Every inch of his not too large terrace has been so economically used to accommodate all those hundreds of luxuriously growing orchids.

Railway sleepers he told me which he hung horizontally to grow all those Phals.
Vertical columns of wood supported scores of other orchids.

Grateful thanks to Dr Shakuntala Manay for her write up on this wonderful Roof top garden and the interview she had with him.

Drs Sastry, Hegde Sri Suresh Kalyanpur and Sriramkumar.

Seldom has there been an issue without some write up or the other by these stalwarts of TOSKAR who are dedicated to the cause of TOSKAR.

Dr Hegde as always comes up with an erudite write up this time highlighting one of the gorgeous terrestrial orchids *Phaius;* and Sureshji instructs us on how to nurture one of the beautiful Dends – *D.thyrsiflorum*.

Dr Sastry educates us on the unique floral morphology and seed germination of orchids.

Sriram Kumar continues to inform the readers about the New Initiatives and the prizes won for the best displays at the BMM and also tells us about the need and use of supplements to grow healthy orchids.

Gayatri Rao regales us with her inimitable write up on the rather uncommon Darwin's orchid.

In another New Inititaive from Toskar, "Orchid of the Quarter" has been introduced.

Ms Gayatri Rao is the first recipient of this honor for her patient nurturing of the very uncommon Darwin's orchid.

Ever obliging Ms Nalini details on the water quality which she very aptly titled Jeeva Jala with very helpful hints.

Last but not least we have the much awaited write up from Dr Divakar about the Orchid Show organized at SJC in February this year.

Vani Hardev Ph.D

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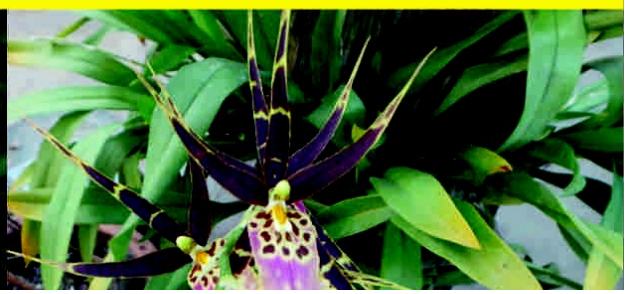
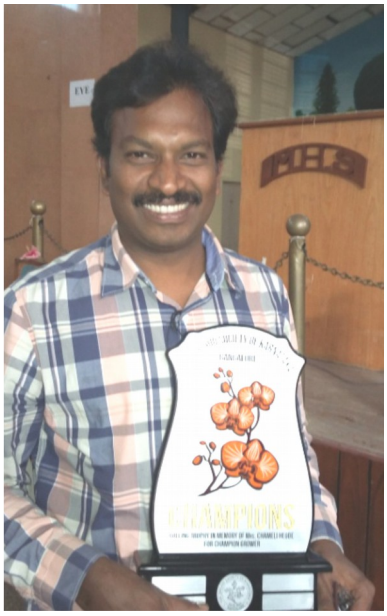
In This Issue:

21st June 2016



NAGESHWAR'S JOURNEY FROM ONION TO ORCHIDS

Dr N. Shakuntala Manay



Here is Nagesh's story, the first recipient of TOSKAR Rolling Shield for the Best Orchid. His interest in growing plants started as a child of eight when he would pick up sprouting onions from Mom's kitchen onion and plant them in the yard and watched them grow into green leeks. This got him into the hobby to grow vegetables. By this time he was 14. Later he turned to growing foliage plants like succulents, *Anthuriums* and Cacti. Thus he dared to enter into annual shows at Lalbagh and won many prizes. In "small homes garden" categories he won eight awards from Urban Art Commission such as "Best Maintained Building & Garden" "Pride of Bangalore" "Role of Honour" etc. Ex-commissioners of Bangalore City Corporation Late N. Laxman Rao and Late Mr. Parthsarathy would visit his house as Judges. He received these prestigious prizes amidst distinguished guests and dignitaries at Rajbhavan.

Trophies gathered so fast that there was no place for them at home. Twenty years ago he got one orchid from Indo American Nursery. Thus he began collecting orchids from Kerala, North East India and Western Ghats. Now on his terrace of 800 sq ft he has 1500 orchids! Among these Dracula Orchid (Monkey face) which grows in cloud mountains of Mexico, Central America and Colombia is one of his special collections, and more than 15 varieties of Carnivorous Plants and many Tillandsias also add to his collection.

A true enthusiast, Nageshwar has paid great attention to ensure quality care for his plants. His greenhouse is totally automated, so if he is not at home for 15 days the timers will take care of fan, foggers, exhaust fans, solenoid valves, Humidifiers & RO systems. With water being a critical element, he collects rain water in a 10,000 liter sump tank which is used for 10-11 months to water the orchids. Light music is played at his greenhouse every alternate hour, he believes that this sound of music is aiding the orchids in reaching their optimum growth.




An interview with Nageshwar:

S M: How did you learn the orchid growing technique?

N: From friends, other hobbyists, books. To begin with I killed many plants. Many say orchid growing is difficult, but for me it is one of the simple plants to manage and needs little care once established. Once it starts blooming it is one of the most enjoyable sights to see.

S M: What were your first collections?

N: They were many, mostly Indian species and some hybrids such as:

Dendrobium nobile, *Dendrobium pierardii* from North Eastern region, *Acampe praemorsa*, *Aerides* species from Karnataka, and later I started collecting from other places. Many Vandas, *Aerides* are from Western Ghats including Madikeri. As these plants were available easily and I started with a number of them. Later, gradually I started collecting several genera such as *Epidendrum*, *Renanthera*, *Phalaenopsis*, *Paphiopedilum*.

Many of the Indian orchids both from NE India and Western Ghats have been identified earlier by Britishers and the species is mainly named after the person - *Paphiopedilum druryi* is named after Britisher Heber Drury; or place. For Example *Eria mysorensis* and *Bulbophyllum mysorense*.

S M: Did you collect other than Indian?

N: Yes, many of the beautiful, rare orchids come from South American countries. Some of them which are in my collection are *Cattleya*, Dracula orchid, *Oncidium*, Ascocenda, Aranda, *Paphiopedilum*.

Each of the orchid genera has a story behind it and it makes an interesting reading.

S M: What is the nature of the feed or food for orchids?

N: Every plant needs all the major, secondary and micro nutrients for their growth and flowering. Orchids also require first NPK in the form of a balanced fertilizer such as 19:19:19 of Nitrogen, Phosphorous and Potassium. There are other variations in the composition such as 20:20:20, or

30:10:20 of NPK. But I use 30:10:30 (NPK) and I make the mixture myself. Besides this, I use calcium nitrate, magnesium sulfate, and other micro nutrients (having ten types of minerals).

