

Species Status Assessment

Common Name	puttyroot	Date Updated:	2023-03-25
Scientific Name	<i>Aplectrum hyemale</i>	Updated By:	Richard M. Ring
Family	Orchidaceae		

Species Synopsis (*a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York*):

Puttyroot (*Aplectrum hyemale*) is a perennial herb in the orchid family. It is the only member of the genus *Aplectrum* in North America. *Aplectrum hyemale* ranges from western New England west through southern Quebec, southern Ontario, Michigan, Wisconsin, and southeastern Minnesota south to Arkansas, Tennessee, far northeastern Georgia, northwestern South Carolina, and the mountains of North Carolina. It is of conservation concern in much of its range, though considered secure in some of the mid-Atlantic and Appalachian states (Natureserve 2023). Range extent was estimated to be 2.1 million square kilometers, using herbarium specimens and photo-based observations documented between 1992 and 2023 (Flora of North America Editorial Committee 2002, GBIF 2023, iNaturalist 2023, Weakley and Southeastern Flora Team 2023).

In New York, the orchid *Aplectrum hyemale* occurs in rich, sometimes mesophytic woods, often found near limestone outcrops or in calcareous talus. Most of the sites where the species is currently known from in NY are deciduous or mixed deciduous-evergreen (New York Natural Heritage Program 2023). (Edinger et al. 2014, NYNHP 2023). It was once broadly distributed throughout most of New York, but it currently is known only from four small populations in Cattaraugus, Washington, Sullivan, and Monroe counties. Both the long and short-term population trends are strongly downward, although one new population was found in 2021. Collection, the decrease of soil pH from acid rain, impacts from deer browse, changes to its habitat by, or competition from invasive plants and earthworms, and changes to the mycorrhizal fungi community may be a factors in the decline of *Aplectrum* (NYNHP 2023). More surveys and research into *Aplectrum*'s ecology are needed to understand the trends in NY.

I. Status

a. Current legal protected Status

i. Federal:	Candidate:
ii. New York:	<u>Endangered</u>

b. Natural Heritage Program

i. Global:	<u>G5</u>
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ii. New York:

S1 Tracked by NYNHP?

On Active Tracking List

Other Ranks:

COSEWIC: Not listed in Canada

IUCN Red List: Not assessed by IUCN Red List

Status Discussion:

Aplectrum hyemale is Endangered in New York (Ring 2023). This orchid was more common in the 1800s and early 1900s with at least 25 collection sites documented across most of the state outside of Long Island. Today only 4 small populations are known to be extant, with a total population of fewer than 85 plants according to the most recent surveys. The reasons for its decline are not well understood, although collection, both for medicinal purposes and by orchid aficionados, may have been a factor. There appears to be plenty of habitat available across a large portion of the state. While it may seem unlikely that people would overlook an orchid, this is possible since the leaves are only visible from fall to spring, and the plants do not flower every year. Additional surveys in the late fall or early winter, when the evergreen leaves stand out best, are indicated (NYNHP 2023).

II. Abundance and Distribution

Region	Present?	Abundance	Distribution	Time Frame	Listing status or S-Rank	SGCN?
North America	Yes	Unknown	Unknown	Unknown		
Northeastern US	Yes	Unknown	Unknown	Unknown		
New York	Yes	Unknown	Unknown	Unknown	E	
Connecticut	Yes	Unknown	Unknown	Unknown	SH	
Massachusetts	Yes	Unknown	Unknown	Unknown	S1	
New Jersey	Yes	Unknown	Unknown	Unknown	S1	
Pennsylvania	Yes	Unknown	Unknown	Unknown	S4	
Vermont	Yes	Unknown	Unknown	Unknown	S1	
Ontario	Yes	Unknown	Unknown	Unknown	S2	
Quebec	No	-	-	-		

