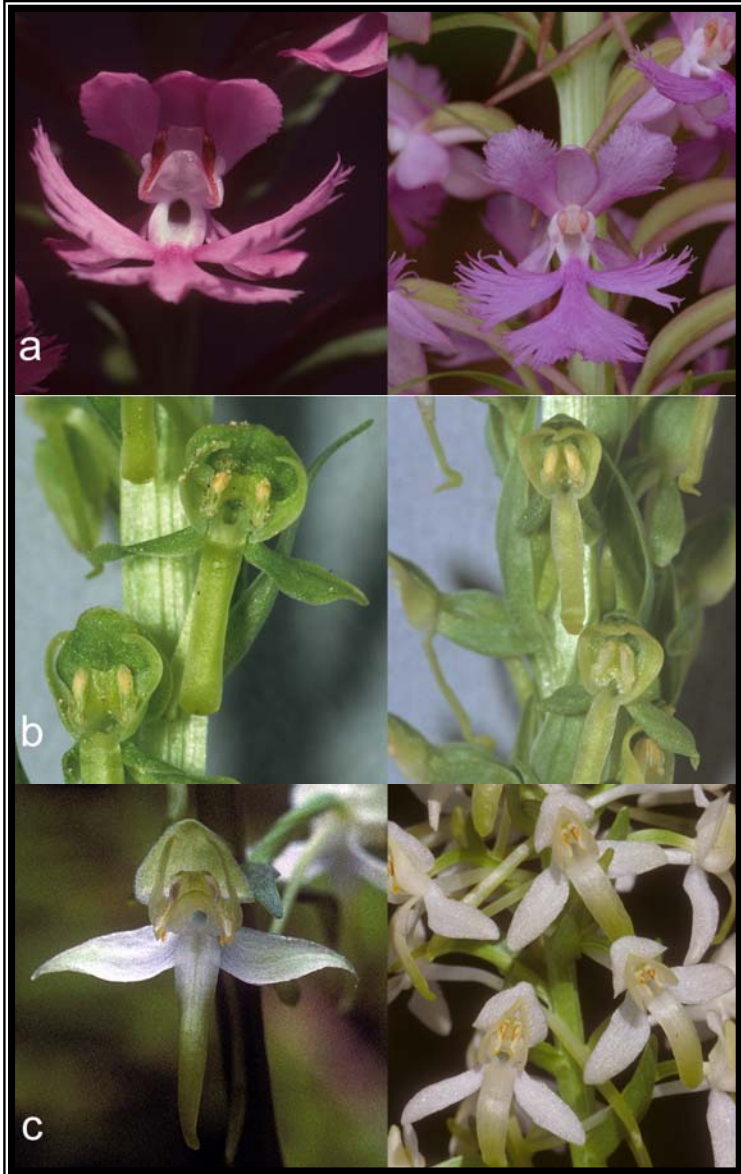


# The Native Orchid Conference Journal



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# Volume 7, Issue 1

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## On a Hypothetical Evolutionary Process in *Platanthera*

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*Platanthera* as it has generally been interpreted in the broad sense is highly diverse and includes several groups of very different-looking species. Certainly such species as *P. grandiflora* (Bigel.) Lindl., *P. orbiculata* (Pursh) Lindl., and *P. huronensis* (Nutt.) Lindl. seem to have little in common. If one considers floral variation in terms of function, however, a coherent pattern emerges.

Much of the variation in flower color, shape, structure, and fragrance in fact reflects differing pollination strategies, including pollinator attraction and pollination mechanics. Studies and observations on various *Platanthera* species date back to Asa Gray (1862) but subsequently were largely ignored in taxonomic studies until Stoutamire (1974) again emphasized them. Accounts are scattered through the systematics, ecology, and general and specialized orchid literature; this is beyond review here. The reader is referred instead to Catling & Catling (1989) and Hapeman & Inoue (1997) for detailed presentations. As a group, *Platanthera* is pollinated primarily by lepidoptera, but other insects are employed by some species. I intend here to focus on the structure of the column as it affects the pollinator and pollination, and further to limit the discussion to a particular pattern and its possible role in speciation. This is something that has intrigued me since considering it during the elucidation of *Platanthera praeclara* Sheviak & Bowles; citation of a few pertinent references can be found there (Sheviak & Bowles 1986). Subsequent work in the so-called *P. hyperborea* (L.) Lindl. complex, especially that leading to the description of *P. tescamnis* Sheviak & Jennings, has given me some ideas that I'd like to share, in the hope that they might stimulate critical investigation that I'm unlikely to have the opportunity to pursue myself.

### **Pollination Mechanics and the Structure of the Column:**

The column of *Platanthera* (Figure 1; page 7) bears an anther with 2 anther sacs separated by a connective that varies in breadth between, and sometimes within, species. Each sac bears one pollinarium (hemipollinarium *sensu* Dressler 1981) with a pollinium connected by a stalk-like caudicle to a viscidium positioned on the end of a lateral lobe of the rostellum. The breadth of the connective, and in particular the length and position of the rostellum lobes and how they orient the viscidia in relation to the mouth of the spur, determine the placement of pollinaria on the pollinator and the mechanics of pollination.

