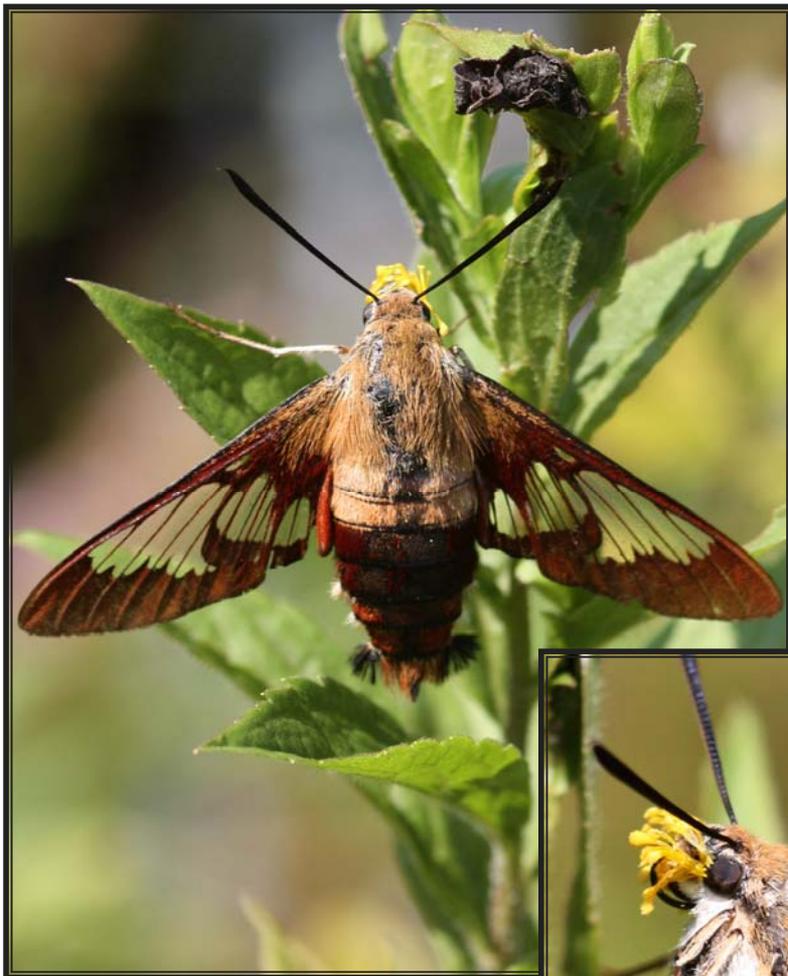




The Native Orchid Conference Journal



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2011 Conference Top Notch

Mark Rose

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Lots of congratulatory words describing this year's conference were heard over the four fun packed days in Delaware, New Jersey and Pennsylvania. First let me extend a heartfelt "Thank You" to Phil Oyerly, Conference Chair, and the entire staff at Mt. Cuba Center. The facility was a first rate venue and every facet of the conference ran with precision and was well received by everyone in attendance. I must admit that at every conference I attend there are a few presentations that I may not be interested in or find boring — it's just human nature that you don't like them all. The 2011 conference was an exciting exception to this general rule. Every presentation was packed with useful information that we can all take away and apply to our love of North America's native orchids.

One of the things I would like to share with everyone is something from our annual business meeting. It was proposed, and accepted by the membership, to establish a new scholarship sponsored by the NOC. It was presented by member Hal Horowitz and is to be called the Fred W. Case Grant. The grant committee will be selected each year and it can award up to \$1,000 annually to a qualified applicant. Details about the grant process including how to apply can be found on the society's Yahoo website. To fund this program, the Board is soliciting donations from the membership. Our goal is to generate \$20,000 to fully fund this program. Our by-laws state our primary function is to educate everyone about our native orchids, and I feel this is one of the best ways to start. By helping students who have an interest in studying native orchids, we can accomplish this. I hope each of you will mail a donation to the NOC at PO Box 13204, Greensboro, NC 27415-3204. Please be sure and include the words "Case Grant" in the memo line of your checks. The Board is excited about this new venture and looks forward to hearing from each of you.

One final note is the 2012 conference. We will be returning to North Carolina for our eleventh conference. The dates are not totally firmed up yet but we are looking at May 19-22 depending on venue availability. We are looking at visiting the Green Swamp on one of the field trips and then heading to the North Carolina mountains for the second day out in the field. Our base will hopefully be the Wilmington, NC area. Details will be announced in the *Journal* as soon and they are firmed up. Please mark your calendars now and make plans to attend what looks to be another fabulous Native Orchid Conference.

Yours in orchids,
Mark Rose, President

2011 Conference: Reports from the Field Trips

Report 1

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What do you call someone who gets chigger bites on top of his tick bites??? A native orchid fanatic!!! Despite ample warning from one of our trip leaders (that would be me), some of us left the New Jersey Pine Barrens with significant evidence of arachnid misconduct (oops... that would also include me). Break out the alcohol, tweezers and nail polish.

Those of you who could not attend this year's annual conference were sorely missed and you passed up two fantastic days at Mt. Cuba Center in Hockessin, DE. The facilities were nothing short of extraordinary, the staff was most cordial, the food was terrific, the logistics well thought out and the speakers were fascinating. Our sincere thanks go to Vice-president Phil Oyerly and his assistants, both at Mt. Cuba and within the NOC, for a job well done.

What do you call someone who travels across the continent (Betty, Jim, Rick, Ben) or across the ocean (Ursula, Dietrich) to attend an NOC meeting??? A native orchid fanatic!!!

On Monday, August 1 we left the air-conditioned comfort of our facilities in Hockessin and headed for the (nearly 100 degree) wilds of New Jersey.



