

DOWNLOAD PDF A FEW NATIVE ORCHIDS AND THEIR INSECT SPONSORS.

Chapter 1 : Featured " Orchids and Insects -

" *A Few Native Orchids and their Insect Sponsors* " EXCERPTED FROM MY STUDIO NEIGHBORS BY WILLIAM HAMILTON GIBSON.

This photo shows the Golden Orchid blooms left and *J. Takuto Shitara*. A species of seed-feeding fly is critically damaging the seed production of multiple orchid species, as revealed by a group of Japanese researchers. If the damage caused by this fly is occurring long-term and across Japan, these already-endangered orchid species could become unable to reproduce using seeds, and their dwindling numbers will take a large hit. The findings were published on September 21st in the online edition of *Ecology*. With over 20 species classified, orchids are one of the most diverse groups of flowering plants, and the unique shape of their flowers has entranced people for many years. Unfortunately this popularity has led to orchid overharvesting. From the perspective of genetic diversity, it is better for endangered species to reproduce via seeds rather than cloning. This means that to save these orchids, we should identify the insects that pollinate these plants and the parasites that prevent seed-based reproduction. During a survey to identify the pollinators of orchid species, the team found that in pollinated fruit which should be able to produce seeds under normal circumstances, a seed-feeding fly known as *Japanagromyza tokunagai* was destroying the seeds of multiple orchid species see figure 1. When orchids bloom, *J.* They become pupae inside the fruit, and when they hatch into their winged forms they make a hole in the fruit in order to make their exit. Fruit that is parasitized by these flies grows to the same size as normal fruit, so at a glance it looks healthy. This means that we have probably underestimated the damage caused by these flies. In many cases, fruit parasitized by the flies produces no seeds at all see figure 2. Humans have known about the damage caused by seed-feeding flies since the s, but we do not know the impact on seed production in concrete terms. Afterwards they compared the quality and amount of the seeds produced by each plant. This is the first study to precisely quantify the reduction to orchid seed production caused by *J.* Results showed that in all five species, damage caused by *J.* It is not yet clear whether this is occurring across Japan or over an extended time period. However, if this situation continues, the affected orchid species will become unable to reproduce via seed production, threatening their already dwindling numbers. It is also possible that damage caused by *J.* This could be for two reasons: Professor Suetsugu comments, "Going forward, we want to shed more light on the damage caused by *J.* We plan to do this by quantifying the damage in other areas of Japan, and by testing the theory that *J.*

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Chapter 2 : ! Rainforest Orchids ! Tropical Rainforest, North Queensland Australia

A FEW NATIVE ORCHIDS AND THEIR INSECT SPONSORS vintage article This is an original, historic, year old article from an bound volume of Harper's New Monthly Magazine. It includes 20 pages with 30 illustrations.

You can also listen to this show online which includes an interview with the author. Online shows can be downloaded for up to 4 weeks after the show. Pollination by sexual deception of male pollinators is known only in orchids from Australia and Europe. These orchid flowers mimic the odour and appearance of female insects and pollination is achieved during mating attempts by the male. This pollination is sometimes known as "pseudocopulation" meaning false mating, although attempted mating is not necessary for pollination in all species, hence we use the more general term of "sexual deception". In Australia at least species perhaps has many as in at least 9 orchid genera, are involved. Not only are male wasps of several kinds exploited, but also ants and sawflies. Although some orchids look remarkably like female wasps see photos below we have known for a long time that the floral odor although not detectable to human noses , rather than appearance is most important. The exciting breakthrough we have described in our Science paper Schiestl et al. This single compound is unique, representing a new class of compounds previously unknown to science. This is also the first known case in orchids and probably plants generally where the orchids have evolved and copied an identical compound to that used by their pollinator as a sex pheromone. A male *Neozeleboria cryptoides* that has been attracted to synthetic copy of the female pheromone that as been dispensed on a bead. A single unique compound identical in the female and the orchid *Chiloglottis trapeziformis* is sufficient to attract the male wasps. A proportion of males attracted to the bead even attempt to copulate with the structure. Further Reading Popular Schiestl, F. New tricks to unlock secrets of orchid pollination. An evaluation of the utility of DNA barcoding. *Lankesterian* 7, In press. *Molecular Ecology* , In press. *Conservation Genetics* 7, DOI *Molecular Ecology* 14, Schiestl, F. *Functional Ecology*, 19, *Plant Systematics and Evolution* , , Mant, J. *Behavioral Ecology and Sociobiology* 56, *Botanical Journal of the Linnean Society* , *Botanical Journal of the Linnean Society* in press. Accepted Aug 28, *Australian Journal of Botany* 50, Genetic and morphometric analysis. *Australian Journal of Botany* 45, Ecological and genetic consequences of pollination by sexual deception in the orchid *Caladenia tentaculata*. *Functional Ecology* 4, *Plant Systematics and Evolution* , A test of two hypotheses accounting for the rarity of ant pollination.

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Chapter 3 : The Bog Men help preserve Alabama's 50 rare orchid species | blog.quintoapp.com

The titles of these sketches are: 'A Familiar Guest,' 'The Cuckoos and the Outwitted Cow-bird,' 'Door-Step Neighbors,' 'A Queer Little Family on the Bittersweet,' 'The Welcomes of the Flowers,' 'A Honey-Dew Picnic,' 'A Few Native Orchids and their Insect Sponsors,' 'The Milkweed.'

