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THE NATIVE ORCHID CONFERENCE JOURNAL

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Message from the President:

This past year the orchid community lost a cherished member, and friend to many. Ron Coleman was a huge part of the Native Orchid Conference. We wanted to put together something special in his memory. This issue of the journal is dedicated to Ron.

Some back story. The lengthy three-part article on *Cypripediums* included here was originally published in the 2018 Native Orchid Conference Journal, split into two parts: Volume 15(1), and Volume 15(2). At that time, the NOC Journal was only printed in paper form. Ron wanted to publish the complete article in one issue, but it was too long for a single issue, so it was divided into two parts. Unfortunately, a number of typographical issues crept into the article when split over two volumes, something that Ron felt very strongly should be corrected. He revised his article, split it into three parts, and it was subsequently published in the *Orchids* magazine by the American Orchid Society (2018). Ron wanted the members of the Native Orchid Conference to read the entire article, so with the kind permission of the American Orchid Society, we have reprinted here in the Native Orchid Conference Journal, with minor changes to some of the photographs and text. We hope you enjoy it.

A later article in this includes a listing of the books and articles Ron Coleman wrote for various orchid organizations over the years. If you did not know him, a read through of the titles of his many years of contributions reveals his scholarly ability, photographic skill, and extreme dedication and passion for all orchids in general, and native orchids in particular.

We hope you enjoy this issue and that you think of Ron on your native orchid adventures... wherever they may be. He would approve.

Ben Rostron
Edmonton, Alberta,
January, 2020.



Scouting for orchids in Arizona, May 2016. Ron pictured with *Hexalectris colemanii*, a coralroot orchid named after him. Photo by Ben Rostron.

IN MEMORY OF
RONALD ALBERT COLEMAN
1946 (29 JUNE)- 2019 (25 JULY)



Ron and Jan Coleman at Looking Glass Falls in the Pisgah National Forest, North Carolina during the NOC's 2012 conference in May. Photo by Marsha Kieffer

It is with great sadness that the Board of Directors of the Native Orchid Conference (NOC) inform the membership that Ron Coleman passed away on July 25, 2019 in Tucson, Arizona. Ron was 73 and had suffered from a series of serious illnesses in the past couple of years. Ron was one of the 20 or so charter members of the Native Orchid Conference and was a major advocate and contributor to our group over the years, including writing numerous articles in past Native Orchid Conference Journals, participating in the NOC board in the early years, and organizing/steering two NOC symposiums: California in 2013 and in Arizona in 2016. Ron was also the author of two orchid books: *Wild Orchids of California* and *Wild Orchids of Arizona and New Mexico*. Coleman's Rein Orchid, *Piperia (Platanthera) colemanii*, an endemic orchid of California found mostly in the Sierra Nevada was named after him, along with Coleman's Coralroot, *Hexalectris colemanii*, an orchid that is endemic to three counties in southern Arizona. Ron was passionate and very knowledgeable of native orchids and a champion of NOC. He was always friendly, generous with his information and enjoyed sharing his interests with others. We will miss him.

-Board of Directors, Native Orchid Conference

THE *CYPRIPEDIUMS* OF THE UNITED STATES AND CANADA

Text and Photos by Ron Coleman, unless noted otherwise

I have been hunting the wild orchid for over 45 years. Although orchid hunters in the Southwest see mostly little green things, the genus *Cypripedium* has been especially intriguing. Starting with *Cypripedium montanum* in Yosemite National Park in the early 1970s, I sought our lady's-slippers in much of the United States and Canada. The 2017 Native Orchid Conference meeting near Winnipeg, Manitoba, provided the opportunity to finally see and photograph *Cypripedium candidum*, a species that had eluded me for many years. After returning from the conference, I realized the experiences and photographs from decades hunting *Cypripedium* were worth sharing. This overview of the *Cypripedium* of the United States and Canada is a compendium of my field experiences with the flowers, and data from many hours poring over herbarium specimens.

The orchid subfamily Cypridioideae contains five genera of slipper orchids. *Paphiopedilum* and *Phragmipedium* are well known to hobbyist orchid growers. Two of the others, *Selenipedium* and *Mexipedium*, are lesser-known New World genera. The fifth genus, *Cypripedium* Linnaeus, contains about 50 species (Pridgeon, et al. 1997) of mostly Northern Hemisphere taxa, including four members of what Cribb (1997) calls Section *Irapeana*, which grow in Mexico and Central America. This paper focuses on the 12 species of *Cypripedium* native to the United States and Canada.

Cypripediums are deciduous from perennial rhizomes. Our plants vary in height, and in number and position of leaves. For our 12 species, blooming plants range from less than 1 ¼ inches to over 51 inches (3–130 cm) tall. The number of leaves varies from two to 10 or more. The leaves are sometimes basal, sometimes midstem and opposite, but more often alternating or subopposite along the stem. The flowers are distinguished by a lip presented as a slipper-shaped pouch that aids in pollination. The pouch is the largest and usually most colorful part of the flower. The pouch does not contain any food for the pollinator, but produces an often-pleasant aroma to induce an insect to enter in search of food. As with other orchids the pistil and stamens are fused into a single structure called the column. Cypripediums have two fertile stamens, one on each side of the column. A third, but sterile, stamen called the staminode is prominent above the pouch opening with a color that often contrasts with the pouch, lip and petals. Except for *Cypripedium arietinum* the two lateral sepals merge into a structure called the synsepal, which lies behind the pouch below the dorsal sepal. On several species the synsepal has a bifurcate apex which hints at its origin from two sepals. Our Cypripediums are widely distributed in the United States and Canada. Subsequent references to *Cypripedium* refer to our 12 species, and not the genus as a whole.

Plant and flower descriptions below, unless otherwise noted, document my field observations and herbarium research. The nomenclature and synonymy for most taxa are from the referenced literature. Details of distributions rely significantly on Sheviak (2002) and the North American Orchid Conservation Center (2017). Common names have been gleaned from the publications listed in the reference section. I have not been able to see all mentioned color forms of all the species personally, but have been able to borrow images of several unusual color forms from multiple orchid photographers to complement the set for this paper. Such images are credited to the photographers.

Divided into three parts, Part I discusses the *Cypripedium parviflorum* complex which includes *C. candidum*, *C. kentuckiense*, *C. montanum*, the various forms of *C. parviflorum* and the two natural hybrids within the complex: *C. × andrewsii* and *C. × columbianum*. Part II will discuss the familiar *C. acaule*, *C. reginae*, *C. passerinum*, and the natural hybrid of *C. reginae* and *C. parviflorum* and Part III will discuss the remaining six species and one natural hybrid.

Part I: The *parviflorum* complex

***Cypripedium candidum* Muhl. ex Willd., Sp. Pl. 4: 142 (1805)**

Synonyms: *Calceolus candidus* (Muhl. ex Willd.) Nieuwl., Amer. Midl. Naturalist 3: 117 (1913).



Left: *Cypripedium candidum* with two flowers, accenting the pure white pouch, characteristic of the species, and the small notch on the forward opening. Photographed in Manitoba, Canada.

Right: *Cypripedium candidum* plant structure showing the leaves partially clasping the stem even at maturity.

The common names for *Cypripedium candidum* include the White Lady's-slipper and the Silver Slipper due to its white pouch. *Cypripedium candidum* is relatively small, with blooming plants usually under 16 inches (40 cm). Three to five leaves clasp the stem, pointing upward without fully spreading. Multiple stems from the same rhizome eventually produce clumps of blooming plants. Usually plants bear only one flower, but two flowers are not uncommon. The sepals and petals are yellowish-green with brown striping. The petals are usually twisted, but sometimes are relatively flat. The pouch is white with faint veining. The opening to the pouch is rounded except for a small acute notch at its forward edge. The yellow staminode covered with red dots provides a bright contrast to the white of the pouch. Homoya (1993) says the flowers have "a delicate fragrance."



Top: A *Cypripedium candidum* flower with more golden sepals and petals.

Bottom: Roadside habitat of *Cypripedium candidum* where mowing maintains prairie-like conditions in Manitoba, Canada.

Cypripedium candidum grows in the northeastern quarter of United States, from Kansas to New York as well as a disjunct site in Alabama. It barely extends into Canadian provinces of Manitoba, Ontario, and Saskatchewan. *Cypripedium candidum* prefers the bright light of wet prairies such as those home to *Platanthera leucophaea*, although *P. leucophaea* blooms later in the year. *Cypripedium candidum* is usually shorter than surrounding prairie plants, making it hard to see. It is sometimes found in roadside ditches where the habitat mimics that of the meadows. The ditches are often mowed regularly allowing the *C. candidum* plants to stand out a little more from their surroundings than they do in the meadows. Mowing has the added benefit of controlling larger invasive plants that could outcompete *C. candidum*. Blooming extends from April to June.

***Cypripedium kentuckiense* C.F. Reed, *Phytologia* 48: 426 (1981)**

Synonyms: *Cypripedium daultonii* nom. nud



Plants of *Cypripedium kentuckiense* showing spreading ovate leaves.

The often-seen common names for *Cypripedium kentuckiense* are Kentucky Lady's-slipper and the Ivory Lady's-slipper, in reference to the state for which it is named and the color of its pouch. It is sometimes referred to as the Southern Lady's-slipper because of its distribution. Sheviak (2002) includes the common name Purloined Slipper. *Cypripedium kentuckiense* is the largest-flowered of our lady's-slippers with a natural spread often greater than 4 $\frac{3}{4}$ inches (12 cm). Just the flower alone can be larger than some entire blooming plants of *Cypripedium fasciculatum*. Flowering plants approach more than a yard (1 m) in height. Only *Cypripedium californicum* is taller, but its flowers are smaller. Flowering plants have three to six alternate ovate leaves along the stem and most bear only one flower. The flowers look like a supersized *Cypripedium parviflorum*. However the color, size and shape of the pouch make it unique. The pouch is

ivory to pale yellow and the forward end of the pouch appears blunted. The sepals and petals are green but almost totally covered with brown to deep reddish purple (madder) stripes, or dots aligned to look like stripes. The petals usually have multiple twists. Weldy et al. (1996), determined that dorsal sepal width and the pouch's orifice length are sufficient to separate *C. kentuckiense* from *C. parviflorum* var. *pubescens*. The dorsal sepal width of *C. kentuckiense* is always greater than 1 ¼ inches (3.5 cm) and that of *C. parviflorum* var. *pubescens* is always less than 1.1 inches (2.9 cm). The orifice length of *C. kentuckiense* is always greater than 1.2 inches (3.0 cm) and that of *C. parviflorum* var. *pubescens* is always less than a ½ inch (1.3 cm). Brown (2004) reports a color form from Arkansas with pure green sepals and petals, and a white pouch. *Cypripedium kentuckiense* grows in the southern states of Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas and Virginia. Weldy et al. (1996) report that Arkansas has more plants of this species than any other state. They also discuss a population of *C. kentuckiense* from Virginia that has characteristics suggesting both *C. kentuckiense* and *C. parviflorum* but analysis confirmed that those plants were *C. kentuckiense*. It favors habitats ranging from mesic deciduous forests to seeps and stream bottoms. The blooming season is from April to June.