This year's conference, housed in a tent on the Mt. Cuba lawn, was cooled by three massive air conditioning units each powered by a 250 KW generator. A unique configuration of tubes, each more than a foot in diameter, channeled the input and exhaust air to keep the attendees comfortable in the 90 °F weather.

Extreme weather conditions during the prior two weeks did not bode well for the flowers we were so anxious to see. A relatively easy ninety minute drive across the Delaware River took us to a forest service office in the heart of the “pinelands.” The two sites we would visit are difficult to access and very fragile in nature. Those concerns resulted in a novel approach... we employed vans to shuttle people in and out of the Wharton State Forest. Arrival times were scheduled and staggered in order to avoid long waits for the vans.

Sweet pepperbush (*Clethra alnifolia*) was in full bloom; everywhere we went the air was filled with its characteristic perfume. Even the parking lot held its own fascination where many folks were intrigued by the comings and goings of cicada killers (sounds like a 1950s sci-fi movie). *Sphecius speciosus* is a large (1½”) wasp that digs a burrow in the ground and provisions it with cicadas that have been paralyzed by the wasp’s sting. A single egg is laid in each burrow and the newly emerged larva is assured an ample supply of fresh protein. An adult wasp hauling a comatose cicada is reminiscent of a Boeing 747 carrying the space shuttle below its fuselage.

Driving in the pinelands can be very dicey. The narrow sand roads are deeply rutted and can easily “hang-up” a low-slung car. Deep, loose sand often sucks vehicles in up to their axles; getting out is difficult. Overhanging vegetation leaves telltale scratches on the sides and roof. Our van drivers transported groups of five to ten people in and out with each leg of the trip being about fifteen minutes.

Our destinations were two sphagnum bogs about one mile apart and each adjacent to the Batsto, one of several rivers which drain southern New Jersey. Meandering through pitch pine/scrub oak forest and Atlantic white cedar bogs, the Batsto wends its way to the ocean some twenty-five miles to the east. It is stained nearly black by tannin and is smooth as glass since it drops only fifty feet in elevation over its entire course. Among typical Pine Barrens plants in the bogs and savannas along the Batsto one can find rare, unusual and sometimes endemic species. These include curly-grass fern (*Schizaea pusilla*), red-root (*Lachnanthes tinctoria*), golden crest (*Lophiola aurea*), bog asphodel (*Narthecium americanum*), red milkweed (*Asclepias rubra*), lance-leaved sabatia (*Sabatia diformis*), several pipeworts (*Eriocaulon*), golden-club (*Orontium aquaticum*), three species of sundew (*Drosera*), eleven species of bladderwort (*Utricularia*), purple pitcher plant (*Sarracenia purpurea*) and, of course, Orchidaceae.

Orchids to be found in the Pine Barrens (during their appropriate season) include *Pogonia ophioglossoides*, *Calopogon tuberosus*, *Arethusa bulbosa*, *Spiranthes tuberosa*, *S. cernua*, *S. laciniata*, *Cypripedium acaule*, *Goodyera pubescens*, *Epipactis helleborine* (yes, even here) and the “fringed orchids.”

Our target species (and the reason for the conference dates) were *Platanthera blephariglottis*, *P. cristata*, *P. clavellata* and *P. integra*. Representative pictures of the plants seen are on pages 10-11.

What do you call someone who shows up bright and cheery, wearing spotless khaki trousers but comes out of the bog stained from head to toe, front and back, with tell-tale red mud??? An orchid fanatic!!!

Pre-conference scouting trips paid off ... we had located the expected species plus a surprise bonus. Amy found one plant of the extremely rare *Platanthera ×canbyi*, a natural hybrid between *P. cristata* and *P. blephariglottis*. Due to the sensitive nature of the sites, we employed the use of docents. Many thanks to Janet Novak, Amy Levensgood, Russ Juelg, Stuart Hughes, and Ted Gordon who stayed in the bogs all day directing traffic. They were able to keep everyone out of the thick mud... well, almost everyone. Linda DeCastro's khaki pants will never be the same.

At the northern site we were treated to many *Platanthera blephariglottis*. Although a little past prime, they indicated the importance of this site. The cedar cove was full of the largest *P. clavellata* most of us had ever seen. They were eight inches tall and bore ten to twelve flowers of considerable size. The prize, however, was one *P. ×canbyi*. Although it started the day with only two flowers and ended with one; it was still a first for most people and the characteristic triangular nectary opening was evident.

The southern site is an anomaly. Barely an acre in size, it contains the only known population of *P. integra* found north of the Carolinas. There was a small population nearby but, since it's on private property, it is not accessible and may no longer exist. We were treated to several plants in full flower (they were extremely photogenic) and saw many more just coming into bloom. We roped off areas known to contain some of the 200 plus plants in order to prevent compaction of dormant or newly emerging plants. Thanks go to all who respected that protective measure while taking their photographs. (In 2009, I counted 120 plants blooming simultaneously; what a spectacular sight... see *Orchids* Vol. 79 No. 10, October 2010).

Many folks took advantage of a nearby roadside site where 300 *Platanthera blephariglottis* put on a magnificent show. Nearby, a few *Spiranthes* were just beginning to open and those with macro capability were able to photograph these young plants. They were thought to be *S. tuberosa* but, after further post-conference investigation by your intrepid Editor, they turned out to be *S. lacera* var. *gracilis*. (The Pine Barrens does host *S. tuberosa* which bloomed at a site a few miles away during the week of August 15.)

So... what do you call grown men and women who crawl around on their bellies through bug infested swamps to photograph tiny little flowers... weird,

scary, out of control??? *Native orchid fanatics... that's what!!! We wouldn't have it any other way.*

Tuesday found us in Pennsylvania, home of the Nittany Lions, funnel cakes and shoo-fly pie. In the morning, half the group headed to Millersburg and the other half to Hazleton. In the afternoon they switched locations, stopping at a roadside orchid site along the 90 minute route between the two towns.

