

# ORCHID POLLINATORS AND VISITORS IN JUNEAU, ALASKA



Marlin Bowles and Bob Armstrong

**Trying to document insects that visit the different orchids in the Juneau area has been a really fun project. We used two major methods: sitting near the flowers with camera in hand and staring at them; and putting trail cams and regular cameras in the video mode focused on a plant and walking away.**

The regular camera that seemed to be the best one was the Panasonic Lumix DMC-FZ 300 model. This camera can be used in the telephoto mode from several feet away and can full frame a bumblee. It will also accept the Raynox Supermacro Lens which allows full frame focusing on very tiny insects from several inches away. And best of all you can use the cameras built in flash at a high f-stop and shutter speed so you do not need a tripod. Also this camera will run in the video mode for about two hours. For an evaluation of this camera look at <https://www.naturebob.com/sites/default/files/Panasonic%20fa-200%20evaluation%20final%206.pdf>.



*This shows a Panasonic Lumix camera focused on a tiny tway-blade plant. It will cover all the flowers and run in the video mode for about two hours. For a video of this process look at*

<https://vimeo.com/421616175>

*We have also used the Wingscapes BIRDCAM PRO model in the motion sensitive mode which will capture large insects such as moths and bumblebees in the photo or video mode both day and night. The camera can be manually focused as close as 6 inches. Here is an example of what the camera captured*  
<https://vimeo.com/280467246>





We have started using the *Wingscapes TimelapseCam Pro* Camera. It will also focus as close as six inches. We set it up to take a photo every minute all day and night. It has been especially useful for capturing images of orchid pollinators that come during the hours of darkness.

Once we set it up focused on several White Bog Orchids and let it run day and night for about 5 days. You can see a video of the results here <https://vimeo.com/440357095> In this video you can see a Bedstraw Hawkmoth and an Owlet Moth visiting the orchids. Of interest in about a five day period we received no images of obvious insects visiting the flowers during daylight hours.

The advantage of using this camera is it will show the date and time that each photo is taken. This allows you to also estimate the length of time the insect spends on the orchid.

# Fairy Slipper Orchid

(*Calipso bulbosa*)



The **Fairy Slipper** is fairly common on some of the islands near Juneau but we have only seen one on the mainland near our road system. We have not put a camera on them, except one at the Arboretum, or watched them more than about an hour.

**According to the literature this orchid is pollinated by bumblebees.**



*There is a transplanted Fairy Slipper at the Arboretum in Juneau. We put a camera on it for about 3 hours but only saw tiny insects coming to it.*

# Sparrow's Egg Lady's Slipper Orchid

*(Cypripedium passerinum)*



*This orchid probably does not occur in the Juneau area. However there is some transplanted ones at the Arboretum.*

*We focused a camera on one of the flowers for about three hours and noticed several visits by hover flies but nothing else.*

*Merrill once photographed a bumblebee coming to one of the flowers.*

*The literature indicates this orchid is usually self-pollinated.*

# Bracted (frog) Orchid

(*Coeloglossum viride*)



In Juneau the Bracted Orchid occurs in the alpine above 2,000 feet in elevation. It seems to be fairly common along the Mt. Roberts Trail above the tram.

It flowers in late spring and reaches 6 to 15 cm high. They have green flowers with 6 to 7.5 mm long lips that are notched at the tip.

Nectar is provided at the base of the lip and in a short spur. Pollinia are positioned on either side of the spur entrance and are attached to insects by viscidia.





We spent several hours sitting next to these plants above the tram in Juneau. We were excited to see numerous march flies visiting them. Most would emerge from a flower with several pollinia attached to their head (lower photo). These flies were obviously important pollinators of these plants. To see a video we took click on:

<https://vimeo.com/340916436>



# Western Coralroot

(*Corallorhiza mertensiana*)

This coralroot flowers in late spring and early summer, with stalks up to 60 cm high. Plants usually have a dark purple stem and purple-spotted lips. Pigment-free forms are common, and range from pale yellow to white, but may retain color on their lips.



*Left: A group of Western Coralroots emerging in the Juneau area on June 1, 2020. Last years orchid with old seed pods is in the middle of this group. Above: Western Coralroot orchids in full bloom.*





We have seen and photographed numerous bumblebees coming to the flowers of Western Coralroot in Juneau. In both of these photos you can see the pollinia attached to the face of these bumblebees. This indicates these insects may be important pollinators of these orchids. For a video of this event look at <https://vimeo.com/343560365>



# Early Coralroot

(*Corallorhiza trifida*)

Although this coralroot orchid lacks leaves, it is capable of conducting photosynthesis in its green stem, through which it supplements fungal resources. Mycorrhizal fungi have been found connecting this orchid with living trees. It begins to flower in late spring, reaching up to 35 cm high with up to 20 flowers. Plants and flowers are green to yellow-green. The lip is white with red spots and about 3.25 mm long.



This coralroot is usually reported to self-pollinate. However, the red spots near the base of the lip and column of the early coralroot may serve to guide pollinators.

We have watched these orchids in a couple of different places in the Juneau area and have only seen dance flies (family Empididae) visiting the flowers.

Based on the frequency of their visits and often observing pollinia attached to them we suspect they are important pollinators of these orchids.



*This shows a dance fly entering an early coralroot flower and exiting with pollinia on its back.*

# Giant Rattlesnake Plantain Orchid

(*Goodyera oblongifolia*)



This orchid is fairly common in Juneau in our spruce-hemlock forest. It appears to mostly root in partially decomposed conifer needles.

