



## **A REVIEW ON THE GENUS: *EPIPHYLLUM***

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### **ABSTRACT**

*Derived from a Greek word meaning upon a leaf, Epiphyllum is a cactus. Native to Central America, it comprises of 19 species. Orchid cacti and Leaf cacti are the common names of it. Morphological features include flat, broad, lobed edge stem. Large, numerous petalled white or red flowers and being similar to pitaya the fruit is edible. Epiphytic plants are most commonly referred to as hybrids and are famous for their phenotypic properties, most noteworthy being the wide variety of colourful flowers that they can produce.<sup>[1]</sup> This paper entails a review on the Epiphyllum Genus, which consists of a brief description of the meaning of Epiphyllum, the conditions required for an essential cultivation and the traditional uses of epiphytic plants.*

**Key words:** Epiphyllum, Phyllocactus, Cactaceae, Night Blooming Ceres, Jungle Cacti.

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### **1. INTRODUCTION**

The genus *Epiphyllum*, meaning “on the leaf” in Greek contains a variety of 19 species. <sup>[1]</sup>They are called so because the blooming of the flowers occurs directly on the leaves. They inhabit the jungles of Central and South America, and Mexico. These epiphytic plants belong to the cactus family, Cactaceae but differ from the Jungle Cacti in few attributes. Jungle cacti have leaf like structures that resembled thickened stems which have protruding spines whereas the Epiphyllum are not covered with spines, rather they are covered with hair bristles or tiny spines in the areolas. The

epiphytic species contain fibrous roots that hold onto decaying vegetative matter and grow in small rock crevices or the forks in trees. Sometimes their roots, as if they are well adhered to the underground soil, grow up trees using aerial roots. This facilitates the plant in receiving sunlight from a canopied jungle. Since these plants have small roots, oversaturation of water causes suffocation. Hence survival is easier in the jungle because the jungles' frequent rains are ideal for keeping the plant roots moist but not saturated. The epiphytic plants are known for the beautiful blooming nature of its flowers such as the Night Blooming species that have white or white with pale yellow overcasts or traces of yellow in back petals, and the species that produce colored flowers such as the orange red blossoms of *Nopalxochia ackermanii*, the red *Heliocereus aurantiacus* to name a few. Hence hybridization is continually done to obtain desired varieties of flowers that have different shapes, number of petals, the colours of the flowers and blossom size. It is noteworthy to mention that the first cross, around 1830, was between *Heliocereus speciosus* and *Nopalxochia phyllanthoides*. With regard to the genus *Epiphyllum*, its traditional uses, secondary metabolites and traditional uses in India have been elaborated upon.<sup>[2]</sup>

### Epiphyllum Genus

*Epiphyllum phyllanthus* was first described by an Englishman, Adrian H. Haworth in 1813 and hence determined that Epiphyllum would be an appropriate genus name. Later in 1820, the same plant was described as *Phyllocactus phyllanthus* by a German, Link who was unaware of the plant's first description. Since the first published name was *Epiphyllum phyllanthus*, the Genus remained Epiphyllum and Phyllocactus became its synonym. Indeed, Phyllocactus became prominent as a word that described not only the epiphyllum species, but all epiphytic cacti including the hybrids produced by various epiphytic cacti plants.<sup>[2]</sup>

## 2. MORPHOLOGY AND TAXONOMIC CLASSIFICATION

*Epiphyllum anguliger*-fishbone cactus as commonly known. Mainly found in India and Mexico. profusely branched stem with nocturnal and sweet scented flowers. Fruits are brown, green, and yellow in colour with oval shape (Table .1)<sup>[3]</sup>

**Table 1** Taxonomy table of *Epiphyllum anguliger*

KINGDOM	PLANTAE
DIVISION	MAGNOLIOPHYTA
CLASS	MAGNOLIOPSIDA
ORDER	CARYOPHYLLALES
FAMILY	CACTACEAE
SUB FAMILY	CACTODIAE
GENUS	EPIPHYLLUM
SPECIES	ANGULINGER
BINOMIAL NAME	<i>Epiphyllum anguliger</i>