Hazleton is home to a now well-known site containing a most unusual hybrid swarm of *Platanthera ×bicolor* (see *Native Orchid Conference Journal* Volume 8(1) Jan-Feb-Mar 2011). The site is in the middle of an industrial park and was the subject of a brief presentation at the conference. The NOC played an active role in ongoing efforts to preserve this remnant bog.

We were treated to large numbers of *Platanthera blephariglottis* (many in perfect condition) as well as *P. ciliaris* and their much sought after hybrids. This site contains many color expressions of *P. ×bicolor*, not all of which appear every year. We were able to photograph many specimens which showed widely fluctuating combinations of orange, white and yellow.

The bog and surrounding uplands are also home to *Liparis liliifolia*, *L. loeselii*, *Cyp. acaule*, *Spiranthes cernua* and a large population of *Calopogon tuberosus* which surprised us with a few blooms still open at this late date. Those who acknowledge that there are plants other than orchids were pleased to see narrow-leaved gentian (*Gentiana linearis*) and climbing fern (*Lygodium palmatum*).

Report 2

Mark Larocque

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Millersburg, PA (north of Harrisburg and along the Susquehanna River) is home to Cumming's Swamp where a population of *Platanthera peramoena* has been known for over 25 years. The swamp itself is owned and managed by the Pennsylvania Game Commission. Back in 1991, I first saw this plant along the gravel access road along the swamp edge. Only a few scattered plants were generally known at that time. A few local botanists were further exploring the swamp from the adjacent corn field and discovered a colony of around 200 plants in 1992 in a wet meadow. This wet meadow is located on the southwest corner of the swamp, between the swamp and the corn field. The meadow is

only about 50-60 feet wide and about 300-400 feet long. The meadow is dominated by New York Ironweed (*Vernonia noveboracensis*) and Swamp Milkweed (*Asclepias incarnata*). In recent years the meadow has been invaded by several alien weeds. The population of the orchid in the meadow varies year-to-year. There are usually 20+ plants in any given year. Back in 2007, the population spiked to 200 plants again. During this year's field trip we counted 30-40 plants most of which were in the far southern edge of the meadow where they had not been seen for at least three years. This meadow site is on private property and is at risk every year due to the land owner's farming practices. The corn plant encroaches on the meadow every year a little bit further. During the field trip, Mr. Scott Bills of the Pennsylvania Game Commission arrived at the site to look at the orchids. I spoke with Mr. Bills about the farming practices. Mr. Bills knows the land owner well and was going to talk to him about protecting the meadow area.

A second orchid site was along Route 325 near Halifax, PA. This site is also owned by the PA Game Commission and is a roadside location for *Platanthera ciliaris*, *P. clavellata* and *Goodyera pubescens*. The groups were sent on their own to this site due to time constraints. The groups were rewarded with 20+ plants of *P. ciliaris*, several *P. clavellata*, and a few *G. pubescens*. As luck would have it, several members of the group were at the site when a herbicide spraying truck from the state DOT was working its way toward the orchids. Several members were able to persuade the spray crew to leave the orchid area alone. This is a constant issue up at this site. Every year the orchids endure a dose of herbicide. So far it has not killed off the plants.

On Sunday 7-31-11, after the conference talks, a group of 10-15 people met at Nottingham County Park in southern Chester County, PA. The area is a serpentine barren. In one of the mowed fields near the picnic areas we found 30+ plants of *Spiranthes lacera* var. *gracilis*. Additionally, there were several green milkweeds (*Asclepias viridiflora*) also in bloom. Some folks also went to Iron Hill County Park in Newark, DE to see crane-fly orchids (*Tipularia discolor*). The Iron Hill Park is a wooded park dominated by Oaks. The crane-fly orchids flower in late July into early August there. They are challenging to photograph as they always are in shaded areas and the flowers point downward. Pictures of some of the species seen are on page 11 (lower) and 12.

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Cypripedium montanum in the East?

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Cypripedium montanum Dougl. ex Lindl. is a beautiful and well-known plant confined to the cordilleran region of southwestern Canada and the northwestern United States. Similar to *C. parviflorum* Salisb. in general habit, it has traditionally been distinguished from that species by a striking white lip. The lip is further set-off by disproportionately long, slender sepals and petals uniformly suffused with a dark cinnamon or madder color (Figure 1; page 13). This coloring is shared with *C. parviflorum* var. *makasin* (Farwell) Sheviak; in the other varieties of *C. parviflorum* the dark color is confined to spots or blotches on a pale greenish or tan background. The obvious color differences between the species facilitate determination, and historically little attention was paid to morphological differences. Until recently, this oversight helped to obscure the presence of the natural hybrid *C. ×columbianum* Sheviak and led Correll to propose lumping *C. montanum* with his *C. calceolus* L. var. *pubescens* (Willd.) Correll, citing Midwestern *C. ×andrewsii* A.M. Fuller and *C. ×favillianum* J.T. Curtis as intermediate links between eastern yellow lipped and western white lipped components of a single “polymorphic” taxon (Correll 1938).

In an investigation of hybridization in the Northwest, I found that *C. montanum* was in fact morphologically well-defined and distinct from *C. parviflorum*, and that this was sufficient to permit discrimination of the species and hybrids without regard to color (Sheviak 1992). This was rather surprising, given the great variability of the yellow-lipped species. With the addition of color as a character and variation in color and morphology in individual plants from year to year, a convincing case was made for the occurrence of gene flow in the region. It appeared that *C. ×columbianum* was a product of current hybridization, largely in response to the abundance of anthropogenic habitat and a mingling of the parental species due to various habitat modifications. Additionally, however, I suggested that much of the variation in *C. parviflorum* in the Northwest might be due to more ancient gene flow resulting from the vast alteration of landscapes and habitats following the end of the Pleistocene. Further investigation eventually led to the recognition of *C. parviflorum* var. *exiliens* Sheviak (Sheviak 2010) as comprising a portion,

but not all, of the variation in that region. I have earlier summarized the infraspecific variation of *C. parviflorum* and its known hybrids (Sheviak 1994, 1995, 2002, 2010) and will not repeat it here. But as I have discussed earlier, the formally recognized varieties and hybrids still do not accommodate all the evident variation in the species. Here I want to introduce a novel situation that to my knowledge has otherwise escaped notice.