In a general sense, *Platanthera* species exhibit one or the other of two basic column types. In one, the rostellum lobes are prominent, often angular or finger-like, and position the viscidia well-forward and to either side of the mouth of the spur. The shape and dimensions of the column accommodate a pollinator's head as it extracts nectar from the spur, leading to contact of the eyes with one or both viscidia. As the insect exits the flower, a pollinarium is removed, borne on a com-

pound eye. After removal from the flower, the caudicle of the pollinarium bends so that upon visiting a subsequent flower the pollinium will contact its stigma, located between the rostellum lobes and above the mouth of the spur.

In the other basic column type, the rostellum lobes are greatly reduced, generally rounded, and closely spaced to either side of or above the mouth of the spur. Such columns place pollinaria on the proboscis or other mouthparts of pollinators, largely regardless of size (Catling & Catling 1989). The subsequent caudicle taxis necessary for the pollinium to reach the stigma of another flower is necessarily rather different than in an eye-deposition column (see Sheviak 2005 for an illustration and discussion).

These two column types recur in at least three major sections of the genus: the bifoliate species including such North American species as *P. orbiculata* but primarily Eurasian [nominated *Platanthera*]; the primarily North American boreal and cordilleran species including *P. dilatata* (Pursh) Lindl., *P. sparsiflora* (S.Wats.) Schlecht., etc. [The so-called *P. hyperborea* complex and sometimes referred to *Limnorchis*]; and the eastern North American plants with colorful three-lobed, fringed or eroded lips such as *P. grandiflora* and *P. psycodes* (L.) Lindl. [sometimes referred to *Fimbriella*]. Each of these groups includes various species with each column type, and in some cases a close relationship can be demonstrated between pairs of species (Figure 2; Front Cover; see page 8 for caption).

A particularly clear example of the two column types is the pair of closely related species *P. praeclara* and *P. leucophaea* (Nutt.) Lindl. (Figure 3; page 8). Both species bear white, nocturnally-fragrant flowers and are specialized for pollination by long-tongued sphingid moths. These two species differ most significantly in the structure of their columns; otherwise they are very similar. In *P. praeclara*, the large angular column presents the viscidia 6.2 – 7.5 mm apart; in *P. leucophaea*, with a much smaller, rounded column, the viscidia are separated by only 1.2 – 3.2 mm. The mechanical barrier to hybridization resulting from the differences in pollinarium placement and rotation of the pollinia was the primary basis for recognizing two distinct species (Sheviak & Bowles, 1986).

The structural differences seen in these two species have some interesting implications. The column of *P. leucophaea* will attach pollinaria to a wide variety of insects. Essentially anything with a proboscis long enough to reach the nectar in the spur, and hence repeatedly visit the flowers, may serve as a pollinator. Robertson (1893) described the pollination of this species, reporting two species of sphingid moths as pollinators. Viscidia attached to the proboscis, and pollinaria generally were removed one at a time, because the moth directed its proboscis to one side or the other. In contrast, in our work on *P. praeclara*, using live moths in a laboratory setting we demonstrated the anticipated contact of viscidia and removal on the moth's compound eyes. This placement involves two critical dimensions. First, the proboscis must be long enough to reach nectar as in *P. leucophaea*, but additionally it must also be short enough that, in order to reach the nectar toward the bottom of the spur, the moth must insert its head fully into the center of the flower and between the rostellum lobes. Furthermore, placement of pollinaria on eyes dictates

another dimension: the size of a moth's head and eyes must be sufficient to bring the eyes into close proximity of the viscidia. A moth with a suitable proboscis but a small head will be able to reach nectar without contacting the viscidia, and it will not serve as a reliable pollinator. This pair of measurements, then, greatly restricts the potential range of pollinators.

Eye-deposition of pollinaria is consequently a much more complicated process, involving more critical measurements, than is proboscis deposition. As a result, flowers with the larger eye-deposition column are prone to nectar thievery as long-tongued moths with excessively long tongues or with small heads can remove nectar without effecting pollination. The smaller column, then, can be seen to have two major advantages: it accommodates a large range of insects as pollinators, and, in so doing, guards against non-productive nectar loss. It thus is more efficient and could lead to greater reproductive success, especially in heterogeneous regions with a diversity of habitats and potential pollinators. The recurrent pattern of occurrence of these two column types across much of the genus consequently makes sense evolutionarily.

The costs and benefits of the two column types may result in differing geographic ranges of related species. In the two pairs *P. grandiflora*-*P. psycodes*, and *P. praeclara*-*P. leucophaea*, the proboscis-depositing species *P. psycodes* and *P. leucophaea* have much wider ranges and occur across much more ecologically diverse regions than do their eye depositing relatives. Proboscis deposition itself, rather than a greater ecological amplitude, may thus account for differences in distribution of related pairs of species. Perhaps the restriction to the Southwest and West Coast of the eye-depositing *P. sparsiflora*, *P. brevifolia* (Greene) Kraenzlin, and *P. zothecina* (Higgins & Welsh) Kartesz & Gandhi, in comparison to the transcontinental distribution of related proboscis-column species such as *P. dilatata* and *P. huronensis*, may have a similar basis.