Dyna Grow is an American nutrient product, besides these, I also use fish emulsion, sea weed extract, and humic acid for its special iodine and other minerals it gives.

S M: In what frequency you use them?

N: I keep changing them based on the plant's requirement and growth period. I fertilize more during its vegetative growth phase starting from March until September and then reduce them. The orchids, like us need variety, we get bored when we have only chapatis!. So when they show sprouts and new roots they need more nitrogen and when they are in spikes give them more potash. Accordingly, I adjust the feed to keep them healthy and flowering.

S M: What is the potting media you use?

N: Pine wood bark, coco chips. charcoal & perlite for epiphytes, coco peat, charcoal, perlite for many terrestrials. Media should be free draining and at the same time retain moisture for plants. I also use Sphagnum moss in the mixture.

S M: Do you use also brick pieces?? How do you control pest and diseases?

N: No as it gather fungus I find its use not so effective. For Orchids general problems we face with Scales or sucking insects, Mealy bugs, Red mites, White flies, snail and slugs and caterpillars; also fungal and bacterial diseases. To control effectively on a regular basis we have to spray Systemic Fungicide, insecticide, bacterial treatments. For any viral problems, there is no remedy we have to burn the plants so that we avoid spreading the virus to other plants.

S M: What about Sphagnum moss and drift wood?

N: Moss can be used but has to be carefully used. It absorbs a lot of moisture. One has to water sparingly if moss is used for potting. It is ideal as all orchids naturally grow on trees. To mount on driftwood with moss is very good. Mango and Teak branches are the best as other woods tend to decay and breed white ants.

S.M: What about lighting?

N: There are three lighting conditions, low, medium and high. - depending on the type of orchids. Low light is required for Phalaenopsis and Paphiopedilum. Medium light to Oncidium and Dendrobiums, and bright light for Cattleyas and Vandas.

S.M.: Can we use tap water?

N: This is very important. In nature orchids get rainwater which is pure and has very low dissolved salts in it. Hence rain water is the best, Cauvery water can be used, it has relatively low dissolved salts when compared to some of the bore-well water. The TDS (Total Dissolved Salt) content is crucial, bore-well water has high TDS hence not suitable. Where rain water is not possible it is better to use Reverse Osmosis or filtered water.

S.M: TDS means dissolved salts, so should one take care of the pH of the water?

N: As you know 7 is neutral more than 7 is alkaline less than 7 is acidic. Orchids do well when the pH is acidic with 5.5 – 6.0. This range will make most of the nutrients available for the plants to absorb. Sometimes, to bring it to acidic range, we have to add a little Citric Acid or Phosphoric Acid.

S.M: You are the first Recipient of this accolade given by TOSKAR. Do you have something to say?

N: Yes, ever since, The Orchid Society of Karnataka (TOSKAR) was established in 2005-06, as one of the objectives of the Society, an awareness of growing and conserving orchids has been created in Bangalore, I have been passionately keen to collect orchids of different species but preferably from nurseries which have been multiplying them. All my Cacti, foliage, Anthuriums, which I had earlier, I have given away.

TOSKAR for the first time instituted a rolling shield sponsored by Dr S.N.Hegde in memory of his beloved wife Smt. Chameli Hegde who passed away recently. Such awards and recognition encourages a hobbyist to do better. I am proud to receive this honour. I hope that the Organization will attract many more orchid lovers and Bangaloreans will grow orchids in their balconies and windows sills and make their homes beautiful; create a lovely atmosphere and make Bangalore not only a Garden City but a beautiful Citizens' City who have an aesthetic sense, however small their homes may be. TOSKAR is doing a tremendous job in encouraging people to grow orchids and also create awareness about its conservation. It has provided an ideal platform for hobbyists like me to exchange ideas, information and even exchange plants. TOSKAR has put orchids on Bengaluru map successfully.

Note: Nageshwar can be contacted at:

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Nageshwar's Rooftop Orchid Garden

Nageshwar with his orchids on the Rooftop of his house

Varieties of orchids – Vandas, Dendrobiums, Cattleyas, Oncidiums, Phals, etc., grown scientifically as per the environmental requirements. Note the roof structure, poly cover, shade-net, benches/ platforms, wooden blocks, humidifiers, etc., installed, with proper water, nutrients & space management, besides controlling pests & disseases.

Inside view of his Rooftop Orchidarium studded with varieties of orchids

Orchids grown vertically on processed wooden sleepers


Above Left: Paphs grown in pots in cool & partial shade getting evening sunlight
Above Right: Phals grown on wooden blocks under semi-shaded condition


Above left: Dendrobiums on platforms; Above right: Vanda – note the healthy long roots, grown under more light & humid conditions


Above left: Western side with evening sun, most of the cymbidiums & shade loving orchids are grown

Above right: Some terrestrial orchids like Paphs, calanthe, Phaius, Habenaria, etc along with miniature orchids

A work table for potting, treatments, etc.

RO water system, softening of water & automation.

Nageshwar, being presented TOSKAR Rolling Shield for excellent cultivation of orchids in a scientific manner

Phaius Lour. – An Interesting Terrestrial Orchid Genus

Dr. Sadananda Hegde

Introduction

About 225 years ago, the grandeur of an orchid flower cultivated in a garden in China attracted the attention of a visitor, Juan Loureiro who described the elegant plant with lovely blooms as *Phaius grandifolius* (in the year 1790) and today, the credit goes to him for establishing the genus *Phaius Lour.,* from a single species cultivated. The same species is presently known as *Phaius tankervilleae.* The name *Phaius* is derived from the Greek word "*Phaiios*" (dusky) and it refers to its flower which turns dark when mature. This species is popularly referred to as Nun's Orchid. However, this interesting terrestrial orchid is also known variously as Nun's Cap Orchid, Chinese Ground Orchid, Red Crane Orchid, Swamp lily and Veiled Nun Orchid; in Manipuri it is known as Nongmai mani (Pankaj Kumar, in Flowers of India).

Distribution

The genus *Phaius* Lour. essentially consists of about 50 terrestrial species distributed in various parts of the world including India, China, Japan, Burma, Thailand, Malaysia, Indonesia, Papua New Guinea, Australia, Central & South Africa and Madagascar. In India, there are about seven species, namely, *P. flavus (Blume)Lindl., P. longipes(Hook. f.) Holtt., P. luridus Thw., P. mishmensis Rchb.f., P. nanus Hook.f., P. tankervilleae (Banks ex L'Herit.) Blume and P. woodfordii(Hook.) Merr.* Out of these, *P. luridus* is found in South India(Kerala) and also in NE India (Assam & Arunachal Pradesh), *P. nanus* in West Bengal, *P. tankervilleae* is wide spread through Northwest Himalayas, Chhattisgarh and NE India and interestingly, Arunachal Pradesh alone harbours as many as six species excepting *P. nanus* (Chowdhery 1998, Hegde 1984, 2005, Gagoi *et al* 2013, Sathish & Manilal 2004, Pradhan 1979).