But orchids typically have exclusive relationships with their pollinators. These are usually bees, wasps, and flies, but many orchids also utilize moths, butterflies, fungus gnats, or birds to cross-pollinate their flowers. While the ways that various species entice pollinators to visit their flowers and carry their pollinia pollen masses off to a flower on another plant vary tremendously, they often employ complex, frequently deceptive strategies to achieve success. Bloom Time Governed by the weather and pollinator activity, orchids regulate their bloom time to increase the likelihood of successful pollination. The length of time that flowers remain open and viable varies considerably from a few hours in *Flickingeria* species to as much as nine months in species such as *Dendrobium cuthbertsonii*. Some orchids flower only once or twice a year at very specific times. Others have flowers opening so frequently during the course of the year that they are almost constantly in bloom. Orchids that bloom frequently or for extended periods certainly have less difficulty coordinating blooming with others of their kind, increasing the chances of successful cross-pollination. By contrast, species with short bloom periods would seem to be at a severe disadvantage. Orchids in the New World genus *Sobralia*, whose flowers typically are open for no more than one day, solve this problem by relying on a group temperature signal to achieve simultaneous bloom. Several days after a trigger temperature is reached, all the individual plants in a given population flower at the same time. Lures and Rewards Orchids utilize a variety of intricate strategies for attracting the many specific pollinators on which their survival depends. In virtually all cases the orchid and pollinator have evolved together. *Microtis parviflora* lures its ant pollinator with a reward of nectar. *Prasophyllum fimbria* uses deception to attract its pollinators: Orchids commonly use nectar to entice their pollinators, but they also employ color, shape, or fragrance, and even mimic the flowers of other plants. Color is often important for animals active during the day. For example, 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 this mimicry is deceptive because the orchids often offer no nectar reward. The flowers of most moth-pollinated species, such as angraecoids, are green or white and are often very fragrant only at night so they can be found by these primarily night-flying insects. The flowers of orchids pollinated by flies or carrion beetles, such as many of the *Bulbophyllum* species, typically come in browns and fleshy reds and emit the odor of rotting meat. The stench of *Bulbophyllum beccarii* is so foul that it has been said to smell like "a herd of dead elephants. Flowers of the beard orchid, *Calochilus robertsonii*, attract male scoliid wasps. A male wasp pollinates *Chiloglottis reflexa* while attempting to copulate with the flower. Little iridescent euglossine bees can be seen buzzing in the canopies of Central American forests when the bucket orchids *Coryanthes* are in bloom. As the name suggests, in these species the lip of the flower forms a bucket filled with a sweet-scented viscous liquid. Just above, they also have a rounded pad from which the male bees scrape off fragrant oils they pack into sacks on their back legs and use to court females. Actually elaborate traps, the surface of the flower is slippery, and occasionally a bee loses his footing and falls into the bucket. The only way to escape and avoid drowning is through a narrow opening at the base of the lip. As the bee squeezes his way through, his back scrapes against the column and the two pollinia are deposited on his back. Fortunately for the orchids, the bees seem to have short memories and are easily fooled: After drying himself and flying off, the bee will often visit another flower and repeat the process, this time depositing the pollinia on the stigma female part of the flower. Some orchids lure their pollinators through sexual deception. *Oncidium henekenii* is pollinated by male bees trying to mate with the flower, which resembles a female bee. Some orchid flowers deceive their pollinators by mimicking the appearance and scents produced by female

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insects. In European species of the genus *Ophrys*, flowers have a labellum that looks like the body of a fetching female bee or wasp—complete with the requisite shape, iridescent colors or colorful markings, and hairs. They also exude a scent that simulates the pheromones produced by receptive females. Each species of *Ophrys* is generally pollinated by its own species of insect. When the male lands on the flower, it grabs the labellum and attempts to copulate with it. Other orchids, such as species of *Oncidium*, produce flowers that resemble the males of certain territorial bees or wasps. Seen as competitors, these flowers are attacked. They are shaped in such a way that the attacking insect is inevitably placed in contact with the pollinia or stigma.

Secure Attachments Where the pollinia become physically attached to the pollinator and how they get there is individual to each given orchid species. One example involves euglossine bees, common shared pollinators for orchids in Central and South America. The structural differences in the various flowers ensure that the pollinia are attached to a part of the bee specific to each orchid species: When the pollinia-loaded bee encounters an orchid flower, only the pollinia in the proper position for that species will come in contact with the stigma and accomplish pollination. Some species of *Bulbophyllum* and *Porroglossum* have hinged lips that snap shut or tip closed, temporarily pinning the insect against the column so that the pollinia can be properly secured.

Orchid Seeds In the wild, the chance of successful pollination varies tremendously among orchid species. In some, nearly every fertile flower is pollinated; in others, few or none are. Once pollinated, the flower begins to collapse and the ovary, located directly behind the sepals, begins to swell. The time it takes for orchid seed to mature varies from a few days to nearly a year. When finally mature, the fruit, a capsule, splits open and the seed spills out. Orchids produce enormous amounts of minute seeds that are disbursed widely by the wind. Most orchid species have very specific needs regarding where they are able to germinate and grow. To ensure that seeds find these ideal conditions, orchids produce vast amounts of minute seeds, which are disbursed widely by the wind. Because orchid seeds are so small, however, they contain virtually no endosperm, the food reserve on which young plantlets typically depend prior to the development of roots and leaves. To germinate in the wild, tiny orchid seeds must become infected by a mycorrhizal fungus that produces substances necessary for germination and growth. Of the very few orchid seeds that are able to find ideal conditions to germinate, few survive to maturity. 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. Early efforts to artificially raise orchids from seed in the 19th century were unsuccessful until growers discovered that seed sowed at the base of the mother plant would sometimes germinate. This was possible because the parents were still naturally infected with the necessary mycorrhizal fungi. However, even this technique resulted in relatively few plants, so the commercial orchid industry continued to depend on vast quantities of wild-collected plants to satisfy the constant demand of wealthy collectors. In , Louis Knudson discovered that nearly 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 mericlone was developed, allowing the mass production and marketing of individual cultivars. They are now among the most widely grown and popular flowering pot plants in the world. For a comprehensive discussion of orchid ecology, consult the monumental work *The Orchids: Natural History and Classification* , , by Robert L. **Anatomy of an Orchid Flower** Despite the astonishing diversity found in the thousands of wild species and man-made hybrids, orchid flowers show an unmistakable family resemblance. Orchid flowers are generally bilaterally symmetrical—only a single imaginary line can be drawn through a flower to create a mirror image. A typical orchid flower has three sepals the outer segments that protect the bud before the flower opens , alternating with three petals. The petals and sepals may be similar or not, showy or inconspicuous. The middle petal, which is always opposite the column, is usually quite different from the others. Called the lip or labellum, it comes in a variety of shapes, depending on the species, and can be wavy or fringed or covered with hairs or other structures. The labellum often serves as a landing pad and attractant for insect pollinators. **View larger image** The most distinctive aspect of orchid floral anatomy is the column, the single reproductive structure formed by the fusion of the male stamens and female style, which are separated in the vast majority of plant