### **The Hypothesis:**

Assuming, then, that proboscis-depositing species have repeatedly arisen from eye-depositing progenitors, what mechanism might account for such a pattern? Indeed, Hapeman and Inoue (1997) assert both that proboscis deposition is primitive, and that in species pairs such as *P. praeclara*-*P. leucophaea* and *P. grandiflora*-*P. psycodes*, both species probably arose from an intermediate progenitor and resulted from bidirectional selection. They do not, however, offer a compelling mechanism. In contrast, the proboscis-depositing column can be viewed as a product of neotony: during development of buds of the eye-depositing species, the angularity of the column develops late, and initially the developing column is small and rounded. If its development is arrested during this stage, but the rest of the flower continues to develop more or less normally, the resulting flower will bear a small, rounded column with closely spaced viscidia. If all other structures are maintained as in the normal flower, the column will be both functional and serve to accommodate a broad range of pollinators. Potentially, then, a greater efficiency in pollination may lead to its selection. The differences in caudal taxis between the two column types probably would necessitate some subsequent fine-tuning, but the effects of the initial column reduction on the correspondingly smaller pollinaria

cannot be anticipated. The dysfunction might not be significant. Indeed, hybrids of *P. sparsiflora* with *P. dilatata* are known, thereby suggesting that mechanical isolation is not absolute.

Proboscis-depositing species therefore may be repeatedly generated by a mutation of a regulatory gene that arrests development of the column during development of the flower bud. Favoring this hypothesis is the tendency for the flowers of the proboscis-depositing species to be somewhat smaller than those of their eye-depositing relatives. If a particular gene is responsible, as seems likely, then it is reasonable that it may have a marked tendency to mutate in the particular fashion that leads to the observed situation. A certain frequency of mutation thus could lead to the occasional, repeated generation of proboscis-depositing species.

Such a system raises an obvious question: Where did the eye-depositing columns come from? If proboscis-deposition is more efficient and leads to greater reproductive success, how would eye-deposition arise? Indeed, this may be a chicken-or-egg situation, but the ultimate starting point may not be significant in terms of speciation. If a recurrent mutation leads to the generation of proboscis-deposition from an eye-deposition progenitor, then very likely back-mutation could reverse this process, leading to the restoration of eye-deposition. What might be seen over the course of an evolutionary time-frame, then, would be a cycling between the two different pollination modes.

Such a process has interesting evolutionary implications, and the taxonomic complexities of the *Limnorchis* group may bear witness to it. The eye-depositing column with its prescribed measurements specifies a limited suite of pollinators. Together with differing habitats, ranges, and the like, pollination mechanics greatly limits the opportunity for hybridization. As a result, such species are for the most part distinct and unambiguous. On the other hand, the ability of the proboscis-depositing column to be pollinated by a great range of pollinators should lead to some incidence of hybridization, and that is indeed what appears to be the case. If such characteristics are superimposed on the cyclical pattern suggested here, a novel speciation scenario emerges. The hypothetical back mutation in a proboscis-depositing species would yield the progenitor of a potential new eye-depositing species, one that derives from the adaptive and hybridization history of the proboscis-depositing phase. It may be that the notorious taxonomic complexity of the proboscis-depositing species marks the present introgressive phase of a cyclical speciation system. Whereas the eye-depositing phase would be characterized by relatively stable species maintained by a level of pollinator specificity, the principal mechanism for diversification of such species actually would be passage through the proboscis-depositing phase.

This proposal is, to say the least, speculative, but it is supported by the patterns that we see in the field, and it is based on real-world biology. Furthermore, it may be testable. Critical use of DNA sequence data may prove useful in resolving these questions, but elucidation of relationships will require more insightful techniques than the obfuscatory cladistic analyses currently in vogue. Cladistic analysis can detect only divergence; it is blind to hybridization, and therefore it is inappropri-

ately applied to hybridization-prone groups.

**Afterword:**

My continuing taxonomic work in the diverse and evidently rapidly evolving *Limnorchis* group provided a sound foundation for a detailed investigation. Accordingly, over a period of 8 years I collected nearly continent-wide in an effort to obtain an adequate sample for a preliminary study. All samples were vouchered at NYS and chromosome numbers were obtained for each collection or at least material was preserved for future counts. Additional samples were obtained from the cultivated collection that had been assembled for taxonomic studies over a period of decades. With the capable and dedicated assistance of Diana L. Hurlbut and Jerome S. Haller at the New York State Museum, nearly 300 PCR amplified product aliquots were prepared and were being readied for sequencing in late 2008. At that point the economic collapse eliminated funding for such non-essential pursuits, and at this stage in my life, I felt that I no longer should continue to fund my research to the extent that I had been. Consequently, the project was put on hold. For all practical purposes, that means terminated, and so I've decided to put forth the hypothesis without exploring it further. Hopefully it will attract attention in a future that is more capable, financially, conceptually, and methodologically, than is the present.

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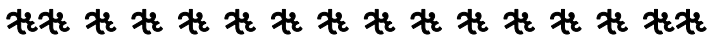
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## Seasonal Development of Case's Ladies'-tresses (*Spiranthes casei* Catling & Cruise) Plants

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Case's Ladies'-tresses (*Spiranthes casei* Catling & Cruise) is a Great Lakes - St. Lawrence - Acadian Forest Regions endemic. Its whitish flowers are present in late August and early September. Like other orchids with tuberous roots, *Spiranthes casei* plants renew themselves annually — both above and below ground. Seeds are the end product of multiple steps that include the production of the first two or three leaves in the fall, the formation of new roots and additional leaves in the spring, the emergence of the flowering stem with several cauline bracts in July, and the development of the fall rosette. (See Figures 1–5 on pages 9-10 and details below.) Vegetative plants follow the same basic seasonal pattern except that no plant part is above ground between the time the leaves die in July and the fall rosettes appear a month or so later.

