

Amelanchier sanguinea

Round-leaf Service-berry

Rosaceae



Amelanchier sanguinea courtesy R. W. Smith, Lady Bird Johnson Wildflower Center

***Amelanchier sanguinea* Rare Plant Profile**

New Jersey Department of Environmental Protection
State Parks, Forests & Historic Sites
State Forest Fire Service & Forestry
Office of Natural Lands Management
New Jersey Natural Heritage Program

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Life History

Round-leaf Service-berry (*Amelanchier sanguinea*) is a deciduous shrub or small tree in the Rose family (Rosaceae). It usually occurs singly or with several trunks (up to 20 stems) growing to 7 m (23 ft) and often forming small colonies by the spread of rhizomes (Campbell et al. 2020; Chafin 2019). Wiegand (1912) described the stems as straggling or arching in appearance. The bark on the main stems is smooth and gray with shallow furrows, and the twigs have a reddish-brown appearance (Chafin 2019).

The leaves of Round-leaf Service-berry are alternate, simple, coarsely toothed with 2–6 teeth per cm along the margin, with parallel lateral leaf veins or forks extending into the teeth, appearing “*Ulmus*-like” according to Wiegand (1912). Leaves are rounded to cordate at the base, 3–7 cm long and 2–5 mm wide with petioles that are usually > 10 mm ([8–]11.3–18.1[–25] mm) (Campbell et al. 2020; Native Plant Trust 2023; Natural Resources Canada 2015; Weakley et al. 2022). At flowering the leaves are sparsely to densely pubescent on the upper side, becoming less so as they mature (Campbell et al. 2020; Gleason and Cronquist 1963; Weakley et al. 2022).



Left: Britton and Brown 1913, courtesy USDA NRCS 2023a. Right: Courtesy R. W. Smith (2011), Lady Bird Johnson Wildflower Center.

The flowers of Round-leaf Service-berry have five 11–18 mm linear to narrowly spatulate white petals that are borne in four to many-flowered nodding clusters at the end of new growth. The sepals are recurved or spreading after flowering and (1.8–)2.5–4.1(–6) mm in length. The flowers of service-berries typically bloom before the leaves are fully grown (Natural Resources Canada 2015; Weakley et al. 2022) with flowering occurring from late April to mid-May or later into June depending on location. Fruits ripen in late May and June in more southern regions or elsewhere in July and August (Campbell et al. 2020; Weakley et al. 2022). Berry-like, they are dark purple to almost black when mature.

Service-berries can be difficult to identify as they often hybridize and intergrade. The Pennsylvania Natural Heritage Program (PANHP 2019) noted that *A. sanguinea* may be

overlooked for this reason in that state if surveys are conducted outside of the blooming period and it may also be missed as it often grows in inaccessible “rugged” habitat. *A. sanguinea* can be differentiated from Allegheny Service-berry (*A. laevis*), Downy Service-berry (*A. arborea*), and Canadian Service-berry (*A. canadensis*) by the fact that the ovaries of *A. sanguinea* are tomentose at the summit (vs. glabrous at the summit for the other three species) (Gleason and Cronquist 1963). Also, according to Wiegand (1912), *A. sanguinea* flowers 10 to 14 days later than *A. arborea* or *A. laevis*.

Pollinator Dynamics

As early blooming spring shrubs, native service-berries provide important pollen and nectar resources to native bees and non-native Honey Bees (*Apis mellifera*) (Krochmal 2016; Lady Bird Johnson Wildflower Center 2022). Examples of native pollinators observed visiting members of the *Amelanchier* genus that are likely pollinators of *A. sanguinea* include long-tongued bees (e.g., Apidae – Large Carpenter Bee [*Xylocopa virginica*], Bumble Bees [*B. bimaculatus* and *B. pensylvanica*]; Anthophoridae – Doubled Carpenter Bee [*Ceratina dupla dupla*], *Nomada* spp.; Megachilidae – *Osmia taurus*); short-tongued bees (e.g., Halictid bees – *Agapostemon sericea*, *Halictis* spp., *Lasioglossom* spp.; Colletidae – *Colletes inaequalis*; and Andrenidae – *Andrena* spp.). Many fly species visit flowering *Amelanchier* including Syrphid flies (e.g., *Eristalis* spp. and others), the Greater Bee Fly (*Bombylius major*), and species from other genera. Several beetle species have also been observed, although their effectiveness as pollinators for *Amelanchier* is not known (Hilty 2020 and references therein).