The New York shore of Lake Champlain is in some areas dominated by sheer cliffs and palisades of limestone and dolostone crowned by open, rocky forests of mixed hardwoods and conifers. One such area south of Plattsburgh supports a sparse, stunted forest of *Acer saccharum*, *Ostrya virginiana*, *Tsuga canadensis*, *Pinus strobus*, and *Thuja occidentalis*. An abundance of *Trillium grandiflorum* further attests to the calcareous nature of the site. In 1981 I was exploring the area, investigating a large population of *C. parviflorum* var. *pubescens* (Willd.) Knight. The plants at this site were typical of the variety, with large flowers with massive lips laterally compressed and rather angular in outline, dorsi-ventrally compressed and slipper-shaped, or more globose. Sepals and petals varied from rather short, broad and flat or with one to a few twists, to long, slender, and extensively twisted and undulating. Their coloring varied from sparsely to heavily spotted and blotched with dark mahogany or madder on a pale background. Fragrances varied from musty or sweet-pungent to rose-scented. These plants occurred in abundance throughout the open, rocky forest, but mostly some distance back from the edge of the cliff. There was nothing in particular about the population to suggest anything out of the ordinary.

At one point in an open grove of gnarled *Thuja* within a few meters of the cliff's rim, I found several plants disjunct from the rest of the population. One of these was a typical plant of var. *pubescens*. The others were uniformly smaller-lipped, with distinct morphology and coloring and wholly unlike the rest of the plants in the area, or, for that matter, any *C. parviflorum* that I had seen anywhere else. Lips were markedly smaller than in the local var. *pubescens*, but not so small as in many var. *makasin*. It was not merely the lip size, however, that was distinctive. Rather, these plants were remarkable in the uniform mahogany color of their long, slender sepals and petals (Figures 2 & 3; pages 13-14). Curiously, too, in many cases the petals deflexed abruptly downward from a nearly horizontal position, rather like forearms hanging limply from the elbows (Figure 4; page 14). Together with sometimes rather pale lips and two flowers per stem, a particularly long internode beneath the lower flower imparted a distinctive aspect to the plant. Clearly, these plants

Note that the editors of *Flora of North America* (Sheviak 2002), without consultation, erroneously changed the parentage of *C. ×andrewsii* nothovar. *landonii* (Garay) Boivin; the actual parents are *C. parviflorum* var. *makasin* × *C. ×andrewsii* nothovar. *×favillanum*.

were not merely unusual variants of the large, diverse population of var. *pubescens* in the vicinity.

The local population of var. *pubescens* was only part of a much larger metapopulation, and adjacent Valcour Island supported still more plants. Nonetheless, despite a considerable range of variation across the area, none of the obvious plants of var. *pubescens* approached the unusual plants at the cliff top. The latter were themselves somewhat variable in the size and shape of the lip, but the unique aspect held throughout. Immediately upon seeing them I was struck by the similarity of some to *C. montanum*; if they had been encountered in the West, were it not for their yellow lips, they would have been readily included in that species. These plants were accordingly too remarkable to ignore, and one was collected for study in cultivation. The following year, it bloomed together with *C. montanum* from Oregon, and the similarity was striking. At this point I had little experience with *C. montanum*, however. It was only with my investigation of hybridization of this species that I came to realize just how remarkable these cliff top plants were.

As part of my work on the problem in the Northwest, I measured 26 characters in each of 135 specimens from the region. The specimens were subjectively assigned to groups based on an assessment of morphology, color, and fragrance. This was a continuation of a much broader effort that included specimens from across the range of *C. parviflorum* and other related species in North America and Eurasia. The data were subjected to discriminant function analysis (Sheviak, 1992). This procedure minimizes differences within previously assigned groups while simultaneously maximizing the differences between groups. Each specimen is also classified independently of its assigned group and the classifications compared. As reported in the original paper, *C. montanum* was morphologically distinct from all assigned yellow-lipped groups and the evident hybrids. The hybrids clustered in an intermediate position (Figure 5; page 20). In an initial analysis, however, a single yellow-lipped plant was found to be “misclassified,” *i.e.*, statistical analysis showed it to be morphologically referable to *C. montanum*. When I checked the identity of the unique individual, I discovered that I had inadvertently included an eastern specimen in the database; I had intended to limit the analysis to western material. The errant specimen was one of the Plattsburgh oddities, and it proved to be referable to *C. montanum* when compared to a large range of western plants including a great diversity of yellow-lipped plants and hybrids. This plant really did look like *C. montanum*!

How should this be interpreted? What significance, if any, might it have? The uniform suffusion of dark coloring in the sepals and petals suggests *C. parviflorum* var. *makasin* and *C. montanum*. Its most likely origin would be through hybridization of either of these with the local var. *pubescens*. Given

(Continued on page 20)

Figures to accompany “2011 Conference: Reports from the Field Trips — Report 1” by Bob Sprague, page 2. Images by Bob Sprague and are representative of the orchids seen.

Platanthera cristata, *P. xcanbyi* (a natural hybrid of these two species) and *P. blephariglottis*



*Platanthera
integra*

*Platanthera
clavellata*



Platanthera \times *bicolor*,
a natural hybrid of *P. blephariglottis* and *P. ciliaris*



Tipularia discolor
(Insert: Mark Larocque.)