It has thick evergreen leaves with a distinctive white and often reticulated venation. The leaves form rosettes that are connected by rhizomes into clones. It flowers in late summer about the same time as the hooded ladies tresses.

It produces a one-sided spike up to 45 cm high with 5-70 small white flowers. The flowers lips are less than 4 mm long.



*This orchid is reported to be pollinated by bees and we did see and photograph one on a flower last year.*

# What Pollinates Rattlesnake Plantain Orchids



In Juneau, Alaska

## Number of Times Moths Were Observed Visiting Eight Rattlesnake Plantain Orchids\*

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**July 29** between 9:21 p.m. and 10:45 p.m. there were **four** visits

**July 30** between 10:19 p.m. and 10:22 p.m. there were **six** visits

**July 31** between 9:51 p.m. and 9:58 p.m. there were **eight** visits

**August 2** between 9:27 p.m. and 10:45 p.m. there were **twelve** visits

**August 3** between 3:03 a.m. and 4:16 a.m. there were nineteen visits and between 9:41 p.m. and 9:57 p.m. there were seventeen visits for a total of **thirty six** visits.

**August 4** between 3:24 a.m. and 4:13 a.m. there were eight visits and between 8:39 p.m. and 8:44 p.m. there were five visits for a total of **thirteen** visits.

**August 5** between 3:24 a.m. and 3:37 a.m. there were fourteen visits and between 9:41 p.m. and 10:26 p.m. there were six visits for a total of **twenty** visits.

**August 6** between 2:31 a.m. and 4:01 a.m. there were **nine** visits.

**August 7** at 9:00 p.m. there was **one** visit.

**August 8** between 4:09 a.m. and 4:10 a.m. there were two visits and between 8:26 p.m. and 9:34 p.m. there were five visits for a total of **seven** visits.

**August 9** between 4:06 a.m. and 4:07 a.m. there were **two** visits.

**August 10** between 9:17 p.m. and 10:22 p.m. there were **seven** visits.

**August 11** between 3:49 a.m. and 4:52 a.m. there were **six** visits.

**August 12** between 9:26 p.m. and 9:31 p.m. there were **five** visits.

**August 13** there were **no** visits.

\*The Wingscapes Birdcam Pro Timelapse camera was set to take a photo every minute throughout the 24 hour period each day.

Moths were the only insects that visited these orchids.

The moths only visited the orchids during the hours of darkness.

No insects visited the orchids during daylight hours.

The moth *Autographa corusca* was identified by Robin McLeod on BugGuide Net as the probable species that we have photographed visiting these orchids. The **Checklist of the Moths of Alaska** by CLIFFORD D. FERRIS<sup>1</sup>, JAMES J. KRUSE<sup>2</sup>, J. DONALD LAFONTAINE<sup>3</sup>, KENELM W. PHILIP<sup>4</sup>, B. CHRISTIAN SCHMIDT<sup>5</sup> & DEREK S. SIKES<sup>6</sup> lists this moth as occurring in Southeast Alaska.

Images of this individual: [tag all](#) · [unlink](#)



[full size](#) · [edit](#) · [add image](#) · [tag](#) · [add comment](#) · [unsubscribe](#)

Contributed by [Bob Armstrong](#) on 29 July, 2020 - 12:32pm

### Plusiinae

Might be *Autographa corusca* or something close.

... [Robin McLeod](#), 29 July, 2020 - 3:06pm

So far we do not know if these moths are helping to pollinate these orchids. In some of the photos the moth appears quite close to the entrance of the flower – near where the pollinea are located. They have quite “hairy” heads and front parts (photo below) so it is possible they may be picking up the pollinea. From the time lapse photos the detail is not sufficient enough to detect any pollinea.

We had the time lapse camera focused on these eight orchids from the start of flowering to the end. By looking at these orchids for any seed production should tell us whether or not pollination occurred. Since these moths were the only visitors, if any of the orchids were producing seeds, it would indicate pollination by the moths.







In Juneau we observed a second flowering of these plants with short inflorescences, which extended into early fall (left photo). No pollinators or seed pods were observed on these plants.

However, we were surprised to see numerous geranium plume moths (*Amblyptilia pica*) visiting these plants. They appeared to be removing nectar from the flowers. These plume moths over-winter as adults and may depend upon the nectar from these late blooming orchids.

For a video of this event look at Plume Moths on Rattlesnake Plantain Orchid

<https://vimeo.com/288474762>



# Northwestern Twayblade

*{Listera banksiana}*



*The Northwestern Twayblade Orchid (Listera banksiana), as its common name implies, is restricted in distribution to the Pacific Northwest, where it extends north to the Kenai peninsula. These orchids have a broad lip that is notched at the tip (upper photo). It is usually uncommon, occurring as an isolated plant or in small groups.*

*We tried for several days to determine what pollinates these flowers. We only saw and photographed Dryomyza Flies visiting these orchids. In the following few pages we illustrate what we discovered.*

# Dryomyza Flies

on

Northwestern Twayblade Orchids





*The Northwestern Twayblade Orchid (Listera banksiana), as its common name implies, is restricted in distribution to the Pacific Northwest, where it extends north to the Kenai peninsula. These orchids have a broad lip that is notched at the tip (upper photo). It is usually uncommon, occurring as an isolated plant or in small groups.*

We focused a camera on this orchid and let it run in the video mode each day for about 4 hours over several days. Every day we would get a tiny reddish insect called a **Dryomyzid Fly** that would visit the orchids flowers for one to five minutes. This would usually occur twice during the four hour period. No other insects were observed or filmed visiting these flowers.