Seed Dispersal

A. sanguinea produces 10 mm-diameter dark purple to black fruits (pomes) (Campbell et al. 2020) considered to be juicy and sweet (Krochmal 2016). Fruits begin to mature immediately after flowering in *Amelanchier* (Stiles 1980); they ripen in mid-to-late summer during July and August in New Jersey and northern areas, falling to the ground soon after ripening. In more southern regions fruits mature earlier, May through June (Chafin 2019). The seeds themselves are dark brown with a leathery seed coat, and 5 to 10 seeds are produced per fruit (Lady Bird Wildflower Center 2022; Natural Resources Canada 2015).

Stiles (1980) classified the fruits of *Amelanchier sanguinea* as “summer small-seeded”, described with the following characteristics: low in lipids and high in sugars, growing within 2.0 m (6.5 ft) of the ground, having small seeds with tough seed coats, and not retained on the plant once mature. Both resident birds and mammals feed on the fruits. Examples include birds such as American Robin (*Turdus migratorius*), Cedar Waxwing (*Bombycilla cedrorum*), Gray Catbird (*Dumetella carolinensis*), crows (*Corvus* spp.), orioles, and thrushes (Martin et al. 1951; Stiles 1980) and mammals such as American Beaver (*Castor canadensis*), Red and Gray Foxes (*Vulpes vulpes* and *Urocyon cinereoargenteus*, respectively), Eastern Gray Squirrel (*Sciurus carolinensis*), Eastern Chipmunk (*Tamias striatus*), and bears (*Ursus* spp.). Each of those aid in seed dispersal once the fruits are digested. While dispersal by birds can occur over long distances to other forest patches (Catling and Mitrow 2006) especially during migration, Stiles (1980)

suggests that the timing of fruit ripening and the fruit quality in *Amelanchier* and other similar species have evolved to target resident bird and mammal species and for this reason dispersal would be more local. Once consumed, fruit seeds can be voided or expelled by birds relatively quickly (e.g., 30–45 minutes or less) (Stiles 1980 and references therein), which would also result in a more localized seed distribution.

If propagating the species by seed, the Lady Bird Wildflower Center (2022) recommends collecting the seeds after ripening and cleaning them as soon as possible to prevent fermentation. Seeds require cold-moist stratification for 90 to 120 days to germinate and if properly dried and stored under refrigeration can remain viable up to five years (Lady Bird Wildflower Center 2022; Rantala-Sykes and Campbell 2017). Round-leaf Service-berry can also spread by suckers and stolons/rhizomes, creating thickets with many stems (Chafin 2019).

Habitat

Range wide, Round-leaf Service-berry grows on dry rocky slopes, in scrubby woods and woodland edges, along shorelines and river ledges, and on cliffs and outcrops, especially over mafic or calcareous rock (Campbell et al. 2020; Chafin 2019; ODNR 2020; PANHP 2019; Weakley et al. 2022). It is found mostly in the mountainous counties in West Virginia (Strausbaugh and Core 1978) and in Pennsylvania (PANHP 2019); similarly in Georgia it occurs in the higher elevation northern sections of the state—on gneiss and mafic outcrops in the northeast and on sandstone outcrops in the northwest (Chafin 2019). In Massachusetts it was reported growing on “wooded slopes in calcareous soil” (Coddington and Field 1978). In Michigan it grows in dry open sandy savannas, thickets, forest borders and even in bogs (Reznicek et al. 2011); in Wisconsin it is also most common on sandy soils (Fewless 2009). In southeastern Saskatchewan, Canada the only known population of the Round-leaf Service-berry is confined to the wooded areas of the Moose Mountain plateau, which lies 100–150 m (328–492 ft) above the surrounding prairie (Catling and Mitrow 2006). Elsewhere, it has been found growing up to 1,000 m (3,281ft) in elevation (Campbell et al. 2020).