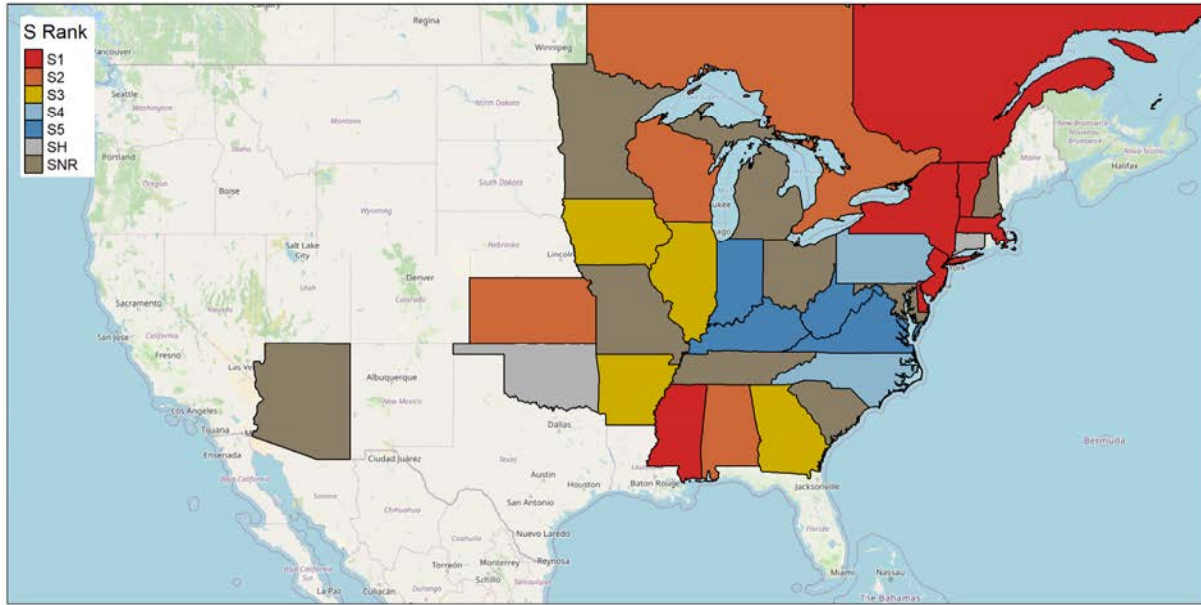


Figure 1 1: Aplectrum hyemale North American distribution.

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	Unknown

III. NY Rarity and Trends

Trends Discussion

There are four known extant populations now, one with 40 plants and the remaining three with fewer than 20 plants. This is in stark contrast to at least 30 known historical collection sites, most from the late 1800s through the early 1900s. So, the trend in NY is definitely downward over the last century or more. Puttyroot is also considered rare in most of the New England states and adjacent Canada, although it is more abundant in the mid-Atlantic and Appalachian states (Natureserve 2023). Two of the extant populations had no plants recorded when last surveyed, and three of them are small populations with decreasing population sizes while the first is only recently discovered, so the short-term trend is also downward.

Details of historic and current occurrence

Historically this orchid has been reported throughout the state outside of Long Island, from at least 25 locations, but today it is only known from only four populations in the Adirondack Foothills, the Cattaraugus Hills, the Eastern Allegheny Plateau, and the Lake Ontario lakeplain. The marked decrease in number of populations may be the result of changing habitats, over-collection, deer browse, or a combination of these factors. The extant sites were last surveyed from 2016 to 2022 (NYNHP 2023).

