

Dendrophylax lindenii (Lindl).
Bentham ex Rolfe



A MONOGRAPH

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DENDROPHYLAX LINDENII

A MONOGRAPH

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Colegio Bolivar. Agricultural science. COL

2024-2025

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INTRODUCTION

(Dendrophylax lindenii) (Lindl). Bentham ex Rolfe is the corresponding authorial name for the rarely known Ghost Orchid. It was first described by the Belgian horticulturist and plant collector Jean Jules Linden in Cuba in 1844 (Mújica et al, 2021). The floral species is particular for its leafless structure and photosynthetic process, commonly found in damp and wetland forests. *Dendrophylax lindenii* adheres to tree branches and trunks to carry out this photochemical reaction process (*North American Orchid Society 2015*). This plant species is native to Cuba but is currently distributed in Florida with a perimeter of 50 x 100km² with an average quantity of 2000 individuals in this area.

Its leafless characteristic provides the flower with chlorophyllous roots “3-5 mm wide to over 50 cm long” that carry out the photosynthetic process (*North American Orchid Society, 2015*). The orchid’s distinctive labellum has two lateral “legs” or labellum lobes that take an inside form and then spread in an outwards shape, characteristic to the form of an amphibian's lower limbs (Figure 1 below). This unique characteristic has put the species in a crucial state of extinction, due to illicit extraction from native territories (Kuligowski, 2016). The following investigative research will discuss the different features of *Dendrophylax lindenii* in five sections. The first chapter will include the Ecology of the plant species, focusing on the distributional context, the environmental factors in distribution, and *Dendrophylax lindenii* as a vegetation component. The second chapter will focus on the biology of the epiphyte, taking into context its chromosome complement, life cycle, phenology, and reproductive nature, such as pollen and pollinators as well as its sexuality. The third chapter centers on the various propagation methods of the species. The number of methods to grow the plant varies depending on the species selected; in this case, *D. lindenii* can be re-grown through the Air layering technique, Division Method, and cutting propagation. Finally, the fourth section of the monograph will focus on the market participation of the species, specifically, inside the food industry, medicine, and the commercial market.

Figure 1.

Ghost orchid showing distinctive labellum:

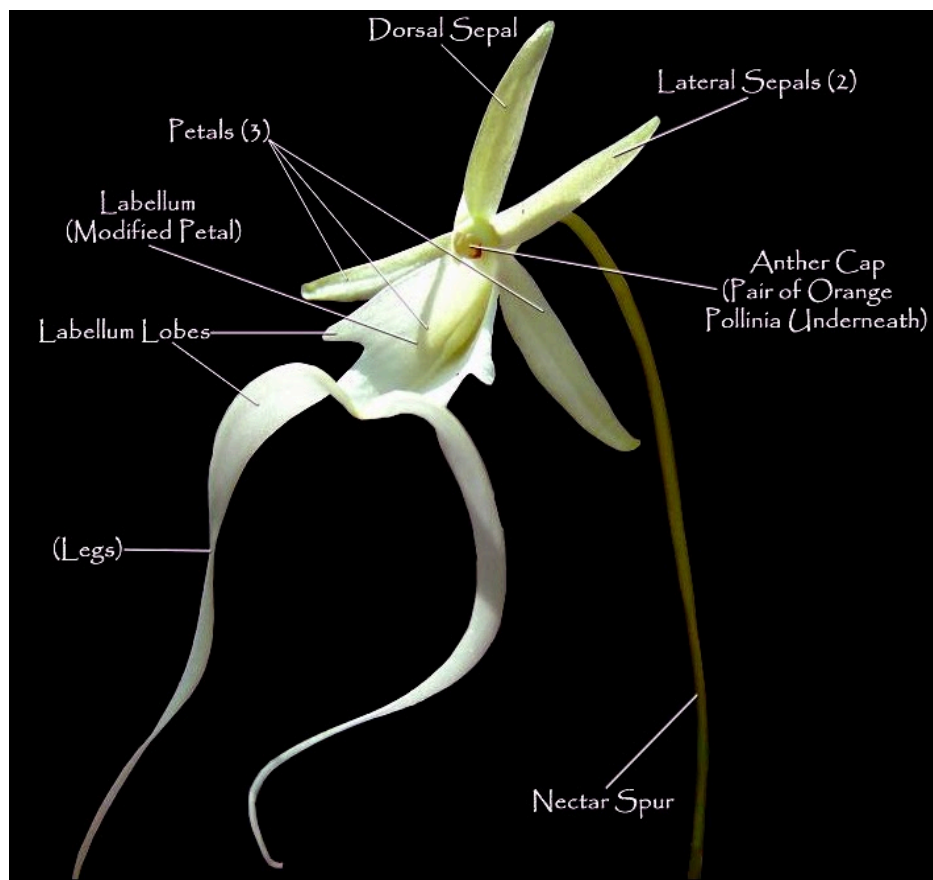


Figure 1. Above distinctly signals the multiple components of the species. As mentioned before, the short triangular shape and the elongated “leg” signal both labellum lobes (Mazuk, 2015).