**Little information is available on the pollination of the Northwestern Twayblade Orchids so it was quite exciting for us to see and film these insects visiting the flowers.**

The orchids we were observing were in a very dark part of the forest. In this area we could only find two plants. They were about 20 feet apart from each other and quite isolated. Some Western Heart-leaved Twayblade orchids were growing nearby and appeared to be forming seed pods with no new flowers developing.

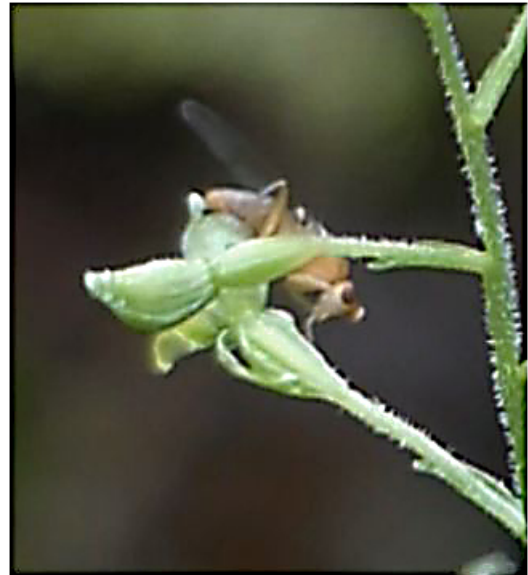
In contrast the Northwestern Twayblade Orchids had, by June 20, only opened about half of their flowers. The Dryomyzid Flies typically visited the uppermost ones in bloom. This indicates the lower blossoms may have been pollinated and were no longer releasing any nectar or odor to attract the flies.

Over the years we have observed and filmed Dryomyzid Flies visiting bear scat and salmon carcasses in the Juneau area. They typically feed, lay eggs, and mate on the bear scat and salmon carcasses.

We have never observed these flies on other flowers or in places that did not produce some sort of "fetid" odor. **We suspect that the Northwestern Twayblade Orchids are releasing an odor that attracts these flies. Here is a link to one video of the fly visiting the orchid** <https://vimeo.com/430921806> **In this video it appears that pollen is attached to its legs and antennae.**



*We would often see the flies land on the leaf before going up to a flower.*



*The flies would usually spend about a minute or more licking the lip of an orchid flower (left). The photo on the right shows one emerging from a flower with possible pollinia on its antennae and back.*

# Western Heart-leaved Twayblade

(*Listera cordata*)

This orchid emerges in spring and begins flowering almost immediately. Flowers are quite small; the forked lip is about 5 mm long. Insect pollination is required to produce seed. The primary pollinators are reported to be fungus gnats, which are attracted by a fetid odor. However, a small amount of nectar is also produced and may attract other pollinators. A touch-sensitive trigger hair releases a quick-drying glue onto the visiting insect. This is immediately followed by release and attachment of pollinia to the insect via the glue. Flowers are retained on developing seed pods through the summer.



Two forms of this orchid occur a “green-flowered form” on the left and a “red-flowered form on the right.

This species occurs in small to large colonies, often in thick moss, in heavily shaded coastal and riparian forests. Leaves of non-flowering plants are often present among flowering plants. This is our smallest forest orchid; the inflorescence reaches up to 30 cm high and has 5-25 green or red flowers. It often occurs with the giant rattlesnake orchid, and may occur with the less common northwestern twayblade orchid.



**Rove Beetles** *Eusphalerum pothos* have been seen every time we visited a certain patch of twayblade orchids in the Juneau area. We looked at the place about every other day since they first started blooming in early May.

These beetles often spent up to fifteen minutes probing about one individual flower. They appeared to be eating the orchids pollinia.



*The beetle in the photo above shows an entire pollinia attached to its mouth. At the base of the pollinia is a special glue that appears to have attached to the beetles mouth. This would have probably occurred if the beetle grasped the pollinia at its base.*

*The photo on the left shows a beetle that appears to be feeding on a pollinia.*





*This beetle appears to have some pollen grains attached to its head. This could have happened while it was feeding on the orchids pollinia.*



*This beetle looks like it has a pollinia from the orchid attached on top of its head.*

Rove beetles have been documented as accidental pollinators of plants (xxxxxxxxxxxxxxxxxxxxxxxx). Although their main purpose in plant visitation is to eat the pollen and not the nectar (xxxxxxxxxxxxxxxxxxxxxxxx). Of interest is these beetles are commonly called **“pollen robbers”**.

In our numerous visits to this patch of twayblade orchids we have only seen and photographed one other insect visiting these plants (a fungus gnat).

