Good Agricultural Practices of Zygopetalum Orchids

L. C. De and S. S. Biswas

ICAR-NRC for Orchids, Pakyong, Sikkim

Corresponding Author
L. C. De
Email: lakshmanchandrade@gmail.com

Keywords
Orchid, Zygopetalum

How to cite this article:

ABSTRACT
Zygopetalums are terrestrial, lithophytic or epiphytic aromatic Brazilian orchids with pseudobulbous plants that produce white or cream with lilac pattern flowers. They thrive well in a temperature range of 20-26°C during daytime and 10-15°C during night and bloom from October to December. A bright light in the range 3000-4000 f.c. with 40% shade is ideal for their commercial cultivation. A potting mixture consisting of cocopeat or cocochips and tree barks is ideal. The plants can be easily propagated through division of pseudobulb although tissue culture aids in mass production of planting materials.

INTRODUCTION
Zygopetalum, derived is from the Greek zygon, yoke, petalon, petal or sepal; referring to the ‘holding together’ of the flower segments by the callus, It is a New World genus mostly distributed through tropical South America, Paraguay, Argentina, Peru and Bolivia and closely related to Bollea, Huntleya, Pabstia, Pescatorea, Promenaea, Warrea and a number of other minor genera. They usually grow best at intermediate temperatures but can withstand summer heat under partial shade and well-watered and respond well during cool nights in winter if kept drier than usual. Zygopetalum maculatum (syn. Zygopetalum mackayi) is particularly susceptible to leaf spotting in wet and cold climate. One of the great characteristics of some zygopetalums is their heady fragrance and people fond of this characteristic. The plants give out attractive and scented blooms during October -December i.e. during Durga puja and Diwali festivals. They are excellent for cut flowers and corsages.

Botanical Description
Zygopetalum consists of 25 species of terrestrial, lithophytic or epiphytic orchids from Brazil. It is a small sized, cool to cold growing epiphyte with ovoid, smooth pseudobulbs arising after blooming and carry 2 apical, lanceolate, acute-acuminate, somewhat thick, plicate leaves. The Spotted zygopetalum
blossoms in the spring on an erect-arching, scapose, racemose, 40 cm long, 8 to 12 flowered inflorescence arising with a new growth and has several large, remote, tubular bracts and large, sub-inflated, broadly ovate, acute floral bracts and carry large, showy, fragrant, campanulate flowers. The flowers are 4–8 cm wide and are green with red-brown markings with a white lip marked with violet.

**Genetic Resources**

*Zygopetalum cerinum*: This species is native to Columbia with degenerative pseudobulbs and oblong leaves. Flowers are borne singly, creamy white with yellow lip streaked with purple.

*Zygopetalum crinitum*: This species is native to Brazil with ovoid to conical pseudobulbs and fleshy. Coriaceous, lanceolate and glossy leaves. The inflorescence is 45 cm long. 3 to 10 flowered. The flowers are 8 cm across, scented with green segments maculated brown and white lip streaked with violet and produced in December-January.

*Zygopetalum mackayi*: A rare and beautiful species from Brazil with long, erect and curving leaves. The inflorescence is 90 cm tall and 5 to 10 flowered. The flowers are large, 8.5 cm across, scented, long lived with yellowish green petals and sepals maculated with violet purple and white lip intricately veined with red and blue and produced during December.

*Zygopetalum intermedium*: A popular species, native to Brazil with ovoid conical pseudobulbs and glossy bright green leaves. The inflorescence is 60 cm long, 10-12 flowered and attractive. The flowers are 7.5 cm across, long lasting, fragrant, yellowish green with purple brown blotches and white lips with dots of blue and produced in December.

*Zygopetalum wendlandii*: This species is native to Costa Rica. The degenerative pseudobulbs and lanceolate leaves. The flowers are 10 cm across, pale green in colour and produced at the end of summer to the beginning of autumn.

**Intergeneric Hybrids**

*Zygonisia = Zygopetalum x Aganisia*

*Chondropetalum = Zygopetalum x Chondrorhynca*

*Zygocolax = Zygopetalum x Colax*

*Zygocaste = Zygopetalum x Lycaste*

**Commercial Hybrids**


**Propagation**

Zygopetalums are commercially propagated through micropropagation using sucrose, BAP and IAA as growth supplements for mass production of planting materials (ICAR-NRCS Report, 2015-16). Four types of media were studied viz., Sand, coco-peat, green moss and leaf mold were studied for hardening of tissue cultured plants. All agronomical practices remain same. Higher survivability percentage was recorded in coco-peat media (75%) followed by sand (66%) while less than 40% recorded in green moss. Conventionally, they can be propagated by division of mother plants of backbulbs.

**Cultural requirements (De, 2014)**

**Temperature**: They perform well in intermediate to moderate temperatures. These are soft-leaved plants and dislike direct sunlight, especially in the hot months. They can tolerate temperatures in the range from 3-5°C and up to 42°C. The optimum for the plant growth would be 20-26°C during day and 10-15°C at night. Summer highs and winter lows can be tolerated for short periods of time without affecting plant growth. At extremely high temperatures for longer period it may induce bud drop whereas too low temperatures

---

Page 32 | Page 32
for long periods may cause leaf drop. On hot days, misting is required to increase humidity.