1.0 ECOLOGY

1.1 DISTRIBUTIONAL CONTEXT

1.1.1 Affinities

Dendrophylax lindenii is part of the Plantae Kingdom, which consists of mosses, ferns, conifers, and flowering plants. With over 250,000 species, the Plantae family is second to the arthropods as the largest category in Earth's ecosystem (UC Berkeley, 97). The Plantae Kingdom first appeared during the Ordovician period, characterized by rapid changes in biological systems, plate tectonics, and ocean seafloor sparsity. The Plantae are also commonly identified by their green pigment called chlorophyll, used to help produce glucose and energy and facilitate oxygen. The following category is the Phylum, which goes below the kingdom and above class, in which *Dendrophylax lindenii* is organized under the Streptophyta. Species in Streptophyta are categorized as multicellular and unicellular organisms commonly charophyte green algae that live underwater, and on land, however, only species that sexually reproduce through conjugation (Sluiman, 1985). *Dendrophylax lindenii* corresponds to the Equisetopsida class, the next taxonomic division. Equisetopsida include spore-bearing and vascular plants. For instance, *Dendrophylax lindenii* is a flowering plant that germinates through mycorrhizal fungus infections and regular germination (Mickel et al, 2016). The proceeding category to Class is Subclass: Magnoliidae, the largest clade of angiosperms, comprising about 10,000 species and divided into four subcategories: Magnoliales, Laurales, Canellales, and Piperales (Massoni et al, 2015). The Order of the species follows the species of Asparagales, also referenced as the "orchid order of flowering plants" (Dodson, 2024). This category contains 14 families, 1,122 genera, and more than 36,200 species. Lastly, *D. lindenii* is categorized into the Family: Orchidaceae. The second-largest family of flowering plants; covers about 880 genera and 26,000 species worldwide (GBIF 2023). This family of flowering plants comprises all types of orchids characterized by their perennial lifetime and symmetric leaf shape, their pods are the origin of marketed vanilla seeds and therefore most commonly used for economic purposes (Petruzzello 2018). The orchid family commonly grows in low-temperature weather conditions and humid

environments. However, the species' scent is released uniquely at night to attract sphinx moths that pollinate these Plantae (Griffiths, 2024). Their pseudobulbs (storage organs) help store carbon dioxide during the night in order to carry out the photosynthetic process during the day. Although its strategic function allows the plant to conserve more nutrients, its photosynthetic process is poorly beneficial; through its leaves, the orchid can store malic acid and carry out its photosynthesis, and allow the plant to close its pores during dry weather (*American Orchid Society 2015*). Due to its leafless structure, *D. lindenii* uses its roots to carry this process and store sugar to convert it into ATP once in daylight. The taxonomy of *D. lindenii* is summarized in the table below.

Table 1:

Taxonomy of *Dendrophylax lindenii*:

- **Kingdom:** *Plantae*
- **Phylum:** *Streptophyta*
- **Class:** *Equisetopsida*
- **Subclass:** *Magnoliidae*
- **Order:** *Asparagales*
- **Family:** *Orchidaceae*
- **Genus:** *Dendrophylax*
- **Species:** *Dendrophylax lindenii*

1.1.2 Environmental factors

According to Dr. Carl L. Withner, the epiphyte requires balanced temperatures and high humidity levels. For instance, species need to grow in humidities that vary from 50 percent to 70 percent and temperatures that vary from 60-70 degrees Fahrenheit. The importance of balanced light is essential for orchids to release their distinctive odor and develop constant growth; at night, temperatures need to become lower than 10-20 degrees in order to attract sphinx moths that allow increased genetic diversity

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within the pollinated orchid (2016). Due to the species's current distribution in South Florida and Cuba, it is concluded that the orchid grows in low altitudes that vary from 300 ft to 100ft where the weather conditions are more balanced.

1.1.3 Fossil record

Although no well-documented research exists for the plant species, the epiphytic plant, *Dendrophylax lindenii* is a relatively new blossom that was founded in 1844 and is already considered an endangered species in Florida, Cuba, and The Bahamas. Nevertheless, the Orchidaceae species fossil record can officially date back to 15-20 million years ago with specimens from the Dominican Republic. The documented information includes *Meliorchis caribea* –an orchid pollinarium– attached to an extinct pollinator. However, the species timeline and geographical distribution can date back to the Late Cretaceous period (76-84 million years ago) after the mass extinction event at the boundary K/T¹(Ramírez et al, 2007).

1.1.4 Origin

The distinctive epiphytic and perennial species, *Dendrophylax lindenii* (Lindl). Bentham ex Rolfe is only known to have originated in Cuba before it was discovered in 1844 by Jean Jules Linden. Still, there is no further information on the center of origin. Regardless, the family species, Orchidaceae, originated in most of Central America and southwest South America and was most commonly used for medicinal purposes. However, earlier species date back to the Late Cretaceous Period in areas now registered as North America.