Left: *Cypripedium kentuckiense* with light brown sepals and petals and ivory pouch.

Center: Habitat of *Cypripedium kentuckiense* in Tennessee.

Right: *Cypripedium kentuckiense* with green sepals and petals and pale ivory pouch.

Photograph by Gary Spicer.

***Cypripedium montanum* Douglas ex Lindley,**
Genera and Species of Orchidaceous Plants 528 (1840)
Synonyms: *Cypripedium occidentale* Watson,
Proceedings American Academy of Arts and Sciences 11: 147 (1876).



The yellow staminode with red spotting on *Cypripedium montanum* provides a bright contrast to the white pouch and dark sepals and petals.

Because of its typical habitat, this species has the common name of Mountain Lady's-slipper. *Cypripedium montanum* blooms on plants ranging between 10 inches and nearly 24 inches (25–70 cm) tall. Mature plants have five or six alternating, slightly fuzzy, leaves. The plants sometimes bear three or four flowers, but most often have one or two. The largest flowers have a natural spread of approximately 4 × 4 inches (10 × 10 cm). The petals are twisted and drooping. The white pouch is veined with purple, with purple lines inside, and occasionally with a purple rim around the opening. The typical pouch measures about 0.6 × 1.2 inches (1.6 × 3.0 cm), with an opening about 0.4 × 0.5 inches (1.1 × 1.3 cm). The color of the sepals and petals varies from an intense brown to a light tan. The petals are slightly hairy near the pouch, with multiple twists. The backs of both sepals and petals are covered with fine hairs. The staminode is bright yellow with red spots. The flowers have a sweet, pleasant fragrance. Sheviak (1990) named a rare anthocyanin-free color form from Canada *C. montanum* f. *praetertinctum*, on which the sepals and petals are a clear light green, the pouch without purple markings and the staminode without red spots.



C. montanum grows in California, Montana, Idaho, Wyoming, Oregon, Washington, Alaska, Alberta and British Columbia. I primarily think of this as a northern California species because I have spent 20 years studying it there. However Catling (1983a) observes that the range of *C. montanum* in Canada is greater than its range in the United States. *C. montanum* has adapted to multiple montane habitats below about 7,000 feet (2,140 m). Often it is found near a stream or on the edge of a hillside seep. *Cornus stolonifera*, the Creek Dogwood, is a common companion plant. *C. montanum* also grows in relatively dry conditions on hillsides in mixed and coniferous forest, under oaks, firs and madrones. The blooming period of *C. montanum* varies with elevation. Blooming begins in late March in coastal California, and continues until early July at the northern limits of its range.



Top left: *Cypripedium montanum* pouch with potential pollinator inside. Also visible are the red stripes on the back interior of the pouch.

Top center: Plants of *Cypripedium montanum* often carry two flowers, but can bear three or four.

Top right: *Cypripedium montanum* forma *praetertinctum* has clear light green sepals and petals and the lip is without purple markings, and the staminode without red spots. Photo by Charles Sheviak from British Columbia.

Left: A four-flowered stem photographed in the Sierra National Forest, CA. in 2018 by Chelsea Kieffer.

***Cypripedium parviflorum* Salisbury, Trans. Linn. Soc. London 1: 77 (1791)**

Cypripedium parviflorum is the most widespread and most confusing of our lady's-slippers. It is unmistakable due to its yellow pouch. However extreme variation of *C. parviflorum* across its range has led to confusing nomenclature and a plethora of synonyms and varieties since Salisbury described it in 1791. The literature contains names such as *Cypripedium hirsutum*, *Cypripedium flavescens*, *Cypripedium pubescens* and *Cypripedium veganum*. Of these, three were eventually demonstrated to be synonyms; one is now treated as a variety. Correll (1938) considered the North American yellow lady's-slippers conspecific with the European *Cypripedium calceolus* and his approach was followed by many, including Case (1964), Luer (1975), and Gupton and Swope (1986), for the next 40-plus years. Atwood (1985) recognized that the yellow lady's-slippers in North America differed from the European ones at the specific level. Atwood based his decision on differences in the staminode, which in *C. calceolus* is obovate (widest near the middle), and in *C. parviflorum* is V-shaped (widest at the base and tapering uniformly to the apex). Atwood called the large-flowered yellow lady's-slippers *Cypripedium pubescens*. Sheviak (1993, 1994, 1995, 2010) updated the treatment of what he called the *Cypripedium parviflorum* complex. He recognizes a single yellow-lipped species in the United States and Canada with four varieties: *C. parviflorum* var. *parviflorum*, *C. parviflorum* var. *pubescens*, *C. parviflorum* var. *makasin* and *C. parviflorum* var. *exiliens*. Sheviak (1995) considers *C. parviflorum* var. *planipetalum*, a varietal name often seen in the literature, as synonymous with *C. parviflorum* var. *pubescens*. Sheviak's treatment is the basis for the following discussion.



European *Cypripedium calceolus* flower showing remarkable similarities to American *Cypripedium parviflorum* except for the staminode. Photographed at Gait Burrows in Lancashire England by Chris Cater.

Notwithstanding the four varieties, even an experienced orchid searcher can be challenged to identify which yellow lady's-slipper is being observed. Size of the plant, size of the lip, color of the sepals and petals, size and shape of the petals, and twisting of the petals vary from region to region, and even within colonies. Sheviak (1995) believes some factors in the variation depend on soil type and exposure to sun. Plants in the open have ascending narrow leaves while those in shadier conditions have leaves that are spreading and broader. Knight (1906) reported that plants referable to *C. parviflorum* var. *parviflorum* were more robust to the point of resembling *C. parviflorum* var. *pubescens* when grown in richer more shaded habitats. Likewise plants looking like *C. parviflorum* var. *pubescens* grew to resemble *C. parviflorum* var. *parviflorum* when grown in a sunnier, harsher environment. All varieties of *C. parviflorum* share the common name Yellow lady's-slipper.

Sheviak (2002) helped distinguish among the varieties by publishing a key to the three then known. Sheviak's key is adapted here to include *C. parviflorum* var. *exiliens*.

Key to the Varieties of *Cypripedium parviflorum*

- 1a. Uppermost entirely tubular bract glabrous or with very few hairs; scent intense, sweet ... 2
 - 2a. flowers small; pouch 15–29 mm; sepals and petals usually suffused with dark reddish brown or madder, or spotted and blotched var. *makasin*
 - 2b. flowers small; pouch 16–26 mm; sepals and petals dull green tan with small clusters of rust colored spots var. *exiliens*
- 1b. Uppermost entirely tubular bract densely to conspicuously silvery-pubescent; scent moderate to faint, rose or musty ... 3
 - 3a. flowers large to small, pouch 20–54 mm; sepals unmarked to commonly spotted, striped, and reticulately marked with reddish brown or madder, rarely extensively blotched var. *pubescens*
 - 3b. flowers small, pouch 22–34 mm; sepals and petals densely and minutely spotted with dark reddish brown or madder and appearing uniformly dark, rarely coarsely spotted and blotched var. *parviflorum*

***Cypripedium parviflorum* Salisbury var. *parviflorum*, Trans. Linn. Soc. London 1: 77 (1791).**

Synonyms: *Cypripedium luteum* Aiton ex Raf., Med. Fl. 1: 140 (1828); *Cypripedium bifidum* Raf., Atlantic J. 1: 178 (1833); *Cypripedium parviflorum* f. *albolabium* Magrath & J.L.Norman, Sida 13: 372 (1989).



Left: Habitat and plant structure of *Cypripedium parviflorum* var. *parviflorum* in Georgia
Right: The smaller and lighter pouch of *Cypripedium parviflorum* var. *parviflorum* when compared to *Cypripedium parviflorum* var. *pubescens*.

Cypripedium parviflorum var. *parviflorum* is called the Small Yellow Lady's-slipper because it is smaller than *Cypripedium parviflorum* var. *pubescens*. These are medium-sized plants, usually between 4 and 20 inches (10–50 cm) with three to five leaves. On *C. parviflorum* var. *parviflorum* the uppermost entirely tubular bract is densely to conspicuously silvery-pubescent. The sepals and twisted petals have a light green base color, but often appear light brown to dark brown due to being mostly covered with closely spaced brown dots. The spacing between dots increases near the base of the sepals and petals, clearly revealing individual dots. The yellow pouch is usually between 0.8 and 1.4 inch (20–35 mm). The flowers have a sweet rose-like fragrance. Summers (1996) reports an albino form of *C. parviflorum* var. *parviflorum* with a white pouch from Missouri.

Prior to Sheviak's work, distributions for *C. parviflorum* var. *parviflorum* encountered in the literature showed a far greater range than we now ascribe to it. Based on our current understanding *C. parviflorum* var. *parviflorum* is concentrated in the Mid-Atlantic states. It is not known from Canada. It grows from New York south to Georgia, and westward to Nebraska, Oklahoma and Kansas. *Cypripedium parviflorum* var. *parviflorum* grows in mesic to dry deciduous forests and blooms from April to June.

***Cypripedium parviflorum* Salisbury var. *pubescens* (Willdenow) Knight, *Rhodora* 8: 93 (1906)**

Basionym: *Cypripedium pubescens* Willdenow, Hortus Berolinensis 1: pl. 13 (1804).

Synonyms: *Cypripedium flavescens* A. P. de Candolle, Les Liliacees I: pl. 20 (1802); *Cypripedium hirsutum* Miller, Mem. Torrey Club 5:121 (1894); *Cypripedium veganum* Cockerell & Barker, Proceedings of the Biological Society of Washington. 4:178 (1901); *Cypripedium parviflorum* var. *planipetalum* Fernald, *Rhodora* 28:168 (1926); *Cypripedium calceolus* Linnaeus var. *pubescens* (Willdenow) Correll, Botanical Museum Leaflets 7:14 (1938); *Cypripedium calceolus* Linnaeus var. *planipetalum* (Fernald) Victorin & J. Rousseau, Contributions de l'institut Botanique de l'université de Montreal 36: 68 (1940).