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families. Most orchids have a single fertile anther flower structure where pollen is produced located at the tip of the column. In most orchids, pollen is not loose and granular when ripe but rather is packed into a waxy mass called a pollinium. Pollinia usually occur in pairs, but in some species they are found in groups of up to eight. The pollinia typically share a single small sticky tab called a viscidium, which adheres to the pollinator when contact is made. To discourage self-pollination and promote cross-pollination, the pollinia typically are separated from the stigma female part of the flower that receives the pollen by a flap of tissue called the rostellum. The rostellum also aids in the transfer of the pollinia from the pollinator to the stigma. There are exceptions to the typical orchid flower configuration, shown above. For example, slipper orchids such as paphiopedilums, considered a primitive branch of the orchid family, have a pouch- or slipper-shaped labellum, below left. They also have two fertile anthers instead of a single anther, below right. A third anther has evolved into a fleshy plate, called a staminode, which sits in front of the other two and assists in luring and guiding pollinators across the anthers and stigma. David Horak has been growing orchids for more than 30 years. He is the curator of orchids and the Robert W.

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Chapter 4 : Orchid Poster | blog.quintoapp.com

My Studio Neighbors Contents A familiar guest -- The cuckoos and the outwitted cowbird -- Door-step neighbors -- A queer little family on the bittersweet -- The welcome of the flowers -- A honey-dew picnic -- A few native orchids and their insect sponsors -- The milkweed.

Contact Author Welcome to the world of unusual orchids! If you have never seen the unusual monkey face orchid, you are in for a real treat. Whenever I show these to people at work, they think that the orchid photos are photoshopped. There are over 20, orchid species in the world and many of them are quite amazing. Orchids produce the most interesting rare and exotic flowers, in all different colours, shapes, smells and variegations. They also have a number of interesting tricks regarding fertilisation. Here is my top ten list of known orchids that look like animals. Dracula simia has a medium-sized monkey face that can blossom with different facial expressions. Another example of dracula simia. Dracula gigas is another example of an orchid that looks like a monkey. Monkey Face Orchid Botanical Name: Dracula simia or Dracula gigas Found on the sides of the high mountains in south eastern Ecuador and Peru at an elevation of 1, - 2, meters, the monkey face orchid is a popular but rare favourite among orchid collectors, because it has a distinctive monkey or baboon face in its flower. Different flowers provide different expressions of the monkey face, from thoughtful to happy to sad. Often this orchid is called the monkey orchid, though this is technically incorrect, even though they are flowers that look like monkeys. There are quite a few dracula orchids that look like monkey faces, but simia and gigas are better known. Of the species in the dracula family, most of which are found in Ecuador, many are not seasonal blooms and can flower at any time throughout the year. Monkey face orchids require cool temperatures and partial shade. They also need attention if grown in captivity. The scent of the blossomed flowers is said to be like ripe oranges and it is rare to find monkey face orchids grown successfully out of the wild. Can you see the hanging monkeys? Monkey Orchid Botanical Name: Orchis simia or Orchis italica Another orchid flower that looks like a monkey is orchis simia. Orchis simia was first discovered in France in and can be found from southern England down to northern Africa and as far east as Iran. It used to be a common orchid, but since has become harder to find. The monkey orchid is perennial and flowers from May until June each year. Another version of the monkey orchid is the orchis italica, which is a Mediterranean native similar to orchis simia. Ophrys insectifera - the fly orchid. Male insects get very excited when they discover the fly orchid. Fly Orchid Botanical Name: Not only does it look a bit like a fly, but it depends on flies, bees and wasps for pollination, using a scent to attract male insects. Sometimes the scent reminds the insects of food and other times it reminds them of female insects. As they land on the flower, the male insect attempts to mate with it and then is disappointed by the lack of nectar and procreation, so it loses interest and flies to another flower, unwittingly pollinating it. This method of pollination, along with the fact that each pollinated orchid produces over 10, seeds, has resulted in ophrys insectifera becoming a very widespread orchid indeed. A European native, the fly orchid is common in several locations from Ireland to Spain to Romania and the Ukraine and grows in alkaline soils with full sunlight to partial shade, from sea level to m altitude. Sadly, it is often bulldozed in developing areas of the UK, but the species is not endangered. Ophrys apifera - the bee orchid. Bee Orchid Botanical Name: Ophrys apifera Another version of ophrys insectifera is the bee orchid. Bee orchids are common in the Mediterranean region and can also be found in the UK, northern Ireland and Scotland. There are many hybrids from the ophrys genus, with ophrys bombyliflora specifically attracting bumblebees and ophrys lutea attracting yellow bees, for example. Caleana major - the flying duck orchid. Flying Duck Orchid Botanical Name: Caleana major Another flower which uses pseudocopulation is the flying duck orchid, found in eastern and southern Australia Queensland to South Australia and Tasmania. Caleana major attracts male sawflies visually and with scent for pollination. The first specimen was collected at the site of the Sydney Opera House in , but has been difficult to cultivate in captivity due to the root system requiring vegetative fungi found typically in the wild. When a sawfly lands on

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the flower, its weight forces the lip labellum to spring down and trap it and the only way out is an exit where the insect gets covered in pollen. The sawfly then flies to another orchid and pollinates it. Plants may flower for 1 to 2 years, then weaken and die. They can grow up to 50cm high and have up to 4 flowers on its stem.