Diagnostic features

The species of the genus ***Phaius*** are essentially terrestrial with distinct rhizomes bearing several leaves, producing lateral erect inflorescence of many flowers. The genus is distinguished by the lip joined to the base of the column with a short spur and trilobed condition. *Calanthe* is allied to this genus and several hybrids have been produced between the two.

Classification

The genus ***Phaius*** Lour. Has been classified under the sub-tribe ***Arethuseae*** distinguished primarily by their 4 or 8 clavate, laterally flattened, compact and waxy pollinia without stipe or viscidium. It is further classified under the Tribe ***Epidendreae*** belonging to the sub-family ***Epidendroideae*** of the Family **Orchidaceae.**

Enumeration

A brief description of the Indian species has been presented below with notes on their habitat and environmental conditions.

P. flavus (Blume)Lindl.: This is a lovely terrestrial species producing a cluster of conical pseudo bulbs measuring up to 15 cm, bearing 3 – 8 leaves measuring 6 - 10 x 30 – 50 cm, dark green, yellow-white mottled on the surface. Inflorescence is 30 – 45 cm long, but shorter than leaves, produced laterally, erect, bearing fragrant yellow tipped with red bunch of flowers appearing in April – May. Plants are cool loving types growing in rich humus soil under the shade of trees at an elevation between 800 and 1500 m MSL in humid valleys of the Himalayas, extending up to China and Japan. The species is rare and endangered.

P. longipes(Hook. f.) Holtt.: Herb with thin stem, 30 – 45 cm long, slightly swollen at the base with long internodes; leaves 5 – 8, measuring 7.5 – 15 x 3 – 4.5 cm, Inflorescence 1 – 3, about 15 – 25 cm long arising from the middle at the node with 8 – 10 flowers measuring 2 cm across. Flowers are white with yellow band on the lip. Flowering during August to September. It is a cool loving orchid growing at an elevation of 1500 – 2000 m MSL in humus rich soil of forest floor of NE India, Thailand & Malaya.

P. luridus Thw.: A terrestrial herb with sub globose pseudo bulbs, 6-10×3-6 cm in size with 50 – 100 cm long leaves measuring 30-60×12-15 cm. Inflorescence arising from the base of the leaves exceeding the height of the leaves with 10 – 15 flowers, 10 cm across; sepals and petals greenish yellow outside and brownish yellow inside; Lip yellow at the base and purple towards tip; spur hooked. Flowering May to June. It is found in tropical conditions of Assam plains bordering Arunachal Pradesh and Agasthyamalai hills in humus rich soil under humid conditions. The species is distributed in India & Sri Lanka. Considered rare in occurrence.

P. mishmensis Rchb.f.: A lovely species. The stem of this species is about 90- 120 cm long with 6 – 8 leaves measuring 15 - 30 x 7.5 – 10 cm size; raceme decurved, with few rose coloured flowers, 4 – 5 cm long, partly opening, with bright yellow spur which is unequally bi-lobed at apex. Lip 3- lobed. Flowering September to October. It occurs at an elevation of 1500 – 2000 m MSL, cool loving, growing under shade of trees in hums rich soil. Occurs in Mishmi Hills, Arunachal Pradesh, Sikkim, Darjeeling & Kashia Hills. It is also a rare and endangered species.

***P. nanus Hook.f.*:** A species with stout rhizome with 2.5 – 5 cm long stem bearing leaves with winged petiole. Leaves measure 30 -35 x 3.5 – 7 cm, elliptic-oblong. Scape arising from the base, erect about 15 – 25 cm long with 2 – 3 flowers, about 6 cm long with cymbiform bract. Lip obscurely 3-lobed with a 5 mm long spur. Flowering in February. Found in West Bengal, distributed up to Bhutan. A warm loving tropical species experiencing a brief winter.

P. tankervilleae (Banks ex L'Herit.) Blume: Most popular fragrant species under cultivation known as Nun's Orchid. Pseudo bulbs are ovoid-cylindrical measuring 10 -15 x 5 – 6 cm bearing 5 – 6 leaves, 30 – 70 cm long and 10 -20 cm broad. Scape arises from the base of the pseudo bulb, 60 – 120 cm long with many flowers. Flowers are 10 – 15 cm across, pale buff to dull

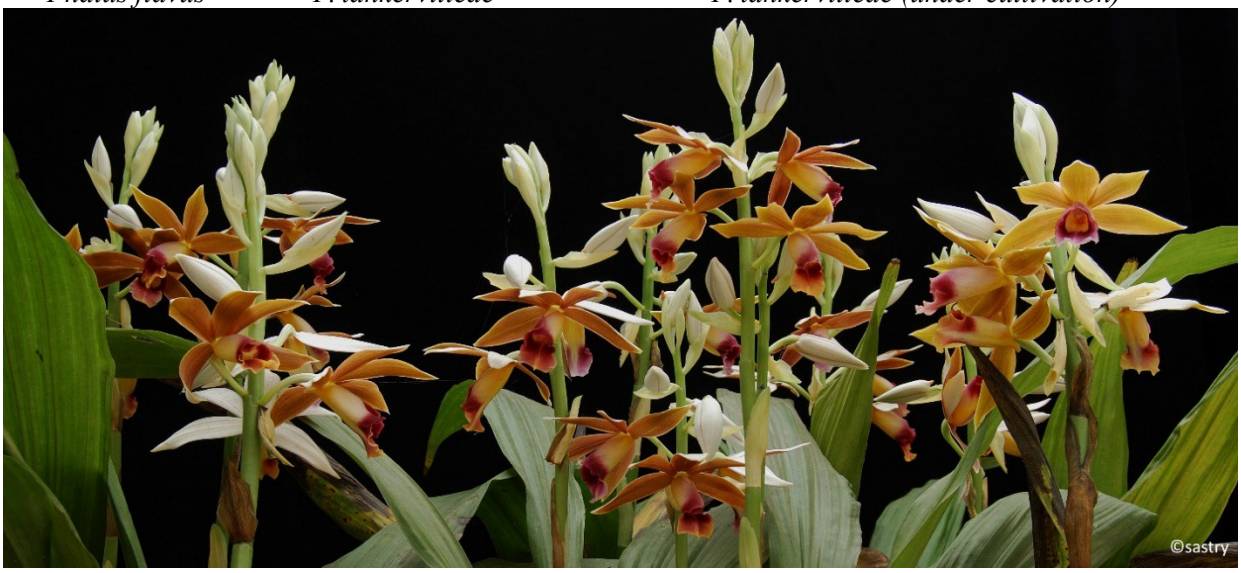
yellow colored, Lip deflexed at apical end and has a spur measuring 15 - 20 mm long. Flowering in June – July. Distributed throughout NE India and eastwards to Malaya. Enjoys moist humus rich soil; found in the river valleys under semi shaded conditions.