Left: Plants that were at one time called *Cypripedium parviflorum* var. *planipetalum* because of the relatively straight petals. The name is now considered synonymous with *Cypripedium parviflorum* var. *pubescens*.

Photographed in Newfoundland.

Right: *Cypripedium parviflorum* var. *pubescens* with the synsepal clearly showing a split apex suggestive of its origin from two lateral sepals. Photographed in Manitoba.

Common names for *C. parviflorum* var. *pubescens* include the Yellow Lady's-slipper, Large Yellow Lady's-slipper, and the Whippoorwill-shoe. *Cypripedium parviflorum* var. *pubescens* is the largest of our yellow varieties, with some plants reaching over 31 ½ inches (80 cm) tall with four to six ovate-lanceolate, plicate leaves. As with *C. parviflorum* var. *parviflorum*, the uppermost entirely tubular bract of *C. parviflorum* var. *pubescens* is densely to conspicuously silvery-pubescent. Other than that character the plant is highly variable throughout its range, with the pouch varying greatly in size, and in color from light to dark yellow. In robust specimens the pouch exceeds 2 inches (5 cm), but can be much smaller depending on growing conditions. The pouch is generally considered a darker, brighter yellow than the pouch of *C. parviflorum* var. *parviflorum*, although great variety in intensity and color abound. The inside of the pouch has lines of

reddish dots on the bottom back, and around the opening. Some pouches have reddish dots on the forward exterior. The sepals and petals vary from dark brown to reddish brown to greenish. The dark color in the sepals and petals is due to brown to reddish stripes over the yellowish green base color that turns to dots near the pouch. On some plants the petals may be totally untwisted with wavy margins while others will have multiple complete turns. The staminode is yellow with red dots. Summers (1996) also reports an albino form of *C. parviflorum* var. *pubescens* with a white pouch from Missouri, but in a different county than the albino form of *C. parviflorum* var. *parviflorum*.

This is perhaps the most widely distributed and most common *Cypripedium* species in North America. Cribb (1997) shows its distribution as extending from Newfoundland to Alaska and south to Oregon in the West. In the eastern United States along the Atlantic coast *C. parviflorum* var. *pubescens* is in every state except Florida, and extends west to Louisiana and eastern Texas. The extreme southwestern limit of its range is in Arizona. *C. parviflorum* var. *pubescens* grows in moderate shade to nearly full sun in prairies, meadows, barrens, deciduous forests, boreal forests and other coniferous forests. It favors calcareous soils. Flowering starts as early as the last week in May, and is usually over by the first week of July.



Left: *Cypripedium parviflorum* var. *pubescens* often has dark brown sepals and petals similar to *Cypripedium parviflorum* var. *makasin* but the flower is much larger.

Right: The habitat and plant structure of *Cypripedium parviflorum* var. *pubescens* in New Mexico.



Top left: *Cypripedium parviflorum* var. *pubescens* with nearly completely green sepals and petals.

Left center: The relatively larger pouch of *Cypripedium parviflorum* var. *pubescens*.

Bottom left: *Cypripedium parviflorum* var. *pubescens* with ambush spider waiting for visiting insect.

Top right: *Cypripedium parviflorum* var. *pubescens* with red dots on exterior of pouch. The V shaped staminode distinguishes *Cypripedium parviflorum* from *Cypripedium calceolus*.

Bottom right: Potential pollinator within pouch of *Cypripedium parviflorum* var. *pubescens*. This view shows the red dots at the entrance to the pouch, and the red dot pattern on the back inside of the pouch.



***Cypripedium parviflorum* var. *makasin* (Farw.) Sheviak, Amer. Orchid Soc. Bull. 62: 403 (1993)**

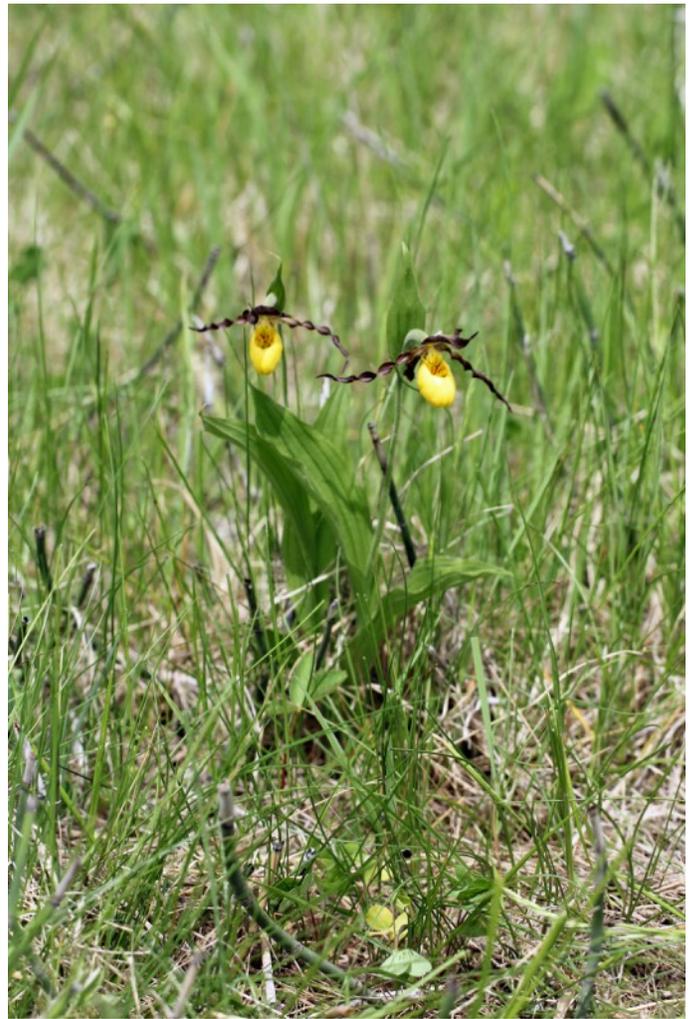
Synonyms: *Cypripedium pubescens* var. *makasin* Farw., Rep. (Annual) Michigan Acad. Sci. 18: 198 (1918); *Cypripedium parviflorum* var. *parviflorum* auct, non Salisb.



Side view of *Cypripedium parviflorum* var. *makasin* showing red dots at entrance to pouch and translucent areas at back of pouch.

Cypripedium parviflorum var. *makasin* is one of the small yellow lady's-slippers, usually under 16 inches (40 cm) tall with two to five leaves. It can be distinguished by the uppermost entirely tubular bract being glabrous or with very few hairs. It is noticeable because of its bright yellow pouch and dark sepals and twisted petals. The small pouch is between 0.6 and 1.2 inch (15–30 mm) long. The staminode is the same bright yellow as the pouch, with reddish dots. The sepals and petals are usually suffused with dark reddish brown or madder, though in western parts of its range may become more spotted. The petals have multiple twists. Its scent is intense and sweet.

Cypripedium parviflorum var. *makasin* shares much of its range with *C. parviflorum* var. *pubescens*. Their ranges essentially overlap in Canada. Ames et al., (2005) refer to introgressions of *C. parviflorum* var. *makasin* with *C. parviflorum* var. *pubescens*, which makes identifying as to variety difficult in portions of its range. In the United States, its southern limit is in the states of Illinois and Indiana. In the Rocky Mountain states its southern limit is in Utah. It gets as far west as California, but there is only one record of it there, and attempts to locate it there again have been unsuccessful (Coleman 1995). It has not yet been found in Oregon. *Cypripedium parviflorum* var. *makasin* grows in wetter habitat than *C. parviflorum* var. *pubescens*. It favors moist to wet tall grass and mixed grass prairies, meadows and fens. Less often it is found in open forest lining the prairies and meadows. In portions of its range it is quite common on road rights-of-way where frequent mowing maintains habitat resembling meadows. *Cypripedium parviflorum* var. *makasin* blooms from May to August.



Left: The dark twisted petals, and bright yellow pouch of *Cypripedium parviflorum* var. *makasin*.
Right: Habitat and plant structure of *Cypripedium parviflorum* var. *makasin* growing on a roadside in Manitoba, Canada.

***Cypripedium parviflorum* var. *exiliens* Sheviak, Native Orchid Conf. J. 7(2): 5 (2010).**

Sheviak (2010) described *Cypripedium parviflorum* var. *exiliens* to recognize small-flowered yellow lady's-slippers that did not fit within the bounds of *C. parviflorum* var. *makasin* and *C. parviflorum* var. *parviflorum*. The uppermost entirely tubular bract is glabrous or with very few hairs. The flowers are small relative to *C. parviflorum* var. *pubescens*, with the pouch typically between 0.63 and 1 inch (16–26 mm). The sepals and petals are dull green-tan with small clusters of rust-colored spots rather than the uniform color or dense patterns of stripes or blotches found on the other varieties. The scent initially is intense and sweet but in older flowers becomes more rose-like.

Cypripedium parviflorum var. *exiliens* is primarily found in northern Alaska where it is considered rare and imperiled. Its range extends into northwestern Canada. Sheviak (2010) says plants of *C. parviflorum* var. *exiliens* “occur in mesic upland sites, but sometimes are found in wetter conditions in the south of their range.” It blooms from late June to August.