Habenaria radiata - the white egret orchid. **White Egret Orchid Botanical Name:** It can have up to 8 flowers on its stalk and each flower is about 4cm wide. *Habenaria radiata* is fast becoming endangered in the wild due to habitat destruction and requires some attention to grow in captivity. However it still grows in the private gardens of orchid collectors, in non urbanised mountain areas at over m elevation and in protected Japanese bogs where flower viewing is allowed. Other varieties of *habenaria* have egret-like flowers as well, including some with variegation and different wingspans. **Source Moths in flight. Moth Orchid Botanical Name:** Found in southeast Asia, the Philippines and northern Australia, the moth orchid has many artificial hybrids that have been cultivated from over 60 species. Some species of *phalaenopsis* in Malaysia can bloom at the same time when they experience certain weather conditions. *Phalaenopsis* is one of the more popular orchids because there are many to choose from and it can be cultivated at home easily, requiring some repotting, a bright windowsill, fertiliser and consistent moisture. Mature plants with strong root systems can bloom all year round, while beginning plants can bloom for about 2 months. **Doves on their nests. Dove Orchid Botanical Name:** *Peristeria elata* The dove orchid is also known as the Holy Ghost orchid. What is strange about this orchid is that its perfume smells like beer. *Peristeria elata* usually grows from the ground but in humid mountain forests it has been found growing on tree trunks. Due to over collection, the dove orchid is on the list of endangered plants, and is almost extinct. **Tulip orchids look like they are cradling babies. Tulip Orchid Botanical Name:** *Anguloa uniflora* Also known as the cradle orchid, and boat orchid, the *anguloa uniflora* flower looks like it has a baby held in a cradle. Each flower is up to 10cm wide and has a fragrant minty or cinnamon perfume. Hailing from Venezuela, Colombia, Ecuador and Peru at elevations of m to m, tulip orchids prefer humid conditions and there are more than 9 species of *anguloa* some hybrid species are currently evolving. *Anguloa uniflora* is tricky to grow at home without a lot of attention. The right temperature, soil components, fertiliser and watering schedule is required. Some people think this orchid looks like an octopus. **Cockleshell Orchid Botanical Name:** *Prosthechea cochleata* The cockleshell orchid, also known as the clamshell orchid, has pseudo bulbs that look like hoods growing from the plant, from which the flower blooms. It is native to Central America, the West Indies, Colombia, Venezuela and southern Florida and is national flower of Belize, where it is also known as the black orchid. In Florida, the cockleshell orchid is endangered and many wild plants have developed a self-fertilisation system using three anthers instead of one. *Prosthechea cochleata* is a commonly cultivated household plant and is easy to take care of. It blooms for up to 6 months and each flower can last for weeks. Several hybrids have been produced, including the well-known epi green hornet variety. Which orchid is your favourite?

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Chapter 5 : Native Orchids Cross Fertilization Insects vintage article | eBay

*Some orchid flowers deceive their pollinators by mimicking the appearance and scents produced by female insects. In European species of the genus *Ophrys*, flowers have a labellum that looks like the body of a fetching female bee or wasp—complete with the requisite shape, iridescent colors or colorful markings, and hairs.*

Friday, 2 May The pollination of orchid flowers Orchids are one of the most advanced families of flowering plants with worldwide currently 21 to 26 accepted species in genera. Orchids have evolved a diverse range of pollination mechanisms with an increasingly precise adaptation to particular flower-visiting insects. Some orchids offer a reward in the form of nectar but other orchids deceive potential pollinators by pretending to provide rewarding nectar or a potential mate. Others simply trap flower-visiting insects inside the flower and usually do not release them before the insects have done their deed. Man orchid *Aceras anthropophorum* The orchid flower itself consists of 6 perianth segments 3 outer segments and 3 inner segments. One inner segment forms the lip labellum which is always enlarged and often modified and functions as a landing platform for insects at the bottom of the flower. The lip often has a spur or nectary at the base. Orchid flowers have lost most of the stamens or reduced them to sterile vestiges. The remaining stamens and the stigma the part of the flower which receives the pollen are fused into a stout column which projects from the centre of the orchid flower just above the lip. In most orchids, the pollen grains are bound together by threads of a clear, sticky substance viscin in masses called pollinia. Nevertheless female mining bees mostly of the genus *Andrena* are attracted to the flowers. The bees enter the lip and get trapped. After a few minutes of undirected efforts to escape the bees start to prise methodically under the stigma until a passage through the back of the flower opens. But in order to get out they have to walk past the stamens which smear sticky pollen on the upper side of the thorax of the bee. When visiting the next flower the bees first leave the pollen on the stigma before picking up another load of pollen. Markus Wagner Helleborines *Epipactis* and *Cephalanthera*: The flowers of the Marsh helleborine *Epipactis palustris* have no noticeable scent but are producing nectar as a reward and are visited by a wide variety of insects such as bees, wasps, ants and flies. On top of the flower sits a large projecting rostellum which bears a broad stigma below and the anther containing the pollinia, which overhangs the rostellum. Visiting insects land on the lip and depress it while drinking the nectar. They do not touch the rostellum in this position. Markus Wagner Twayblades *Listera* have a similar pollination mechanism to the Helleborines see above but the greenish flowers are particularly attractive to ichneumon wasp males *Ichneumonidae*. Sawflies and beetles are visiting the flowers as well. The long thin downward-pointing lip forms a landing platform leading to the centre of the flower. Lots of nectar is produced in a groove, running up the centre of the lip. The insect, while feeding on the nectar, walks up the lip until its head hits the rostellum and subsequently gets the pollinia glued to it with a viscid liquid exuded by the rostellum. *Listera ovata* has a long downward-pointing lip Orchids in the genus *Orchis* have evolved a different pollination mechanism. The orchids often have numerous large and scented flowers which mimic the appearance and scent of typical nectar flowers. But unlike true nectar flowers these orchid flowers offer no nectar at all. Early-purple orchid *Orchis mascula* The Early-purple orchid *Orchis mascula* has relatively large flowers with a broad lip which has a long stout spur at its base. The insect visiting the flower lands on the lip and inserts its tongue into the spur in order to drink the nectar it thinks is there in reality there is no nectar produced. While doing so the head touches the rostellum which splits open and sticks the pollinia to the insects head. Interestingly the pollinia will change position on the head of the insect during its flight to the next flower to be in exactly the right position to strike the stigma. The main visitors to these flowers are queen bumblebees, cuckoo bumblebees and also some solitary bees and flies. The food deception only works because the orchids have a superior flower display quite early in the year when other flowers are rare and as newly emerged bees are quite inexperienced they easily fall for the sham. Additionally the orchids also often vary the appearance of their flowers so that the insects cannot learn to avoid them. Markus Wagner Food deception is also found in species