Figures to accompany “2011 Conference: Reports from the Field Trips — Report 2” by Mark Larocque, page 5. Images by Mark Larocque.



Goodyera pubescens



Spiranthes lacera var. *gracilis*

Platanthera peramoena



Platanthera ciliaris





Figures to accompany “*Cypripedium montanum* in the East?” by Charles Sheviak, page 7.

Figure 1. *Cypripedium montanum*, in the vicinity of Radium Hot Springs, British Columbia (Sheviak, Sheviak, & Metzloff 3100 [NYS]).



Figure 2 . *Cypripedium parviflorum*, south of Plattsburgh, New York. Sheviak 2001a [NYS].



Figure 3. Left: *Cypripedium montanum*, in the vicinity of Radium Hot Springs, British Columbia *Sheviak*, *Sheviak*, and *Metzloff 3105* [NYS]; Right: *Cypripedium parviflorum*, south of Plattsburgh, New York. *Sheviak 2001a* [NYS].

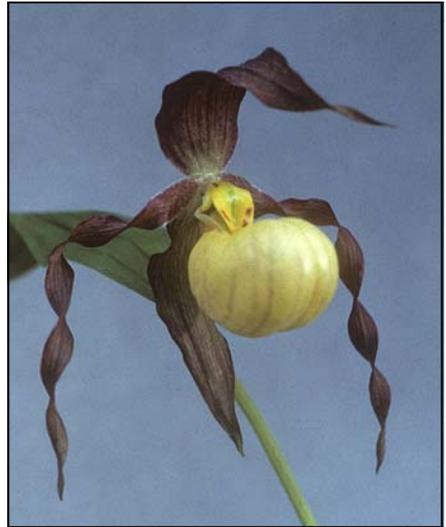


Figure 4. One of the unusual *C. parviflorum* from the Plattsburgh colony. In this plant the lip is larger than others, but smaller and a paler yellow than in the typical var. *pubescens* at the site. Note the coloring of the sepals and petals and their peculiar deflection downward. *Sheviak 5086* [NYS].



Figure 6. *Cypripedium parviflorum*. One of several plants with small, pale lips and dark sepals and petals in a large colony of otherwise typical var. *pubescens*. Vicinity of Pike Bay, Bruce Peninsula, Ontario. 17 June 2003. Photo by the author.

Figures to accompany
“Three-birds Orchid
(*Triphora trianthophora*
subsp. *trianthophora*) in the
Pisgah National Forest, Near
Brevard, North Carolina” by
Jim Fowler, page 23.



Figure 1. Single plant of *Triphora trianthophora* subsp. *trianthophora* with three open flowers.



Figure 2. Flowers of *Triphora trianthophora* subsp. *trianthophora* with pinkish purple petals.



Figure 3. White flowered three-birds orchid



Figure 4. Three-birds orchid in full bud



Figure 5. Small group of pink-tinted flowers of *Triphora trianthophora* subsp. *trianthophora*



Figure 6. Flower of *Triphora trianthophora* subsp. *trianthophora* with unopened bud



Figure 7. Small group of a dozen white-flowered plants



Figure 8. Flower with pollen-laden Halictid bee



Figure 9. Dehiscent seed capsules

Figures to accompany Mark Larocque's article, "Rocky Mountain High," page 27. Images by Mark Larocque.



Coeloglossum viride



Corallorhiza maculata



Platanthera purpurascens



Platanthera dilatata.



Spiranthes diluvialis.



Spiranthes romanzoffiana



Colorado

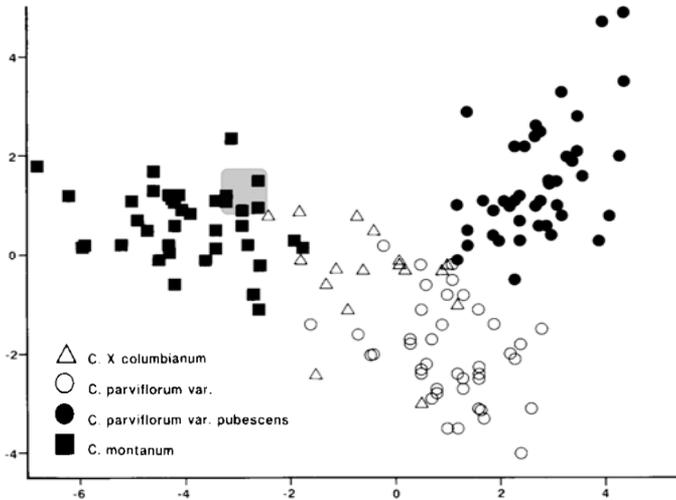


Figure 5. Scatterplot of 135 western specimens included in the discriminant function analysis slightly modified from the original publication (Sheviak, 1992). The open circles are now understood to include a mixture of small-flowered *C. parviflorum* including introgressed plants of the species, var. *exiliens*, and a few plants perhaps referable to var. *makasin*. The gray area indicates the approximate position of a Lake Champlain specimen (Sheviak 2001a) that was not included in the analysis that generated this plot. Although not a legitimate statistical procedure, extrapolation from other analyses that included it suggests its potential position for illustration purposes.

(Continued from page 9)

the northeastern location, only var. *makasin* seems a reasonable option. Although var. *makasin* is not known in the vicinity and the immediate area lacks suitable habitat, at present it does occur within a few kilometers, and it may have been more closely associated before much of the surrounding area was extensively developed. If, in a hybrid, the lip size were reduced but the lengths of the sepals and petals were maintained as in var. *pubescens*, perhaps something like the Plattsburgh plants could result. The tendency of var. *makasin* to produce two flowers per stem might also reasonably be expressed. Indeed, the small group of plants at the cliff rim was not uniform, and some intermediacy toward var. *pubescens* was evident. If these plants resulted from such parentage, however, it seems odd that such plants are not generally present where the two varieties occur together. In the rare cases where I have seen what appears to be extensive hybridization, nothing approaching the Plattsburgh plants was seen. Above all, it seems remarkable that such hybridization would yield plants so perfectly representative of *C. montanum* that they were statistically referable to that species and excluded from a diverse range of its hybrids and yellow-lipped plants in a region of *C. montanum* influence. Is there another possible origin?