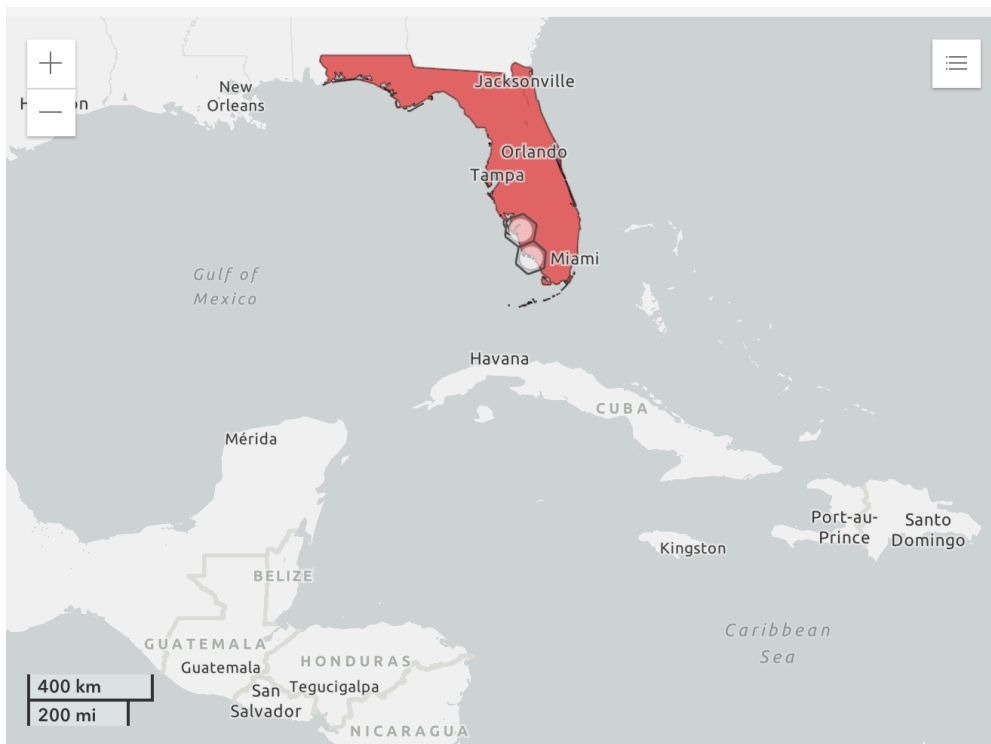
¹ K/T boundary: (K/T) Between the Cretaceous and Tertiary periods—an event that led to the extinction of 75% of all species and marked the transition between the Cretaceous period to the Paleogene period. One of the most important mass extinctions on Earth (*The Editors of the Encyclopaedia Britannica 2024*).

1.1.5 Present Distribution

Although the *Bentham (Lndl.) ex. Rolfe* is native to Cuba, and South Florida, it has currently been in critical condition of extinction. Climate changes, alterations in hydrology, wildfires, sea level rises, and rainstorms have currently caused the epiphyte to decrease in quantity. Through South Florida, the orchid has a distribution scope from 20,000 to 200,000 Kilometers², most visible in the southwestern tip: in Collier, Hendry, and Lee counties (Figure 2 below) (Angelo et al, 2022). In Cuba, there is an extant occurrence, meaning there is an inferred projected site of the species, located in western Cuba, Guanahacabibes.

Figure 2.

Appearance of epiphyte in South Florida



The picture shown above currently shows the documented appearance of the epiphyte in a 200-mile radius. The hexagonal figures at the left of southern Florida present their documented apparition, showing coverage of 2,401 mi² or 6,219 km² (Angelo et al, 2022).

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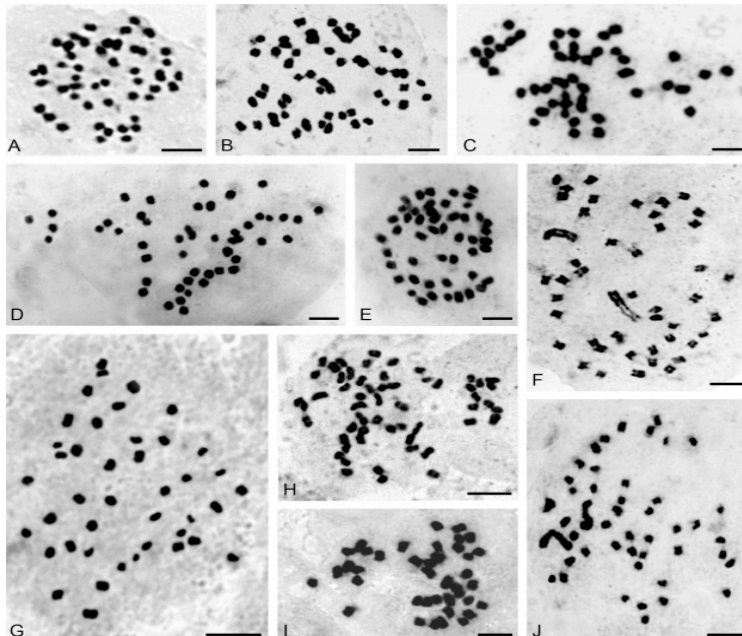
2.0 BIOLOGY

2.1 Chromosome Complement

D. lindenii, although part of an extensive species, has no data evaluating its chromosomal complement. However, the epiphyte is part of the Orchidaceae family: a taxonomic category comprising around 78 genera (Daviña et al, 2009). The most common numbers for the subcategory are $2n=30, 32, 36, 38, 40, 42, 44, 46, 48$, but, they can still range from $2n=10$ to $2n=168$ depending on the species (Felix et. al 2000). Under the family of Orchidaceae, there are a variety of subfamilies into which this rare epiphyte falls, most specifically under the Epidendroideae (Figure 3). This subfamily contains over 15,000 orchid species in 576 genera and covers up to 76% of the entire Orchidaceae family (Freudenstein et al, 2015). This family includes species with numbers like $2n=28, 30, 32, 34, 36, 38, 40, 42, 46, 48$ and 50.

Figure 3.