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of the genus *Dactylorhiza* which are often pollinated by bumblebees and honeybees. Markus Wagner Other orchids are pollinated by butterflies and moths such as *Gymnadenia*, *Platanthera*, *Nigritella* and *Anacamptis*. The Fragrant orchid *Gymnadenia conopsea* has heavily scented long-spurred pink flowers which produce copious amounts of nectar and are mostly pollinated by moths. Once the moth inserts its proboscis into the spur to drink the nectar the pollinia are stuck to it. Fragrant orchids have a long nectar-producing spur The butterfly orchids *Platanthera bifolia* and *P. P.* Markus Wagner The Pyramidal orchid *Anacamptis pyramidalis* attracts a large number of both butterflies and moths. The proboscis is guided straight into the spur by converging ridges on the lip and once the proboscis is fully inserted in the spur the pollinia are firmly cemented in place with a viscid matter. But conversely to Butterfly and Fragrant orchids, Pyramidal orchids produce no free nectar so it is not fully clear why insects visit these flowers so persistently. Some orchids in the genus *Ophrys* resemble various insects such as flies or bees and produce scents which resemble scents produced by insects to attract mates. The scent produced by the orchid often does not match the scent produced by the insect exactly so the orchids depend on the availability of newly emerged males when females are not yet present. Markus Wagner The Fly orchid *Ophrys insectifera* has flowers with a rather long and narrow dark-reddish brown lip with a metallic-blue patch in the middle. The two upper petals are very narrow and resemble insect antennae. The only regular pollinators to these flowers are males of the solitary wasp species *Argogorytes mystaceus* and *A.* The wasps settle down on the lip with the head close to the centre of the flower. After frequently changing position for a few minutes they start to perform movements which look like an abnormally vigorous and prolonged attempt at copulation. The commonest *Ophrys* species in Western Europe is the Bee orchid *Ophrys apifera* which does not depend on pollinators but instead regularly self-pollinates. While insects occasionally visit the flowers they do not seem to be very effective pollinators. Normally after a few days the pollinia fall out of the anther and hang down in front of the stigma. A slight wind swings the pollinia against the sticky stigma which leads to pollination. Markus Wagner Bee orchids do not rely on pollinators and often self-pollinate As you can see, orchids are a truly amazing and interesting family of plants and represent an extraordinary example of adaption to insect visitors. Sarah Hulmes Posted by.

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Chapter 6 : Orchids and Their Pollinators - Brooklyn Botanic Garden

The "Native Orchids Need Their Pollinators" Poster Beautiful and diverse, orchids are found throughout North America with species in Canada and the US and more than 1, species in Mexico, many of which are threatened or endangered.

Zool Biologist Guide Rainforest Orchids: The orchid family is a group of very hardy plants that are very abundant in the wild. They belong to the family Orchidaceae, which is claimed by some authorities to be the largest of the plant families. There are some species of orchids found in the Wet Tropics of Queensland. Their evolution has enabled them to live in a variety of niches including growing on trees epiphytes, rocks lithophytes and in the ground terrestrials. This means they must rely on are saprophyte fungi to provide food. Orchids are characterised through their ways of animal pollination and wind dispersal and their adaptations to these to give them their common features. The pollen grains are massed into discrete parcels called pollinia to help with efficient pollination as the parcels are easily carried around by insects. The orchid flowers have evolved to entice the insect into doing this. The flower is made up of three sepals which are similar to each other and arranged radially, and three petals, one of which is modified to act as a landing pad for insect pollinators. The female and male parts in the centre of the flower are fused into a column with a single anther at the end. Some species have a lip designed to mimic a female insect and attracts males to try to mate with it. The colours, shapes and scents used to attract insects are numerous. It has large pink coloured flowers - a common sight in the Cape York Peninsula monsoon scrubs. Orchids are abundant from Townsville to Cooktown in areas of rainforest, open forest, mangroves, mountain tops and even eucalypt-dominated forests. This diversity in habitats has resulted in the rich diversity in orchids. Because of the widespread interest in orchids, they are collected by many people, sometimes resulting in significant decreases in numbers of orchids. Growing native orchids is fine, but there are some rules that should be followed: In the Wet Tropics upland rainforests, large epiphyte orchids occur on the larger trunks and forks, but the real diversity is often in the small branches of the outer canopy. Terrestrial species such as the jewel orchid may be abundant on the forest floor where there are rocks, on slopes where there is good drainage, or on the banks of small streams. Courtesy of Damon Ramsey Many botanists believe it to be one of the most highly evolved plant families, and there are indeed many species that have elaborately specialised relationships with particular pollinating insects. They are important to humans for various other reasons; for example, the flavour vanilla comes from an orchid. It is also one of the celebrated families, for the spectacular, elaborate flowers are prized by flower fanciers all over the world. The flowers are often spectacular in the fact that they are often colourful, or intricately patterned, and the uneven zygomorphic petal arrangement often forms bizarre shapes. These are made from three sepals; two lateral sepals that stick forward, and a high dorsal sepal, and three petals; two lateral petals that stick out like wings, and the front hanging petal called the labellum that hangs out like a tongue Clarke and Lee The resulting fruits are usually small, hard, dull capsules. The plants themselves are usually only small, growing either as tiny ground herbs, or compact bunches growing on trees or rocks. Orchids are found practically over the world. However, they are much better known, and there are many more species, in the tropics, where they grow mainly as epiphytes high in the rainforest canopy.

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Chapter 7 : - Orchid: Cymbidium - PlantTalk ColoradoPlantTalk Colorado

Orchids deceive insects into pollinating them, Mirenda said. The reproductive parts of many orchid flowers are shaped and colored to look like the kind of insect they hope to attract.