***P. woodfordii (Hook.) Merr*:** Pseudo bulbs are broadly ovoid with 3 – 4 green margined with yellow dotted leaves, 30 – 47 cm long. Scape arising from the base, about 60 cm long, nodose with scape at long intervals; Flowers in dense raceme, large, yellow- green; lip equaling petals, 3 – lobed, orange brown spur short white & conical. Flowering & fruiting August – October. Found in Arunachal Pradesh in the foothill region and extremely rare.

Phaius flavus

P. tankervilleae

P. tankervilleae (under cultivation)



P. tankervilleae (under bed cultivation) (Photo by K.S. Sastry)

Cultivation

All the species enumerated above are terrestrial growing in humus rich soil. Hence they can either be potted or grown directly in the soil bed in the garden. However, it should be ensured that potting mixture is porous mixed with sand & charcoal dust or pieces along with humus rich

soil. Depending upon their habitat requirement, they should be grown under shaded/semi-shaded conditions and maintain 60 – 80% humidity. During the growth season, plenty of water is required that drains down the pot or medium, reducing the frequency of watering in winter when the plants need rest. Since all these species are sympodial in nature, they can be propagated easily by separating the back bulbs and potting them separately. They can also be propagated from seeds aseptically in the lab. In case of *P. tankervilleae*, it has been reported that flowers about to wither can be cut along with the bract from the raceme and put in a sand tray partly buried, covered with plastic sheet and placed in a damp shady location. This gives rise to plantlets in about 2 – 3 months from the base of the bracts which can be potted after six months.

Conservation

In Sessa Orchid Sanctuary, Arunachal Pradesh, three species *viz, P. flavus, P. mishmensis and P. tankervilleae* find their natural habitat and thus are protected. They have also been collected from forest coup area as a measure of conservation and introduced in the Orchid Sanctuary creating the required habitat for their perpetuation. However, other three species – *longipes, luridus & woodfordii* occurring outside the protected forest areas require conservation measures *ex situ & in situ*.

Concluding Remarks

With the dwindling of forests day by day most of these species have become rare and endangered in the wild. Excessive collection for commercial exploitation of orchids has further worsened the situation. Hence there is a need to conserve these orchids in their natural habitat (*in situ*), besides growing them *ex situ* to ensure their survival. All the State Governments and Orchid Societies in India should ensure that the species found in the respective areas are protected by declaring Orchid Reserves/Sanctuaries and propagate them through vegetative and aseptic methods for their survival. Almost all the species are ornamental and are worth including them in the hobbyists' list. Some enthusiastic members have grown some of these species, especially *P. tankervilleae* in Bangalore successfully with lovely blooms. Hence, it should be our endeavor to propagate some of these species *in vitro* and share the plants with other hobbyists for their proliferation and improvement by way of breeding.

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Why can't I grow orchids from seeds like other flowering plants??

Dr Shashidhar Sastry

As a beginner (orchid grower) each one of us wonder why we cannot grow orchid plants directly from seeds like other flowering plants (at least in the initial stages!!!). There is nothing strange about this view point and is a common thought that flashes into anybody's mind as most of us grow our annual flowering plants from seeds regularly. But the case with orchids is different and also unique. I would say everything with orchids is extraordinary and unique. Before we try to understand this, let us look into the flower structure and related details of orchids. Trust me I am not being technical here (as I want to reach the common reader), but being an avid orchid grower I feel each one of us should make an effort to understand the plant and its parts considering its peculiarity.

Before we know more about orchid seed and its germination, let us understand orchid flower and its parts. The orchid flower is like a lily flower and is a monocotyledon. A typical Dendrobium flower (Fig. 1a) has three sepals and tthree petals out of which one is the most attractive and modified into 'lip 'or labellum. The lip is normally three lobed with a spur at the base. The upper surface of the lip sometimes has callus like structure with ridges to enable cross pollination. This also forms an important landing platform for the pollinators. Orchidaceae is a highly evolved family with great reduction in the number of floral parts. Fusion of male and female organs into a single structure called **column (**Fig. 1b) is located at the center of the flower.

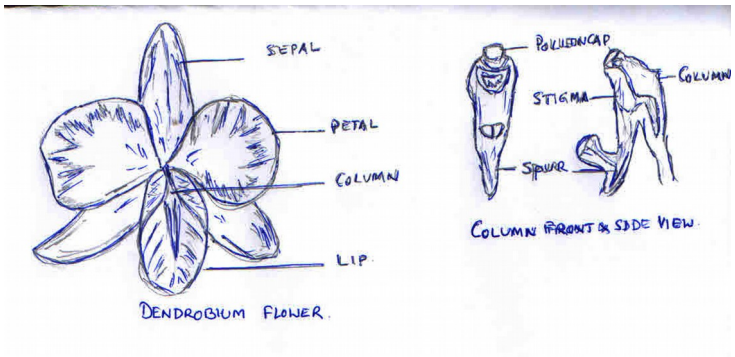


Fig 1a and 1b

At the apex of the column, lies the anther and is a sticky mass called pollinia unlike the dust or powdery pollen we see in other plants. The pollinia (pollinium -singular) may be 2-4 and rarely six in number. The stigma (female organ) is a receptive surface and is positioned in the column on the ventral surface. In orchids, cross pollination is a common phenomenon and to deter self-pollination and to promote cross pollination with the help of the pollinators, pollinia is separated from the stigma by a flap of tissue known as rostellum and this also helps in the transfer of pollinia to stigmatic surface. There is tremendous variation in the pollination of orchid species in

the wild. In some species most of the flowers are pollinated and in others very few and in some none at all. All these depends on the pollinator availability.