*After spending some time exploring one twayblade orchid the beetles would typically climb to the top of the flower, open its wings, and fly over to another flower.*





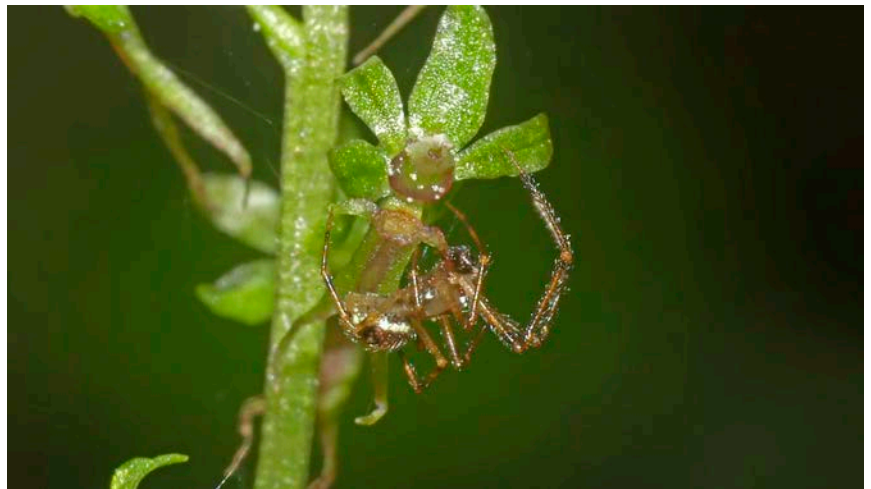
Twayblade orchids typically produce a small amount of nectar and the insect considered the most important pollinator is the **fungus gnat** (xxxxxxxxxxxxxxxxxxxxxxxxxxxx).

In another patch of twayblade orchids we mostly observed and photographed fungus gnats visiting the flowers.



*The upper two photos show fungus gnats that appear to be feeding on the nectar that these orchids place on their lip. The photo to the right shows a spider that also appears to be feeding on the orchids nectar.*

*If the rove beetles eat the pollinia and the orchid flowers do not get pollinated then the flower may continue to release nectar.*



In the many days and hours we have spent watching and photographing these gnats visiting the twayblade orchids we have never noticed or photographed any pollinia attached to the insects.

# White Bog Orchid

(*Platanthera dilatata*)

This is Southeast Alaska's most highly visible orchid, occurring from sea level to alpine in meadows, fens and muskeg. It also colonizes roadsides and ditches. And can be found in all these places in the Juneau area.

Flowering occurs in early summer, with an inflorescence of showy white flowers that may reach 1 m high. It has been segregated into three varieties with long, intermediate and short nectar spurs which are thought to correspond to pollinators with different tongue lengths.





On a few occasions the camera caught a bedstraw hawkmoth (*Sphinx gallii*) visiting the flowers. Of interest is this occurred only during daylight, mostly in early afternoon. You can see the pollinia from this orchid attached to the moths tongue (upper photos).

A video of this event can be seen at:  
<https://vimeo.com/280467246>

We set a birdcam pro camera focused on a bog orchid plant for a few days. This camera was set in the trigger mode and larger insects such as moths and bumblebees can trigger the camera in the video mode for 90 seconds in daylight and 30 seconds at night.



We have seen numerous bumblebees and yellow jackets (above) visiting these flowers.



We also photographed an owlet moth (Noctuidae) visiting the white bog orchid flowers. In the photo you can see a pollinium attached to the tongue of the moth. We took a video of this event

<https://vimeo.com/348093863>

# Blunt-leaved Rein Orchid

*(Platanthera obtusata)*



*We focused a camera on this orchid in Juneau for about one and half hours. Several Dance Flies visited the orchid and probed into the opening. Some appeared to be gathering pollinia but we were not sure. For a video of this event look at <https://vimeo.com/276573344>*

The Blunt-leaved Rein Orchid is rare in the Juneau area and we have only seen it a couple of times. This orchid has a single blunt leaf and an inflorescence that may reach 35 cm high with up to 15 small, light green flowers.. The lips and spurs may reach 8 mm long. The flowers of this species are adapted to pollination by mosquitoes. They release an odor similar to that of the human body (and presumably other mammals) that attracts mosquitoes. Unlike most rein orchids, there is no centrally located nectar spur entrance. Although the pollinaria are widely spaced, as if positioned for deposition on eyes of a quite large pollinator, small openings adjacent to each pollinarium force the insect to contact either viscidium as it feeds. We have seen dance flies visiting these flowers, and geometrid moths have been reported bearing pollinia.

# Slender Bog Orchid

(*Platanthera stricta*)



This orchid is quite common in the open and partially shaded edges of the muskegs in Juneau. It often occurs with skunk cabbage.

Flowering begins in late spring, with the dark to pale green flowers persisting into summer. Inflorescences may reach up to 1 m high with 10-50 flowers. Large plants may be so robust as to appear to be different species from the smaller plants.



These flowers have a 4 mm long lips and a thick nectar spur of the same length. This species is a generalist with respect to pollinators, placing pollinia on the eyes of geometrid moths and on the tongues of bees and dance flies.

In Juneau we have seen a geometrid moth and a dance fly visiting these orchids. In the lower photo you can see the pollinia from this orchid attached to the tongue of a dance fly.



# Hooded Ladies Tresses

(*Spiranthes romanzoffiana*)



This species appears to flower from early to late summer, depending upon location. It is often one of the last orchids to flower. It produces a spike of 10-60 white flowers that reaches up to 55 mm high. The name “ladies tresses” refers to the spiral arrangement of flowers. “Hooded” refers to the closure of the top of the flower by the lateral petals and sepals.





These orchid flowers are almond-scented and produce nectar at the base of the lip. The late-flowering plants we looked at were being visited by male bumblebees that usually emerge in August.

The pollinium (left) contains two pollen masses, and is attached to the base of the bee's tongue by an elongated viscidium. The photo below shows a Black-tailed Bumblebee pollinating a Hooded Ladies-tresses in Juneau.