Mature orchids produce highly modified flowers, and their colors, shapes, fragrances, nectar, and oils attract specific pollinators. The Orchids Orchid Overview Orchid flowers are unique. Their male organs one or two anthers fuse to the back of the female organs pistils. Both sets of organs work together to transfer pollen to a visitor and then collect it again when the insect enters a second flower encouraging cross-pollination. With the exception of milkweeds *Asclepias* and their allies, orchids are the only plants on this planet that release their pollen as discrete balls pollinia and each ball may contain thousands to millions of compacted grains. As the pollen-accepting tip stigma of an orchid has space for only a few pollinia this means that, quite often, all the seeds in the same orchid pod have the same father flower. The successful transfer of pollinia then makes all the difference between orchid motherhood and extinction. An orchid flower that is pollinated by queen bumblebees has a floral architecture that makes it improbable that visiting moths or butterflies will pollinate it no matter how hungry they are. Around the world different orchid species may be pollinated by different members of seven different families of bees, several families of wasps, nectar-drinking flies, butterflies, sphinx and settling moths, hummingbirds and African sunbirds. No bat-pollinated orchids are known to date but on the island of Reunion, in the Indian Ocean, at least one species probably more night-blooming orchids is pollinated by a raspy cricket. In North America, we see only a few orchids pollinated by hummingbirds in Mexico. All remaining species are pollinated by insects, but that can include some rather unusual creatures including clear wing hawkmoths and mosquitos. Once we enter the warmth of Mexican forests we find hundreds of species of specialized bees in which the males visit orchid flowers to collect perfumes. They use these scents to mark their territories and, more often, they make colognes that will attract other males. These males hold massed mating displays leks attracting females. These tropical orchid bees receive their own tribe, the Euglossini. In the 19th century wealthy people started collecting tropical orchids for their new greenhouses and they dissected the flowers. Amateur botanists were perplexed. Why did they have such unusual shapes and why did male and female organs fuse together to form a reproductive structure they called the column? Charles Darwin observed wild orchids around his home in Kent, England for 20 years, but also received and studied plants from the tropical Americas and Africa. He published his findings in and revised them in a second volume in Read it today and you can see how he came to the conclusion that the unusual forms of the flowers were adaptations that helped transfer pollinia between flowers when insects came for nectar or other foods. He noted, for example, that different orchids deposited their pollinia on different part of different insect bodies. Butterflies and moths still tend to carry the pollinia at the bases of their tongues while bees and wasps are more likely to carry them on their heads or backs often between their wings. At times, Darwin pretended he was an insect inserting pencil tips, pins and straws into the flowers and then removing them to see if he had withdrawn the pollinia. To help prove his points, Darwin employed a scientific illustrator G. Sowerby to draw the interiors of dissected flowers, changes in the pollinia as they dried and a moth head wearing pollinia at the base of its tongue. Pictured on the right. All orchid species that are cross-pollinated must have an animal pollinator no wind or water-pollinated orchids but no pollinator is entirely dependent on orchid nectars or perfumes to survive. Even those male orchid bees that must collect scents to reproduce have the option of shopping for chemicals from the resins and leaf and tree bark or from completely unrelated flowers like tree tomatoes *Cyphomandra* and flamingo tongues *Anthurium*. Orchids must compete for pollinators, especially the ones they trick. This competitive mode has been unusually successful as the family of orchids is one of the largest in the world. There may be over 20, species on this planet as new ones are described monthly. Some botanists speculate that one out of every 10 plant species on the planet is an orchid but the vast majority is found around the equator. Distribution of orchid species in North America seems unfair without a big tropical

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zone. Mexico has over species but the continental United States has only and Canada just The good news is that some orchids really like cold bogs and tundras, so you can find over 25 species in the brief summer of the Alaskan panhandle onto the Kodiak and Aleutian islands. As we can see, though, many North American orchids and some pollinators have grown increasingly rare. Refrain from buying tropical species from Mexico or Florida unless you know their seeds were grown in a greenhouse or by cloning potted plants man-made hybrids are fine. If you find them on a hike why not share them in photos? You can help scientists by photographing pollinators at the flowers and reporting the populations you find to botanic gardens, the US Forest Service and to plant biology departments at local universities. Hoverflies Syphidae searching for nectar. At elevations from 40 to m above sea level. Often follows creeks and stream banks and can tolerate both hot and brine springs. One of the tallest, terrestrial orchids in Canada and America from 30 " cms tall in bloom. From March southwards through August north. A yellowish and pink background with striking red-purple veins on petals and sepals. Its hinged, striped, lip petal may bounce up and down on breezy days making the tip of the petal resemble a wagging tongue. The plants appear to do well among sand, gravel and stones along creeks and riversides. Some populations actually seem happy and robust around hot or even salt springs. Absent from Mexico, it is found from the Arctic Circle into the Alaskan panhandle then eastwards through most of Canada heading southwards to Pennsylvania, around the Great Lakes then into the wetter northwestern states including northern California. May be visited day or night as skippers fly by day but so do some nectar-drinking owl moths Noctuidae. These moths do not hover while they feed from orchids, unlike the better known sphinx moths Sphingidae. They are settling moths and must land on the flower like a bee or hoverfly. Wet tundra, meadows, moist forest edges and natural seeps. Sometimes in cold, swampy fens flowing above limestone deposits. Flowering stems 11 " cm. May through August, depending on latitude and variety Color: White often with greenish yellow throats. People really like the spicy odor of the flowers although spicy scents are more often associated with tropical orchids with much larger flowers. Is the spur longer or shorter than the length of the lip petal? The different lengths and shapes of the nectar-secreting spur strongly suggests that different moths pollinate this orchid over its broad range. A single flowering stem of bog orchid may bear a hundred flowers with most of them open at the same time. Some people say they smell like cloves. Native people living in Alaska and Canada dug them up, boiled the starchy underground storage organs tuberoids and ate them like potatoes. Queens of various bumblebees visit the flowers for nectar in mid-spring in America but in Canada, common visitors include native orchard bees or leafcutters *Osmia*. Some people have seen butterflies visiting these flowers but their effectiveness as pollinators remains unstudied. Usually refuses to grow in full sun. They prefer ravines in open woodlands of deciduous trees especially mixtures of beech *Fagus* , maples *Acer* and tulip trees *Liriodendron* where there is dense humus. Short, compact and the flowering stem is rarely more than 20 cm high. Easily recognized by its red-violet to purple helmet. A single pod of the showy orchids can contain over 7, seeds. This orchid seems to be extremely sensitive to soil chemistry, shade and man-made disturbance. A cousin *Galearis diantha* is found in China. While some plants bloom in old fields most appear to grow best in moist, wooded ravines with trilliums and jack-in-the-pulpit. As this species becomes increasingly harder to find local naturalists may be able to show you some plants if you refer to them under their other common names including gay orchis, purple orchis or purple-hooded orchis or even two-leaved orchis. The lip petal has a hole at its base leading to a hollow spur that containing a droplet of nectar. The queens of at least five bumblebee species drink the nectar of this orchid and pollinate the flowers. In Canada, though, the most important pollinator may be a smaller orchard bee *Osmia proxima*. Follows the Arctic Circle from Alaska through Canada. It grows as far south as New York in the American east and Oregon in the west. Female mosquitoes *Aedes* , a snout moth pyralid and an inchworm moth geometrid pollinated these flowers. Prefers a wide range of wet cold sites including spruce forests, sphagnum bogs, tundra and along roadside ditches. Usually less than 10 cm tall, it may be as high as 35 cm Bloom Period: Usually a summer flowerer from June " August. Green to greenish yellow. Reports of mosquito pollination in this orchid date back to It was hard for botanists to believe but then more observations