*Epiphyllum crenatum* – derives its name due to presence of wavy-tooth i.e. crenations in stem and is related to *Epiphyllum laui* and *Epiphyllum anguliger*. It can be cultivated easily, moisture and large amount of humus needed. The stem is tapering which is branched. At the end forms a woody, flat, secondary stem. Linear and long leaves and has green or grayish green epidermis. Nocturnal flowers which are 18-29cm long (Table.2.)<sup>[4]</sup>

**Table 2** Taxonomy table of *Epiphyllum creanatum*

KINGDOM	PLANTAE
DIVISION	MAGNOLIOPHYTA
CLASS	MAGNOLIOPSIDA
ORDER	CARYOPHYLLALES
FAMILY	CACTACEAE
SUB FAMILY	CACTODIAE
GENUS	EPIPHYLLUM
SPECIES	CRENATUM
BINOMIAL NAME	<i>Epiphyllum creanatum</i>

*Epiphyllum oxypetalum*-Also called as D man’s pipe, beauty under the moon and *Nishagandhi*, most commonly cultivated cactus.<sup>[5]</sup> Originated from Sri Lanka, Central and North America, it is also seen in South East Asian countries, Venezuela, Brazil. In India, it is distributed in Mumbai, Bangalore, Chennai, Ranchi, and Uttarkhand<sup>[6]</sup>. It can be used as a substitute for digitalis. It is called as “The pain of heart” by Shoshone Indian tribe.<sup>[7]</sup> The flower withers in dawn while blooms in the night. Erect terete primary stems contain lignin at the base, with wavy and crenate margin flat secondary stem. It has fragrant nocturnal flowers as the aromatic compound benzyl salicylate is present and oblong purplish red fruits which is angled<sup>[5]</sup> (Table.3)

**Table 3** Taxonomy table of *Epiphyllum oxypetalum*-

KINGDOM	PLANTAE
DIVISION	MAGNOLIOPHYTA
CLASS	MAGNOLIOPSIDA
ORDER	CARYOPHYLLALES
FAMILY	CACTACEAE
SUB FAMILY	CACTODIAE
GENUS	EPIPHYLLUM
SPECIES	OXYPETALLUM
BINOMIAL NAME	<i>Epiphyllum oxypetalum</i>

*Epiphyllum phyllanthus*-Called as climbing cactus, it is native to Mexico. grown as ornamental it is a species native to Mexico.<sup>[8]</sup> (Table.4)

**Table 4** Taxonomy table of *Epiphyllum phyllanthus*-

KINGDOM	PLANTAE
DIVISION	MAGNOLIOPHYTA
CLASS	MAGNOLIOPSIDA
ORDER	CARYOPHYLLALES
FAMILY	CACTACEAE
SUB FAMILY	CACTODIAE
GENUS	EPIPHYLLUM
SPECIES	PHYLLANTHUS
BINOMIAL NAME	<i>Epiphyllum phyllanthus</i>

*Epiphyllum pumilum* –Grown as ornamental, it is native to Mexico and Guatemala. Woody based, profusely branched primary stem which form tapering

ends, Secondary stem is elongated.Nocturnal,fragrant 10-15am long flowers. Sweet ovoid fruits with white pulp.<sup>[9]</sup>

**Table 5** Taxonomy table of *Epiphyllum pumilum*–

KINGDOM	PLANTAE
DIVISION	MAGNOLIOPHYTA
CLASS	MAGNOLIOPSIDA
ORDER	CARYOPHYLLALES
FAMILY	CACTACEAE
SUB FAMILY	CACTODIAE
GENUS	EPIPHYLLUM
SPECIES	PUMILUM
BINOMIAL NAME	<i>Epiphyllum pumilum</i>

Alfred B.Lau discovered the species in 1975 and hence named after him. It is found in MEXICO on steep slopes. It is tricky to grow as the stem tissue is affected by viral infection but grown in Europe and in Germany grows even in freezing temperature. Laterally or basally branched stem with prominent midrib. Brownish cream leaves hide the aeoles. Opened in the evening, the flowers remain expanded for two days (Figure 1). They are 14-16cm wide, 15-16cm long and funnel shaped. Thick in the middle, fruits are oblong and are carmine red, flesh white coloured. Ripened fruits are pink.