In New Jersey the single *Amelanchier sanguinea* occurrence is located at the edge of the woods adjacent to a limestone quarry. The species is considered an associate of the Sugar Maple–Chinquapin Oak Forest type, an S2 community in the state. This community type is typically found on calcareous substrate, in dry soils on slopes or summits of limestone ridges and outcrops. In addition to Sugar Maple (*Acer saccharum*) and Chinquapin Oak (*Quercus muehlenbergii*), the canopy includes other *Quercus* species, Shagbark Hickory (*Carya ovata*), Redbud (*Cercis canadensis*), *Fraxinus* spp., and American Basswood (*Tilia americana*) (Breden et al. 2001).

Many plants in the Rosaceae are considered to have associations with mycorrhizal fungi, which enhance nutrient and water uptake in the host plant. While Wang and Qiu (2006) did not review any *Amelanchier* species, they noted other trees in the Rose family (e.g., *Pyrus* spp. and *Malus* spp.) as facultatively mycorrhizal, exhibiting an association with arbuscular mycorrhizae. Research on the more closely related Canadian Service-berry found that this species does have an association with arbuscular mycorrhizal fungi (Berliner and Torrey 1989). *Amelanchier*

alnifolia is known to have an association with both arbuscular and ectomycorrhizal fungi (Piotrowski et al. 2008). Therefore, it is likely that *Amelanchier sanguinea* has a similar beneficial association, at least with arbuscular mycorrhizal fungi.

Wetland Indicator Status

Amelanchier sanguinea is not included on the National Wetlands Plant List (NWPL). Any species not on the NWPL is considered to be Upland (UPL) in all regions where it occurs. The UPL designation means that it almost never occurs in wetlands (U. S. Army Corps of Engineers 2020).

USDA Plants Code (USDA, NRCS 2023b)

AMSA

Coefficient of Conservancy (Walz et al. 2020)

CoC = 10. Criteria for a value of 9 to 10: Native with a narrow range of ecological tolerances, high fidelity to particular habitat conditions, and sensitive to anthropogenic disturbance (Faber-Langendoen 2018).

Distribution and Range

The global range of *Amelanchier sanguinea* is restricted to the United States and Canada (POWO 2023). The map in Figure 1 depicts the extent of Round-leaf Service-berry in North America.

The USDA PLANTS Database (2023b) shows records of *Amelanchier sanguinea* in two New Jersey counties: Passaic and Sussex (Figure 2). Specimens labeled as *A. sanguinea* have also been collected in Bergen and Gloucester counties (Mid-Atlantic Herbaria 2023). The data include historic observations and do not reflect the current distribution of the species.