Flowering *Spiranthes casei* plants may or may not still have green leaves at flowering time. There likely will be no green leaves if the summer has been hot and dry. On the other hand, there may well be a few green leaves left at flowering time in an exceptionally moist summer or habitat. If there are green leaves, they may be either basal or cauline, or both. One or two basal leaves may survive until flowering time. In addition, one or more cauline bracts are sometimes leafy and may remain green until the flowers open. Whatever happens to the leaves in a given year, it is important to realize that the presence or absence of leaves at flowering time cannot be used as a diagnostic feature for this species.

How long individual plants and populations of *Spiranthes casei* live depends on how fast shrubs and trees overtake the open places that are their usual habitats. In locations where succession is slowed by environmental constraints such as shallow soil, we have found that individual plant lifetimes average about 14 years and populations can persist for four or more decades (Reddoch and Reddoch, in press).

The stages of growth listed below and shown in Figure 1 are based on our field studies (Reddoch and Reddoch, 2008, in press) near Ottawa, Ontario, and the observations of Henry Mousley (1924 (sub *S. cernua* var. *ochroleuca*), 1942 (sub *S. vernalis*)) on underground development near Hatley, Quebec.

### Month by Month Seasonal Development

(\* = both flowering and vegetative plants; \*\* = flowering plants only)

#### April

\* A plant overwinters with a fall rosette of one to four (usually two or three) leaves and three or four roots.

\* The third and fourth basal leaves begin or resume growth.



Figures to accompany 'On a Hypothetical Evolutionary Process in *Platanthera*' by Charles J. Sheviak (page 1). Figures: Charles J. Sheviak.

Figure 1: Flowers of *Platanthera zothecina*, Grand Co., Utah, *Sheviak 6527* showing column structures discussed in the text. a: anther sac (one of two) with enclosed pollinium barely visible as a yellowish swelling; c: connective; v: viscidium (one of two); r: rostellum; s: stigma. The opening below the stigma is the mouth of the spur.



Figures to accompany ‘On a Hypothetical Evolutionary Process in *Platanthera*’ by Charles J. Sheviak (page 1). Figures: Charles J. Sheviak.

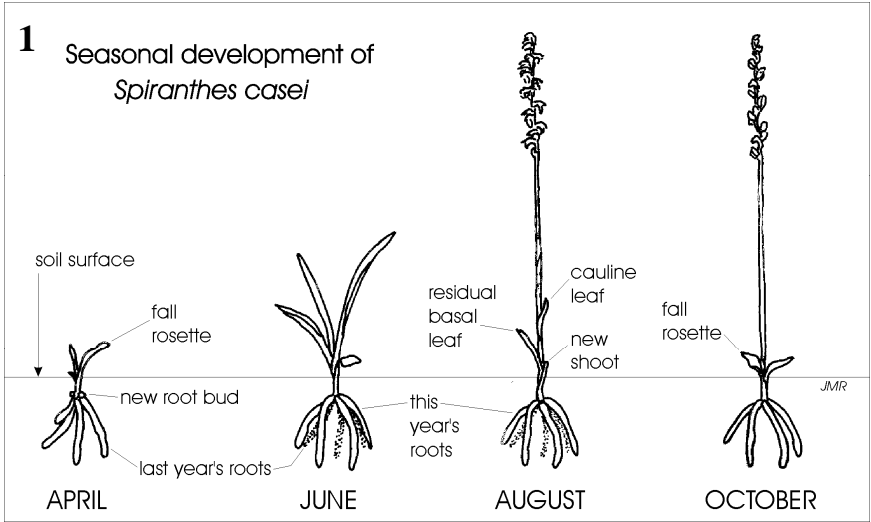
Figure 2: *Platanthera* flowers of species with the two different column types. a: A species pair from eastern North America. (left) The putative progenitor species, *P. grandiflora*, Hamilton Co., New York, *Sheviak 2050*; (right) The putative derivative species, *P. psycodes*, Essex Co., New York, *Sheviak 1877*; b: A species pair from western North America. (left) The putative progenitor species, *P. sparsiflora*, Mono Co., California, *Sheviak 6517*; (right) The putative derivative species, *P. tescamnis*, Beaver Co., Utah, *Sheviak 6504*; c: Two of several East Asiatic bifoliate species with differing column types, and not necessary a pair of progenitor and derivative species. (left) *P. freynii*, Primorye Territory, Russia, *Sheviak 5367*; (right) *P. metabifolia*, Hokkaido, Japan, *Sheviak 6028*. (FRONT COVER)

Figure 3: Flowers of *Platanthera praeclara* (left), Richland Co., North Dakota, *Sheviak 2222a*, and *P. leucophaea* (right) Kenosha Co., Wisconsin, *Sheviak & Bowles 1828a*, showing the differently structured columns. In *P. praeclara*, the viscidia are borne at the tips of the finger-like lobes of the rostellum, facing inward, and widely separated. In *P. leucophaea*, the rostellum lobes are short and rounded and the viscidia are closely spaced.



Figures to accompany 'Seasonal Development of Case's Ladies'-tresses (*Spiranthes casei* Catling & Cruise) Plants' by Joyce M. Reddoch and Allan H. Reddoch (page 6).  
Figures: Joyce M. Reddoch.