Orchidaceae family (*Epidendroideae*) microscopic references of multiple species



The image above presents the somatic chromosomes of other orchid species inside the Orchidaceae. “(A) *Pelexia lindmanii* ($2n = 46$), (B) *P. ekmanii* ($2n = 46$), (C) *Sarcoglottis fasciculata* ($2n = 46$), (D) *S. fasciculata* ($2n = 47$), (E) *S. fasciculata* ($2n = 49$), (F) *Mesadenella cuspidata* ($2n = 46$), (G) *Aspidogyne kuczynskii* ($2n = 42$), (H) *Eurystyles actinosophila* ($2n = 56$), (I) *Stigmatosema polyaden* ($2n = 40$), and (J) *Skeptrostachys paraguayensis* ($2n = 46$). Scale bars = 5 μm ” (Daviña et al., 2009).

2.2 LIFE CYCLE AND PHENOLOGY

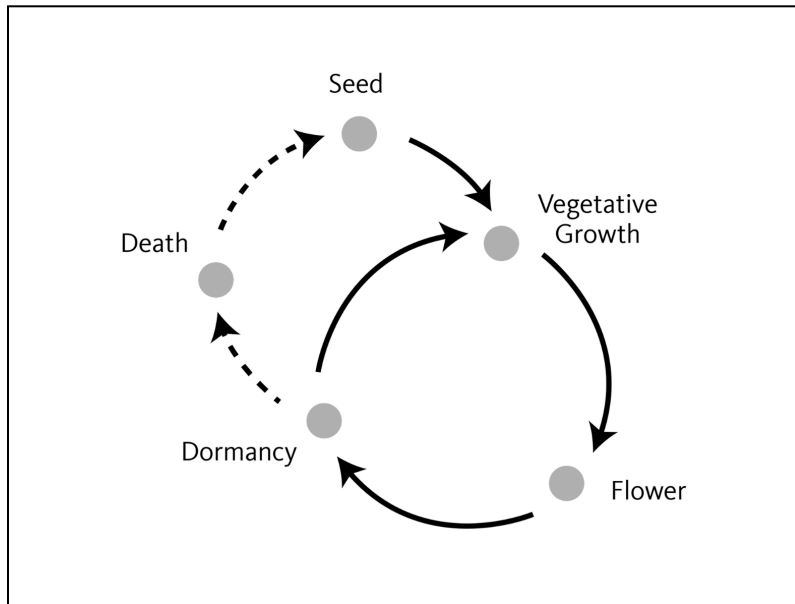
2.2.1 Life Cycle

D. lindenii is characterized as a species with a herbaceous perennial life cycle (Figure 4 below); these plants conserve their resources specifically for their roots, crowns, and in this case, its leafless structure to live more than two years (VanDerZenden, 2008). Perennials like this one, regenerate from their roots each year to ensure their longevity during drastic seasonal changes. For instance, during dormancy periods, the epiphyte conserves its ATP and carbohydrates so that by colder or hotter dormant periods, it is able to survive. Seed germination starts in between temperatures that vary from 20°C to 30°C and lasts over two months in which the species develops root structures and grows its first leaves (the plant is considered “leafless” but it does grow some small structures) (Rankel, 2024). The following stage lasts up to 2 years when seedlings start to grow until they are 1-2 inches tall and are starting to transition to vegetative growth. This following stage lasts up to 5 years in which the leafless epiphyte grows at a slower pace and develops additional roots. The plant must strive in multiple weather conditions so that its mycorrhizal (fungus) relationship allows a longevous nutrient absorption (Rankel, 2024). In its final stage, *D. lindenii* starts to flower after 3 to 5 years of transitioning from vegetative growth and then proceeds to take from 2 to 3 weeks to flourish into its final bloom. When humid weather comes in season, the orchid begins to attract pollinators to produce seeds, in this case, as mentioned earlier in other chapters, the sphinx moth, is one of the most crucial participants for seed production and reproduction. During dormancy periods,

temperatures tend to become drier and water becomes scarcer, allowing the epiphyte to develop longevity (Rankel, 2024).

Figure 4.

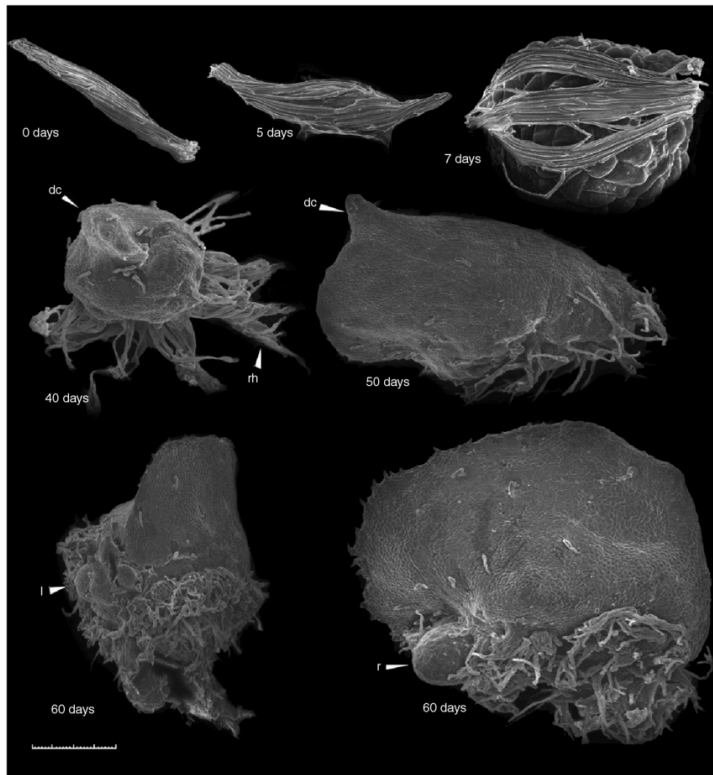
Life cycle of a perennial organism



The image presented above shows a condensed diagram of a Perennial life cycle. The curved arrows in black show the cycle of a plant that rebirths from its roots and reutilizes them to germinate once again. Consequently, the dashed arrows represent what can happen to an epiphyte if it dies and its roots and trunk are no longer useful for regenerating the plant (Rankel, 2024).