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arrived from other field scientists in the s and s. There was only one report from Alaska in of male mosquitos carrying the pollinia of this orchid. All other reports show the females do it. It also likes cold, sphagnum bogs and true tundra. While we think of this wildflower as a summer plant of Alaska, Canada and New England the exact same species is also found in Siberia, northern China and Asian countries that were once part of the old Soviet Union. Their skinny stalks rarely bear more than 15 flowers. They are also pollinated in part by small, nectar-drinking, snout mouths pyralids. Found in partial to full shade in mixed deciduous and pine forests along springs and streams or on roadside banks colonized by mosses, ferns and sedges. Most common at elevations between 1000-2000 m ft. Mid to late July. Light to pale purple mauve. Butterflies did the original job and the hybrid has become stabilized by a process of backcrossing known as introgressions.

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Chapter 8 : Overview of Pterostylis Pollination (Orchidaceae) in Victoria - blog.quintoapp.com

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Description[edit] High resolution image of orchid Orchids are easily distinguished from other plants, as they share some very evident, shared derived characteristics, or synapomorphies. Stem and roots[edit] Germinating seeds of the temperate orchid *Anacamptis coriophora*. The protocorm is the first organ that will develop into true roots and leaves. All orchids are perennial herbs that lack any permanent woody structure. They can grow according to two patterns: The stem grows from a single bud, leaves are added from the apex each year and the stem grows longer accordingly. The stem of orchids with a monopodial growth can reach several metres in length, as in *Vanda* and *Vanilla*. Sympodial orchids have a front the newest growth and a back the oldest growth. Sympodial orchids grow laterally rather than vertically, following the surface of their support. The growth continues by development of new leads, with their own leaves and roots, sprouting from or next to those of the previous year, as in *Cattleya*. Sympodial orchids may have visible pseudobulbs joined by a rhizome , which creeps along the top or just beneath the soil. *Anacamptis lactea* showing the two tubers Terrestrial orchids may be rhizomatous or form corms or tubers. The root caps of terrestrial orchids are smooth and white. Some sympodial terrestrial orchids, such as *Orchis* and *Ophrys* , have two subterranean tuberous roots. One is used as a food reserve for wintry periods, and provides for the development of the other one, from which visible growth develops. In warm and constantly humid climates, many terrestrial orchids do not need pseudobulbs. Epiphytic orchids, those that grow upon a support, have modified aerial roots that can sometimes be a few meters long. In the older parts of the roots, a modified spongy epidermis , called velamen , has the function of absorbing humidity. It is made of dead cells and can have a silvery-grey, white or brown appearance. In some orchids, the velamen includes spongy and fibrous bodies near the passage cells, called tilosomes. The cells of the root epidermis grow at a right angle to the axis of the root to allow them to get a firm grasp on their support. Nutrients for epiphytic orchids mainly come from mineral dust, organic detritus, animal droppings and other substances collecting among on their supporting surfaces. The pseudobulb of *Prosthechea fragrans* The base of the stem of sympodial epiphytes, or in some species essentially the entire stem, may be thickened to form a pseudobulb that contains nutrients and water for drier periods. The pseudobulb has a smooth surface with lengthwise grooves, and can have different shapes, often conical or oblong. Its size is very variable; in some small species of *Bulbophyllum* , it is no longer than two millimeters, while in the largest orchid in the world, *Grammatophyllum speciosum* giant orchid , it can reach three meters. Some *Dendrobium* species have long, canelike pseudobulbs with short, rounded leaves over the whole length; some other orchids have hidden or extremely small pseudobulbs, completely included inside the leaves. With ageing, the pseudobulb sheds its leaves and becomes dormant. At this stage, it is often called a backbulb. Backbulbs still hold nutrition for the plant, but then a pseudobulb usually takes over, exploiting the last reserves accumulated in the backbulb, which eventually dies off, too. A pseudobulb typically lives for about five years. Orchids without noticeable pseudobulbs are also said to have growths, an individual component of a sympodial plant. Leaves[edit] Like most monocots , orchids generally have simple leaves with parallel veins , although some *Vanilloideae* have reticulate venation. Leaves may be ovate, lanceolate, or orbiculate, and very variable in size on the individual plant. Their characteristics are often diagnostic. They are normally alternate on the stem, often folded lengthwise along the centre "plicate" , and have no stipules. Orchid leaves often have siliceous bodies called stegmata in the vascular bundle sheaths not present in the *Orchidoideae* and are fibrous. The structure of the leaves corresponds to the specific habitat of the plant. Species that typically bask in sunlight, or grow on sites which can be occasionally very dry, have thick, leathery leaves and the laminae are covered by a waxy cuticle to retain their necessary water supply. Shade-loving species, on the