Figure 1. Generalized seasonal development of a flowering plant of *Spiranthes casei*.  
Figure 2. A developing inflorescence (left arrow) and cauline leaf (right arrow) in mid-July. *Spiranthes casei* plants are virtually invisible among the surrounding vegetation except when in full flower; emerging flowering stems are particularly susceptible to damage from trampling.

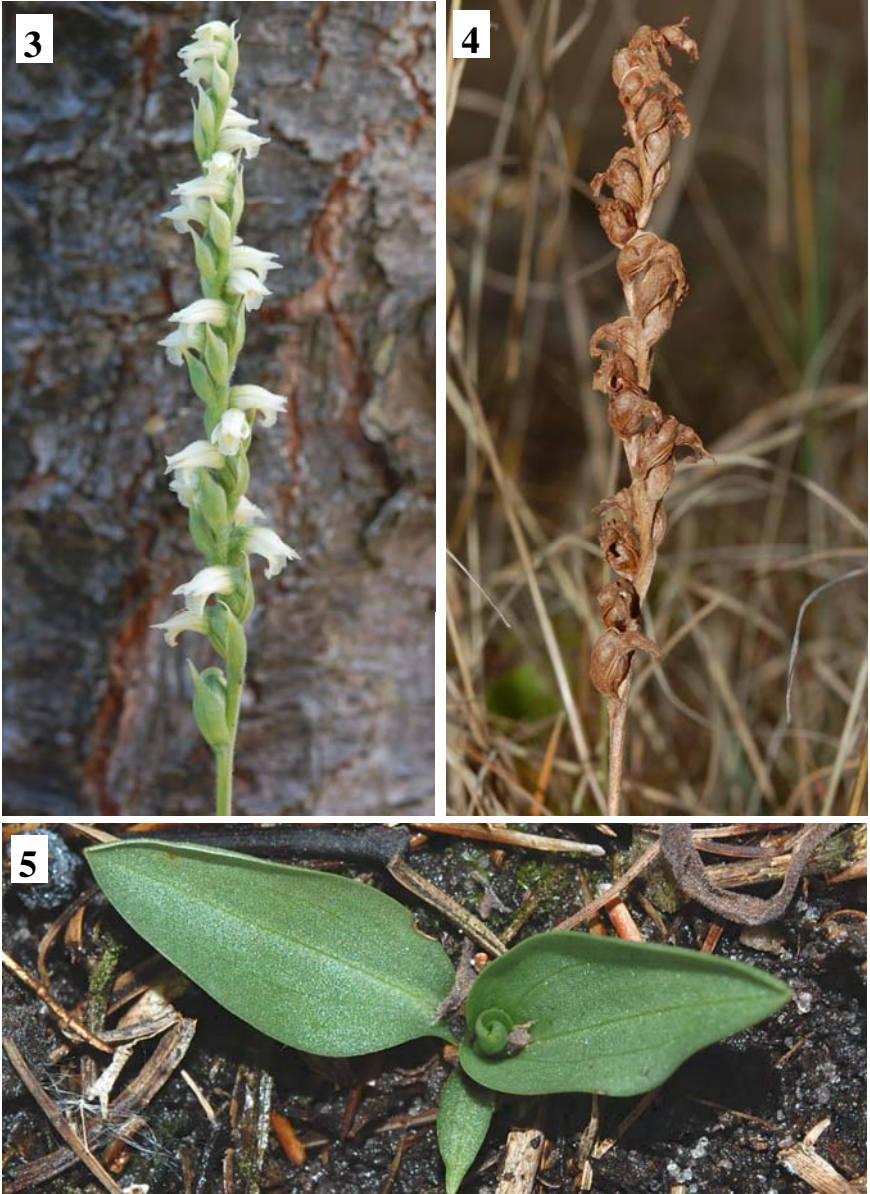


Figures to accompany 'Seasonal Development of Case's Ladies'-tresses (*Spiranthes casei* Catling & Cruise) Plants' by Joyce M. Reddoch and Allan H. Reddoch (page 6).  
Figures: Joyce M. Reddoch.

Figure 3. A *Spiranthes casei* inflorescence at anthesis in late August.

Figure 4. A *Spiranthes casei* inflorescence after seed release in mid-October.

Figure 5. A *Spiranthes casei* fall rosette in late October.





Figures to accompany 'A Great Orchid Hunting Year: Tales from the field in 2009' by Tom Nelson (page 16). Images: Tom Nelson.



Figures to accompany 'A Great Orchid Hunting Year: Tales from the field in 2009' by Tom Nelson (page 16). Images: Tom Nelson. This page and facing page.



Eric Lamont with *Gymnadeniopsis integra* (syn. *Platanthera integra*)







9

*Hexalectris spicata*



10

*Isotria verticillata*



11

*Platanthera blephariglottis*



12

*Platanthera ciliaris*

13



*Platanthera x bicolor*

14



*Spiranthes laciniata*

Figures to accompany 'A Great Orchid Hunting Year: Tales from the field in 2009' by Tom Nelson (page 16). Images: Tom Nelson.

15



Ron Parsons with *Platanthera peramoena*



\* The root buds emerge and the roots begin to elongate.

**May**

\* Additional basal leaves emerge and expand.

\* The roots continue to grow.

**June**

\* The basal leaves and roots complete their growth; the first one or two leaves may turn yellow or brown or may disappear. Last year's roots begin to turn brown. In our Ottawa study (Reddoch and Reddoch, in press), plants with two or three basal leaves were always vegetative, while plants with four, five or six basal leaves were either vegetative or flowering.

