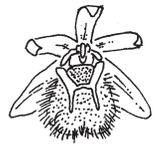


Orchid Pollinators

Although orchid pollinators tend to be insects (86%), birds and bats visit orchid flowers as well. Bees and wasps are the most common orchid visitors, tending to pollinate yellow and green flowers which often provide nectar



for the pollinator, and visual color or “nectar guides” to direct the bees to the column. Flies pollinate brown, maroon and green flowers that smell fetid or of carrion, but have no nectar. Butterflies pollinate pleasantly fragrant flowers that are yellow, orange, red and bluish. These flowers often have nectar guides and spurs (equal in length to the long tongues of the moth or butterfly) filled with nectar! Moths visit night-fragrant white flowers. Some orchid flowers never fully open and are self-pollinated.

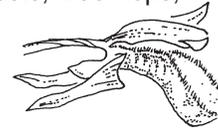
Some orchid flowers mimic their pollinator: *Trichoceros* species (fly mimics) and *Ophrys* species (bee mimics) look and smell like a female of the insect species and thus the male insect attempts to copulate with the flower, and in doing so, pollinates the orchid. Orchid flowers can trap their pollinator (*Paphiopedilum* species), with exit only possible by brushing against the pollinia. Another



trap species (*Coryanthes speciosa*) has bucket traps where the only exit from a pool of liquid is first past the stigma, then the pollinia. Still other orchids (*Cycnoches* species) have spring-loaded pollinia, that are ‘thrown’ onto the back of the visiting bee.

Orchid Conservation

While orchid diversity and adaptations are amazing, it is the very nature of their habitats that have provided for their diversity. Orchids grow in specialized habitats: rainforests, tree-tops, stream-banks, rainshadows, cliffs and rocky meadows, even woodlands and wetlands. Orchid and their pollinators have evolved to fill nearly every niche on earth. It is the loss of those habitats that are threatening the future of orchids and other plants worldwide.



Collectors have been known to over-collect a particular species, thus extirpating it from the wild. Even our native terrestrial orchid species are threatened by habitat loss, primarily from agriculture and urban development. It is collections such as The Wheeler Orchid Collection and Species Bank that serve as a repository for species orchids and help avoid their extinction.

Guided tours are available. Contact the curator at 765-285-8839 for more information or the FSEEC office at 765-285-2641 to schedule a tour. Bus parking is available. Enjoy your visit and be sure to return throughout the year.

Orchid Greenhouse Hours

Mon-Fri 7:30 a.m.-4:30 p.m.



A FSEEC Property

Ball State University
Muncie, IN 47306

3/2009

Wheeler Orchid Collection and Species Bank

Located in Christy Woods



FSEEC

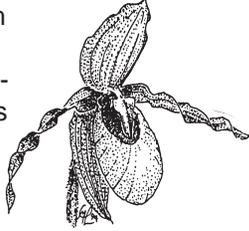
Field Station and
Environmental Education Center

www.bsu.edu/fseec



Introduction

The Wheeler Orchid Collection and Species Bank, referred to as WOCSB, was originally donated to Ball State University in 1970 by W.O. and Goldie Wheeler of Indianapolis. In 1982, over 600 orchids were donated by Al Thanhauser of Connecticut; and 1,000 plants were given by Dr. Charles Bracker of West Lafayette in 2008. As a designated Plant Rescue Center (a program with the USDA), WOCSB receives occasional confiscated shipments of orchids that are imported illegally. The Wheeler Collection is well known as one of the finest and most diverse collections of its type. The collection, currently comprised of approximately 1,800 plants, emphasizes conservation and education by maintaining over 240 genera, representing over 1,000 different species and more than 700 hybrid orchids.



Mission

The purpose of the WOCSB is to conserve rare and endangered species of orchids, disseminate them for preservation, and utilize the collection for research and education. Orchids are displayed in the WOCSB with other tropical plants to give the visitor an impression of being in a small tropical environment. A terraced "mountain" and waterfall hint at the cooler, high-elevation rainforest environment and the cloud-forest orchids that grow there. A display of tropical poison arrow frogs adds to the message of rainforest conservation.

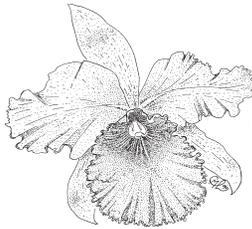


Fig. 1: labellum

What is an Orchid?

The orchid family is a rapidly expanding group of monocots that evolved about 65 million years ago from a lily-like relative. Monocots have parallel veins and their parts in groups of three. Many species have complex pollination mechanisms, such as pollinator-specific structures, including parts for insect mimicry, pollinator traps, and/or nectar rewards. These mechanisms suggest co-dependant relationships between plant and pollinator.

Orchids occur on the ground (terrestrial), on rocks (lithophytic) and on trees (epiphytic). Epiphytes do not damage or derive any nutrients from their tree hosts. All of Indiana's 43 species of orchids are terrestrial.

Unique Orchid Characteristics

One of the most striking features of the orchid flower is one large, often showy, petal, called the lip or labellum (Fig 1, left). Another key character of the orchid family is known as the column (Fig. 2) which is a fusion of reproductive parts (anthers, filaments, stigmas and styles) that are normally separate in other plants. Pollen is not dusty, but massed together in hard or waxy structures called pollinia. The ovary is located below the petals. Seed capsules produce between 1,000 and 1 million tiny dust-like seeds (Fig. 3), which have no endosperm (stored food). Mycorrhizae (fungal species) invade the developing orchid embryo, providing sugars that are necessary for the orchid seed to grow. Without the mycorrhizae, orchid seeds cannot germinate in the wild.



Fig. 2. column

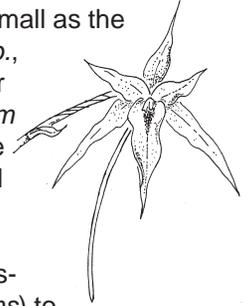


Fig. 3: 40X seed capsule

Orchid Diversity

Orchids exhibit an incredible range of variability in shape, color, size and fragrance. Even orchid leaves, notably less showy than the flowers, vary: thick and leathery or thin and flexible, folded at the midvein, pleated, round in cross-section, or flattened laterally.

Orchid flowers can be as small as the head of a pin (*Platystele sp.*, Central America) or greater than 10" (*Grammatophyllum sp.*, New Guinea). The vine *Vanilla planifolia*, of tropical America, is the primary source of vanilla extract. Fragrances vary from citrus-like (*Polystachys pubescens*) to fetid (*Satyrium pumilum*, a fly-pollinated species from South Africa). Perhaps the most unusual is the Australian species *Rhizanthella gardneri*, which lives and flowers completely below the earth's surface!



Orchid diversity is truly amazing. In addition to species, over 60,000 hybrid orchids exist, created from over 150 species, and more are being created every day.

Why Are Orchids Special?

Orchids are beautiful and complex, unique and magical. They have long been admired and were cultivated in the Far East before the 11th century. They make up the largest flowering plant family in the world, with estimates of as many as 30,000 species! New species are still being discovered. Orchids vary in color, fragrance, and size, ranging from microscopic plants to long vines and gigantic plants. Although concentrated in the tropics, orchids are found worldwide.