To look at a video we took showing this process look at <https://vimeo.com/285643040>

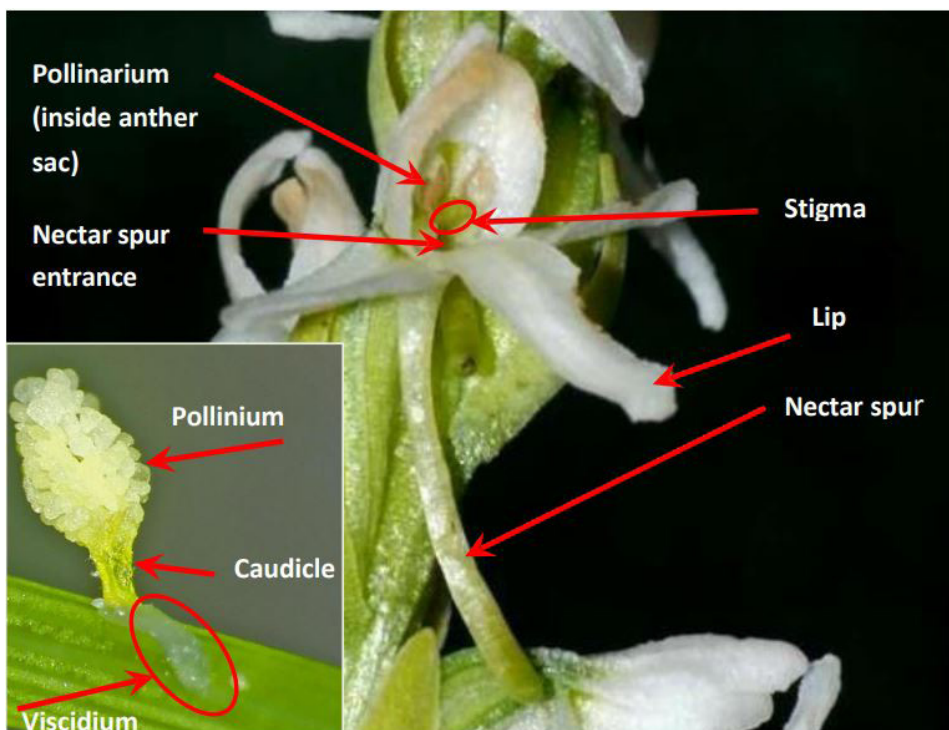




## Learning and understanding about how orchids are adapted to attract and manipulate insects for cross pollinations has been just as exciting for us as seeing the different insects visiting the orchids.

Orchids have an outer whorl of three sepals and an inner whorl of three petals. However, one orchid petal (the lip) is extremely modified, and often showy, to guide specific insect pollinators. When in bud the lip is uppermost but usually the flower stalk twists 180 degrees to place the lip lowermost, or resupinate. A nectar reward is often provided to insect pollinators; it may be stored in a recessed nectary or spur that determines insect tongue length required to access the nectar. Some species appear to offer food, but do not, which is referred to as "food deception." The shape of the lip and length of the nectar spur are key features in species identification. Many different orchid species are cross-compatible and capable of hybridization. Their use of specific insect species as agents for pollen transfer helps maintain orchid species by avoiding such hybridization. Some orchid species may share pollinators by placing pollen (see below) on different body parts, such as the compound eyes, tongues, or thorax, which will not come into contact with the stigma of different species. Other orchid species may be pollinator generalists, and place pollen on different body parts of different pollinators.

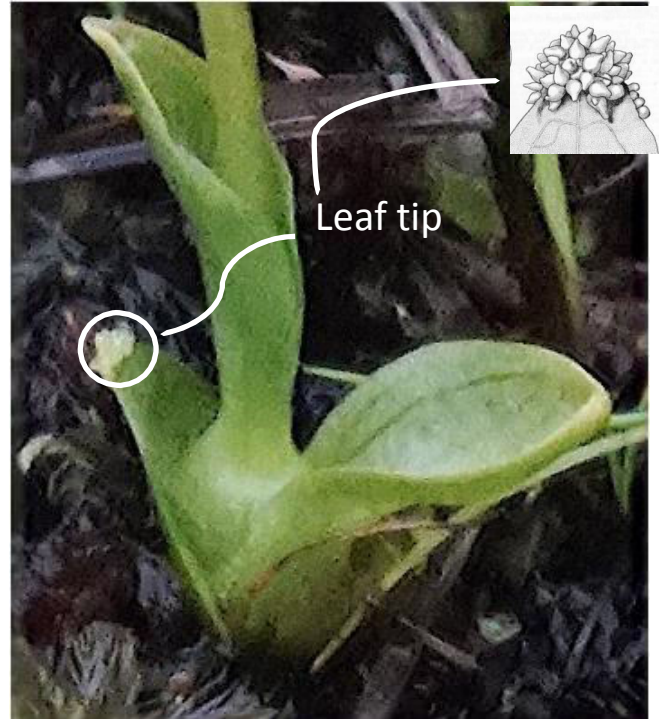
The reproductive structures of orchids are fused into an organ called the column, which positions the anthers for deposition of pollen on visiting pollinators, and the stigma to receive pollen carried by pollinators. Most orchids have a single anther that contains two or more pollen masses, or pollinia (pollinium is singular). Pollinia are usually attached directly to pollinators by a glue, or by a stalk (caudicle) with an adhesive disk (viscidium) that adheres to the pollinator (see illustration of orchid flower anatomy). The pollinium, caudicle, and viscidium are termed a pollinarium. Insects carry pollinia to a different plant in search of food, where they in contact with the plant's stigma and deposits pollen grains, completing cross-pollination. Some orchids may self-pollinate by depositing their own pollinia, or pollen, onto the stigma. Such plants are referred to as autogamous. This has been thought to be advantageous in environments that lack diversity of pollinators.