**July**

\* Most or all of the remaining basal leaves turn yellow and then brown.

\* In July and August last year's roots continue to atrophy.

\*\* The flowering shoot emerges and develops.

**August**

\*\* The flowering stem completes its growth; flowers open. The flowering stem bears several bracts, the lower one or two sometimes leafy (then referred to as cauline leaves); it/they may still be green at flowering time.

\* Most or all basal leaves are dead.

\* The shoot that will develop into a fall rosette emerges and develops, earlier in plants that were vegetative that season.

**September**

\*\* The ovaries expand and seeds develop.

\* The shoot develops into a fall rosette.

**October and early November**

\*\* The capsules dehisce and release seeds.

\* Some root buds for next year's roots may be evident, earlier on plants that were vegetative that season.

\* The fall rosette overwinters under the snow.

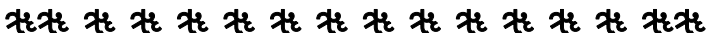
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## A Great Orchid Hunting Year: Tales from the field in 2009

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I am a professional jazz pianist that resides in NYC with my wife and two young daughters. I have had an interest in wild orchids ever since I was a teenager – I almost pursued a career in botany - but it wasn't until 2007 that I began to meet the right people and started to fulfill a life-long dream of actually seeing these beautiful and interesting plants in the wild. After 3 years of traveling to far-off places and constant networking my life list now totals 90 species. The following is an account of some orchid adventures from the bountiful season that just ended (images on pages 11-14).

The morning of May 11<sup>th</sup> couldn't have been more delightful; and to make things even better, I was headed to a great site for *Isotria verticillata* (large whorled pogonia) located in a county park on Long Island. Eric Lamont, an excellent field botanist, Long Island native and one of the good orchid-friends I have acquired over the last 3 years had told me about this site and I had visited it in 2008 only to find the plants past bloom. Eric had put me in touch with Dave Taft, another Long Island orchid-nut, who had been monitoring the site this year; he had informed me that the orchids were “waiting for me” this morning... Sure enough, there were several hundred prime specimens greeting me when I arrived in the sandy oak woods where they grow. This was my first time seeing this remarkable orchid in bloom. The 2-inch sepals are drawn back with the stragglng effect of wavy ribbons – or perhaps sprawling spider legs. The corolla is thrust forward in the shape of a funnel, its upper half formed by the pair of over-arching petals. The white lip is flanked on each side with dull purple streaks. The overall effect is of some kind of bizarre insect waiting to pounce. There were also hundreds of gorgeous pink lady's-slippers (*Cypripedium acaule*) a species that is often sympatric with *Isotria* growing in the surrounding acidic oak woods. After photographing this orchid-feast for several hours, I drove back to my Manhattan apartment, very pleased with the first foray of the year and amazed that such an orchid site exists only 41 miles from the asphalt jungle.

I spent many years hoping that I would stumble on choice species of native orchids on my many excursions into the wild but as we all know, that is like finding the proverbial needle in the haystack. Unless one is in an orchid-rich area such as Newfoundland or Manitoba, site-specific information is a must. In 2008 I joined the Ridge and Valley Conservancy, a land preservation group in northern New Jersey. My oldest daughter, 10 year old Johanna and I had gone on one of their trail maintenance hikes and the naturalist that was guiding the group had told me about some small yellow lady's-slippers that he had seen about 20 years ago in a nearby state park. It seemed like a long shot, but after the hike finished, the RVC president kindly drove with us to the park and pointed out the appropriate trail, which was not marked and would have been impossible to find on our own. Sure enough, the orchids, although out of bloom, were still growing there in a lake-side marl bog along with *Sarracenia purpurea* (pitcher plant) an uncommon plant in New Jersey. Today, the

17<sup>th</sup> of May, I was returning to hopefully see them in bloom. As I neared the lake shore my heart skipped a beat as I spied yellow color in the open bog. Yes! There were 19 prime-bloom *Cypripedium parviflorum* var. *makasin* (small northern yellow lady's-slipper) and more seedlings all growing on one raised hummock. One clump of 12 plants was especially stunning. This is one of my favorite orchids, and as always, the flowers seduced me immediately. Sweetly scented with brilliant mahogany-red sepals and petals, they were a sight to behold. I searched the bog thoroughly, but the lady's-slippers were only growing on the one hummock. A true paradise and only 60 miles from NYC!

It was Memorial Day weekend and we were on a family orchid trip. I am lucky to have a family that loves orchids and traveling. We were headed to a southern location to meet Eric Lamont, who was dying to see *Cypripedium kentuckiense* (Kentucky lady's-slipper) for the first time. Eric is great company in the field and his encyclopedic knowledge of plants is an asset; the girls are very fond of him as well. We had been here in 2008 so I was able to guide Eric right to the site – thankfully located in a nature preserve - where the reigning monarch of the genus *Cypripedium* holds court. As an added bonus, we passed several colonies of *Liparis liliifolia* (lily-leaved twayblade) in prime bloom, on the way. The cyps are located in a hard to access swamp, so the ladies waited on the boardwalk – where there were a few *C. kentuckiense* to entertain them - while Eric and I ventured out into the muck. We soon found prime specimens of the largest of the North American cyps. These stunning plants can reach 3 ft in height with slippers the size of a goose egg. The 1 to 2 inch wide dorsal sepal arches up over the lip very dramatically, almost touching it with its tip. The sepals are 4-5 inches long and in this population spiral straight down beside the lip resembling a fair maiden's ringlets. To my eye, some individuals at this location are reminiscent of the beautiful tropical genus *Paphiopedilum*. We searched a large part of the swamp, which is a maze of fallen-down trees, cat briar and knee-deep mud, and counted a total of 69 plants. A thankfully healthy population! The next day we drove north to a wildflower preserve located along the Susquehanna River in Pennsylvania. There we found 36 prime specimens of *Aplectrum hyemale* (putty-root orchid) growing in the lush forest. This was my first time for this species, so I spent a long time trying to capture an image of this beautiful but hard to photograph orchid.