Pic. 1. Dendrobium hybrid with a swollen ovary after hand pollination

Pic 2. Orchid capsule and seeds

Once the flower is pollinated either by pollinator or by manual techniques, the flower begins to collapse and the sepals and petals wither away and the ovary starts swelling (Picture 1). From this stage to maturity of the seeds inside the capsule it almost takes up to a year. The orchid seed pod known as 'capsule' will contain minute dust like seeds which runs into tens of thousands to millions (Picture 2) in a capsule. The fruits will be green to begin with and as they attain maturity will turn yellowish and then split. It is important that the fruits are harvested before they split for seed culture in the laboratory as the split fruit exposes the seeds for contamination with fungus in the atmosphere and then it will be difficult to culture in the laboratory. However, in nature, these seeds from the split capsules get carried away to different places. But in nature all these seeds will not germinate as they have specific association requirement of a mycorrhiza (fungus). Very few of them will come in contact with the mycorrhiza to germinate. Majority of the orchids cannot germinate without the association of mycorrhiza in nature. Noel Bernard and Hans Buergeff discovered the role of mycorrhiza in orchid seed germination. This symbiotic association of orchid seed with mycorrhiza in nature is an important phenomenon. This interdependence will help the orchid seeds to get nutrition through mycorrhiza. Orchid seeds do not contain the endosperm (Fig. 2), a nourishing tissue which supports germination as it happens in other seeds. The seed contains protoplasmic cells and fat droplets acting as food store in the absence of endosperm. This is also one of the reasons why orchids produce millions of seeds so that in nature at least some of them will survive, germinate and reach maturity. In natural conditions, when a seed is wind disseminated and lands on a moist tree bark, the seed eventually swells but unless it is supplemented by nutrition through a mycorrhizal association it will not germinate. The mycorrhiza enter the seed through testa

(seed coat) and further entry is through the epidermal hairs or suspensor of the undifferentiated embryo. Once the mycorrhizal association is established, essential nutrients and sugars are provided for necessary differentiation. This process will result in the mycorrhiza and the plant form a functional association to enable the embryo to grow further. If the mycorrhiza and the seed do not form an association, then germination will not take place; and here the issue may be specific strains of mycorrhiza may be required for the germination.

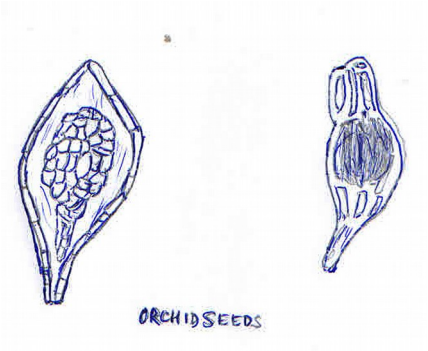


Fig 2. Orchid Seeds

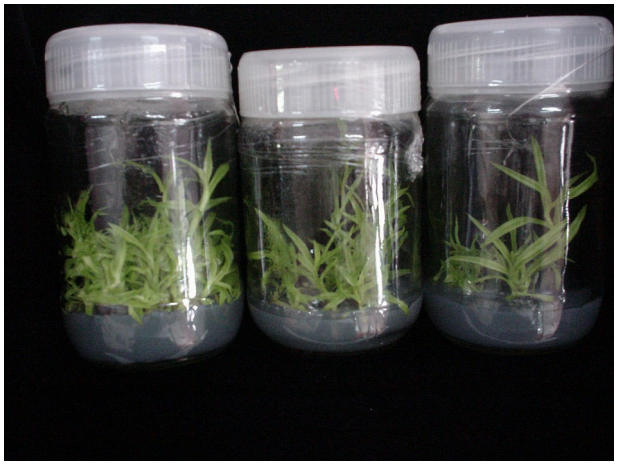
The process of germination starts with swelling of the embryo and forming a disc like structure called the protocorm which will develop into shoot apex and leaf primordia and later roots will form. The chalazal end of the embryo develops into shoot apex and roots from other parts. While this process is on, the mycorrhizal association will ensure the breakdown of starch substrate into sucrose for nourishing the embryo. Once the protocorm develops a green leaf and roots, the plant can photosynthesize and produce its own food.

Epiphytic orchids have their roots colonized by mycorrhiza only when they come in contact with organic substrate. At times both the terrestrial and the epiphytic orchids have poor colonization and in such cases the mycorrhiza may remain either in the substrate or the velamen of the roots.

Pic 3. Eria javanica seedlings August 15

However, several efforts were made in the 19th century to artificially raise the plants from the seeds but were unsuccessful. But when some of the seeds were sown in the same pot as the mother plant, some seeds germinated indicating that the presence of mycorrhiza in the medium and roots of the mother plant has helped the germination of the seeds (Picture 3). It has been challenging to germinate the seeds without the assistance of mycorrhiza. Over collection of orchids in the wild by humans has made it all the more difficult to conduct studies with regard to the life cycle of orchids.

Dr. Lewis Knudson in 1922 found that orchids could be germinated asymbiotically on a nutrient media comprising of inorganic nutrients, cane sugar and solidified agar. This paved way for a revolution in the asymbiotic germination of orchid seeds and today we have millions of healthy and wonderful hybrids making way into our collections. Asymbiotic germination in the laboratory with a media supplying all the necessary nutrients will ensure germination of the orchid seeds. By repeatedly culturing the germinated seedlings, one can multiply the number of plants they want to have (Picture 4, 5, 6 & 7).



Pic 4. Pod culture plants in flask

Pic 5. Plants in flask

Pic 6. Phaius tankerville seedlings from pod culture ready for hardening

Pic 7. Cattleya seedlings from pod culture

To summarise, orchid seeds require symbiotic association with mycorrhiza to germinate in nature, as these fungi provide them nourishment till they start photosynthsising. However, asymbiotic germination can be done in Laboratories with a nutrient rich agar medium and these can be multiplied to the required quantities.

References

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"JEEVA JALA"
When, how, what type of water?

Nalini Kottolli

All these queries on watering of orchids could be overwhelming to most orchid growers.
Well-water, bore-well water, Corporation water are the various sources in Bengaluru. Every article on water quality stresses on rain water as the best water for orchids. True. However, how many of us can actually do this? The cost involved in setting up Rain Water Harvesting System, to be able to store rain water in sufficient quantities, discourages many from using rain water. Then comes RO (Reverse Osmosis) water. Here again, the cost factor and the wastage of water which is a sort of necessary evil while using this electronic water purifier poses a problem.

There are two other factors on checking water quality; namely pH of water and TDS (Total Dissolved Solids (salts). TDS meter has to be used to measure TDS in water, and a pH meter for measuring the acidity/alkalinity of the water used for orchids.
pH should be between 6.5 to 7.0. Anything lower than this is too acidic and above this is undesirably alkaline. pH can be adjusted by using citric acid.

I water my plants with Cauvery water without checking pH and TDS with a prayer as stated by Mr. William Cullina in his book "Understanding Orchids". He says: “I raise my watering can to you and offer this toast, may your roots be long, your pseudo bulbs fat and your flowers all the colors of rainbow".

The most common statement on watering orchids is to keep "evenly moist". How to know it?
One way is to lift the pot, if it feels light it needs water, if it is heavy do not water. This is really not a practical way to do. Another method is to insert a bamboo stick into the potting media and if the stick comes out wet no need to water. Thus with careful observation and experience one can set a time-table to water ones orchid collection.

Another point is that it is preferable to water the plants early in the day, before the temperature gets high. In tropical regions, like Bengaluru orchids can be watered in the evening but care should be taken to see there is no water logging in the crown of the plant.