*Anatomy of a white bog orchid flower showing organization of reproductive parts. Pollinaria are enclosed in anther sacs located on either side of the stigma, which is located above the entrance to the nectar spur. Insects contact a viscidium and remove a pollinarium while probing for nectar. Inset shows a pollinarium removed from the anther sac and adhered by its viscidium.*

**Flowering phenology** – Orchid species are distributed not only spatially among different habitats, but they also display distinct seasonal flowering times (phenology) from spring to late summer (see accompanying table). Their phenologies also change with latitude and elevation, with spring occurring earlier in lower elevations in southern Southeast Alaska. Timing of flowering also corresponds to emergence of insect pollinators. Spring flowering begins in May, soon after soils thaw, with appearance of the fairy slipper (*Calypso*) orchids. Their pollinators are naive bumblebee queens that soon switch to nectar-producing flowers of other plant species after they learn that fairy slippers do not provide nectar. The fairy slippers are followed closely by the early coralroot (*Corallorhiza trifida*) and heart-leaved twayblade (*Listera cordata*). Other twayblade species and the adder's mouth orchids (*Malaxis*) begin to flower in June. The flowers of these species may persist on developing fruits into late June, giving the appearance of extended flowering. A large number of species begin flowering in late June and continue through July, corresponding to flights of different insect species pollinators, including mosquitoes, beetles, moths and butterflies and worker bees. The first of these species include the slender bog orchid (*Platanthera stricta*) and the blunt-leaved rein orchid (*Platanthera obtusata*), followed by other rein-orchid (*Platanthera*) species as well as piperia (*Piperia*) and coralroot species. The lady's slippers (*Cypripedium*) and bracted orchids (*Coeloglossum*) usually follow a similar pattern, beginning to flower in late June and continuing into early July. Only two species begin to flower in late summer. In muskeg, the hooded ladies' tresses (*Spiranthes romanzoffiana*) begins to flower as the white bog orchid (*Platanthera dilatata*) flowers senesce, and appears to be pollinated by late-emerging male bumblebees as well as by bee mimics. However ladies' tresses may flower earlier in low elevation meadows. The giant rattlesnake plantain (*Goodyera oblongifolia*) begins flowering in late July, and continues to flower into August, initiating late-flowering spikes after initial flowering spikes are forming seed pods. The giant rattlesnake plantain also appears to be pollinated by late-emerging male bumblebees. We have observed geranium plume moths obtaining nectar from late-flowering plants, but they do not appear to remove pollen.

# Orchids in Juneau that we have seen no insect visitors Bog Adder's Mouth



*This is the only native orchid that produces leaf-tip embryos, or bulblets, which disperse and generate new plants. After dispersal, the embryos must establish a fungal mycorrhizae for further development.*

**The bog adder's mouth (*Malaxis paludosa*)** is one of Southeast Alaska's smallest (less than 5 cm tall) and rarest orchids and we have only seen it in one spot in the Juneau area. In one study the flowers were reported to have a sweet odor and pollinated by fungus gnats.

# Chamisso's Orchid

*(Platanthera chorisiana)*



This is the smallest native rein orchid in Southeast Alaska. The lip is about 2 mm long, and the spur about 1 mm. Flowers are often partially rotated and appear closed except for the flared lateral sepals. It is pollinated by beetles in Japan, which corresponds to its short nectar spur. It was found to be self-pollinating in Canada, and insect pollination has not been reported for North America. We have only found it in one place in the Juneau area and have not observed any insects coming to it.

# Two-leaved (Aleutian) Adder's mouth

(*Malaxis diphyllus*)



Flowering occurs in late spring with 30-100 yellow-green flowers in a tight inflorescence that may reach 30 cm high. Flowers are quite small; the lip is about 2 mm long. Flowers in Southeast Alaska are non-resupinate due to a full 360-degree twist, which can be observed with a hand lens. Little information is available on pollination. Insects are thought to be required for cross-pollination. In Europe, the white adder's mouth reportedly has a fungus-like smell and is apparently pollinated by fungus gnats. Pollinia are attached to insects by a viscid glue to which pollinia are first attached.

We normally find this plant near and on rocky cliff areas along the coast in Juneau. We have not seen any insects visiting them but we have not used cameras or spent much time looking at them.

# Spiders Hunting on Orchids

While looking for possible pollinators on the Orchids in Juneau we have sometimes seen spiders hunting on them. Of special interest is they often catch insects that we have not seen or identified coming to the orchids.

So far the ones that spin webs have done this on the Slender Bog Orchid. The spider to the right appears to be the **Silver Longjawed Orbweaver** (*Tetragnatha laboriosa*).