I had heard from Karl Anderson, a noted botanist and a friend of Eric's that *Spiranthes lucida* (shining ladies'-tresses) had been found previously near the boat launch at the state park in New Jersey where the *C. makasin* grows. It was June 12<sup>th</sup> and I had spent most of the day searching for *C. reginae* in a nearby Nature Conservancy Preserve and had come up empty-handed. The few remaining stations in New Jersey for this beauty as well as the equally rare *C. candidum* are a closely-guarded secret that I have yet to unravel. To my delight there were 53 *Spiranthes lucida*, mostly past bloom, growing in a boggy area near the lake when I arrived there in the late afternoon. I plan to return next year to see them in their prime. Karl – who did a plant survey of the park for the state a few years ago - told me later where to find *Liparis loeselii* (Loesel's twayblade) in the same area.

It was August 2<sup>nd</sup> and we had just returned from a 4 week 10,000 mile cross-country family orchid-hunting expedition to the West Coast (32 species total) and were glad

to be home. I met San Francisco native Ron Parsons at the Native Orchid Conference in Morgantown last July and he has become a good friend; he had helped us with orchid sites in California and I was now taking him to some choice sites in my area. Today Eric, Ron and I were headed to Hazelton, Pennsylvania to show Ron the incredible fringed orchid site there. Hundreds of *Platanthera blephariglottis* (white fringed orchid) can be found growing in damp swales in power line cuts at this site. There are a few *Platanthera ciliaris* (orange fringed orchid) and a good number of their hybrid *Platanthera x bicolor*. The show was spectacular and since it was a Saturday there were at least 15-20 other orchidophiles – most of them fellow NOC members - there to take it in. It was like a mini-orchid conference. Ten species of orchids have been found at this site and Frank Destifano is spearheading an effort to get it preserved. Bravo! While Ron and I were busy photographing the various *Platanthera*, Eric scoured the area and discovered several out of bloom *Liparis loeselii* (Loesel's twayblade) and some gorgeous *Gentiana linearis*. We then drove about 25 miles further south and west to visit a population of *Platanthera peramoena* (purple fringeless orchid) that grows on the edges of a cornfield along the Susquehanna River. Ron loves lilies and we were able to oblige him with some beautiful roadside specimens of the very desirable *Lilium superbum* on the way. The *P. peramoena* were phenomenal. One of the "trophy orchids" of the eastern states, Ron had been very disappointed when there were none blooming for the conference last summer due to the late season. Eric and I had visited this site in 2008 but this was an even better year, with over 70 blooming plants. Jeff Hapeman tells me that he first saw *P. peramoena* at Millersburg twenty years ago and that there are records of this population going back almost forty years. A truly spectacular orchid, some of the plants were chest high and even though it was in the mid-90's and the August sun was beating down, we spent a long time photographing this dazzling display. The blossoms are very beautiful on close inspection. Stan Bentley calls this the "southern belle" orchid. To him the pollinia resemble big, dark, enchanting eyes and the lip is spread like outstretched arms beckoning above a wide, full skirt... Happy after a good day in the field, we retired to a motel in nearby Harrisburg to rest up for more fun the next day.

After a late start - it was pouring when we awakened – we arrived at our first orchid site just as the sun came out. Growing along a roadside in rural Pennsylvania were prime specimens of *Platanthera ciliaris* and *Gymnadeniopsis clavellata* (little club-spur orchid). Rounding out the summer bouquet was *Lilium superbum*, *Lobelia cardinalis* and *Sabatia angularias*. We had directions to a site for *Platanthera psycodes* (small purple fringed orchid) in southeastern Pennsylvania but after searching a power line cut in the sweltering sun for over two hours, all we came up with were some more gorgeous lilies.

In the early spring of 2008 my ten year old daughter Johanna and I had discovered a large colony of several hundred *Goodyera pubescens* (downy rattlesnake orchid) while hiking in a nature preserve near Bedford, New York, 25 miles north of NYC. We were returning this year on August 6<sup>th</sup> to hopefully catch them in bloom. Unfortunately a huge blow-down had occurred – the bane of all orchid hunters – obliterating almost all of the plants. After I had taken about three pictures Johanna, who was playing in the nearby stream suddenly started to scream hysterically. I ran over and could see wasps swarming all around her. She was standing right on top of a mud

wasp nest! I grabbed her and pulled her away and tried to swat the wasps - which were now stinging me as well - away. They were really mad and wouldn't leave us alone. I grabbed my camera and camera bag, which was full of wasps, and we high tailed it to the car. A few wasps actually tailed us all the way there, about ½ mile! Luckily neither of us is allergic to wasp stings so other than the discomfort of the swelling and itching we were fine. I returned a few days later and finished taking my photos, all the while keeping one eye on the nearby hole in the ground where the wasps were busily coming and going.