Avoid over watering, which kills the plant, than under watering. Constant wetness will cause the roots to rot leaving the plant without the means to take nourishment which in turn will make the leaves turn yellow and fall.

It is possible to rescue over watered plants, provided you notice the problem on time. If the roots are rotting, remove the rotten parts using a sterilized secateur and dust the cut ends with cinnamon powder. Then keep the plant in a transparent cover with some sphagnum moss under the plant. Punch holes in the cover to ventilate so as to evaporate excess water. Remember to keep it in shade. When the Sphagnum moss becomes dry moisten it. Wait to watch till new roots

appear – now the orchid is ready to be repotted, however be careful with watering. Do not fertilize till the plant grows a new leaf.
Similarly it is possible to revive the under watered plant. The dry roots can be re-vitalized with high humidity condition. Keep the plant in a transparent plastic container with Sphagnum moss - in shade.

The following varieties are to be kept moist all the time – *Paphiopedilum*, *Miltonia*, *Cymbidium* and *Odontoglossum*.

Catteleyas, Dendrobiums, and Oncidiums enjoy staying moist during active growth. When new roots are visible they can be kept moist. After flowering when they are in resting stage watering has to be reduced.

Ascocendas and Vandas are to be dry in between watering. While watering Vanda in the first round, wet the leaves and roots thoroughly. After a few minutes water the roots only, as the roots will be spongy to absorb more water. Another sign of good watering is the color of the roots. The Vanda roots should turn green after watering, before next watering the roots should be white.

The orchid species require a rest period during winter, wherein, watering and fertilizing is not required. Group them separately and just spray water once a week on the shriveling stems. Watering can be stopped from November end to February end.

Watering of hybrids also requires changes in schedule during winter and summer. In winter water evaporation is slow, as such the media will be moist for longer periods. So watering may be done once in three days, depending of course on the location. In summer months afternoon watering is needed, but in the afternoon wet the media only, not the leaves to avoid fungal attack.

The size of the plant also has to be considered. The smaller the plant the less and more frequent watering is desirable. Larger, matured plants with their well-developed roots need copious watering, not frequent though. Mounted orchids need frequent watering as they dry quickly. It is better to spray water two to three times a day during summer.

Last, but not the least, keep observing the plant, look at the leaves and roots to check their needs. With experience, trial and error one can master the Art and Science of Watering Orchids.

HAPPY ORCHIDS GROWING.

Dendrobium thyrsiflorum

S. Kalyanpur

Species information

1. **Scientific name:** *Dendrobium thyrsiflorum* Rchb.f 1875.
2. **Habitat:** Epiphytic, lithophytic or even terrestrial. Generally grows in humid, mossy coniferous forests.

3. ***Dendrobium thyrsiflorum*** known as the pine cone-like raceme dendrobium in Thailand

Dendrobium thyrsiflorum (thyrse is a type of inflorescence where the central axis grows indeterminately like a raceme bearing clusters of lateral determinate cymes, hence the name thyrsiflorum) is generally found growing in the Arunachal Pradesh, Assam, Bhutan, Thailand, Laos, Vietnam, Hainan region of China and Myanmar, on hilly slopes and coniferous forests at altitudes of between 1200/2000 meters.

You can mount the plant on tree fern or driftwood. Alternatively you could grow it in a heavy clay pot as the plant grows big as the pot could tip over.

The plant bears slender, ridged, rounded, yellowish stems each bearing 5 to 6 smooth, dark green leaves. This species blooms in the spring, only once a year, throwing up a pendant, 8 to 10" long, carrying from 25 up to 40 fragrant flowers, each about 1" (2.5 cms) on a raceme that arises from near the apex of the cane.

The flowers last from a week to ten days. A mature plant may give you two to three blooms in a year during spring.

Water and fertilise (once a week) the plant regularly during the growing months of March to August, thereafter slowly reduce both the feed and watering. The plant needs a winter rest. The plant will drop all its leaves during the winter – remember it is not dead. Water sparingly through the winter months until the initiation of new growth in the spring.

Air circulation and bright light are essential for blooming.

If your plant doesn't bloom in spring something in your environment isn't right – could be too much watering in the rest period, not enough rest to dry between normal watering, or the temperature isn't right.

Angraecum sesquipedale – Darwin's Orchid

Gayatri Rao

Wikipedia says the *Angraecum sesquipedale also known as Darwin's orchid, Christmas orchid, Star of Bethlehem orchid, and King of the Angraecums, is an epiphytic orchid in the genus Angraecum endemic to Madagascar*.

The long nectar spur behind the bloom has earned it the Latin name "sesquipedale", which actually means "a foot and a half". The shape of the bloom, and the season in which it normally blooms in its natural habitat has resulted in it also being referred to as the Christmas Star Orchid.

In 1862, the naturalist Charles Darwin first anticipated that it required a pollinator with a proboscis long enough reach the nectar in this elongated spur to help pollinate it. At the time the idea of a pollinating insect with a 10-11 inch proboscis was inconceivable. It was only in 1903, 41 years later and 21 years after Darwin's death that such a moth was actually discovered, and Darwin's surmise was actually proved. The story of this assumed pollinator is regarded as one of the notable predictions of Darwin's theory of evolution.

Dendrobium... Cattleya... Vanda... Phalaenopsis...Oncidium.... these were names I had heard, and yes, by then I had some of these in my collection. But Angraecum .... hmmm.... sounded exotic! And sesquipedale.....wow! I could hardly pronounce it! *YES!!* I must have this, I thought...

I acquired this plant from *Orchid Tree* about 3 to 4 years ago, when I was just beginning to take my first steps into adding something more exciting to my collection. I knew very little about caring for it, but I thought it looked like a shade-loving plant, so I brought it home and hung it in a well-protected place. And there it stayed for a while, showing no signs of happiness or otherwise. After several months, there was indication of some root growth, in my eagerness to please it, I carefully placed it into a slightly larger pot, without removing it from its original small plastic pot. I nurtured it as I did my other orchids. The same NPK etc. Again it withdrew and sulked. Mind you, it didn't fade away or die. It just stayed.

On a later visit to Orchid Tree, I mentioned this. "It is a vandaceouas plant," I was told, so..... out it went to a brighter, more open spot. And there it hung, again for a year or two, refusing to smile. I continued to give it the nourishment I thought it might need, but gradually even I withdrew from it and began to ignore it. "This one is never going to bloom," I thought.

One morning in early May when I was watering the plants, I suddenly spied something that looked suspiciously like a bud! I peered at it closely, and lo and behold! A bud it was! Just a tiny one that I prayed to every day, hoping it would grow to its full potential! It did. It grew, and grew AND grew. Three weeks ago it bloomed one Sunday morning. A creamy white, flower, with waxy petals and this long, long nectar spur. At the time of writing the bloom looks like it might last another week or two, in the meantime giving out the most gorgeous perfume every evening.