**Figure 1** *Epiphyllum oxypetalum* flowers.

### 3. CULTIVATION OF EPIPHYTIC PLANTS

Since epiphytic plants as already discussed grow in between rocks (rock crevices) and on the overhanging branches of trees where they are afforded considerable shade hence it should be duly noted that during cultivation of these plants during summer, they should be shaded from direct sunlight and kept in moist places. Whilst in winter they require the temperature of an intermediate house. All through the summer months, the plants should be syringed both morning and evening; but by the end of August they will have completed their growth, and should, therefore, be gradually

exposed to sunshine and air. Till the return of spring it is advisable to discontinue the use of the syringe from September, but the plants should always be supplied with moisture at the root and in the air during the winter months. The cultivation of epiphytic plants and their hybrids is frequently carried out as they are used for decorative purposes and also used as exhibition plants, although these plants are much rarer at exhibitions now than they were a few years ago, yet they do sometimes appear, especially in the northern towns, such as Liverpool and Manchester.<sup>[11]</sup>

#### **4. TRADITIONAL USES**

Since Epiphyllum and Phyllocactus were considered to be synonyms in the 1800's, the different traditional uses they contributed to were;

##### **4.1. Epiphyllum strictum**

These epiphytes are 1-3 meters tall that inhabit the wet forests of Southern Mexico, Guatemala to Panama. They are usually cultivated for ornamental purposes as their funnel form flowers are white /pink, 20-30 cm long, 17-20 cm wide, and nocturnal. In Alta-Verapaz, Guatemala, the branches are heated and used as a splint around broken bones.

##### **4.2. Red pitaya Epiphytic**

Also called *Hylocereus polyrhizus*, which produce white flowers that are nocturnal and 29cm long. They grow on anything from trees to brick walls. They produce red fruits with foliaceous scales that are edible at maturity. Cultivated for the elegant use as a hedge/ natural barrier. Due to their ability to tolerate and recover from extreme high/low temperature flux stress (because of waxy cuticle layer), as well as dry soil conditions, this species have recently been cultivated in areas of the Negev Desert in Israel where no other agriculture takes place. This operation, performed by the Ben-Gurion University, produced and marketed the fruits in Europe for US4\$/kg. This is the highest ever paid for a fruit exported by Israel.

##### **4.3. Epitheliantha (Rosapara)**

This species comes under the psychoactive cacti genera and some of it's folkloric uses include treatment of arthritis, intestinal disorders, scorpion and snakebites, and during datura poisoning. The plant is sliced into small "buttons" and which is dried and then eaten or drunk. The affects last for 6-12 hours depending on a few factors like amount consumed, age of the plant etc. Rosapara denotes it's tribal name.

##### **4.4. Night-blooming Cereus**

Also called "Queen of the night", it is a terrestrial cactus usually epiphytic. Inhabits the thickets in the rocky woods of Jamaica and Cuba. In Cuba the juice of the stems is used to induce blistering and expel parasitic worms from the body.<sup>[12]</sup> Also in Cuba, as well as Costa Rica, Brazil, Mexico, and elsewhere, an infusion of the stems and flowers is used as a cardiac tonic to combat rheumatism. In Europe, an alkaloid compound called "cactine" is extracted from the plant and used to treat irregular heartbeat, angina pectoris, and cardiac neuralgia. This compound has been found to have a spasmolytic effect on the coronary arteries that promotes blood circulation. The effects are similar to that produced by Digitalis (foxglove). Prostate diseases,

bladder irritation, congested kidneys, and nervous headaches are also treated with infused stems.<sup>[13]</sup>