Figure 5.

Embryo and seedling development in D. lindenii observation



The image above displays *D. lindenii* embryo and seedling development from 0-60 days after germination. (0 days) under germinated seed; (5 days) seed with swollen embryo and partially ruptured testa²; (7 days) enlarging embryo and fully ruptured testa; (40 days) differentiating embryo with dorsal crest (dc) and rhizoids (rh); (50 days) embryo with elongated dorsal crest; (60 days) seedling with emerging leaves (l) or roots (r) (Zettler, 2016).

2.2.2 Phenology

The Ghost Orchid flower is an epiphytic plant that grows in cypress swamps and Hydric Hammocks. These are commonly known as palm forests with flooding patterns that are grouped up mostly of palms and ferns with limestone soil (Johnson, 2010). This community of organisms is dominated by swamp

² Testa: The coat of a seed. Structure in which the embryo is protected from extreme temperatures, and drying. Helps maintain dormancy by protecting the seed from water and gases (Harrison, 2025).

Laurel oak (*Quercus laurifolia*), Cabbage palm (*Sabal palmetto*), American elm (*Ulmus americana*), Sweetbay (*Magnolia virginiana*), Red cedar (*Juniperus virginiana*), Red maple (*Acer rubrum*), Sugarberry (*Celtis laevigata*), Sweetgum (*Liquidambar styraciflua*), and Water oak (*Q. nigra*) (Johnson, 2010). *D. lindenii*'s roots attach to the other corresponding organisms and begin the photosynthetic process by synthesizing sugars and working alongside a fungus to exchange carbohydrates allowing the plant to absorb nutrients (Co, 2023). The orchid's labellum has three lobes with a triangular one in the middle, while the other two are elongated and form a tapered shape (Co, 2023). The most important factor that allows the epiphyte to reproduce and live through several generations is the substrate to which it adheres; these organisms have to live longer than a decade and should hold moisture in times of high temperatures to allow conditional living (*American Orchid Society*, 2009). The species' flowering period in its life cycle starts in May and lasts until August but can come as early as February. Still, it doesn't arrive until 3 or 5 years later after having transitioned to vegetative growth.

Figure 6.

D. lindenii attached to a piece of wood

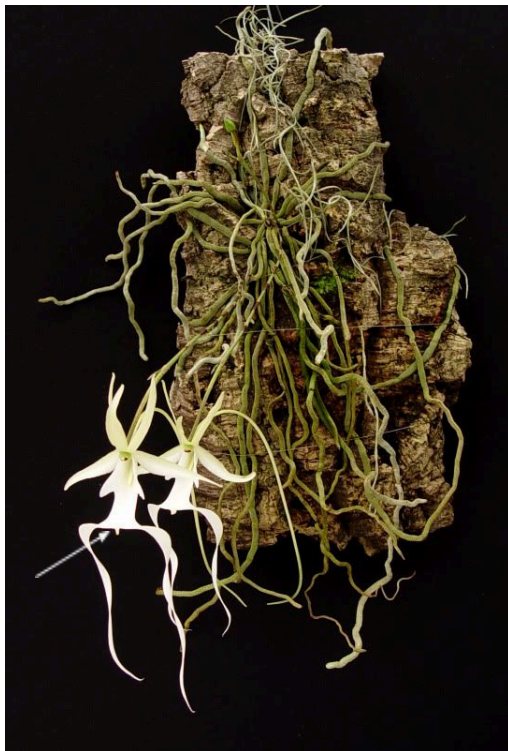


Figure 7.

Epiphyte naturally grown in the tree and captured



In Figure 6 *D. lindenii* is at its full blooming phase. The roots are attached to the bark of a tree, holding the flowered species. The two elongated lobes are seen through their tapered shape and the lobe in the shape of a triangle is signaled by the arrow (Slippertalk, 2010). In Figure 7, the Orchid is also in full bloom but has naturally grown in a tree trunk, compared to the figure before where it has been grown by an individual (Orchid Web, accessed 2025).

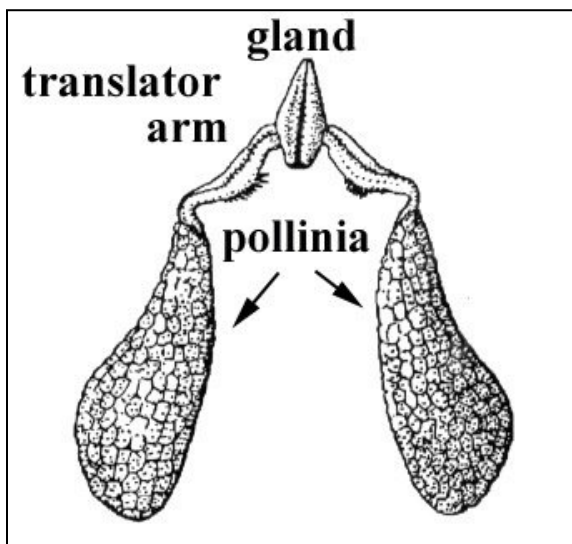
2.3 REPRODUCTIVE BIOLOGY

2.3.1 Pollen

D. lindenii orchids release pollen through the nectar spur once the pollinator is attracted to the flower. Unlike most flowering plants, the orchid contains a bundle of pollen called a pollinium or pollinia (see Figure 8 below), which is produced in the anther lobe of the species so that when the Sphinx Moth elongates its tongue and is able to grab the pollen (Main, 2019). Most orchids, including this one, have only one anther; this part of their anatomy is attached to the filament, which composes the Stamen (In Figure 9 below, the anatomy of the flower clearly shows these components).