I have earlier pointed out that *C. montanum* and *C. parviflorum* var. *makasin* share not only coloring of sepals and petals but also fragrance. The pattern of variation in the Northwest and the abundance there of very similar small-flowered plants including var. *exiliens* led me to propose earlier (Sheviak 1992) that var. *makasin* might have arisen through hybridization of *C. montanum* and *C. parviflorum*, such as was now evident in the Northwest. Its particularly distinctive form and coloring might have been selected as the variety ranged eastward. Such a scenario is suggested by the rare occurrence of plants apparently identical to eastern var. *makasin* in the Northwest, where the similar var. *exiliens* and other variable small-flowered plants lack the dark sepals and petals. This might suggest that suitable genetic stock was present in the West and could have served as a source for an eastward expansion. If var. *makasin* does include a genetic component from *C. montanum*, it seems just barely possible that under some circumstances it might lead to the expression of a greater suite of characteristics of that species and, hence, plants like those at Plattsburgh. Perhaps hybridization with var. *pubescens* in some manner led to such an expression of *C. montanum* characteristics. Frankly, this smacks of hocus pocus, and the evident extreme rarity of such an occurrence seems at odds with an origin in hybridization between two wide-ranging and largely sympatric varieties. Again, is there another option?

One of the notable floristic features of the Great Lakes-St. Lawrence region is the occurrence there of cordilleran species widely disjunct from their principal ranges in the West. Such species as *Piperia unalascensis*, *Goodyera oblongifolia*, *Corallorhiza striata*, *Zigadenus elegans*, *Aconitum columbianum*, *Iliamna rivularis*, *Tetraneuris herbacea* and others are sporadically distributed across the region, usually in open limestone habitat. These species are thought to remain as relicts of a more extensive periglacial flora that colonized the barren, rocky rubble left as the Pleistocene glaciers retreated. The raw landscape that dominated at that time bore considerable similarity to the rocky montane habitats of the species today. As the eastern deciduous forests replaced the boreal conifers, however, the western species lost the open habitat to which they were adapted, and they largely disappeared in the East. Only in a few areas kept open by their extreme calcareous nature and lack of soil development were a few of these plants able to persist. Perhaps one species that was originally present but that was completely displaced was *C. montanum*. Perhaps it persisted the longest in such rocky limestone areas. Perhaps in some it hybridized with *C. parviflorum* as it does today in the Northwest. Perhaps the plants at Plattsburgh were one product of such hybridization.

This last hypothesis, although it depends on the unknown past presence of *C. montanum*, is actually the simplest. It provides the most direct infusion of *C. montanum* genes into the local gene pool, and thus most reasonably could account for the precise expression of that species' morphology in the Plattsburgh population. It is also based on a well-known phenomenon, the occur-

rence of cordilleran species in the local flora. Other populations, too, supply some supporting evidence. I received a report of what may be a similar plant on the Vermont side of the lake, and a photograph from a limestone area near Syracuse in central New York is similarly suggestive. Additionally, plants with small, creamy lips and dark sepals and petals are frequent within sizable populations of var. *pubescens* on the Bruce Peninsula in Lake Huron (Figure 6; page 16). Traditionally these would be interpreted as products of introgression from *C. candidum*, a species not known to have occurred on the Peninsula (Whiting and Catling 1986). Of course, the species might have occurred there in the more distant past, but if it were a parent, how would one account for the dark sepals and petals? Commonly with two flowers on a stem, perhaps these plants are actually expressing genes of *C. montanum*.

This sort of speculation is intriguing, and it poses interesting questions and avenues for investigation of the evolutionary origin of the variation in *C. parviflorum* and the very nature of the species. Unfortunately, my discovery of the Plattsburgh plants preceded the development of DNA sequencing technology, which clearly could provide a means of exploring these questions. Unfortunately, too, the site south of Plattsburg was developed in recent years and from what I have been told, it appears that the plants have been destroyed. The broader Lake Champlain shore and islands continue to support *C. parviflorum* var. *pubescens*, however, and perhaps more intensive field work would uncover additional plants of this nature. It might be fruitful to focus on particularly exposed situations such as the rims of cliffs and open ledges. If genes of *C. montanum* are indeed being expressed in such plants, they might appear under conditions that suggest a western montane environment.

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Three-birds Orchid (*Triphora trianthophora* subsp. *trianthophora*) in the Pisgah National Forest, Near Brevard, North Carolina

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Three-birds orchid (*Triphora trianthophora* subsp. *trianthophora*) is an uncommon terrestrial orchid of rich deciduous forests. Its common name, three-birds orchid, arises from the habit of the plant to produce as many as three open flowers on a stem (Figure 1; page 15). Actually, the Greek epithet, *trianthophora*, means “three-flower-bearing.”

The height of the plant ranges from about two inches (5 cm) to eight inches (20 cm). There may be a total of as many as six or seven flowers on a single stem, with all of the flowers being found at the termination of the stem. Not all of the flowers on a particular plant will open at the same time. The color of the tiny (less than 2 cm wide) flowers ranges from a blushing, pinkish purple (Figure 2; page 16) to pure white (Figure 3; page 16), and each flower’s lip shows three closely spaced green ridges down the center. A pure white form of the plant (forma *albidoflava*) is occasionally found. This form is distinguished by bright yellow rather than green ridges down the center of the lip. The stem is some shade of green or greenish purple, and the tiny (8-15 mm), rounded, clasping, heart-shaped leaves are usually yellow green.