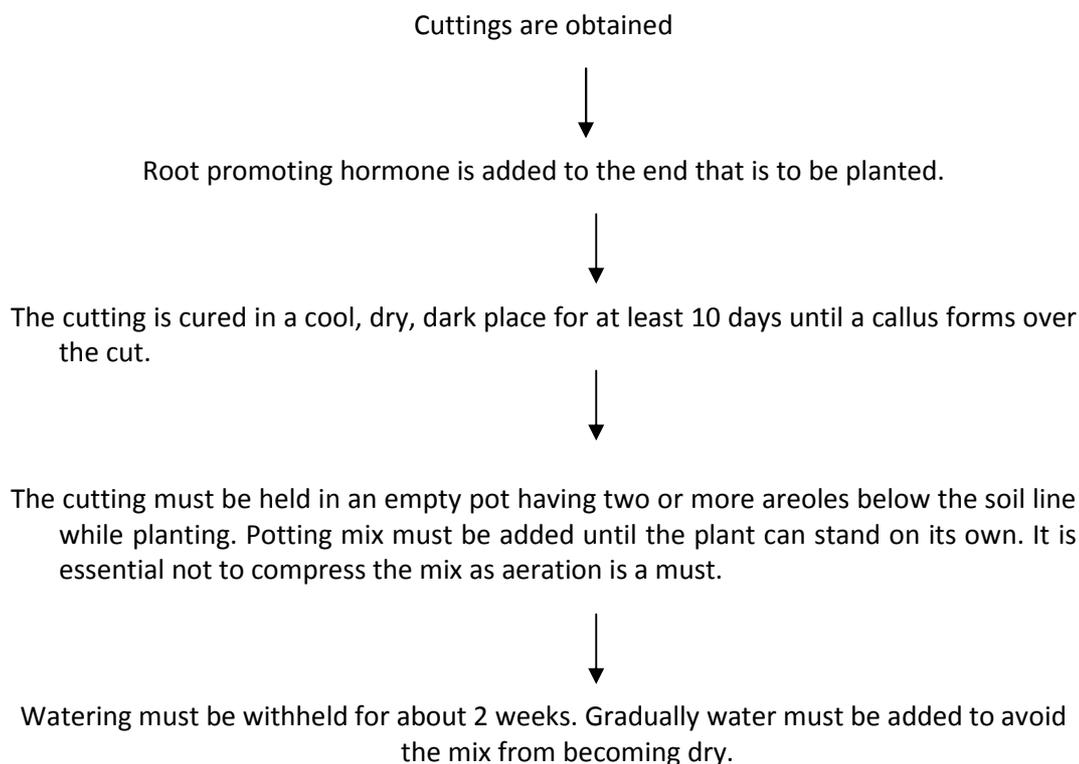
## 5. THERAPEUTIC USE

*Epiphyllum* is used in the treatment of cough and tuberculosis.<sup>[13]</sup> It is used in reducing heat by detoxification and loosening stools.<sup>[13]</sup> It was mainly used in Chinese medicine.<sup>[13]</sup> It can be used in the treatment of anxiety and insomnia thus serves as an analgesic.<sup>[14]</sup> *Epiphyllum* when mixed with honey and other herbs and consumed control hypertension.<sup>[14]</sup> *Epiphyllum oxypetalum* contains phytochemical compounds such as saponins, phenolic compounds, steroids, glycosides, tannins, terpenoids, and resins. It can be used to treat diabetes due to absence of reducing sugars.<sup>[7]</sup> Antibacterial activity is exhibited by the phyllocaldes. In the treatment of cardiac disease and dropsy, stem is used. Soups are made from petals of faded bloom which is believed to possess aphrodisiac medicinal properties.<sup>[7]</sup>