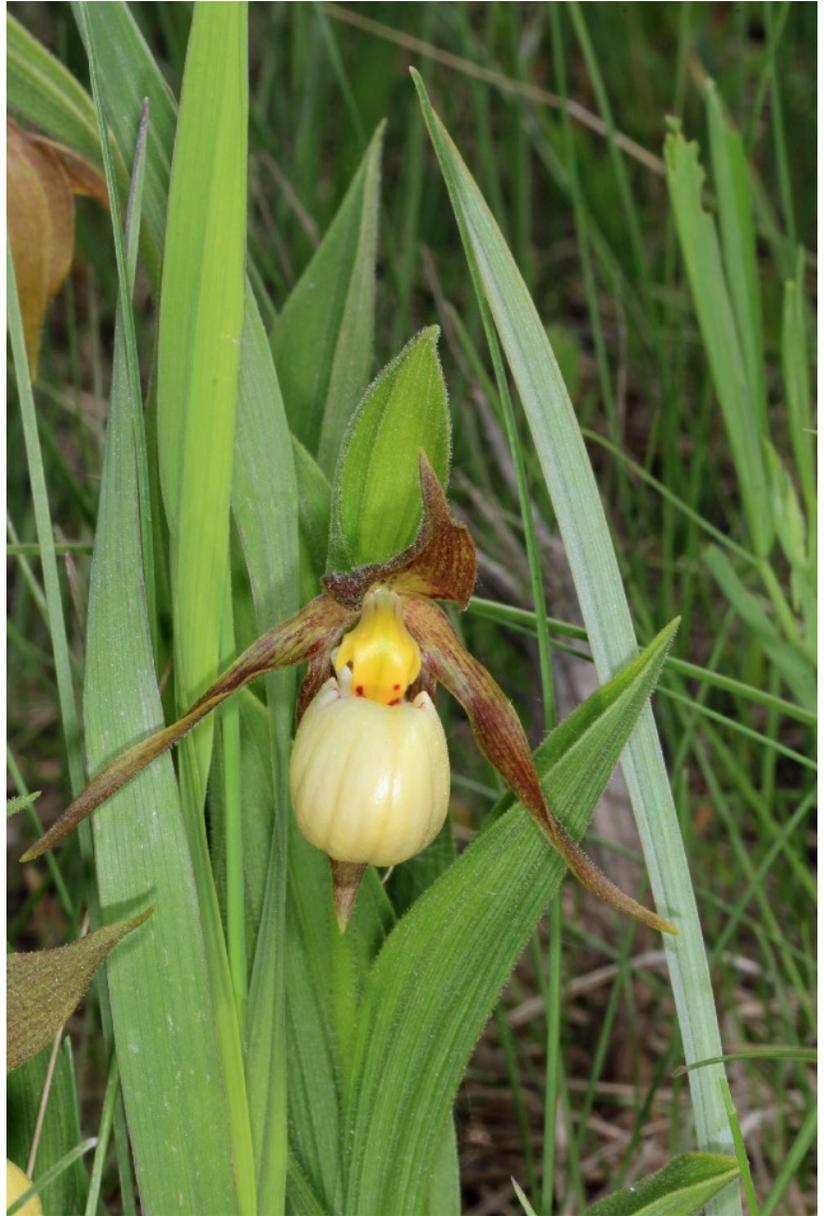


Left: Habitat and plant structure of *C. parviflorum* var. *exiliens* photographed by Chuck Sheviak from Alaska. Right: *Cypripedium parviflorum* var. *exiliens* showing the coloring in sepals and petals is a pattern of scattered dots rather than the lines or solid fill often seen in other varieties. The V-shape of the staminode is clearly visible. Photographed in Alaska by Chuck Sheviak.

***Cypripedium* × *andrewsii* A.M.Fuller, Rhodora 34 No. 402 (1932)**

Cypripedium × *andrewsii* is the name of the natural hybrid between *C. candidum* and *C. parviflorum*. Flower size and color are intermediate between the two parents but vary widely. Hybrid swarms exist where the flowers appear on a continuum between the extremes of the parents as a result of backcrossing. *Cypripedium* × *andrewsii* is most easily recognized by the color of its pouch, which is creamy to pale yellow. The sepals and petals can be pale brown or greenish brown. The hybrid can be expected wherever the two parents grow together.

Different hybrid names have been applied to the natural crosses between *C. candidum* and two of the varieties of *C. parviflorum*. *Cypripedium* × *andrewsii* was applied to the natural hybrid between *C. candidum* and *C. parviflorum* var. *makasin*. Then *Cypripedium* × *favillianum* was used for the hybrid between *C. candidum* and *C. parviflorum* var. *pubescens*. *Cypripedium* × *landonii* was applied to a backcross involving *C. × favillianum* and *C. parviflorum* var. *makasin*. However Cribb (1997) points out that the hybrid name depends only on the primary species, independent of varieties or backcrossing. The correct name then for any hybrid between *C. candidum* and *C. parviflorum* is *C. × andrewsii*. (* but *landonii* and *favillianum* may still be recognized as nothosubspecies of *x andrewsii* - Ed.)



Cypripedium x andrewsii showing the pouch a pale yellow, intermediate in color between the parents *Cypripedium parviflorum* and *Cypripedium candidum*. Photographed in Manitoba, Canada.

***Cypripedium* × *columbianum* Sheviak, American Orchid Society Bulletin 61(6) (1992)**

Sheviak (1992) used the name *Cypripedium* × *columbianum* for the natural hybrid between *C. montanum* and *C. parviflorum*. The hybrid features creamy yellow pouches and dark sepals and petals. The ranges of *C. montanum* and *C. parviflorum* overlap in only a few places. Therefore *C. × columbianum* is found only in a few parts of southwestern Canada and northwestern United States.



Top left: *Cypripedium* × *columbianum* showing the pouch intermediate in color between the parents *Cypripedium parviflorum* and *Cypripedium montanum*. Photographed in Alberta, Canada.

Bottom left: A plant of *Cypripedium* × *columbianum* with two flowers, as often seen in the parent *Cypripedium montanum*.

Right: *Cypripedium* × *columbianum* photographed in Washington by Chelsea Kieffer

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Part II: *acaule*, *passerinum*, *reginae*, and *x herae*

***Cypripedium acaule* Aiton, Hort. Kew. 3:303 (1789).**

Synonyms: *Cypripedium hirsutum* Mill., Gard. Dict. ed. 8:N. 3 (1768), nom. rej.; *Cypripedium humile* Salisb., Trans. Linn. Soc. London 1:79 (1791); *Calceolus hirsutus* (Mill.) Nieuwl., Am. Midl. Naturalist 3:118 (1913); *Fissipes hirsuta* (Mill.) Farw., Druggists' Circ. 61:230 (1917); *Fissipes acaulis* (Aiton) Small, Fl. SE. U.S.:311 (1917); *Cypripedium acaule* f. *lancifolia* House, Bull. New York State Mus. Nat. Hist. 254:236 (1924).



Left: *C. acaule* in habitat showing slightly upturned basal leaves.
Right: *C. acaule* with bright magenta pouch. Photographed in Manitoba, Canada.

The most often used common names for *C. acaule* are the Pink Lady's-slipper and the Moccasin Flower. It is sometimes referred to as the Stemless Lady's-slipper because the flower scape and leaves rise directly from the underground rhizome. Even non-flowering plants of *C. acaule* are fairly easy to identify. The two basal leaves, ribbed and hairy, are distinctive. They are broadly elliptic, and held from nearly flat on the ground to pointing upward. Plants typically have a single flower, but Brown (1995) reported a plant with two flowers. The sepals and petals are shades of greenish-brown to brown, on some plants very dark brown.



Top: *C. acaule* with pure white pouch and green sepals and petals. Photographed in New Hampshire.

Bottom: *C. acaule* with dark pink pouch. The vertical fissure is the opening for the pollinator.

The petals are held either alongside the pouch or slightly spreading. Twisting of the petals varies from none, to a slight twist, to a full twist. The insides of the petals have fine hairs. The pouch is diagnostic in this species. Most *Cypripediums* have a circular opening at the top of the pouch for the potential pollinator. However, instead of an opening at the top, *C. acaule* has a forward-facing, closed vertical fissure the length of the pouch, and the pollinator must force its way in. Most pouches are hues of pink, from very pale to an intense almost magenta color, with branched veining in a deeper shade than the color of the rest of the pouch. Some plants produce flowers with a pure white pouch and green sepals and petals and have been given the name *C. acaule* f. *albiflorum*. In most of its range the white form is rare, but Keenan (1998) reports that up to 25 percent of the *C. acaule* in New Hampshire have white flowers. The flowers have a faint sweet fragrance.

Cypripedium acaule is widely distributed in the eastern United States and central Canada. In the East it ranges as far south as Georgia and Alabama, and as far north as Newfoundland. In Canada its contiguous distribution extends as far west as the northeast tip of Alberta. Its northwest extreme is a disjunct location in the Northwest Territories. Typical habitat is mesic to dry mixed coniferous–deciduous forests. Sometimes it grows in more moist conditions, such as a bog or fen. In the northern portion of its range, it favors open conditions. Gill (1996) reports that although plants grow and flower in dense forest, an opening of the canopy can result in increased flowering and greater seed set. The blooming season varies with location, starting as early as April in the south and extending to July in the north. Peak bloom tends to be in May and June. Fowler (2005) and Gill (1996) state that only 10 percent of the plants in an area may flower in a given year. Gill additionally reports that flowering of an individual plant is erratic, and the plant may go years between blooming. Brackley (1985) observes that blooming increases after a fire because the fire opens the canopy, allowing in more light. *Cypripedium acaule* was adopted as the Provincial Flower of Prince Edward Island in 1947.

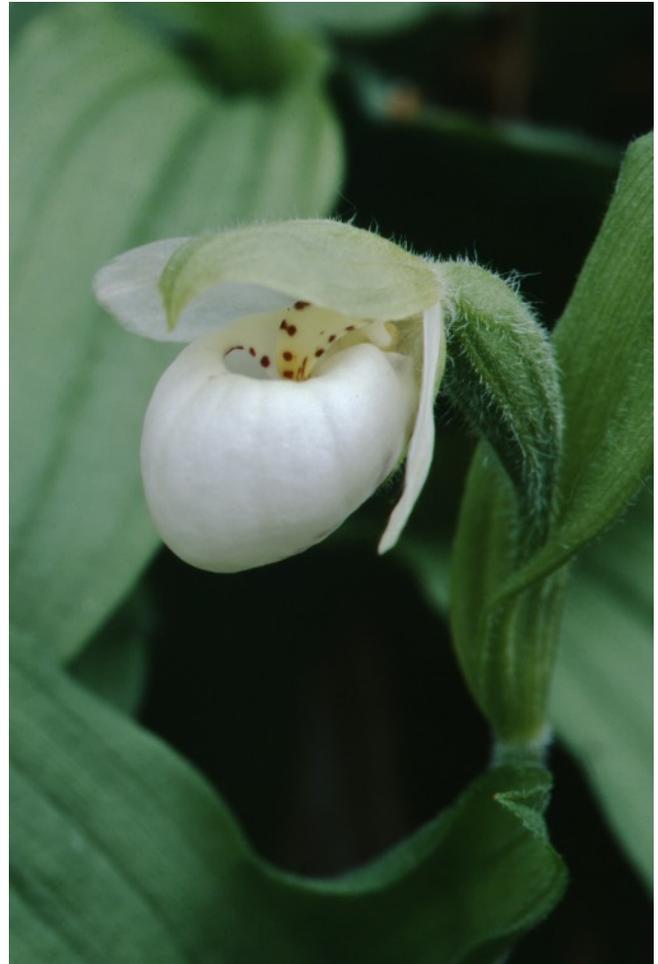
***Cypripedium passerinum* Richardson, Bot. App., ed. 2:34 (1823).**



Habitat of *Cypripedium passerinum* near Hudson Bay, Canada.