Figure 8.

Pollen structure of an orchid



In Figure 8. the pollinia or *pollinium* is seen by both arrows; they are attached to the gland which makes part of the Anther cap of *D. lindenii* (Kaur, 2021).

Figure 9.

Diagram of flower anatomy

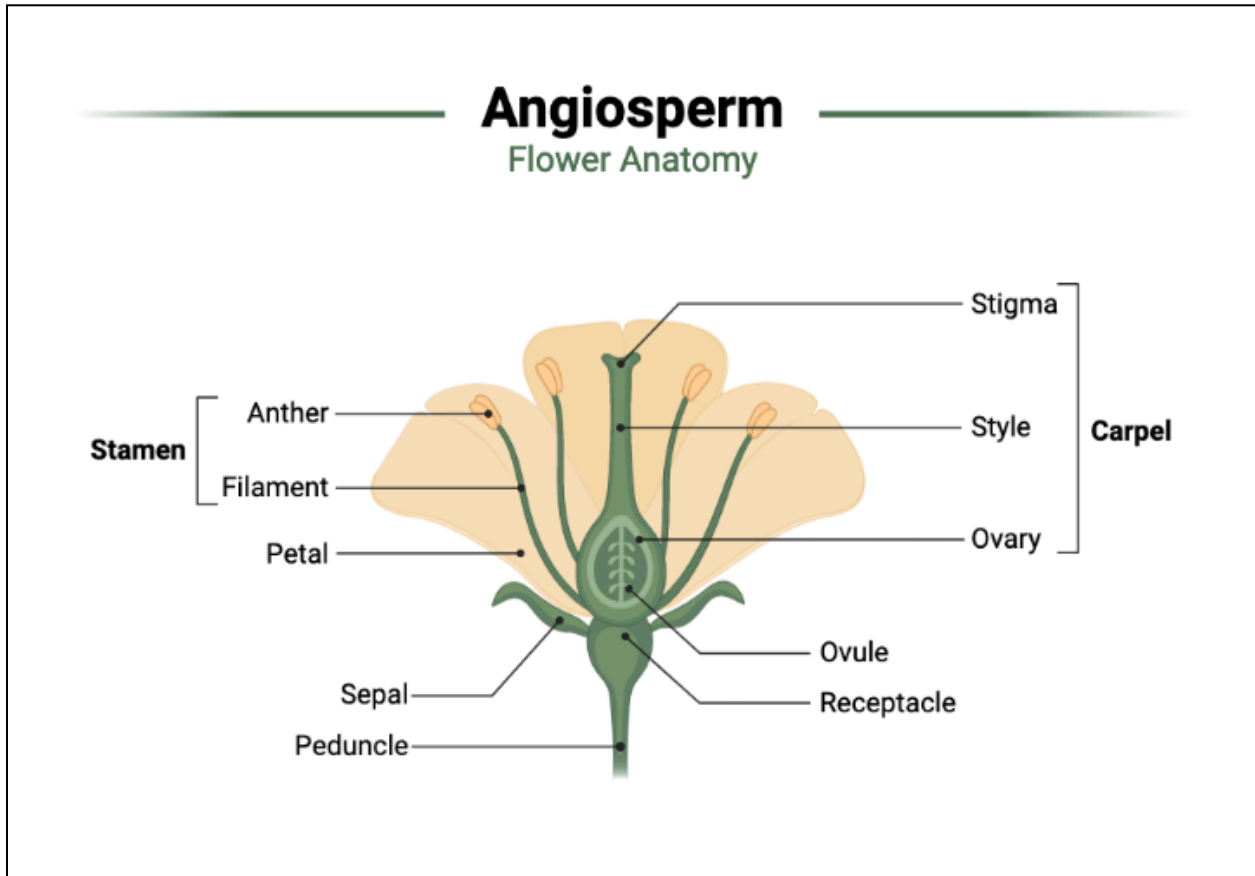


Figure 9. above is a detailed diagram of the anatomy of a flower, showcasing the inherent components of a flowering plant. The Anther is seen as the yellow circle-like feature that is attached to the Filament; consequently making part of the Stamen (Catherine, 2015).

2.3.2 Sexuality

D. lindenii is not currently investigated for its sexuality beyond pollination, however, it is known to be part of the Orchidaceae family. This category of species is adapted to attract male insects that

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inadvertently act as pollinators of the orchid when their own mating receptors deceive them (Gasket, 2011). Beyond this information, there have been certain studies of (Lindl) Bentham Ex. Rolfe, regarding its apomictic reproduction or asexual development of seed and embryo without the need for fertilization. A study made by Krawczyk et al. in their journal *Annals of Botany* Volume 115, suggests that the mycoheterotrophic plant could be autogamous and apomictic simultaneously; in other words, the species is capable of asexual reproduction and self-pollination. In one of the observations, author Geitler “noted a similar percentage of seed capsules on flowering shoots that were manually self-pollinated or cross-pollinated”, meaning that the pollen rises to the stigma of the flower; in cross-pollination, the pollen from the flower moves to a different plant (2016).