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other hand, have long, thin leaves. The leaves of most orchids are perennial, that is, they live for several years, while others, especially those with plicate leaves as in *Catasetum*, shed them annually and develop new leaves together with new pseudobulbs. The leaves of some orchids are considered ornamental. The leaves of the *Macodes sanderiana*, a semiterrestrial or rock-hugging "lithophyte" orchid, show a sparkling silver and gold veining on a light green background. The cordate leaves of *Psychopsis limminghei* are light brownish-green with maroon-pace markings, created by flower pigments. Also, *Phalaenopsis schilleriana* is a pastel pink orchid with leaves spotted dark green and light green. The jewel orchid *Ludisia discolor* is grown more for its colorful leaves than its white flowers. Some orchids, such as *Dendrophylax lindenii* ghost orchid, *Aphyllorchis* and *Taeniophyllum* depend on their green roots for photosynthesis and lack normally developed leaves, as do all of the heterotrophic species. Orchids of the genus *Corallorhiza* coralroot orchids lack leaves altogether and instead wrap their roots around the roots of mature trees and use specialized fungi to harvest sugars. Some orchids have single flowers, but most have a racemose inflorescence, sometimes with a large number of flowers. The flowering stem can be basal, that is, produced from the base of the tuber, like in *Cymbidium*, apical, meaning it grows from the apex of the main stem, like in *Cattleya*, or axillary, from the leaf axil, as in *Vanda*. As an apomorphy of the clade, orchid flowers are primitively zygomorphic bilaterally symmetrical, although in some genera, such as *Mormodes*, *Ludisia*, and *Macodes*, this kind of symmetry may be difficult to notice. *Dactylorhiza sambucina*, Orchidoideae for reference The orchid flower, like most flowers of monocots, has two whorls of sterile elements. The outer whorl has three sepals and the inner whorl has three petals. The sepals are usually very similar to the petals thus called tepals, 1, but may be completely distinct. This characteristic, called resupination, occurs primitively in the family and is considered apomorphic, a derived characteristic all Orchidaceae share. The torsion of the ovary is very evident from the longitudinal section shown below right. Some orchids have secondarily lost this resupination, e. Longitudinal section of a flower of *Vanilla planifolia* The normal form of the sepals can be found in *Cattleya*, where they form a triangle. In *Paphiopedilum* Venus slippers, the lower two sepals are fused into a synsepal, while the lip has taken the form of a slipper. In *Masdevallia*, all the sepals are fused. Orchid flowers with abnormal numbers of petals or lips are called peloric. Peloria is a genetic trait, but its expression is environmentally influenced and may appear random. *Laeliocattleya* cultivar shows the normal form of petals. Orchid flowers primitively had three stamens, but this situation is now limited to the genus *Neuwiedia*. *Apostasia* and the *Cypripedioideae* have two stamens, the central one being sterile and reduced to a staminode. All of the other orchids, the clade called *Monandria*, retain only the central stamen, the others being reduced to staminodes 4. The filaments of the stamens are always adnate fused to the style to form cylindrical structure called the gynostemium or column 2. In the primitive *Apostasioideae*, this fusion is only partial; in the *Vanilloideae*, it is more deep; in *Orchidoideae* and *Epidendroideae*, it is total. The stigma 9 is very asymmetrical, as all of its lobes are bent towards the centre of the flower and lie on the bottom of the column. Pollen is released as single grains, like in most other plants, in the *Apostasioideae*, *Cypripedioideae*, and *Vanilloideae*. In the other subfamilies, which comprise the great majority of orchids, the anther 3 carries two pollinia. A pollinium is a waxy mass of pollen grains held together by the glue-like alkaloid viscin, containing both cellulosic strands and mucopolysaccharides. Each pollinium is connected to a filament which can take the form of a caudicle, as in *Dactylorhiza* or *Habenaria*, or a stipe, as in *Vanda*. Caudicles or stipes hold the pollinia to the viscidium, a sticky pad which sticks the pollinia to the body of pollinators. At the upper edge of the stigma of single-anthered orchids, in front of the anther cap, is the rostellum 5, a slender extension involved in the complex pollination mechanism. As mentioned, the ovary is always inferior located behind the flower. It is three- carpelate and one or, more rarely, three-partitioned, with parietal placentation axile in the *Apostasioideae*. In *Bulbophyllum nocturnum* was discovered to flower nocturnally. Orchids have developed highly specialized pollination systems, thus the chances of being pollinated are often scarce, so orchid flowers usually remain receptive for very long periods, rendering unpollinated flowers long-lasting in cultivation. Most orchids deliver pollen in a single mass. Each time pollination succeeds, thousands of ovules can be

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fertilized. Pollinators are often visually attracted by the shape and colours of the labellum. However, some *Bulbophyllum* species attract male fruit flies *Bactrocera* spp. Although absent in most species, nectar may be produced in a spur of the labellum 8 in the illustration above , or on the point of the sepals, or in the septa of the ovary, the most typical position amongst the Asparagales. In orchids that produce pollinia, pollination happens as some variant of the following sequence: While leaving the flower, it pulls the pollinium out of the anther, as it is connected to the viscidium by the caudicle or stipe. The caudicle then bends and the pollinium is moved forwards and downwards. When the pollinator enters another flower of the same species, the pollinium has taken such position that it will stick to the stigma of the second flower, just below the rostellum, pollinating it. The possessors of orchids may be able to reproduce the process with a pencil, small paintbrush, or other similar device. *Ophrys apifera* is about to self-pollinate Some orchids mainly or totally rely on self-pollination , especially in colder regions where pollinators are particularly rare. The caudicles may dry up if the flower has not been visited by any pollinator, and the pollinia then fall directly on the stigma. Otherwise, the anther may rotate and then enter the stigma cavity of the flower as in *Holcoglossum amesianum*. The slipper orchid *Paphiopedilum parishii* reproduces by self-fertilization. This occurs when the anther changes from a solid to a liquid state and directly contacts the stigma surface without the aid of any pollinating agent or floral assembly. The only exit leads to the anthers that deposit pollen on the visitor. In some extremely specialized orchids, such as the Eurasian genus *Ophrys* , the labellum is adapted to have a colour, shape, and odour which attracts male insects via mimicry of a receptive female. Pollination happens as the insect attempts to mate with flowers. Many neotropical orchids are pollinated by male orchid bees , which visit the flowers to gather volatile chemicals they require to synthesize pheromonal attractants. Males of such species as *Euglossa imperialis* or *Eulaema meriana* have been observed to leave their territories periodically to forage for aromatic compounds, such as cineole, to synthesize pheromone for attracting and mating with females. A rare achlorophyllous saprophytic orchid growing entirely underground in Australia, *Rhizanthella slateri* , is never exposed to light, and depends on ants and other terrestrial insects to pollinate it.

Chapter 9 : What's eating these endangered orchids? | EurekAlert! Science News

Members of the large terrestrial orchid-genus Pterostylis, collectively known as greenhoods and rustyhoods, attracted only insects of the order Diptera, the flies, as their principal or primary vectors.