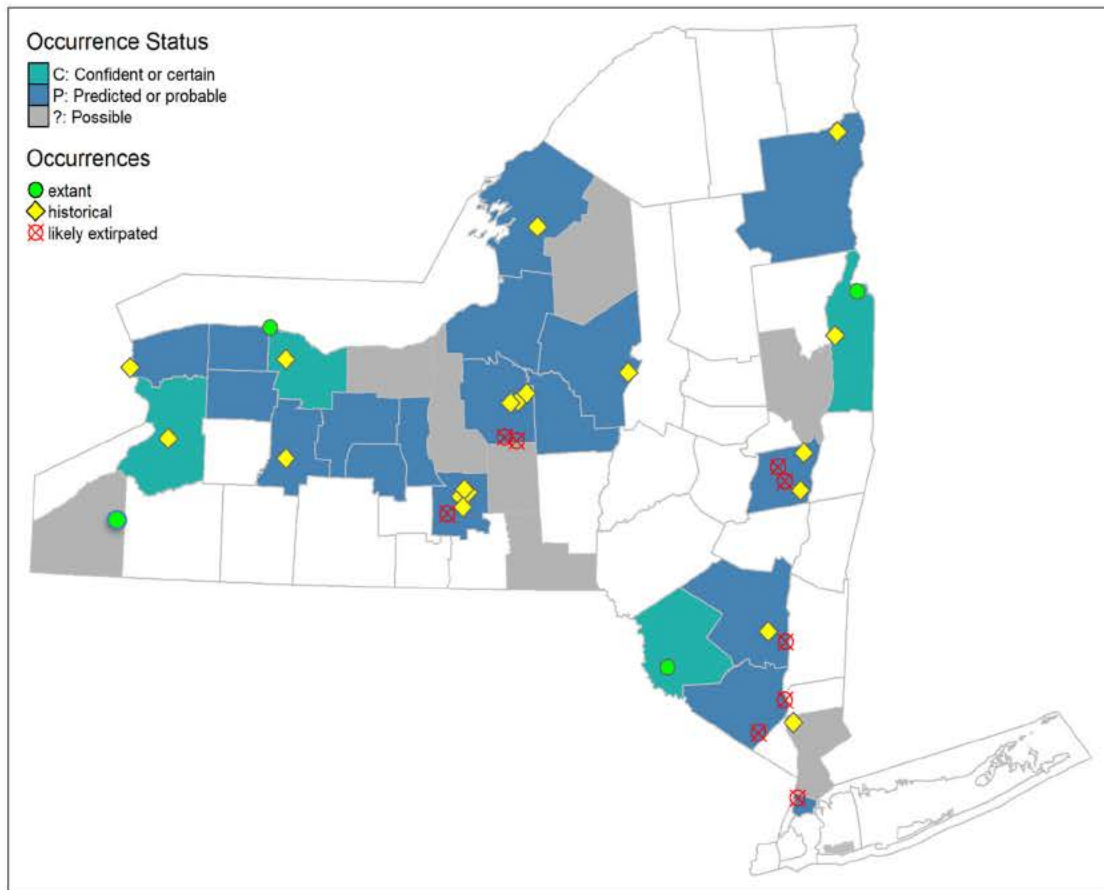


Figure 22: NYS distribution for *Aplectrum hyemale*.

Table 1. Number of records (element occurrences) of *Aplectrum hyemale* grouped by the dates known to be extant (the years spanning first observation to last observation) and the number and percent of total of USGS 7.5 minute map quadrangles these observations fall within for New York State.

Years	# of Records	# of distinct quads	% of quads in State
Pre-1995	29	41	4.2
1995-2004	1	1	0.1
2005-2014	2	2	0.2
2015-2023	3	3	0.3

Monitoring in New York

One extant population occurs on NY State Park lands, and is surveyed on a 5 to 10 year rotation. An additional population occurs on NY State Multiple Use Area lands and is monitored on a 5 year cycle. The remaining two occur on private land, and have no regular monitoring schedule. The last surveys for these four populations range from 2, to 5 - 10 years ago.

IV. Primary Habitat or Community Type (from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):

NE Terrestrial Habitat Classification Macrogroup: Cliff and Talus, Northern Hardwood and Conifer.

NatureServe broad habitat types: Forest – Hardwood.