Then I began to look on the internet for the correct spelling of the name, because I wanted to post this on facebook and share it on the TOSKAR mailing group. Imagine my shock and excitement when I began to read the historical connections, the reasons why Angraecum sesquipedale is so celebrated. It has only redoubled my enthusiasm for orchids, which I find one of the most rewarding hobbies one can have!

There was some discussion when I posted the picture on orchid forums that this could be a hybrid *Angraecum Lemforde White Beauty*. The original label which is still legible says it is Angraecum Sesqipedale; I would like to believe that that is the case. Be that as it may, it was still a significant milestone in my orchid growing experience.

Plant and flower of *Angraecum sesquipedale* Thouars

This video gives you an insight into the discovery of the moth that pollinates this orchid in the jungles of Madagascar.

https://www.youtube.com/watch?v=OMVN1EWxfAU&feature=youtu.be

For those of you who have the plant or might acquire it in the future, my internet search says:

b) Water frequently (they get plenty of rainfall in the natural habitat) &and maintain high humidity.
c) They grow on tree trunks as epiphytes so can be mounted on bark or grown in a coarse, well-drained potting mixture because they require drying out quickly.
d) They don't like having their roots disturbed, so re-pot infrequently or never.
e) They like intermediate to high light conditions, but take care to avoid sun burn.

Need and Use of Growth Supplements

Sriram Kumar

To augment their growth and flowering many orchids need a few supplements besides specific light, temperature, humidity and water.

A brief description and schedule is herewith given.

Role of Calcium & Magnesium

Calcium (Ca) is vital for humans for healthy bones. Orchids require calcium to build strong cell walls, functioning of enzymes which are responsible for cell growth and division.

Supplied Ca is absorbed through root tips and transported to newly growing parts of the plant. Calcium cannot be translocated from older leaves to new leaves and hence calcium deficiency would be noticed in newer growths as blackening of the tips. These black tips are usually mistaken as Black rot. Providing adequate calcium also enables orchids to be resistant to fungal and bacterial infections to a large extent.

Magnesium (Mg) plays a major role in the production of chlorophyll – the green pigment which participates in photosynthesis and other metabolic processes. Unlike Ca, Mg can be translocated from older growth to new growth and therefore deficiency symptoms show in older growths first. Symptoms are bleaching of leaves or leaves turning reddish purple during winter months.

Is there a Need for Supplements?

Most of us use BWSSB water, which has adequate calcium in it but not enough magnesium, therefore supplementing magnesium is necessary.

RO water or rainwater also do not contain sufficient amounts of Ca and Mg and hence those who depend on RO or rain water must supplement them.

How Much and How Frequent?

Calcium and Magnesium supplements can be provided once a month

Supplement	Dosage	Remarks
Calcium Nitrate (Water soluble)	.5 gm to liter	Mandatory if using RO or rain water only
Magnesium Sulfate (Water soluble)	1 gm to liter	Recommended for BWSSB and other sources of water

Precautions

Please remember not to give Calcium and Magnesium supplements together and also do not mix them with other supplements.

Role of Micronutrients – Micronutrients are trace elements which are required in very low quantity but play a vital role as catalysts in vital chemical reactions that happen during photosynthesis and other metabolic activities. BWSSB water does not seem to contain all the trace elements at all seasons. Recommend giving a 2ml/Liter once a month

Table below shows the various micronutrients and their role.

Element	Role	Deficiency
Iron (Fe)	Iron is a major catalyst in chlorophyll production and is used in photosynthesis	Leaves turn pale and veins remain dark green. pH imbalance in the potting mix makes iron inaccessible to plants.
Manganese (Mn)	This element works with the enzymes in the plant to reduce nitrates before producing proteins	Leaves develop necrotic yellow spots.
Boron (B)	Necessary for the division of plant cells as well as protein formation. It also appears to play a major role in pollination and seed	New growths turn grey, look burned and can die.

	production.	
Molybdenum (Mo)	Helps formation of proteins and aids the plants ability to fix nitrogen from the air.	Middle portion of the leaves turn yellow.
Zinc (Zn)	This acts as a catalyst and MUST be present in minute amounts for plant growth.	The deficiency shows as the tips of the leaves and between the veins turning white

Is it ok if it precipitates after I mix it with water?

Micronutrients react with hard water and could precipitate. Avoid using precipitated solution and if possible use rain water or RO water for supplementing micronutrients.

TDS Meters

A TDS Meter indicates the Total Dissolved Solids (TDS) in a solution, i.e. the concentration of dissolved solid particles. A TDS meter typically displays the TDS in parts per million (ppm). For example, a TDS reading of 1 ppm would indicate there is 1 milligram of dissolved solids in each kilogram of water.

The lower the PPM the better the quality of wate.

Uses of TDS meter

- To ascertain the quality of water. Most of the orchids do best in water that has very less dissolved solids.
- Controlling the nutrition supplements to orchids. Providing around 200 PPM of Nutrition during summers is found to be beneficial.

New Initiatives – Award of Ribbon and Merit Certificates

Sriram Kumar

Idea is to recognize and reward the best orchids brought and displayed in Bi-Monthly Meeting by presenting a Merit certificate along with a Ribbon for the best display.

1 Entries are free and open to members of The Orchid Society of Karnataka only.

2. Plants must be benched before the start of the Bimonthly meeting. Late entries are liable to be rejected

3. All plants must be in show bench condition, free from pests and diseases, clearly labelled (species level or Hybrid) and preferably owned for a minimum of six (6) months. Responsibility for correct labelling of plants rests with the exhibitor and plants without labels will not be accepted for benching.

4. Staking Rules – tying of inflorescence may be made up to but not above the pedicle or ovary.

5. A flower or flowers missing from an inflorescence will disqualify only that inflorescence, provided that the missing flower or flowers is tabled in the pot with the plant. Plants, which flower progressively, may have flowers missing.

6. A pollinated, dead or dying flower or flowers on a plant or inflorescence shall not disqualify that plant or inflorescence but shall detract from the merit of the plant.

7. A minimum of 50% of buds on an inflorescence must be fully opened before it is eligible to be judged unless the plant has habit of progressively flowering.

Voting Procedure

a) Each member is given a sticker
b) Each member observes all orchids in display
c) He/She puts a sticker against the orchid he likes the best and suited for an award
d) Once all members finish the voting, total is tallied and orchids with maximum votes are awarded 1st, 2nd and 3rd place merit certificates
e) End of the year, consistent performer gets award for the best grower.