**Light:** *Zygopetalum* needs the light level of no more than 3000-4000 f.c. about 40% shade, except in winter when on a sunny day, higher light levels, because they are not accompanied by high leaf temperatures, will do no harm for a few days. Direct sunlight may cause leaf burn. Shade may be increased for newly potted plants coupled with cooler temperatures.

**Humidity:** *Zygopetalums* require humid conditions under moderate shade with plenty of water during active growing season, less after formation of new pseudobulbs. This orchid requires relative high humidity level, at least 65% or higher. The levels of humidity need to be reduced if fungal spot is observed on the leaves. Air movement should always be maintained with these plants to help prevent disease especially in moist media.

**Growing media:** *Zygopetalum* should be planted in a plastic pot or a clay pot, in moist substrate. For quality flower production, a mixture of bark of coniferous trees with peat, claydite and moss sphagnum is good. The components can be mixed or layered. Long drying in the heat is bad for both root as well as leaf development. In hot sunny weather, the orchid should be well watered, and if it does not, it will be taken from more mature pseudobulbs and their leaves.

In *Zygopetalum*, Cocochips / cocopeat + brick pieces + tree barks, Cocochips / Cocopeat + brick piece + leaf mould or cowdung and Cocochips / Cocopeat + brick piece + rice husk produced maximum number of leaves (8), longest leaf (30cm), highest number of bulbs (5) per plant and maximum bulb size (3.0 x 2.5 cm).

**Fertilizer:** A slow release fertilizer is ideal for this genus. A liquid NPK 20-20-20 formulation at half strength recommendation year-round has proven to work well. Some growers report excellent results with a light topdressing of organics in late spring. Feeding with high levels of nitrogen should be avoided as this can make the foliage brittle and stretched. In active growth period, the plants can be fertilized once in three weeks in 1/2, 1/3 or 1/4th strength of NPK (20-20-20) both in drenching and foliar spray alternately.

Effect of ionic strength of nutrient solution and medium composition: Uniform sizes of plants were planted in 6” size pot in perlite, vermiculite, moss, and Cocopeat media. Plants were applied with 1/4, 1/2 and full strength of Hoagland Solution at monthly interval. There were 12 treatment combinations. The experiment was set to identify the medium and nutrition requirement of *Zygopetalum* grown under semi-hydroponic system. The experimental results revealed that

- Application of half strength of Hoagland Solution in plants grown in moss growing medium increased plant height (80.9cm), and no. of shoots/plant (4.67).
- Application of one fourth strength of Hoagland Solution enhances number of leaves (61) and leaf length (64.96cm)
- Application of full strength of the solution improved the spike length (75.5 cm) and spike longevity (52.3 days).

**Repotting:** *Zygopetalums* will respond best if divided and repotted when the new growths are stretching upward. They are quite succulent and should be divided with care or pseudobulbs are easily damaged or even broken. Any medium that is free draining such as a mixture of coconut chip, bark and perlite works well.

**Watering:** *Zygopetalum* requires lots of water as they prefer constantly moist conditions. Plants should be watered at least two to three times a week during summer and once a week during winter. Between watering, they must be absolutely dry.

**Zygopetalum based farming systems:** In *Zygopetalum* based farming systems, 10 to 12 spikes of *Zygopetalum* per m² per year with 7 number of pseudobulbs/plant, 3 number of spikes/plant having 70 cm spike length, 6.5
flowers/spike of measuring 7.75 cm can be produced along with anthurium bearing 8 to 12 number of spikes per m² per season, 2 to 3 spikes/plant having 6.96 cm x 9.17 cm spathe size, 32-40 cm peduncle length, 0.5 cm x 6.15 cm spadix size. In bed culture of anthurium, a dose of 10-20 kg FYM/m² is sufficient for production of quality flower production with a vase life of 90 days.

Post-harvest management (ICAR-NRCO Report, 2016-17)

- Treatment with 2% sucrose + 100 ppm \( \text{Al_2(SO}_4\text{)}_3 \) enhanced post-harvest life of Zygopetalum cut flowers to the extent of 15 days over control 10 days in tap water.
- Treatment with 2% glucose + 8-HQS (200 ppm) + citric acid (100 ppm) enhanced post-harvest life of fully open Zygopetalum cut flowers to the extent of 10 days over control 7 days in tap water.
- Treatment with 2% glucose + 8-HQS (200 ppm) + citric acid (100 ppm) and 2% sucrose + 200 ppm 8-HQS enhanced opening of buds and vase life of Zygopetalum cut flowers to the extent of 86% and 11 days over control 14% and 7 days in tap water, respectively.

Economics of Cultivation

A grower can harvest 5000 spikes of zygopetalum and 10,000 spikes of anthurium per year from a polyhouse of 500 m² area.

Cost of cultivation per year for 500 m² area: Rs. 100000/-

Total sale price of spikes of zygopetalum per year: Rs. 1, 50, 000/-

Total sale price of spikes of anthurium per year: Rs. 2,00, 000/-

Net profit per year/500m²: Rs. 2.5 lakhs

REFERENCES