Three-birds orchid is geographically confined to North America, north of Mexico. It has been reported from each of the states east of the Mississippi River as well as Nebraska, Kansas, Oklahoma, Texas, and Ontario, Canada. This species probably occurs in numbers much larger than have been reported, but it easily goes unnoticed except when in bloom.

Like many other North American terrestrial orchid species, it may “rest” underground for years (for reasons we still do not understand) before reappearing. It is ranked as scarce-to-rare in many states, but when it is found, it is considered locally abundant. Predicting a bloom date is problematic, as will be detailed below.

In the Pisgah National Forest, near Brevard, North Carolina, it is found growing in open woods, frequently beneath tulip poplar (*Liriodendron tulipifera*), white pine (*Pinus strobus*), rosebay rhododendron (*Rhododendron maximum*), mountain laurel (*Kalmia latifolia*), and eastern hemlock (*Tsuga canadensis*).

While it seems to prefer the level flood plains of the Davidson River, in states farther north it can be found on rocky hill sides in predominantly American beech (*Fagus grandifolia*) forests.

At this location in the Pisgah National Forest, two other terrestrial orchid species bloom at the same time and usually can be seen in close proximity. These are downy rattlesnake plantain (*Goodyera pubescens*) and crane-fly orchid (*Tipularia discolor*). Crane-fly orchid is certainly the most common orchid species in the area.

Small plants of three-birds orchid, already showing tiny flower buds, begin to push up through the substantial, damp leaf litter around mid-July. Within three to four weeks (early to mid-August), they will begin blooming. As mentioned previously, the bloom time is not easy to predict.

When I saw three-birds orchid in the Pisgah National Forest for the first time, the flower buds were white, plump, and apparently ready to open the next day (Figure 4; page 16). I was excited, since I had not photographed three-birds orchid at this location. I ended up having to return to that same location each day for a full week before I was able to see open flowers. That was no small task, since it was a two-hour trip, and I was “forced” to take time away from work to accomplish this labor of love.

I admit that I did not discover this location. It was found separately, in successive years, by a couple of different orchid-loving friends who happened to be there the very day that the flowers were open. After having explained to them that they were just lucky to see the flowers blooming, they were incredulous. Later, they would discover what I and most other orchid hunters had already experienced with this mysterious plant. More often than not, one sees plants with withered flowers from the previous day’s bloom, or with plump buds that are yet to open, or with seed capsules that indicate a previous bloom of six or seven days earlier.

After much discussion with others who have studied three-birds orchids, I have determined an almost fool-proof method to predict when it will be in bloom. For my study area in the Pisgah National Forest, it turns out to be:

The flowers will begin to open forty-eight hours after the end of a two-day, consecutive drop in morning low temperatures of at least seven °F.

Here is an example to illustrate my point: Low temperature on Tuesday morning is 64.5 °F. Low temperature on Wednesday morning is 58.1 °F. Low temperature on Thursday morning is 54.7 °F. That’s a total drop of 9.8 °F over two

consecutive days. My experience would predict that the flowers will be open in forty-eight hours – on Saturday morning.

Fortunately, near the three-birds orchid site, there is an amateur weather station that transmits real-time weather data to the Internet:

<http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KNCPISGA2>

This web site permits me to quickly download and plot daily low temperature data. My prediction method is not completely fool-proof, but it certainly has saved me much time and mileage in being able to confidently plan my three-birds orchid photography trips for the past couple of years.

On the day of blooming, the drooping flower buds slowly rise. The flowers begin to open a few hours before noon and then proceed to close around 5:00 pm the same day. These short-lived flowers will be open for just a single day (rarely two days if the temperature remains cool), but one interesting feature of this orchid is that many of the flowers on plants in the same location will open simultaneously (Figure 5; page 16). It is even said that this synchronized “wave” of flower bloom can be observed throughout an entire regional area covering many square miles.

While some flowers are blooming, others are still in bud (Figure 6; page 17). Once the initial bloom wave has finished, it may be days or even weeks before another bloom wave occurs. In a single season, I have observed three significant bloom waves on my study plot, with an additional one or two successive minor bloom waves finishing the season. In the Pisgah National Forest, the second bloom wave generally represents the largest total number of open flowers.

Three-birds orchids in the Pisgah National Forest are found as single plants as well as loose groups with up to as many as a dozen plants (Figure 7; page 17). I have seen photographs of three-birds orchids from states farther north (New Hampshire, Massachusetts, and Wisconsin), which occur in dense groups of as many as seventy-five to one hundred plants. I have yet to find similarly dense groups in my study area.

Recently, it has been posited that the three-birds orchid might be a self-pollinating species. That would explain my observation of almost every flower producing a plump seed capsule. However, I have photographed a species of *Halictid* bee (possibly *Augochlora pura*) entering the flowers (Figure 8; page 17) shortly after they began to open. After it emerged from its brief but feverish task, it was observed to have a magenta-colored packet of pollen firmly stuck to its thorax. I followed the bee from flower to flower, and it

appeared not to miss a single one. Although I have seen only this one instance of a bee exhibiting possible pollination activity in the several years I've been studying these orchids, in my mind it is possible that the three-birds orchids in the Pisgah National Forest depend (at least in part) on insects for pollination.

In early September, the downward-hanging seed capsules begin to point skyward as they ripen. By mid-October, the capsules have dehisced (Figure 9; page 17), releasing their seed to an unknown fate. By December, there is usually no visible evidence that the beautiful three-birds orchids were ever there.

During winter, spring, and early summer, the plant's root system rests underground, relying on its fungal associate to provide nutrition. If we are both lucky and persistent, we will be dazzled once again in late summer with the beauty of its dainty, three-bird flowers.