The most frequently used common names for *C. passerinum* are the Sparrow's egg Lady's-slipper and the Small White Northern Lady's-slipper. Morris and Eames (1929) report that another common name is Franklin's Lady's-slipper, in honor of John Franklin, an early explorer of the far North. *Cypripedium passerinum* is a relatively small plant, usually under 15³/₄ inches (40 cm) tall, with 3–5 alternating leaves. In contrast to most of our *Cypripediums*, which have sepals and petals of the same color, *C. passerinum* has green sepals and white petals. On many flowers the green dorsal sepal is bent over the opening to the pouch. The petals are flat and spreading. The pouch is rather small, only about ³/₄ inch (2 cm) long, and the inner edge is lined with reddish to purple spots. The staminode is white with traces of yellow, and with spots the same color as on the inner pouch. Catling (1983) and Catling & Bennett (2008) report that *C. passerinum* is the only *Cypripedium* species that self-pollinates over much of its range.

The primary distribution of *C. passerinum* is from north-central Canada to Alaska. A few plants make it into Montana, the only place they grow in the lower 48 states. Luer (1975) reports that it grows within the Arctic Circle. There is a disjunct location in Côte-Nord, Quebec. Ames et al. (2005) report it is the only *Cypripedium* species that grows near Hudson Bay in Manitoba, where orchid seekers must be on the lookout for polar bears. *Cypripedium passerinum* prefers sandy soil in moist areas of coniferous forests and more open places in the tundra. It often grows in thickets on stream banks, lake shores and seeps, frustrating anyone wishing to photograph it. Szczawinski (1959) tells of seeing large patches of *C. passerinum* growing along the Alaska Highway in British Columbia. Smreciu and Currah (1989) report it growing on gravel outwashes and talus slopes. Whiting and Catling (1986) report it on sand dunes at Lake Superior. *Cypripedium passerinum* blooms in June and July.



Left: *Cypripedium passerinum* with erect dorsal sepal.

Right: *Cypripedium passerinum* with the more common presentation of the dorsal sepal folded forward over opening to the pouch.

***Cypripedium reginae* Walter, Fl. Carol.:222 (1788).**

Synonyms: *Cypripedium album* Aiton, Hort. Kew. 3:303 (1789); *Cypripedium spectabile* Salisb., Trans. Linn. Soc. London 1:78 (1791); *Cypripedium canadense* Michx., Fl. Bor.-Amer. 2:261 (1803); *Calceolus reginae* (Walter) Nieuwl., Amer. Midl. Naturalist 3:117 (1913); *Cypripedium hirsutum* f. *album* R.Hoffm., Proc. Boston Soc. Nat. Hist. 36:246 (1922); *Cypripedium reginae* f. *albolabium* Fernald & B.G.Schub., Rhodora 50:230 (1948).

Many consider *C. reginae* the most beautiful of our *Cypripediums* and it has acquired common names such as the Queen's Lady's-slipper, Showy Lady's-slipper and Rose Lady's-slipper. *Cypripedium reginae* is one of our tallest species, comparable to *Cypripedium kentuckiense* in height. Plants reach 3 feet (90 cm) with up to nine alternating leaves, and often two flowers. The sepals and petals are white, the petals flat and spreading. The base color of the pouch is white, but it is often totally covered with reddish to maroon suffusion and often appears totally red. On some flowers the pouch is closer to pink. On others the pink to maroon coloring spreads out only partway from the pouch opening. Some flowers have a pouch that is totally white, and these have been given the name *Cypripedium reginae* f. *albolabium*. The pouch is relatively large, usually between 1 and 2 inches (25–50 mm). The staminode is white with yellow markings and red dots. The flowers have a faint fragrance. *Cypripedium reginae* is the state flower of Minnesota. In Canada *C. reginae* grows in the southern parts



Habitat and plant structure of *Cypripedium reginae*.

of the provinces from Saskatchewan to Newfoundland, where it is often locally common in the west. Its southern limit in the United States is in Arkansas, where Slaughter (1993) reports fewer than two dozen plants in the state. From Arkansas it extends north to Maine, and northwest to Minnesota. The typical habitat is near the margins of wet areas and in tamarack and cedar bogs, or fens and seeps where it can find a constant supply of water. It grows well in prairies, and wet, even boggy woods. In the heart of its growing region it is often found growing fully exposed in wet roadside ditches. Voitk and Voitk (2006) have observed it growing on limestone bedrock. Minnesota has designated a segment of County Road 29 in the Chippewa National Forest as the Lady's Slipper Scenic Byway, where masses of *C. reginae* bloom along the highway every year in June and July. More information about the Lady's Slipper Scenic Byway can be found at <https://www.ladyslipperscenicbyway.org/>.

In parts of its range, *C. reginae* is often prey to heavy deer browsing, with entire plants consumed before seeds mature.



Top left: *C. reginae* with pale pink markings on the pouch from the Bruce Peninsula.

Bottom left: A group of *C. reginae* with dark reddish pink pouches.

Photographed in Newfoundland.

Right: The pure white form of *C. reginae*. Photographed by Mark Larocque.

***Cypripedium* × *herae* Ewacha and Sheviak, Orchids 73(4) (2004).**



Cypripedium × *herae* (*parviflorum* × *reginae*) as found in the field in 2004 in Manitoba along with *Cypripedium reginae*, one of the parents, with which it was found growing. Photographed by Agnes Ryckman.

The two natural hybrids with *C. parviflorum* are both within the *C. parviflorum* complex. That complex contains the closely related and similar appearing species of *C. parviflorum*, *C. montanum*, *C. candidum*, and *C. kentuckiense*. Hybrids with *C. parviflorum* outside of this complex would not be expected because of differences in flower morphology, which suggest different pollinators. That expectation was shattered when Ewacha and Sheviak (2004) published a description of *Cypripedium* × *herae* as a natural hybrid between *C. parviflorum* and *C. reginae*. Notes on the specimen sheet indicate that the hybrid was found growing in a roadside ditch along with both parents. A live plant was collected from the field in 2000, and grown successfully in cultivation. A specimen was taken from the cultivated plants for the herbarium record in 2003. The sepals and petals are yellowish to whitish- yellow, with scattered red spots. The pouch is dull yellow with hints of pink, and stripes of reddish dots. So far, the only report of *C. × herae* is the original collection from Manitoba. Because of its extreme rarity, and the differences in floral morphology and blooming seasons of the reported parents, anecdotal speculation suggests this hybrid may have resulted from human-assisted pollination. Clearly more field searches for *C. × herae* are necessary to clarify its status. This is one of our *Cypripediums* that I have not personally seen in the field, so the description data herein are from the Ewacha and Sheviak publication (2004). The images shown here are reproduced from that publication.



Carson Whitlow of Cyp Haven created the hybrid between *C. parviflorum* and *C. reginae* in his laboratory sometime before what we are calling *C. × herae* was found in the wild. He registered his hybrid as *Cypripedium Genesis*.

Cypripedium Genesis (*reginae* × *parviflorum* [var. *pubescens*]), registered by Carson Whitlow in 1987.
Photographed by Carson E. Whitlow.

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Part III: *arietinum*, *californicum*, *fasciculatum*, *guttatum*, *yatabeanum* and \times *alaskanum*

***Cypripedium arietinum* R.Br. in W.T.Aiton, Hort. Kew. 5: 222 (1813).**

Synonyms: *Criosanthes borealis* Raf., Amer. Monthly Mag. & Crit. Rev. 2: 268 (1818); *Arietinum americanum* L.C.Beck, Bot. North. Middle States: 352 (1833); *Criosanthes arietina* (R.Br.) House, Bull. Torrey Bot. Club 32: 374 (1905).



Different views of *Cypripedium arietinum* showing two lateral sepals instead of synsepal. Note the translucent spots in the pouch that allow in light for the pollinators and the side view suggesting charging ram feature of *Cypripedium arietinum*.

The most frequently used common name for *Cypripedium arietinum* is the Ram's-head Lady's-slipper due to the fancied resemblance of the flower to the lowered head of a charging ram. Other common names include Chandler's *Cypripedium*, and the Steeple-cap. *Cypripedium arietinum* is one of our smaller lady's-slippers. Plants are usually under 8 inches (20 cm) tall with three to five elliptic leaves and a single flower. Two features of the flower distinguish *C. arietinum* from our other *Cypripedium* species. The flower has two distinct lateral sepals instead of the fused synsepal in other species, and the pouch is cone-shaped rather than pouch-shaped. We occasionally find two lateral sepals in other *Cypripedium* species but it is a rare exception (Coleman 1995, 2002). The petals are untwisted and held forward, essentially clasping the pouch. The top of the pouch is white and covered with fine white hairs. The cone portion of the pouch is heavily veined in reddish purple. There are translucent spots in the pouch that allow light to pass through. This feature is also found in other *Cypripedium* species. The sepals and petals are greenish brown to brown and sport white hairs. Luer (1975) and Whiting and Catling (1986) document occasional white forms called *C. arietinum* f. *albiflorum*.

Rafinesque based his genus *Criosanthes* on the unique spreading lateral sepals of *C. arietinum*. Cribb (1997) points out that most authors have not followed Rafinesque, and his names are relegated to synonymy. Cribb adds that recent cladistic analyses (DNA) place *Criosanthes* clearly within *Cypripedium*.

C. arietinum has a limited distribution and is always a treat when found. It can be found in the southern portion of the Canadian provinces from Nova Scotia to Saskatchewan. In the United States it is found in the northern states from Maine to Minnesota. *C. arietinum* grows in a variety of habitats. It is often found in cedar woods, and in shaded pine to mixed oak woodlands. In the northern part of its range it grows in full sun in grasses along road cuts and the flowers barely reach above the grasses. Morris and Eames (1929) report it from “rich mossy bogs.” Luer (1975) reports large populations growing over limestone and sand. Because of their small size and dark color the flowers are very difficult to spot even if you know where to look. A time-critical problem facing the orchid hunter is the short life of each flower. Correll (1950) says individual flowers last only one day, but Brackley (1985) observes that such ephemeral flowering is due to pollination. After pollination the dorsal sepal droops down over the opening to the pouch. Unpollinated flowers may last for a few days each. Plants flower from May to June.