We focused a camera on this spider and let it run in the video mode for about 1.5 hours. During this time several very tiny insects that appeared to be no-see-ums visited the flower and a couple were caught in the spiders web. You can look at the video here: <https://vimeo.com/436958381>

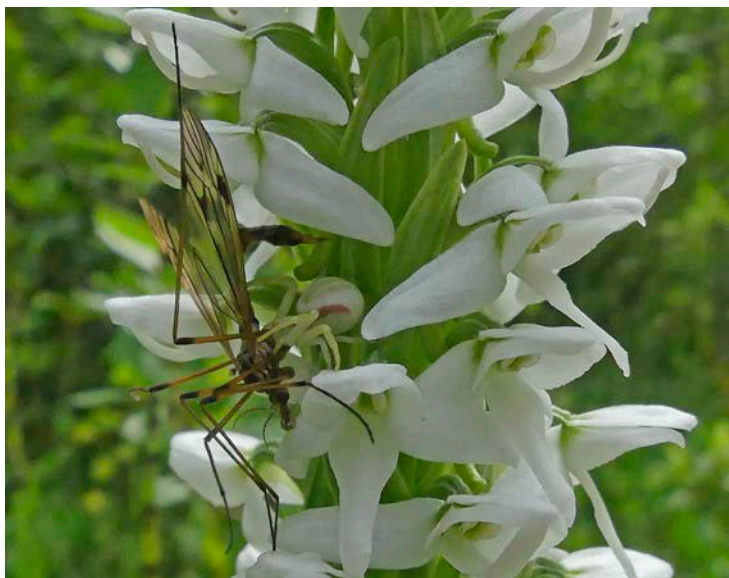


This spider is also hunting on a Slender Bog Orchid. It appears to be the **Sixspotted Orbweaver** (*Araniella displicata*). It has captured and is eating one of the sawflies, perhaps the Alder Sawfly.

What has been really fun for us to see are the crab spiders hunting on the White Bog Orchids. The female spiders blend in so well with the flowers that they are very difficult to spot unless they have captured prey.

In the photo on the right is a small male crab spider. It appears to have captured a adult no-see-um.

The fact that both male and female crab spiders are hunting on these orchids indicates that they are breeding in the area. And that they commonly hunt for insects on these orchids.



The female crab spider to the left has captured an adult Crane Fly.

In general we have noted lots of different insects visiting these orchids. Thanks to the crab spiders for showing us some of them.

The female Crab Spider on the right has captured a Horsefly. All three of these insects, no-see-ums, crane flies and horseflies, commonly live as larvae in the marshy areas and ponds where these white bog orchids grow.

***Special thanks to Joey Slovik and Derek Sikes with help with spider and insect identification.***



### **Useful References about orchid pollination:**

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Argue, C.L. 2012. The pollination biology of North American Orchids: Volume 2. North of Florida and Mexico. Springer, New York, N.Y. (Exhaustive review of species-level pollination biology)

Darwin, C. 1862. The fertilization of Orchids by Insects. 1st edition. London. (Revised in 1877; both versions have been reprinted. Good insight into Darwin's reasoning power)

van der Pijl, L. and C.H. Dodson. 1966. Orchid Flowers: Their Pollination and Evolution. University of Miami Press, Coral Gables Florida. (Academic, but a quite useful well-illustrated reference for understanding orchid pollination).

**Add some of the recent references we have received.**

**For information about orchids in Southeast Alaska look at:** Native Orchids in Southeast Alaska by Marlin Bowles & Bob Armstrong <https://www.naturebob.com/sites/default/files/Bowles%20%26%20Armstrong.%202019.%20REVISED%20Native%20Orchids%20in%20Southeast%20Alaska%20%28300dpi%29.pdf>

### **A Useful Internet Resources:**

University of Alaska Fairbanks Herbarium and data base. Collection records, herbarium sheet photos, and interactive maps for Southeast Alaska plants. <https://www.uaf.edu/museum/collections/herb/> Searchable through ARCTOS (<http://arctos.database.museum/SpecimenSearch.cfm>)

Include the insects database for Alaska. [http://www.akentsoc.org/the\\_fauna/checklist](http://www.akentsoc.org/the_fauna/checklist)

Include BugNetGuide. <https://bugguide.net/node/view/15740>



Ko Mochizuki\* and Atsushi Kawakita 2018 Pollination by fungus gnats and associated floral characteristics in five families of the Japanese flora. *Annals of Botany* 121: 651–663. doi:10.1093/aob/mcx196, available online at [www.academic.oup.com/aob](http://www.academic.oup.com/aob)

Thomas D. J. Sayers<sup>1</sup> · Martin J. Steinbauer<sup>2</sup> · Rebecca E. Miller 2019 Visitor or vector? The extent of rove beetle (Coleoptera: Staphylinidae) pollination and floral interactions *Arthropod-Plant Interactions* (2019) 13:685–701 <https://doi.org/10.1007/s11829-019-09698-9>

Olle Pellmyr and Joseph M. Patti Source: Madroño (JANUARY 1986), FUNCTION OF OLFACTORY AND VISUAL STIMULI IN POLLINATION OF *LYSICHITON AMERICANUM* (ARACEAE) BY A STAPHYLINID BEETLE Vol. 33, No. 1 pp. 47-54 Published by: California Botanical Society Stable URL: <http://www.jstor.org/stable/41424562>

Adriano Zanetti (2014) Taxonomic revision of North American *Eusphalerum* Kraatz, 1857 (Coleoptera, Staphylinidae, Omaliinae) *Insecta Mundi* 0379: 1-80

Klimaszewski, Jan (2000) Diversity of Rove Beetles in Canada and Alaska. *Memoire de la Societe royale belge d Entomologie* 39: 3-126.

