Essential Orchids

Orchids are one of the oldest and largest families in the plant kingdom with over 25,000 species worldwide. Through the millions of years of their existence, they developed complex relationships with their pollinators, animal communities, and environment in general. Today, orchids are now among the most widely grown and popular flowering potted plants in the world. With modern scientific cultivation, there are over 100,000 varieties of orchid and the number is increasing. However, in the wild populations are declining; many orchids are on the endangered lists, and almost all collecting of orchids is banned.

What Makes an Orchid an Orchid?

All orchids share three basic characteristics:

- 3 sepals
- 3 petals. In most orchids, one of these is highly modified and called a lip, or labellum. These are easy to see in most of the common orchids, and acts as a landing pad for insect pollinators.
- A column. In most flowers the male (stamen) and female (pistil) reproductive structures are separate. However, all orchids have male and female parts fused into a single structure commonly called a "column"—often visible protruding from the center. Despite the fused sex organs, orchids have evolved a highly efficient system of ensuring that self-pollination never takes place.

Natural History

Orchids are one of the most successful, diverse, and adaptable family of plants

- Orchids evolved about 120 million years ago (mya).
- At least 64 million years ago orchids lump pollen into sticky balls, called pollinia, so that pollinators would not lose any grains before reaching other orchids.
- By 35 million years ago, many orchids became epiphytes, plants that cling to trees, opening new habitats and increasing orchid diversity.
    - To make up for having their roots exposed, some lineages adopted a kind of water-saving photosynthesis called crassulacean acid metabolism that likely helped them survive on only fog and rain.

Flowers and Pollination

- Some orchids flower only once or twice a year at very specific times. Others are almost constantly in bloom.
    - For those that only flower once, a temperature signal helps achieve simultaneous bloom. Several days after a trigger temperature is reached, all the individual plants flower at the same time, thus allowing cross pollination.

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- Orchids commonly use nectar to entice pollinators, but they also employ color, shape, fragrance, and even mimicry.
    - Some orchids create a lure and have flowers on long stems that dance in the breeze and look amazingly like butterflies.
    - Orchids can look like a female insect. During an attempted mating with the flower, a male insect will collect pollen, which it deposits during its next amorous encounter.
    - Orchids pollinated by hummingbirds and butterflies tend to have red, orange, or pink tubular—but not necessarily fragrant—flowers. They frequently have yellow blotchy patterns to mimic the anthers and pollen of the other plant types visited by these nectar lovers, but often offer no nectar reward.
- Where the pollinia become physically attached to the pollinator is individual to each species.
    - Structural differences in orchid flowers ensure that the pollinia attach to a part of a bee specific to each orchid species: The pollinia of one may attach to the insect's eye, that of another to the top of the thorax, and that of a third to a foreleg, etc. When the pollinia-loaded bee encounters an orchid flower, only the pollinia in the proper position for that species will contact with the stigma and accomplish pollination.
    - Some orchid species have hinged lips, or slippery chambers, that snap shut or tip closed or otherwise temporarily trap the insect, pinning it against the column so that the pollinia can be properly secured.
- Some orchids rely on crawling insects and produce long petals that trail downwards until they touch the ground or another object, and create a path to the flowers

- Interestingly, orchids can reproduce in the wild without this pollination process. As epiphytes it is not uncommon to have a part of the host tree, or a part of the orchid plant itself, break off in high winds, storms or other adverse situations. These parts of orchid plants that break off and spread across a forest continue to thrive wherever they land, as long as it is hospitable to their specific needs.

Germination and growth

- Most orchids need very specific environments to grow. So that at least some seeds find hospitable conditions, orchids produce vast amounts of minute, wind distributed seeds: one individual orchid capsule can have 3.5 million seeds.
- Because orchid seeds are so small, they contain virtually no energy source to sustain the plant as it develops roots and leaves. To germinate in the wild, orchids must become infected by a fungus that produces the substances necessary for germination and growth.
- It generally takes most wild orchids five to seven years to reach blooming size. Mortality rates are high during the fragile early stages of orchid growth.

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Human History: ETHNOBOTANY

Orchids and humans have a long relationship:

- People around the world (Asia, Europe, North America) used orchids medicinally.
- The earliest written evidence of their presence is in the form of Chinese and Japanese drawings and literature from about 700 B.C.
- The ancient Greeks deemed certain orchids to be aphrodisiacs.
- Dioscorides, a Greek medical botanist and physician, first identified them clearly as "orchids" in the 1st century.
- The Totonic people of modern-day Mexico, and then the Aztecs that conquered them, cultivated the seed pods of the Vanilla orchid as a flavoring. It has since become one of the most popular flavorings in the world.

Orchid Mania/Orchid Delirium

- At the start of the 18th-century, orchid collecting became established in many parts of the world because of their attractive, unusual flowers and intoxicating fragrances.
    - Cultivating orchids became somewhat mainstream in 1818 when a man by the name of William Cattleya bloomed the first Cattleya. Unpacking plants he shipped home (not orchids), he noticed the strange plants used as packing material. He potted some of them, and months later, one of the Cattleyas bloomed. The orchid world is still feeling the impact of that single plant.
    - During the mid-19th Century, Victorian era "orchid hunters" popularized the orchid among horticulturists. While many of the orchids we grow today are named after these hunters, there was little concern among them for orchid conservation. One, Josef Warscewicz, even boasted that he plundered all of Quito and Cuenca of its orchids.
    - Hybridization of orchids became very popular during this era and Frederick Sander, Queen Victoria's "royal orchid grower," published the first list of orchid hybrids.

Orchids Today

- In 1922, Louis Knudson discovered that nearly 100 percent germination could be achieved by starting seeds in flasks on sterile media fortified with nutrients to feed the young plants. Some years later the process of mericloning was developed. Mericloning, or meristem propagation, is achieved by removing tissue from the parent orchid to produce new plants. This allowed the mass production and marketing of cloned orchids. Today, many orchid plants may be kept within the average centrally heated home.
- Orchids Are Endangered
    - Many orchids are on the endangered lists, and almost all collecting of wild orchids is banned. Sadly, due to habitat loss and extensive collecting, orchid species are becoming extinct faster than they can be described and classified.
    - The American Orchid Society advocates the purchase of only artificially propagated orchids, either from meristems (clones) or seeds, which will help discourage the collecting of orchid species at home and abroad.

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For a comprehensive discussion of orchid ecology, consult the monumental work *The Orchids: Natural History and Classification* (1981, 1990), by Robert L. Dressler.

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