Left: Anthocyanin-free pure green-and-white forms of *Cypripedium arietinum* are relatively rare. Photographed by Ross Brown in Ontario, Canada.
Right: *Cypripedium arietinum* plant and habitat.

***Cypripedium californicum* A. Gray, Proceedings American Academy 7: 389 (1868).**

This species is named for the state from which it was described, and that led to the common name of California Lady's- slipper. *Cypripedium californicum* is the tallest of the genus in the United States and Canada. Blooming plants get up to nearly 52 inches (130 cm) tall but can bloom on plants as short as 4 inches (10 cm) tall. Large plants have seven or eight alternating leaves and can carry over 20 flowers, by far the most on any of our cypripediums. The pouch is white and sometimes has faint red to purplish veining inside. The sepals and petals are greenish yellow to yellow-gold. Petals are flat and spreading. The staminode is white on the outer edges, with a broad stripe the color of the sepals and petals, in the center. The flowers have a faint, slightly sweet aroma.



Left: *Cypripedium californicum* often forms large blooming clumps. Photographed in the Sierra Nevada Mountain Range in California.

Right: Stem of three flowers of *Cypripedium californicum*.

Cypripedium californicum has the smallest total range of any of our lady's slippers, although *Cypripedium yatabeanum* has a far smaller range within the United States. *Cypripedium californicum* is limited to northern California and portions of southern Oregon. It requires habitats supplying a constant source of water for its roots. Plants grow in and among serpentine formations and in serpentine based soils, often in full sun. They are typically found on the banks of streams or in hillside seeps. Another favored spot is bog-like areas near the water's edge. Blooming clumps often exceed a hundred stems. The blooming season starts in early April in the coastal mountains. Flowering lasts to the end of July in the Sierra Nevada Mountains and at high elevations in the Cascade Mountains.



Left: *Cypripedium californicum* with typical greenish sepals and petals.
Right: Stem of *Cypripedium californicum* flowers with golden sepals and petals.

***Cypripedium fasciculatum* Kellogg ex S. Watson, Proceedings American Academy of Arts and Sciences 17: 380 (1882)**

Synonyms: *Cypripedium knightae* A. Nelson, Botanical Gazette 42: 48 (1906); *Cypripedium pusillum* Rolfe, Kew Bulletin 1892: 211.



Left: *Cypripedium fasciculatum* plants showing two leaves midway on stem with flowering stem bent by weight of flowers. Photographed in California.

Right: Cluster of *Cypripedium fasciculatum* flowers with dark sepals and petals and green pouch. Clustered flowers are unique to *C. fasciculatum* among our *Cypripedium*.

Two common names are often associated with *C. fasciculatum*. It is called the Clustered Lady's-slipper because the flowers are on a cluster at the end of the scape, instead of being scattered along the scape. *Cypripedium fasciculatum* is the only one of our cypripediums with this feature. The other often seen common name is Brownie Lady's-slipper. *Cypripedium fasciculatum* is one of our smallest lady's-slippers. The plants are under 7 inches (18 cm) from the base to the top of the flowers and some bloom as small as 1 ¼ inches (3 cm) tall. There are two opposing leaves halfway up the stem. Even though the plants are small, *C. fasciculatum* bears more flowers per plant than any of our other *Cypripedium* species except for *C. californicum*. The flowers are typically borne in clusters of six or seven, but sometimes as many as 10 flowers per plant. The weight of the flowers bends the top of the stem, which straightens and elongates as the seed capsules mature. The flowers are small, with the largest only about 1 ¾ inches (4.5 cm) from tip to tip. The pouch, sepals and petals are usually all the same color. The pouch is less than 0.6 inch (1.5 cm) across, with an opening about 0.2 inch (0.5 cm) across. Usually the flowers have brown markings on a green or golden background, although considerable variation in color exists. Sometimes the brown



dominates, and the flowers appear dark brown to nearly reddish brown. Other plants have very pale, almost blond flowers, and a few plants have anthocyanin-free, pure green flowers.

Cypripedium fasciculatum grows from the northern half of California into Washington, Oregon, Montana, Utah, Colorado and Wyoming. However, rather than a continuous distribution, Brownell and Catling (1987) report it exists in disjunct populations within its range. It is not known from Canada. The Clustered Lady's-slipper grows mainly in fir forest between 600 and 6,500 feet (180–2,000 m) elevation. Most often the plants grow on or near a stream bank, often on fairly steep slopes, or just above the drainage on the forest floor, either in the open or under dogwoods. Flowering starts in mid-March in the coastal mountains of California. At higher elevations, peak blooming occurs in mid- to late June with flowers sometimes lasting into July.



Top left: Cluster of *Cypripedium fasciculatum* flowers with dark sepals and petals and green pouch. Clustered flowers are unique to *C. fasciculatum* among our *Cypripedium*.

Center left: *Cypripedium fasciculatum* with anthocyanin free pure green flowers.



Bottom left: *Cypripedium fasciculatum* with dark brown flowers.

***Cypripedium guttatum* Sw., Kongl. Vetensk. Acad. Nya Handl. 21: 251 (1800)**

Synonyms: *Cypripedium orientale* Sprengel, Syst. 3: 746 (1826). *Cypripedium guttatum* var. *redowskii* Rchb.f. in H.G.L.Reichenbach, Icon. Fl. Germ. Helv. 13-14: 166 (1851); *Cypripedium guttatum* f. *latifolium* Rouy ex E.G.Camus in E.G.Camus, P.Bergon & A.A.Camus, Monogr. Orchid.: 451 (1908).

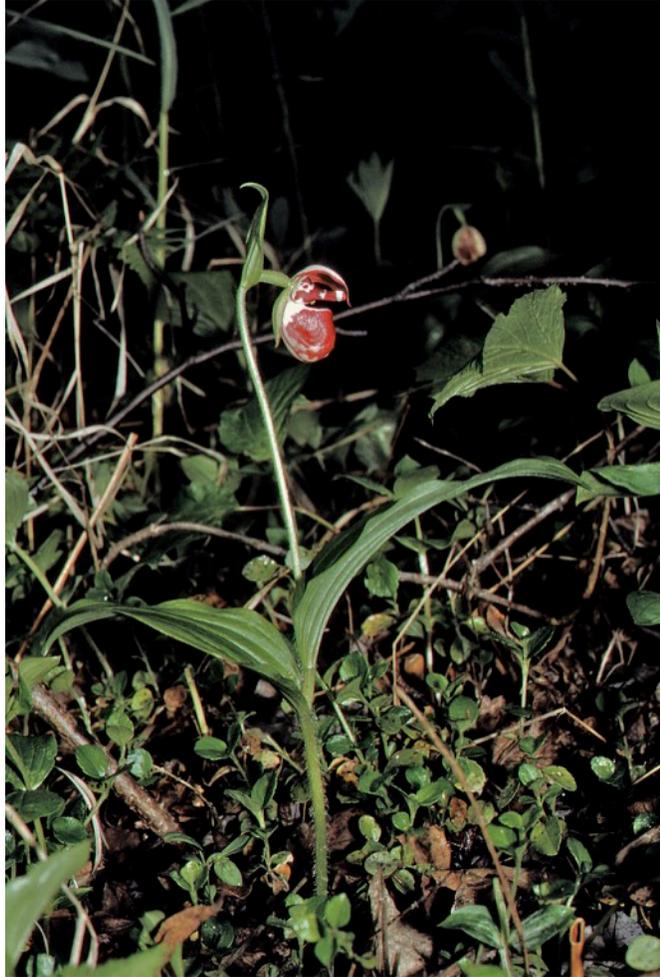


Left: Top view of group of *Cypripedium guttatum* showing white backside of dorsal sepal.
Right: Typical dark reddish brown flower of *Cypripedium guttatum* with terminal constriction in petals.
Photographed near Anchorage, Alaska.

The common name for *Cypripedium guttatum* is the Spotted Lady's-slipper, in reference to spotting on its petals and pouch. *Cypripedium guttatum* is a short plant, under 12 inches (30 cm) tall. It has two leaves near the base and a single flower. The dorsal sepal is white on the backside and a nearly solid reddish brown hue on the side facing the pouch. The dorsal sepal bends over the opening to the pouch and its white top under the forest canopy is often the first visual clue to the flowers. The base color of the petals is white. They are spotted with the same reddish brown as on the dorsal sepal, and constricted near the apex. The spots merge into more irregular markings on some flowers. The pouch is also a base white covered with reddish brown spots. The spots on the pouch often merge into large blotches and on some flowers the pouch is almost solid reddish brown. On some plants the reddish brown of the spots is a lighter brown, even tan or pinkish, suggesting perhaps ancient hybridization with *C. yatabeanum*. The staminode is white to tan with a few small reddish brown spots.

C. guttatum is found in Alaska, the Yukon and the Northwest Territories. It is more widely distributed in Asia. *C. guttatum* grows in pure or mixed deciduous forests and in spruce forests. It sometimes grows on

steep banks of lakes and streams, or in flat forested areas just above the bank. It inhabits edges of meadows near the surrounding forests. The blooming season is short in the northern regions where *C. guttatum* grows. It usually starts blooming in mid-June and finishes by early July.



Top left: Side view of *Cypripedium guttatum* with dorsal sepal bent over pouch opening.

Right: Plant of *Cypripedium guttatum* showing pubescent lower stem, and two sub-opposite leaves midway on stem.

Bottom left: Pale brown flower of *Cypripedium guttatum* suggesting long ago introgression from *C. yatabeanum* but the pouch retains the classic *C. guttatum* shape.

***Cypripedium yatabeanum* Makino, Bot. Mag. (Tokyo) 13: 91 (1899)**

Synonyms: *Cypripedium guttatum* var. *yatabeanum* (Makino) Pfitzer in H.G.A.Engler (ed.), Pflanzenr., IV, 50: 33 (1903); *Cypripedium guttatum* subsp. *yatabeanum* (Makino) Hultén, Ark. Bot., a.s., 7(1): 34 (1967 publ. 1968).