D. LUPI, M. COLOMBO, A. ZANETTI (2006) The rove beetles (Coleoptera Staphylinidae) of three horticultural farms in Lombardy (Northern Italy) *Boll. Zool. agr. Bachic. Ser. II*, 38 (2): 143-165

JAMES D. ACKERMAN AND MICHAEL R. MESLER 1979 POLLINATION BIOLOGY OF *LISTERA CORDATA* (ORCHIDACEAE) *Amer. J. Bot.* 66(7): 820-824. 1979.

## Breeding systems of forest inhabiting orchids in Southeast Alaska

<u>Species</u>	<u>Species</u>	<u>Habitat-Distribution</u>	<u>Breeding system</u>	<u>Pollination-reward</u>	<u>Notes</u>	<u>References</u>
Eastern Fairy slipper	<i>Calypso bulbosa</i> var. <i>americana</i>	Dry interior forest slopes-Haines.	Self-compatible, not autogamous, outcrossing enforced by pollinia removal as insect exits flower.	Bombus queens, pollinia on upper thorax-food deception.	Pollinators abandon flower visits due to deception, fruit set usually low.	Boyden 1982.
Western fairy slipper	<i>Calypso bulbosa</i> var. <i>occidentalis</i>	Rainforest Islands-throughout.	Self-compatible, not autogamous, outcrossing enforced by pollinia removal as insect exits flower.	Bombus queens, pollinia on upper thorax-food deception.	Pollinators abandon flower visits due to deception, low (<20%) fruit set in Calif.	Ackerman 1981.
Frog orchid, Long-bracted orchid	<i>Coeloglossum viride</i> var. <i>virescens</i>	Forest-north to Haines (quite rare).	Possibly autoagamous (Europe), based on knowledge of var. <i>viride</i> .	Insect pollination and nectar may occur as well, based on knowledge of var. <i>viride</i> in Europe.	taxonomic status of this var. is uncertain, it may represent a forest ecotype of var. <i>viride</i> .	Europe: Claessens & Sieffert 2017.
Spotted coralroot	<i>Corallorhiza maculata</i> var. <i>maculata</i>	Dry forest-Haines.	Autogamous, insects may transport pollen as well.	Self-rotation of pollinia onto stigma, pollinia transported on upper thorax by dance flies-reduced nectar spur.	Floral display suggests autogamy, 50-60% fruit set in both caged and uncaged plants (Calif.).	Kipping 1971, Catling 1983, Bowles et al. 2021.
Western coralroot	<i>Corallorhiza mertensiana</i>	Near-coastal rainforest-throughout.	Not autogamous, insect pollinated, geitonogamy may occur due to floral display.	Bombus, pollina transported on upper thorax-well developed nectar spur.	Floral display suggests outcrossing, fruitset: 2.1% in bagged plants, 71.1% in open-pollinated plants (Tee harbor).	Armstrong & Bowles, Bowles et al. 2021.
Early coralroot	<i>Corallorhiza trifida</i>	Dry to wet rainforest - north to Haines.	Autogamous, insects may transport pollen as well.	Self-rotation of pollinia onto stigma, pollinia transported on upper thorax by dance flies-reduced nectar spur.	50-100% fruit-set in caged plants (Ontario).	Armstrong, Catling 1983.
Giant rattlesnake plantain	<i>Goodyera oblongifolia</i>	Dry to wet rainforest - north to Haines.	Self-compatible, not autogamous, protandrous.	Bombus, pollinia transported on proboscis-nectar reward, high levels of nocturnal visitation by Noctuidae.	Low (<50%) fruit set in Calif., <30% in N. Douglas & Tee Harbor, visitation by Noctuidae is apparently nectar thivery, as no specimens carried pollen and fruit set was absent.	Armstrong & Bowles, Ackerman 1975.

Northwestern twayblade	<i>Listera banksiana</i>	Coastal rainforest-throughout.	Not autogamous, pollen apparently removed by insects.	Possibly Dryomyza flies, pollen glued to insect by triggered release, nectar apparently present.	Fruit set usually <100%.	Armstrong & Bowles.
Northern twayblade	<i>Listera borealis</i>	Wet forest, Near Yakutat (rare).	.	No information.	No information.	
Broad-lipped twayblade	<i>Listera convallarioides</i>	Wet forest, throughout, (rare).	Not autogamous, protandrous, pollen apparently removed by insects.	No information.		Ramsey 1950, Kipping 1971.
Heart-leaved twayblade	<i>Listera cordata</i>	Rainforest, subalpine, throughout.	Not autogamous, protandrous, self compatible, pollen transported by insects.	Fungus gnats, pollinia glued to insect by triggered release, nectar present.	Fruit set usually high, also visited by pollen-eating rove beetles and spiders, which prey on pollinators.	Armstrong, Ackerman & Mesler 1979, Mesler et al. 1980.
Blunt-leaved orchid	<i>Platanthera obtusata</i>	Rainforest, northern third (rare).	Not autogamous, self-compatible (?), pollinia transported by insects.	Primarily mosquitoes, also Geometrid moths, pollinia attached to compound eye.	Unique floral structure that diverts insect probosces to dual nectar spur entrances.	Thien 1969, Gorham 1976.
Round-leaved orchid	<i>Platanthera orbiculata</i>	Rainforest, from Prince of Wales Is south (rare).	Apparently not autogamous, insects transport pollen	Little available information, possibly Noctuidae moths, long nectar spur.	Largest flowers and longest nectar spurs of any Alaskan orchid, pollinia apparently attached to compound eyes of nocturnal pollinators.	Leur 1975, Reddoch & Reddoch 1993.

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January 18, 2021