Pisgah National Forest, North Carolina

The Pisgah National Forest, located in western North Carolina, is situated in the ruggedly beautiful Appalachian Mountains. It is sometimes called the "Land of Waterfalls" because of the hundreds of spectacular waterfalls contained within its boundary. The forest consists of more than 500,000 acres of rich, deciduous, oak-hickory woods as well as large stands of Fraser fir, red spruce, eastern hemlock, and white pine.

Of the four ranger districts contained within the national forest boundary, Pisgah Ranger District is probably the most accessible for recreational hiking, camping, and fishing. It is dominated by one of the tallest peaks in the eastern United States – 6,410-foot (1,954 m) Richland Balsam Mountain. The main entrance to the District is situated just north of the mountain town of Brevard, North Carolina – home of Brevard College.

One little known area within the Pisgah National Forest that especially appeals to orchid enthusiasts is a place aptly named "Pink Beds." In the past, dragon's mouth orchid (*Arethusa bulbosa*) was found growing in the mountain bogs. Recently, it has eluded even the most diligent orchid hunter, but another rare, pink-flowering plant is found in substantial numbers – swamp pink (*Helonias bullata*).

Near the Davidson River, which runs through the center of the most popular recreational area, one can find a host of colorful wildflowers in season. These include a number of orchid species: Three-birds orchid (*Triphora trianthophora* subsp. *trianthophora*), downy rattlesnake plantain (*Goodyera pubescens*), crane-fly orchid (*Tipularia discolor*), showy orchis (*Galearis spectabilis*), small whorled pogonia (*Isotria medeoloides*), yellow fringed orchid

(*Platanthera ciliaris*), rose pogonia (*Pogonia ophioglossoides*), small pink lady's-slipper orchid (*Cypripedium acaule*), large yellow lady's-slipper orchid (*Cypripedium parviflorum* var. *pubescens*), autumn coralroot (*Corallorhiza odontorhiza* var. *odontorhiza*), and mountain small spreading pogonia (*Cleistesiopsis bifaria*), to name a few.

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Rocky Mountain High

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In 2010 I had to cancel a trip to the West Coast and Colorado for personal reasons that would have netted me 3-4 more orchid species off my list. In June 2011, one of my work clients contacted me about a project along the Clear Creek Canyon up near Golden, Colorado. So I planned my work trip to coincide with some orchid hunting. Two Colorado species were still on my list of 16 remaining for the US and Canada to photograph. They are *Platanthera purpurascens* and *Spiranthes diluvialis*. With some directions provided by Bill Jennings, a local orchid person in Boulder, Colorado, I was able to locate these species and get the bloom timing to coincide with my work trip.

Spiranthes diluvialis is a recently described species that was broken off from *S. magnicamporum* and *S. cernua*. In the field, the flowers do resemble both of these species to some extent and also slightly resembles *S. romanzoffiana*. The plants are approximately 6-10 inches tall and the flowers have a creamy yellow cast throughout. The lateral sepals are spread outward similar to *S. vernalis* and the petals are held up over the lip and form a hood similar to *S. romanzoffiana* in some of the flowers and like *S. magnicamporum* in others.

On July 24, I took the directions from Bill Jennings to visit the type locality at Clear Creek Canyon for *Spiranthes diluvialis* as described by Charles Sheviak. Bill had visited the site along with several of the Boulder sites earlier in the week but had found only a few plants in bud still. I was not too hopeful to find any blooming plants, but since my work project was in Clear Creek Canyon, I had to at least see the plants and retrace Charles Sheviak's footsteps. The site is located along Clear Creek right underneath an overpass of Route 6 in Golden,

CO. The plants occur in a wet ditch that likely floods during high water. Unfortunately, the area is used by homeless and is strewn with trash. When I arrived, I immediately found 5 plants in an open sunny section of the ditch and another 10 plants in a more brushy section of the ditch. I was also surprised to see several of the plants had their lower flowers open. As I always say, it only takes one flower for photographs. See plant photos on pages 18-19.

I finished up my photos of the *Spiranthes* and decided to go up to Eudora, CO to get photos of the *Platanthera purpurascens* which was still on my list. Following Bill's directions I headed up toward Eudora and a gravel road called Fourth of July Trail. The going was slow as there were numerous cars parked alongside the gravel road that restricted traffic to one car width. This forced cars to back up or pull off the road to let other cars that were coming in the opposite direction to pass. Just west of the small town, I pulled off to check on a roadside site for *S. romanzoffiana*. I found several plants but in bud only (I did find blooming plants of this species up in Clear Creek Canyon up near Black Hawk on that Monday while at work). I proceeded to the pull-off further up the road where a small stream crosses under the road via a culvert. I was quickly able to see *Platantheras*, but they were all *P. dilatata* and a hybrid species, no *P. purpurascens*. I did find a nice blooming plant of *Corallorhiza maculata*. Bill had provided additional directions further up the trail within walking distance so I trekked out on foot. At the next drainage crossing along the road I poked in and found *Coeloglossum viride* var. *virescens* still in bloom, but no *Platanthera*. So I continued up to the next drainage crossing. The area was much wetter and had *P. dilatata* along the road, so I walked upstream along the drainage about 200 feet and found an area loaded with *P. dilatata*, *P. huronensis*, *Coeloglossum viride* var. *virescens* and also *P. purpurascens*. The *P. purpurascens* flowers resemble *P. stricta*. The sepals on this species with the petals form a hood over the lip.

The area was well worth the extra drive. Wild flowers were also in full bloom. I noted *Calochortus* lilies, white and red Indian paint brushes, bell flowers, monkshoods and a variety of others.

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native orchid locations?**

Many upscale cameras and smart phones like the Apple iPhone embed GPS coordinates in the picture's file. When these pictures are posted on the web, others can decipher the information, head to the location, view the orchid, and....

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