Cypripedium yatabeanum is the only species of *Cypripedium* native to the United States and Canada that I have not observed in the field. Data in this section are from Sheviak (2002). It goes by several common names such as the Green Moccasin flower, Palomino Lady's-slipper, and Yatabe's *Cypripedium*. *Cypripedium yatabeanum* is a small plant, usually under 12 inches (30 cm) tall. It has two leaves partway up the stem, and typically a single flower. The sepals and petals have a whitish cream base color. The dorsal sepal is almost completely covered with brownish to greenish stripes. The spreading petals have a pattern of brownish to greenish dots and a constriction near the apex much like the one found in *C. guttatum*. The pouch is narrower and more vertically elongated compared to the similar *C. guttatum*. The bottom third of the pouch becomes almost cone-shaped. The pouch is brownish to greenish to yellowish with darker dots. On some plants the pouch appears nearly solidly colored except near the bottom. The staminode has the same color and spot pattern as the petals.



Cypripedium yatabeanum showing the elongated yellowish spotted pouch and the spotted petals. Photographed in Japan by Charles Sheviak.

Cypripedium yatabeanum is extremely rare in the United States, restricted to a few of the Aleutian Islands. It does not occur in Canada. It is more common in Japan and parts of Asia. Our knowledge of it here is incomplete.

There are few herbarium specimens of it from the United States. Sheviak (pers. comm.) says he is confident of only one from the Shumigan Islands in the Aleutians. Because of the few places where it grows, it is reasonable to project that there are fewer plants of it in the United States and Canada than of any other *Cypripedium*. It occurs in the tundra, subarctic meadows and areas adjacent to marshes and dunes. In Japan it grows in open forest and grassy areas such as meadows. *Cypripedium yatabeanum* blooms from June to August.

For many years plants on Kodiak Island in Alaska were believed to be representative of *C. yatabeanum*. They are spotted with brown instead of the reddish color of *C. guttatum* and the pouch is slightly longer. However Brown (1995) determined they were a natural hybrid between *C. yatabeanum* and *C. guttatum* and named them *C. × alaskanum*. Sheviak (2002) recognized this hybrid and said “most reports and illustrations of *C. yatabeanum* in Alaska are in fact based on them.”

***Cypripedium × alaskanum* P.M.Br., N. Amer. Native Orchid J. 1: 199 (1995)**



Left: Habitat of *Cypripedium x alaskanum* on Kodiak Island.

Right: *C. x alaskanum* with flower structure and color intermediate between *C. guttatum* and *C. yatabeanum*.

Cypripedium × alaskanum is the natural hybrid between *C. guttatum* and *C. yatabeanum*. Characters of the hybrid are intermediate between the parents. The pouch is clearly longer than that of *C. guttatum* but not as long and narrow as that of *C. yatabeanum*. It is found on the southern mainland of Alaska, the Aleutian Islands, Unalaska, and Kodiak Island. Brown (1995) chose a plant from Anchorage as the type specimen. Sheviak (2002) suggests that plants otherwise matching *C. guttatum* occur elsewhere in Alaska, but with lighter brown, or tan, or pink markings suggestive of *C. × alaskanum* are due to interbreeding long ago when *C. yatabeanum* was more widely distributed in North America.

For years, lovers of native orchids have been going to Kodiak Island in search of *C. yatabeanum*, and I was numbered among them, making the journey in the year 2000. There may be some who still incorrectly insist the plants on Kodiak are in fact *C. yatabeanum*. Sheviak (pers. comm.) presents compelling evidence for the hybrid origin of the plants on Kodiak. He has a series of photographs, reproduced here, of a hybrid

swarm of *C. × alaskanum* taken on the island of Unalaska in the Fox Islands group of the Aleutian Islands. One plant he calls “pseudo-*yatabeanum*” because its elongated pouch approaches the structure of the pouch on *C. yatabeanum*. Growing on the same hillside are the *C. × alaskanum* flowers. These have gradations of more rounded and shorter pouches reminiscent of the pouch on *C. guttatum*. In particular, the *C. × alaskanum* flower shown in top right photo is very much, in both color and shape, like the plants on Kodiak Island. Sheviak contends this is conclusive evidence for the hybrid origin of *C. × alaskanum*, including the plants on Kodiak Island.



Top left: *Cypripedium x alaskanum* on Unalaska Island with pouch slightly elongated and slightly rounded. Photographed by Charles Sheviak.

Top center: *Cypripedium x alaskanum* on Unalaska Island with pouch more rounded and less elongated. Photographed by Charles Sheviak.

Top right: *Cypripedium x alaskanum* on Unalaska Island that is very similar to those from Kodiak Island. Photographed by Charles Sheviak.

Bottom left: *Cypripedium x alaskanum* on Unalaska Island nicknamed “pseudo-*yatabeanum*” because its elongated narrow pouch resembles that of *Cypripedium yatabeanum*. Photographed by Charles Sheviak.

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Many thanks to Charles Sheviak for reviewing the text. His insight and suggestions made this a much more accurate paper. He also supplied the photo of *C. yatabeanum* and images of some color forms of other species. The photos of *C. calceolus* (Part 1) from England were supplied by Chris Cater. Images to complete the set of color forms were supplied by Gary L. Spicer, Ross Brown/Paul Catling and Mark Larocque.

Left: Guessing this may be *delitescens*?
Photo by Eirini Pajak

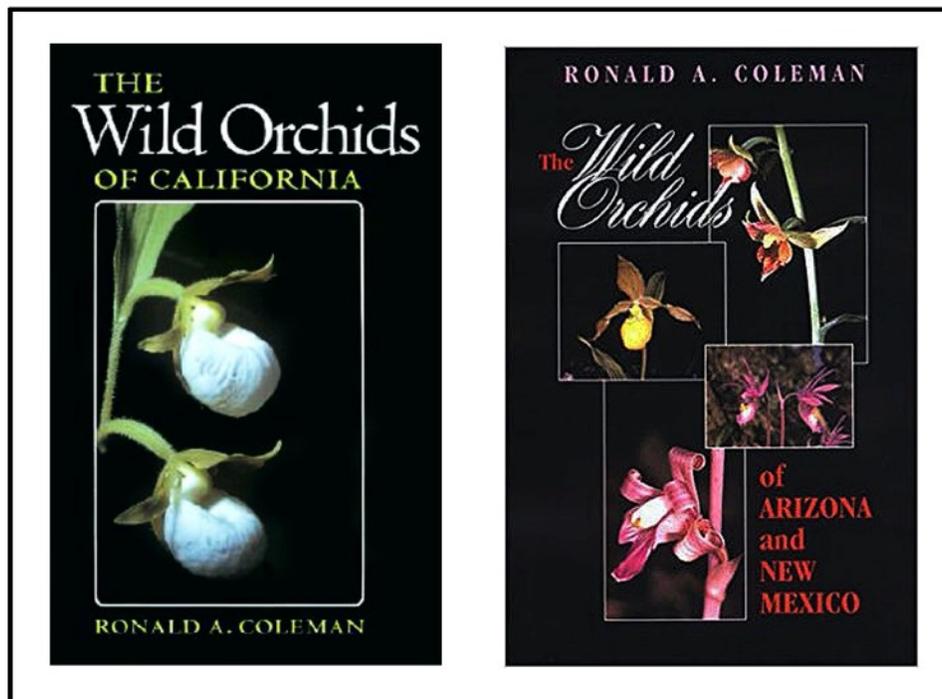
PUBLICATIONS OF RONALD A. COLEMAN

Text by Paul Catling and Chelsea Kieffer

This list is in the standard format for references in the Native Orchid Conference Journal and is arranged first alphabetically by author and then by year of publication.

In compiling the list, we were assisted by Ron's wife, Jan (previously on NOCJ publications committee). Her list was more complete than any other available and we would not have been able to produce a satisfactory list without her help. Paul Brown also sent a copy of his list of Ron's published work. We searched indices and online sources, and also requested additional titles from a few reviewers. We are grateful for the help provided by all these people.

The largest bodies of information on orchids that Ron made available were his books on the wild orchids of California (1995) and the wild orchids of Arizona and New Mexico (2002). These books contributed a great deal to conservation, orchid biology and recreation. Following invitation he contributed chapters on orchids in the Arizona Rare Plant Field Guide and the 2nd edition of the Jepson Manual of vascular plants of California. His articles were published in the American Orchid Society Bulletin (now Orchids), Orchid Digest, Fremontia, Selbyana, Madroño and especially the Native Orchid Conference Journal.



Ron's two comprehensive books contributed a great deal to conservation, orchid biology and recreation.



Ron photographing Spreading Pogonia (*Cleistesiopsis sp.*) in North Carolina.
Photo by David McAdoo.

Ron's photos were published widely (in addition to sources listed below and many front covers of the Native Orchid Conference Journal). Photos have appeared in the following:

Sheehan, T.J. 2001, Ultimate Orchid, American Orchid Society.

Quinn, M. 2003. Wildflowers of the Mountain Southwest. Rio Nuevo.

Brown, P. M. 2003. The Wild Orchids of North America North of Mexico. University Press of Florida.

Sweet, C. A. 2004. Stalking Wild Orchids. Arizona Highways. 80(2) 16-19.

Kramer, K. 2010. Best of AZ. Arizona Highways. 84(8) 26.

Brandenburg, D. 2010. Field Guide to Wildflowers of North America.

Brown, P. M. 2019. Wild Orchids of the Southwestern United States. Koeltz Botanical Books.

His gallery on the "North American Lady's Slippers" (<https://northamericanorchidcenter.org/north-american-ladys-slippers/>) is very popular.

He also shared his passion for local orchids in the gallery "Orchids of the Southwestern US" (<https://northamericanorchidcenter.org/featured-orchids-of-southwestern-us/>).

Some of Ron's photos may also be seen in a gallery on the Native Orchid Conference website (<https://www.nativeorchidconference.info/gallery.html>).

Ron also contributed photos of rare southwestern orchids, not otherwise available, to the online identification aid for North American orchids called "Go Orchids" <https://goorchids.northamericanorchidcenter.org/>.

As well as publishing a great deal, Ron assisted with many research publications of others by providing ideas, information and material. He was involved in the discovery of several new species of orchids such as Star Shaped Spiranthes (*Spiranthes stellata*), Yosemite Bog Orchid (*Platanthera yosemitensis*), Coleman's Rein-orchid (*Platanthera colemanii*), and he contributed to the clarification of many others.