Members Display

Dendrobium Hybrid
Shakuntala Manay

Dendrobium Hybrid
Shakuntala Manay

Dendrobium Hybrid
Shakuntala Manay

Dendrobium parishii H.Low
Sheela Natraj

Dendrobium ellipsophyllum Tang & F.T.Wang
Ramkumar

Chiloschista viridiflava Seidenf.
Laxmi Jagdeesh

Dendrobium Hybrid
Dawn Maree x Thai Jasmine
Gayatri Rao

Dendrobium parishii H.Low
Sheela Natraj

Dendrobium thyrsiflorum B.S.Williams
Suresh Kalyanpur

Dendrobium Hybrid
Shamala Chandra

Blc hybrid
Shakuntala Manay

Grammatophyllum multiflorum Lindl.,
Sriram Kumar

Grammatophyllum scriptum (L.) Blume
Sriram Kumar

Laelia purpurata Lindl. & Paxton
Sriram Kumar

Laelia purpurata Lindl. & Paxton
Nageshwar Mahadev

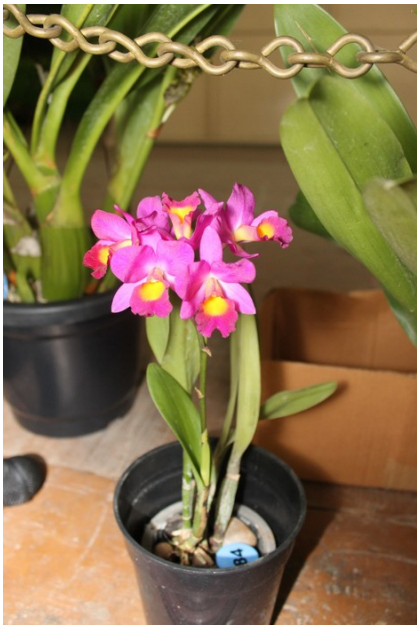
Myrmecophila thomsoniana (Rchb.f.) Rolfe
Gayatri Rao

Paphiopedilum niveum (Rchb.f.) Stein
Ramkumar

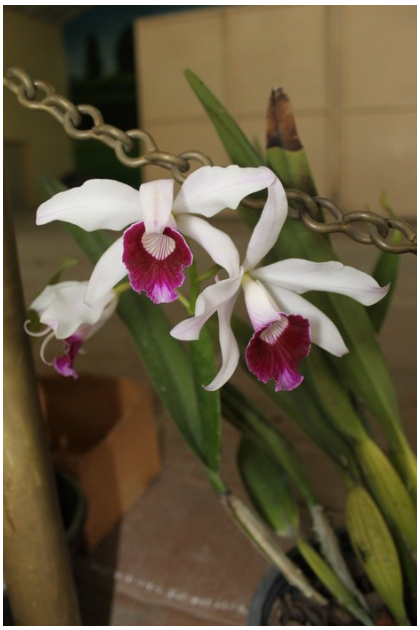
Paphiopedilum Hybrid
Laxmi Jageedsh

Brassia hybrid
Nalini Kottolli

Grammatophyllum Yunan Tiger
Dr.Parvathi



Gauritonia Why Not Walk
Nalini Kottolli



Laelia purpurata Lindl. & Paxton
Laxmi Jadgesh

Oncidium Sweet Orange
Ramkumar

Paphiopedilum callosum (Rchb.f.) Stein
Ramkumar

Recchara Francis Fox

Perreiraara Bangkok Sunset
Nageshwar Mahadev

Aerides rosea Lodd. ex Lindl. & Paxton
Sheela Natraj

Vanda Hybrid
Gayatri Rao

Ascocenda memoria tienchai
Gayatri Rao

Most Voted Orchids

Grammatophyllum Yunan Tiger
Dr.Parvathi
1st Place -- 25 Votes

Dendrobium thyrsiflorum B.S.Williams
Suresh Kalyanpur
2nd Place -- 4 Votes

Grammatophyllum multiflorum Lindl.,
Sriram Kumar
2nd Place -- 4 Votes

Chiloschista viridiflava Seidenf.
Laxmi Jagdeesh
2nd Place -- 4 Votes

"SAMARPAN"

Intra Collegiate Fest – Orchid Show at St Joseph's College – A Report

Dr K.M.Divakar

"SAMARPAN" – A one-day Intra-collegiate association fest at SJC held on 9th February was inaugurated by the Chief Guest Dr Sadananda Hegde, an eminent Orchidologist, Environmentalist and President of TOSKAR. The Guests of Honor were – Mr Rafiullah Baig, a Handwriting analyst and a Memory expert, and the highly acclaimed Film Director Sri Manikandan of Tamil film fame 'Narai Ezhuthum Suryasaritham'. On the dais were Principal Fr Dr Victor Lobo, Vice Principal Fr Clarence D'Souza and the Convener of Association Dr K.M.Divakar, Associate professor of Botany. 51 Curricular and Co-curricular associations of the college partook in the Fest**.**

Dr. Sadananda Hegde with decades of research experience across the country behind him, highlighted the survival instincts and skills of plants and agriculture through time. He felt that if orchids could survive since the age of the dinosaurs, humanity stood a greater chance. "Orchids and plants have survived through continuous ages of climate change. We too, like the orchids, must adapt to life's circumstances in order to survive and live life harmoniously," Dr Hegde said. All TOSAR members present were also felicitated by the Principal.

One of the important highlights of the fest was **Orchid Exhibition and Sale** by TOSKAR. Around 85 hybrid plants of different genera of *Phalaenopsis*, *Dendrobium*, *Paphiopedilum Cattleya*, and several others were on display. All orchids were the pride collections of members of TOSKAR.

Orchid show attracted a large number of students and Faculty as well. The show was very informative and educative. It was arranged by the courtesy of Dr Hegde, the then Vice president of TOSKAR. Late Sri Keshav Murthy, Secretary Sri Ramakumar and Executive Committee member Dr Chandan, Ms. Sabita Reddy all took an active role in organizing the orchid show. TOSKAR embers educated the visitors on culture tips and maintenance. Dr Shashidhar, Dr JayaPrasad, Mr. Vamana Rao's presence at the Orchid Show was very encouraging. SJC expressed a deep sense of gratitude to them for giving their valuable time.
Many students and Faculty members purchased a number of orchids at the Show and exhibited a keen interest in orchid cultivation noting down important tips from the experts present.
Orchid handouts and brochures were also distributed to the enthusiasts. This is the second time TOSKAR associated with the college for a meaningful and educative program on Orchids. The earlier one was organized in 2014, under the leadership of Dr Shashidhar. IFS – the then President of TOSKAR.

SJC Management, The Principal, Faculty, students feel indebted to TOSKAR for conducting the show in the college and making it a memorable and informative event and for promoting this rewarding hobby of growing orchids.

Few photos from the Show

SJC also expresses deep condolences for the sudden demise of Mr. Keshavamurthy, VP TOSKAR who has spent his life so meaningfully with orchids.