2.3.3 Anthesis

D. lindenii anthesis period occurs between June and July. Once the epiphyte blooms, it stays in this phase for 1.5 to 2 weeks; however, on other occasions, due to weather conditions, the flower may not even bloom.

2.3.4 Pollination and Potential Pollinators

D. lindenii's most common and only pollinator is the Giant Sphinx Moth or Sphingidae: a big organism with a long abdomen and a long proboscis (tongue) that pollinates the flower at night (*Missouri Department of Conservation*, 2024). Their features, specifically their tongue, enable them to absorb the nectar from the orchid, making it difficult for other insects to sip. However, to pollinate the plant, the insect must have already visited multiple orchids from the same species to spread the pollen (Co, 2023). Apart from this rare organism, it is speculated that other moths such as the gaudy sphinx moth (*Eumorpha labruscae*) and streaked sphinx moth have pollinated this epiphyte.

Figure 7.

Gaudy Sphinx Moth



Figure 8.

Giant Sphinx Moth or Sphingidae



In Figure 7, the Gaudy Sphinx moth (*Eumorpha labruscae*) is shown, characterized by its green visage and big torso (Wikipedia, 2009). In Figure 8, the most common pollinator, Sphingidae is shown, characterized by its big torso and its long proboscis which it uses to pollinate the purple plant on the image.

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3.0 PROPAGATION AND MANAGEMENT

3.1 Propagation

In order to grow *D. lindenii*, it is essential to understand the environmental factors that facilitate its growth. The species needs the assistance of a mycorrhizal fungi infection for seed germination, a host plant, and a humid environment in order to grow. A recent experiment carried out by authors of the 22nd World Orchid Conference stated that the seed development of a species was more successful without seed hardening rather than pre-hardening. This means that the seeds were preconditioned by withstanding drought under rainy conditions. Additionally, the intermittent misting of the seeds within the environment

of a testing greenhouse allowed the seedlings to germinate after three years; normally, *D. lindenii* germinates within 3-5 years (Zettler et. al, 2019). According to the Ghost Orchid Organization, the species' growth is dependent on “finding a suitable substrate”, to prove this, they utilized Hickory wood because of its capacity to “maintain its integrity without decomposing”, allowing a species with a long period of germination to strive. After attaching the germinated seed to the wood, the branches will begin to adhere and find spaces between the crevices of the substrate, essential to maintain moisture and nutrients, plus carrying out the photosynthetic process, given the fact that the *D. lindenii* has no leaves to store ATP (see Figure 9 below) (2009).

Figure 9.

Roots of D. lindenii attached to hickory wood



Figure 9. above, shows the roots of *D. lindenii* attached to the hickory bark. The epicenter of the roots is noticed in the center of the wood, as the germinated seed has been planted there. The wood has been

attached to a larger tree so that as the plant grows, it will continue to grow within the larger trunk (Ghost Orchid Organization, 2009).

3.1.1 Cutting propagation

For cutting propagation, the stems of the flower need to be selected by detecting the visible nodes (area of the stem where the leaf begins to grow), as these are essential for the rooting process. The stems need to be at least 4-6 inches long and cut at an angle to ensure water and rooting hormone absorption (Figure 10). This rooting hormone is a chemical solution that will be applied to the cut end of the stem to promote rooting (Rankel³, 2024).

Figure 10.

Cutting propagation method, used in plants



³ Kiersten Rankel is Graduate from Tulane University where she majored in Ecology and Evolutionary Biology. Through her research she inspected *D. lindenii* and has created a website dedicated to the epiphyte's propagation.

Figure 10. above shows a general view of the method to propagate the epiphyte. The stems of the plants (which have been previously cut) are in three transparent jars; in them, the roots are beginning to grow due to the rooting hormone (Fast Growing trees.com, 2025).

3.1.2 Air Layering Technique

The air layering technique is a process that allows new blooms from the species to be created while they are still attached to the parent plant (Figure 11 below). According to Kiersten Rankel, the stem needs to be prepared through the girdling technique (cutting in a circumferential method without killing the plant) in order to remove all of the unnecessary root bark so that the tissue is exposed. Afterward, the stems must be wrapped in moss to increase the moisture content and then wrapped in plastic to create a more humid environment (2024). The watering period for this technique is best implemented throughout spring and early summer during temperatures of 22°C to 28°C, allowing the plant to absorb it in humid conditions.

Figure 11.

Air layering technique of a plant



Figure 11. above is a visual representation of the propagation technique used in an aleatory plant; the image entails an overall visual of what the process looks like. The image on the left is the preparation method and the image to the right is the aftermath when the roots have begun to grow (University of Florida et al., 2023).