Ron's publications included most orchid genera of western North America. The subjects included distribution, ecology, taxonomy, variation, and conservation. He also wrote on initiatives of NOC Inc. (<https://www.nativeorchidconference.info/about-us.html>) of which he was a key executive member. Although Ron's publications focused on the southwest, he traveled throughout much of North America taking photos and he had a complete knowledge of North American Orchids which he shared with everyone.

Ron was a very skilled and cautious writer. He had a great deal of respect for those who had studied orchids in depth for a long time. He sought their advice and considered their ideas in detail. This made his work extremely valuable and unusually reliable.



Ron has two species of orchids named in his honor. These are Coleman's Coralroot, *Hexalectris colemanii*, (left) and Coleman's Rein Orchid, *Platanthera colemanii*, (right). The former was named in the second issue of the first volume of this journal: *Hexalectris revoluta* Correll var. *colemanii* Catling, Native Orchid Conference Journal 1(2): 14-15. (2004). Later it was considered to be worthy of the rank of species as *Hexalectris colemanii* (Catling) A.H. Kenn. & L.E. Watson, Systematic Botany 35: 74 (2010). Photo by R.A Coleman. This photo appeared on the cover of NOCJ 1(2) and other photos of *Hexalectris* taken by Ron were used to illustrate a synopsis of *Hexalectris* in the US (pp. 5-25) in the same issue.

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REMEMBRANCES OF RON COLEMAN

Ron Coleman, The California Years: bears, bogs and mountain lions.

Ron and I traveled down many wandering highways in the late 80's and early 90's linked by our passions for his orchids and my carnivorous plants (cps). Soon we would conclude; if you want to find orchids go to where the cps are lurking--ditto for cps with their frequent orchid associates. Synergized by this discovery we went on to explore thousands of miles in our search for these beautiful but often elusive plants. Later I would publish my book in 1991 and Ron would follow with his opus in 1995. Ron may be gone but his spirit is carried forward in my research and by the thousands of people he inspired over the years with his passionate knowledge and attention to detail.

-Hawkeye Rondeau

In the 1990's I was fortunate enough to have been hired to co-lead a trip from the Cleveland Metroparks to Southeastern Arizona. I had met Ron previously through activities in orchid groups and knew of his background. He was kind enough to invite our small group to his home where he put on a slide show of native orchids of the area a wonderful educational sidelight to our trip. He and his wife could not have been more hospitable; that's the kind of folks he and Jan are.

-Tom Sampliner

I was traveling to Arizona several years ago, and contacted Ron and Jan for directions to orchid locations. He apologized for not being available the only day I was, but not only gave me directions to a Corallorhiza wisteriana site, but also said he left some little colored markers to help me find the plants. He added to his directions, "go on this dirt road with gullies and ignore the "Do not enter when flooded" signs, it's not that deep", which I followed in my rental car, despite my trepidation, and he was right. What he didn't tell me about was the signs at the parking location "BEWARE of BEARS!" I had driven over an hour to get there. The orchids were close by and I found Ron's markers, so imagine me alone, lying on the brown pine needles, photographing small brownish orchids, yelling over and over again, as loud as I could, "Hey Bears, It's just me photographing orchids, and I'll be out of here VERY soon, the place is all yours!" Thanks, Ron, for the adventure and the memories. May you rest in peace!

-Jean Stefanik



*A few of us (myself, Ron Coleman, Stefan Ambs and Chris Ohanion) descended on Florida with Wally Wilder as our guide on July 1, 2009. We went to photograph the rare *Triphora craigheadii* north of Tampa. We were fortunate to get the plants in flower on one day (only day they opened). The next day we drove to Big Cypress to photograph the ghost orchids. Ron was reluctant to go into the swamp. But after a few minutes in the water he was great spirits and photographing away. He also was able to get photos of *Triphora gentionoides* in the swamp, a new one for him.*

-Mark Larocaue



"Photo taken by Brenda Kostiuk on a road in BC that had large colonies (many hundreds of plants) of Mountain Lady's-slipper. The road edges had some cutting and bulldozing several years before. In the photo is Hal Horwitz (recently deceased) front right, Ron Coleman in front left, David McAdoo back right and Paul Catling in back left. The photo was taken at a picnic spot on 15 June 2010 where we sat around eating cookies made by Hal's wife, chatting and taking photos of the spectacular orchids which were in peak bloom. The location was near Tete Jaune Cache. It was part of NOC Annual Meeting (Edmonton) in 2010 organized by Ben Rostron."

-Paul Catling



Top right: Ron and David McAdoo looking for orchids to photograph in the longleaf pine savanna during the NOC's 2012 conference held in North Carolina.

Left: Jan watches as Ron and Gary Van Velsir (bottom) photograph Rose Pogonia, *Pogonia ophioglossoides* near Brevard, NC. Photos by Marsha Kieffer



Above: Ron and Jan in a prairie in NW Minnesota photographing the federally threatened Western Prairie Fringed Orchid, *Platanthera praeclara* during the 2014 Native Orchid Conference in July.
Photos by Chelsea Kieffer

Below: A walk at Ponemah Bog with Dr. George Newman at the beginning of the 2015 Native Orchid Conference in New Hampshire. Photos by Chelsea and Marsha Kieffer.





Top: A group shot after photographing a nice specimen of the white form of Pink Lady's-slippers, *Cypripedium acaule* f. *albiflorum* during the Native Orchid Conference in Gorham, NH in 2015. From left to right: Duane Erdmann, Robert Freeman, Marsha Kieffer, Chelsea Kieffer, Jim Fowler, Ron Coleman, David McAdoo, Ben Rostron, Mark Rose, & Walter Ezell. Photo by Jim Fowler

Bottom: It's always nice catching up with orchid friends every year. —Dinner at the Town and Country Hotel during the 2015 Native Orchid Conference in Gorham, New Hampshire. Photos by Marsha Kieffer.

*I first met Ron Coleman in 2005 at the Native Orchid Conference in Winnipeg, Manitoba. It was clear that Ron knew, and was respected by, many people at the conference. I remember meeting him in person while we were both standing up to our knees in water photographing *Platanthera praeclara*. I did not know anyone there but we struck up an immediate conversation – possibly aided by the fact that we were both using the same “film” camera and lens, among the rest of the “digital” camera converts.*

My next fond memory of Ron was when I reluctantly agreed to give a presentation at the 2007 NOC in Florida on “Native Orchids and Groundwater.” Nervous about talking about orchids to a room full of orchid experts, I started my presentation with a slide listing several hydrogeology mathematical equations, and I joked something like “these are what I normally work with, but only a rocket scientist would understand them” ... and Ron interjected from the audience “but I’m a Rocket Scientist, and I don’t understand them!!!”

*I interacted with him through several later conferences, Edmonton 2010, Wilmington 2012, California 2013. We ended up traveling together in Minnesota 2014, and who can forget the 16 hour round-trip marathon drive, to see and photograph one small green orchid species (*Neottia auriculata*). I learned that Ron was also fond of home-made pie, and that Jan can drive for hours! By then we had become good friends, and in 2015 started the planning for the Benson, Arizona, 2016 NOC.*

Over the timeframe 2015 and 2016, I visited Ron and Jan in Arizona and stayed at their home some four times: scouting locations, hotels, restaurants, planning field trips, crossing flooded streams, and the like, all in preparation for the 2016 NOC. He willingly showed me dozens of his favorite spots and waited patiently while I photographed away. At least two times we were chased off of mountain tops in the Sky-Islands by lightning, much to the detriment of at least one digital-camera sensor (Duane’s!). I’m certain that we got along so well because Ron’s philosophy was much like mine: it is so much more enjoyable to share orchids with friends, than keeping them hidden to yourself. And, you always need better photographs! Who else would wait patiently while a crazy person photographed a lightning storm over the desert? (Ron did).

Those of you who attended Benson in 2016, remember the fun we had. Those who missed that meeting... you missed a gem.



*Over the years I remember Ron talking about his many adventures in Big Bend National Park in Texas. Generously, in September 2016, he and Jan offered to meet Catherine and me there, and Ron would lead us up the “marathon” Boot Spring Trail to see *Dichromanthus cinnabarinus*. I’ll never forget that as we got close, Ron relinquished the lead on the narrow mountain trail, saying “why don’t you go first” ... and there they were, two glorious plants, one standing some 60-70 cm tall!!! Catherine and I had traveled a couple of thousand miles to see two plants, but Ron was as happy as we were!*

*In 2017, it was my pleasure to return some of his generosity and show him two species he hadn’t seen before: *Cypripedium candidum*, and *Cyp. x andrewsii*. He was so excited that he finally got to see those and photograph those two species and be able to complete the article published as part of this issue.*

One of my favorite of Ron’s sayings was “you have to photograph every orchid in your state, in your state” ...

*I’m still working on it Ron, but I’ll let you know when I’ve got them all.
Rest in peace my friend.*

*Ben Rostron
Edmonton, Alberta
January, 2020.*

Remembering conservation work with Ron



*I first met and started working with Ron Coleman in the summer of 2015. Ron, several of us from the Desert Botanical Garden's Research Department and a plant ecologist from U.S. Fish and Wildlife Service conducted a survey for the Endangered *Spiranthes delitescens* (Canelo Hills ladies'-tresses) at two wetlands in southern Arizona over the course of two days. In 2016 Ron and I met again at the Native Orchid Conference in Benson, Arizona where we were recruited by Dennis Whigham, from the Smithsonian Institution, to collaborate with the North American Orchid Conservation Center (NAOCC). I jumped at the chance to work with Ron, who was the expert on southwestern orchids, on this important project. Over the course of two years Ron and I traveled to the Santa Catalina, Huachuca, Chiricahua and Pinaleno mountains collecting "roots," voucher specimens and seed for NAOCC.*

*I am still extremely impressed that Ron was so dedicated to the study and photography of orchids. It was his hobby but his two books, *The Wild Orchids of California* (1995) and *The Wild Orchids of Arizona and New Mexico* (2002), are a 'must have' for botanists and conservationists in the Southwest.*

*The amount of time Ron put in doing fieldwork for the books is honestly amazing. In addition to his books, Ron was also a co-author for the taxonomic treatments of *Hexalectris* and *Listera* for the *Flora of North America*, vol. 26 (2002) and an author of many papers in orchid society journals/publications. I am truly blessed that Ron was so willing to share his knowledge and time with me. He has inspired me to continue to work towards the understanding and conservation of orchids. Ron was an exceptionally friendly, kind and generous man and I enjoyed my time with him immensely. He will be missed greatly.*

-Andrew Salywon

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Left: Ron A. Coleman,
Photos by Eirini Pajak



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