## 6. CARE AND MAINTAINENCE OF EPIPHYLLUM PLANTS

1. *Epiphyllums* like orchids, grow naturally above the ground in moss, mold and soil found in the crevices of branched trees. Hence they bloom better when rootbound, so they must be grown in small pots. Their growth can be compared to that of a vine i.e they form a tangled mass of stems and roots which helps them hold their place in the crevice. Hence a trellis or stake must be added to support such vining growth.
2. *Epiphyllums* must be given indirect or filtered sunlight. They like to grow on trees where they get dappled i.e dispersed sunlight.
3. *Epiphyllums* require moisture but tend to rot in wet soil, hence over watering will spoil their growth. Water the pots until water leaks from the drainage holes in the pot and then do not water again until the top third of the pot is dry. The level of water must be checked every few days. Their growing periods are during spring and fall and hence the water requirement is high during this period. After they flower during spring, they enter a resting phase and hence need less water.
4. *Epiphyllums* must be fertilized with a balanced fertilizer like 6-6-6 or 8-8-8 from spring throughout fall. A dilute fertilizer can also be used. Adding too much of the fertilizer will hinder the plant's growth.
5. Buds are formed during long cool winter nights and cooler temperatures and hours of darkness favour blooming. Plant's that have buds must not be moved as they can easily drop off. Here the flower buds are as large as a person's hand and the bloomed flowers are as large as a person's head.

## 6.1. Epiphyllum Culture



## 6.2. Epiphyllum Society of America

The ESA was founded on May 5, 1940 by a group of collectors and nursery people. In 1940 the epiphyllum species was unknown and hybridizing experiments were being carried out at various nurseries and the a plethora of names were used to name these plants. But confusion prevailed as more than one name was being given to the same variety. Hence the ESA was formed. This society started generating a list of names in order to prevent the same name from being used more than once and also to keep a record of which nursery had which variety. The names of some founders still exist such as 'Wegener Pet' and 'Pete's Snowflake'. This list contains an abundance of information including the later registrations made and is today known as the Directory of Species and Hybrids. The listings of which nursery grew which species became impractical hence the next addition was known as the Register of Species and Hybrids. As the years passed ESA grew into an organization that opened its arms to people who wanted to learn and grow such exotic plants. The most important event in the history of the Epiphyllum Society of America [ESA] took place at the end of July 1998. The International Society for Horticulture Science [ISHS] appointed the ESA the International Registration Authority [IRA] for the epiphytic cacti hybrids of the Hylocereae Tribe. The appointment effectively legitimizes fifty-eight years of ESA work as de facto registrar.

## 7. CONCLUSION

The plant kingdom is a large reservoir of pharmacologically active molecules and large number of plant-derived medicines now commercially available. Traditionally used medicinal plants produce a variety of compounds of known therapeutic properties. In recent years, antimicrobial properties of medicinal plants are being

increasingly reported from different parts of the world . The bioactive compounds obtained from medicinal plants have been used to treat various ailments caused by microorganisms. The most important of these bioactive principles are alkaloids, flavanoids, phenolic compounds and tannins that may be evolved in plants as self-defense against pests and pathogens<sup>6</sup>. Nature selects such type of plants and these plants are normally free from pests as well as pathogens. Use of plants as traditional health remedies is very popular and important for 80% of the world's population in African, Asian, Latin America and Middle Eastern Countries Present investigation revealed that *Epiphyllum oxypetalum* leaves could be a very useful resource as a Biotherapeutic agent. As its leaf extracts possess good nutritive values and a broad spectrum of activity against pathogenic bacteria, its expended use as dried/dehydrated extracts and its blends could be worth exploiting from economic point of view. These efforts could open up the possibility of finding new clinically effective biotherapeutic agents. This indeed is a step towards its sustainable use and justifying its abundance. Attempts are also being made to screen the leaf fibers as prebiotic agents.

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