3.1.3 Division Method

The Division Method (Figure 12) is when “two or more actively growing pieces of an orchid” are split to be grown independently (Ritts, 1999). In *D. lindenii*, the propagative method requires the mature parts of the orchid for the technique to be executed. To identify maturity, the plant must have bloomed or been through its active growth phase; this period primarily depends on the mycorrhizal fungi due to its ability to insert nutrients and carbon oxygenation into the orchid. Once these patterns have been detected on the epiphyte, the method can be carried out since the plant will grow and recover quickly, otherwise, the plant will perish. Consequently, it is necessary to sterilize the cutting implements to ensure no diseases come in contact with the plant during fluctuating temperatures. When dividing the roots of *D. lindenii*, it is necessary to ensure that every division has a healthy root system so that, once cut, it will propagate accordingly inside the potting medium designed for the species. The potting medium for the ghost orchid, unlike most plants inside the *Orchidaceae*, is required to live in a tree bark, therefore, the plant must initially be grown on a bed of live moss and then transplanted onto a tree bark.

Figure 12.

Division Method on an orchid



Figure 12. above shows the division method, signaled by two red arrows where the plant has been divided into two. The cutting epicenter, as shown on the image, is not damaging any of the roots or stems that connect the leaves of the plant; this allows for both divisions to grow and develop (Classy Flowers, 2023).

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4.0 COMMERCIAL USE: PRODUCTS AND POTENTIAL MARKETS

4.1 Food

Currently, *D. lindenii* is in danger of extinction and therefore is not available for any commercial use, though the epiphyte is available for the public to purchase from natural reserves in Florida. On the other hand, the Orchidaceae covers a wide range of orchid species that have commercial use, in this case, inside the food industry. As stated in previous chapters, the orchid is used for commercial vanilla. The cured pods of unripe green *Vanilla Planifolia*, after flowering for 8-9 months, are harvested and processed through blanching –a process that prevents enzymatic activity–, fermentation, and finally, drying (Lerner, 2006). The production and commercialization of this product most commonly originates from Madagascar and Mexico, where the environment is humid and warm. Other species from the *Orchidaceae* can be used to produce Chikanda and Salep. The Chikanda is a type of “Zambian sausage” made from the tubercles of terrestrial orchids named *Disa*, *Satyrium*, and *Habenaria*, all species found in Africa (Editors of Wikipedia, 2025). Similarly, Salep is extracted from the tubers of terrestrial orchids that come from the genus *Orchis*. The genus is dried and powdered until fully processed before adding to other spices like chai (Chicago Botanic Garden, 2025).

4.2 Medicine

Although *D. lindenii* is registered as a toxic plant for ingestion, other species are used for medicinal purposes in Chinese and Japanese cultures. The first apparition of orchid medicine can be found in the writing of the Chinese emperor Shen Nung during the 28th century B.C, where he described the *Dendrobium* species and *Bletilla Striata* but failed to describe their medicinal purposes. However, in the present day, these species are medically believed to possess properties that could treat cancer, help strengthen the immune system, and improve sight (Fisher, 2013). According to Luis Perez and contributing authors from the Multidisciplinary Digital Publishing Institute, some studies have shown that Mexican ethnic groups utilize orchids for medical purposes. In states like Chihuahua, the “Tepehuan ethnic group uses orchids from the genus *Malaxis* (Figure 13 below), destined for gastrointestinal illnesses. Another ethnic group, Raramuri, uses *Trichocentrum brachyphyllum* (Figure 14) as a hallucinogen during ceremonial activities (2024). *Trichocentrum luridum*, another species, is a medicinal plant used in all seven Mexican states, according to the article, their tubers are used to treat boils, abscesses, bronchitis and intestinal malfunctions (Pérez et al. 20224).

Figure 13.

Malaxis plant



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Figure 13. shows a detailed close up of the genus *Malaxis* mentioned in the chapter, due to its medicinal attributes (Wikipedia, 2019).

Figure 14.

Trichocentrum brachyphyllum



Figure 14. above shows a detailed image of the orchid *T. brachyphyllum* used by the Raramuri ethnic group (Jiménez, 2011).

Figure 15.

Trichocentrum luridum



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Figure 15. above shows an image of the epiphyte belonging to the *Oncidium* genus and used for medicinal purposes (Koniger, 2003).

4.3 Commercial products

The most common usage of orchids in the market is their ornamental value. Many are purchased and placed as potted plants in living rooms and stores, providing a desired ambience. The most common species is the *Phalaenopsis* (Figure 16), due to its appearance and extensive blooming period.

Figure 16.

Phalaenopsis orchid

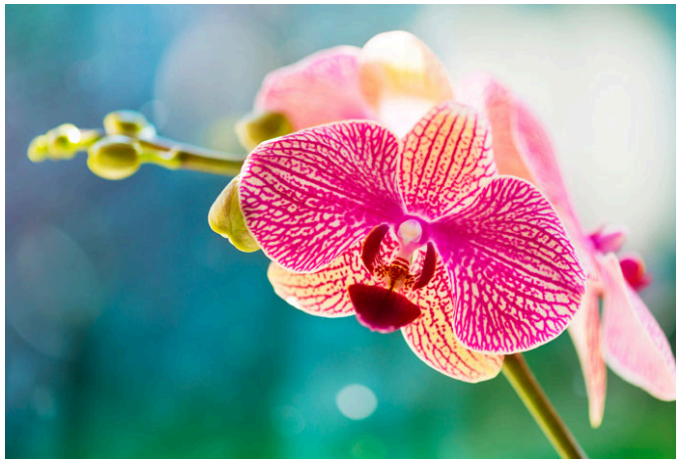


Figure 16. above is one of the many colors in which the *Phalaenopsis* orchids appear (Flores y Plantas, 2023).

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