NY Natural Heritage Communities: Appalachian oak-hickory forest, Limestone woodland, Beech-maple mesic forest, Calcareous talus slope woodland, Maple-basswood rich mesic forest, Rich mesophytic forest (Edinger et al. 2014).

Habitat or Community Type Trend in New York

Declining:	Stable:	Increasing:	Unknown: ✓
Time Frame of Decline/Increase:			
Habitat Specialist	Yes: ✓	No:	

Habitat Discussion:

This is an orchid of rich woods, often found near limestone outcrops or in calcareous talus. Most of the sites where the species is currently known from in NY are deciduous or mixed deciduous-evergreen (New York Natural Heritage Program 2023). It occupies similar habitats elsewhere in its range, although it also is reported from swampy woods or bottomlands (FNA 2002, Voss 1972, Rhoads and Block 2000).

V. Species Demographics and Life History

Puttyroot is a perennial, herbaceous orchid species. It has an unusual life history, in that new leaves emerge in the fall, photosynthesize when exposed through the winter, and die back before the flower stalks emerge in the spring. This habit makes the species harder to detect during the growing season when botanists are most likely to be conducting field surveys. Like many orchids, puttyroot flowers produce no nectar and thus little reward to potential pollinators. However, bees and other insect visitors may assist self-pollination by removing the anther cap covering the pollen (NAOCC 2024). It also can reproduce autogamously – that is, produce seeds from self-pollination. Self-pollination may allow higher seed sets than outcrossing, although it also reduces genetic variability within populations, which has been found to be the case in studies of puttyroot (NAOCC 2024). Puttyroot fruits are dry capsules that open to release a multitude of tiny seeds which disperse on the wind.

Like most North American orchids, *Aplectrum hyemale*'s tiny seeds require mycorrhizal associations to successfully germinate and grow to maturity. *Rhizoctonia neottiae* is one fungal associate that has been found to associate with *Aplectrum*, although there may be others (MacDougal & Dufrenoy 1944). The plants do not flower every year (Richburg 2004), which may make detection even more difficult. Some northeastern orchid species are also known to be able to survive underground for one or more years without even sending up leaves, although that habit has not yet been documented for puttyroot (Richburg 2004).

Table 2. Phenology of *Aplectrum hyemale* in New York State (NYNHP 2023).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flowering					█							
Fruiting						█						
Vegetative			█							█		

VI. Threats

There are many factors that have likely led to the sharp decline of this orchid in NY, and that threaten its future. Among these are acid rain deposition and associated lowering of soil pH, site disturbance, including but not limited to invasive plants and animals (earthworms), collection, and deer herbivory. The newest site is threatened by trampling from a trail that bisects it. (NYNHP 2023, 2024). Changes to the mycorrhizal fungi community of the soil is another threat that has been inadequately researched.

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes:

No:



Unknown:

If yes, describe mechanism and whether adequate to protect species/habitat:

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

More frequent monitoring and protective actions are needed at the three remaining known extant sites, including invasive species management and reduction of deer density.

Complete Conservation Actions table using IUCN conservation actions taxonomy at link below. Use headings 1-6 for Action Category (e.g., Land/Water Protection) and associated subcategories for Action (e.g., Site/Area Protection) -

<https://www.iucnredlist.org/resources/conservation-actions-classification-scheme>

Table 3. Recommended conservation actions for *Aplectrum hyemale*.

Conservation Actions	
Action Category	Action
Land/water protection	1.1. Site/area protection
Land/water protection	1.2. Resource & habitat protection
Land/water management	2.1. Site/area management
Land/water management	2.2. Invasive/problematic species control

Conservation Actions	
Action Category	Action
Land/water management	2.3. Habitat & natural process restoration

VII. References

This SSA drew heavily from these resources:

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Ring, Richard M. 2023. New York Rare Plant Status Lists. New York Natural Heritage Program, State University of New York College of Environmental Science and Forestry, Albany, NY. December 2023. 108 pp.