Eric and I had both been hoping to see *Hexalectris spicata* (crested coralroot) for the first time and our friend Scott Shriver made it possible. After the sites that he knew in West Virginia didn't pan out, he lined us up with an unnamed orchid expert in southwestern Virginia who offered to guide us to some prime-blooming plants. All we had to do was drive 500 miles (each way!) not a big deal for two dedicated orchid sleuths. When we arrived on August 15<sup>th</sup> there were eight plants blooming on a steep hillside in calcareous woods and they were just as stunning as I had imagined they would be. This saprophytic species has very attractively colored blossoms; the butterscotch colored sepals and petals contrast nicely with the bright purple lip and the flower to me resembles a floppy-eared hound dog. It was well worth the trip.

On our way back north the next day we stopped by the Bennett Bogs, a well-known orchid site near Cape May, New Jersey. Eric had seen *Gymnadeniopsis nivea* (snowy orchid) there in the 1980's and Bill Olson, a botanist friend of his had seen it in 2000, so we thought we'd give it a shot. We found nothing, but Eric always finds plenty of interesting plants to look at wherever we go, and I now know the location of the famous bogs, so it wasn't a wasted trip. We then drove north to the Pine Barrens to revisit a site for *Gymnadeniopsis integra* (yellow fringeless orchid) that we had visited in 2008. This year was a spectacular year – we counted 127 blooming plants in an open savannah next to a river! Some of the plants were close to 20 inches tall and the bright yellow racemes were a spectacular sight in the blazing August sun. There were a few past-bloom *Platanthera cristata* (orange crested orchid) as well. We then visited a nearby site for *Spiranthes tuberosa* (little ladies'-tresses) that we know about and found 30-40 prime plants. A great orchid weekend!

It was Labor Day weekend and I had received word from orchid friends Mark Larocque and Bob Sprague that *Spiranthes laciniata* (lace-lipped ladies'-tresses) was in bloom in the Pine Barrens of New Jersey, so Johanna and I headed down that way. I feel very lucky that this botanically-rich area is only 120 miles from New York. Thanks to Bob and Mark we had good directions and found 13 blooming plants growing in an open savannah. This is a very uncommon species in New Jersey and we never would have found it without such great help. There was one magnificent specimen that was almost 30 inches tall! Upon close inspection with a hand lens, all individuals exhibited the characteristic ball-tipped hairs on the inflorescence; there were both secund and strongly spiraled plants present, which is typical of this species. Even though my daughters are being raised in an urban environment, I am determined to have them grow up with a love for nature. Johanna enjoyed the Pine Barrens but was certain that wasps were lurking behind every bush.

I was certain that I was finished for the season until I received an email from up-state New York acquaintance Charles Ufford inviting me to go along on a field trip with

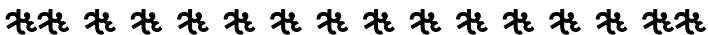
him and his orchid friend Ken Hull to see *Corallorhiza odontorhiza* (autumn coral-root) near Allentown, Pennsylvania on September 18th. It seems that Allentown resident Frank Destifano had located two blooming populations and was offering to guide us. Great! We were rewarded with a nice clump of 10 plants growing in a beech woods. This is a very hard to spot orchid that I definitely never would have found without assistance. The strange but beautiful blossoms are often cleistogamous – or closed - as was the case here. Frank had to return to work but had given us directions to a second site. That beautiful lakeside location had a lot more plants and a few were chasmogamous, or open. The three of us got down on our bellies and tried to photograph the tiny maroon-spotted lips, which is a very difficult proposition. I paid for it later with multiple chigger bites! It was a great end of the season trip amongst new friends.

Looking back over this first experience as a Native Orchid Conference attendee I would consider it a great success. At the beginning of the conference Kip said that if by the end we felt uncomfortable about the status of orchid conservation then they had done their job. He was right. After seeing the magnitude of things that are threatening our orchids and our environment I felt very uncomfortable. The fight to protect these natural treasures can feel overwhelming. However, I was also encouraged to see and hear how much work is being done successfully to counteract these threats. One such success occurred during our conference with the dedication of Carney Fen as a state natural area.

Despite the great success of the conference overall, there were a few points that could be improved upon. For one the field trip organization proved to be highly chaotic and required greater planning before hand. More time needed to be devoted to leader designation, car pooling, and meeting places and times and less emphasis on driving directions which were already provided. A second thing could be to break up the lecture days and spread the time more evenly throughout the conference. For example have morning lectures and afternoon field trips all four days of the conference. This would bring a greater balance to the conference and be easier than sitting through two 7 hour lecture series. I realize due to the time required for travel to the field trip destinations at this year's conference that this would not have been possible, but it is something to consider for the future. One more thing I would like to comment on is that I thoroughly enjoyed having a hands on workshop. Reading about how to do something cannot compare to being shown and then doing it yourself. I would like to see more of these types of workshops at future conferences.

There are some fundamental points that we can take home from this experience; watch your step because you never quite realize the impact you may have, educate others so they can make better choices, we all need to collaborate, cooperate, and share our data to make our common goal of conserving the natural wonders of our world a success.

The 2009 Native Orchid Conference was my first one. I came away from it with heightened knowledge, new experiences, and great friends. I look forward to seeing you all again next year in Alberta, Canada.



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