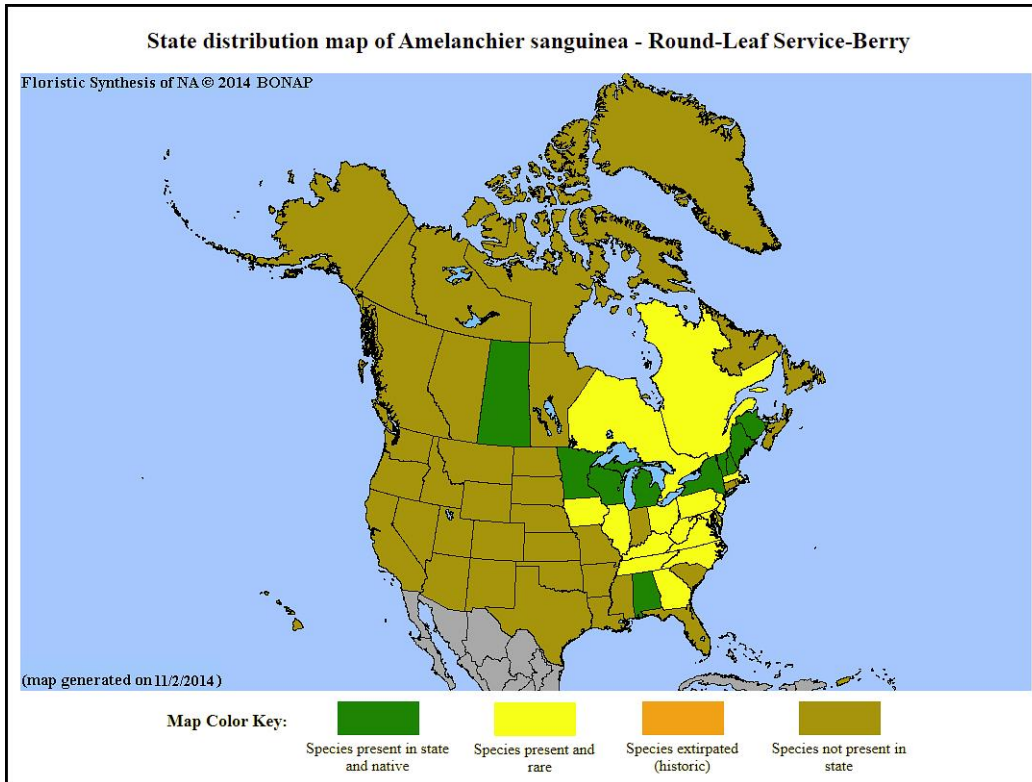


Figure 1. Distribution of *A. sanguinea* in North America, adapted from BONAP (Kartesz 2015).

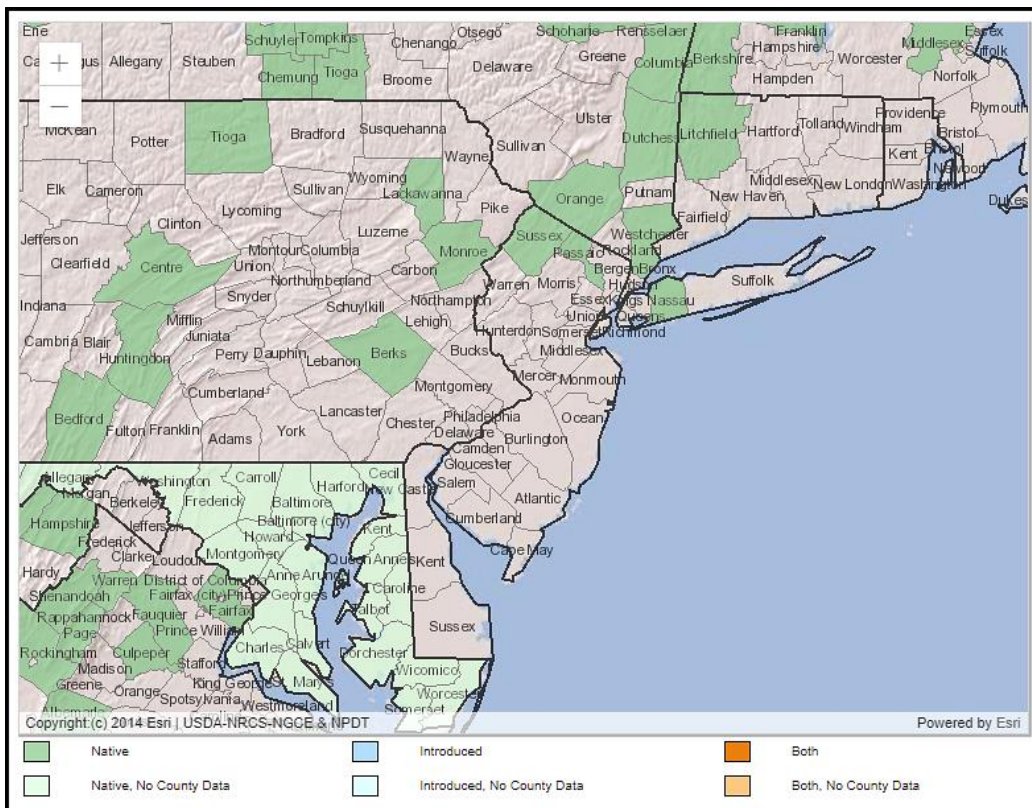


Figure 2. County records of *A. sanguinea* in New Jersey and vicinity (USDA NRCS 2023b).

Conservation Status

Amelanchier sanguinea is considered globally secure. The G5 rank means the species has a very low risk of extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats (NatureServe 2023). The map below (Figure 3) illustrates the conservation status of *A. sanguinea* throughout its range. However, the rarity of Round-leaf Service-berry in states where it was listed as *A. sanguinea* var. *sanguinea* (see Synonyms section) is not reflected. It does appear that populations at the periphery of the species' range and some of those at higher elevation are most at risk of decline.

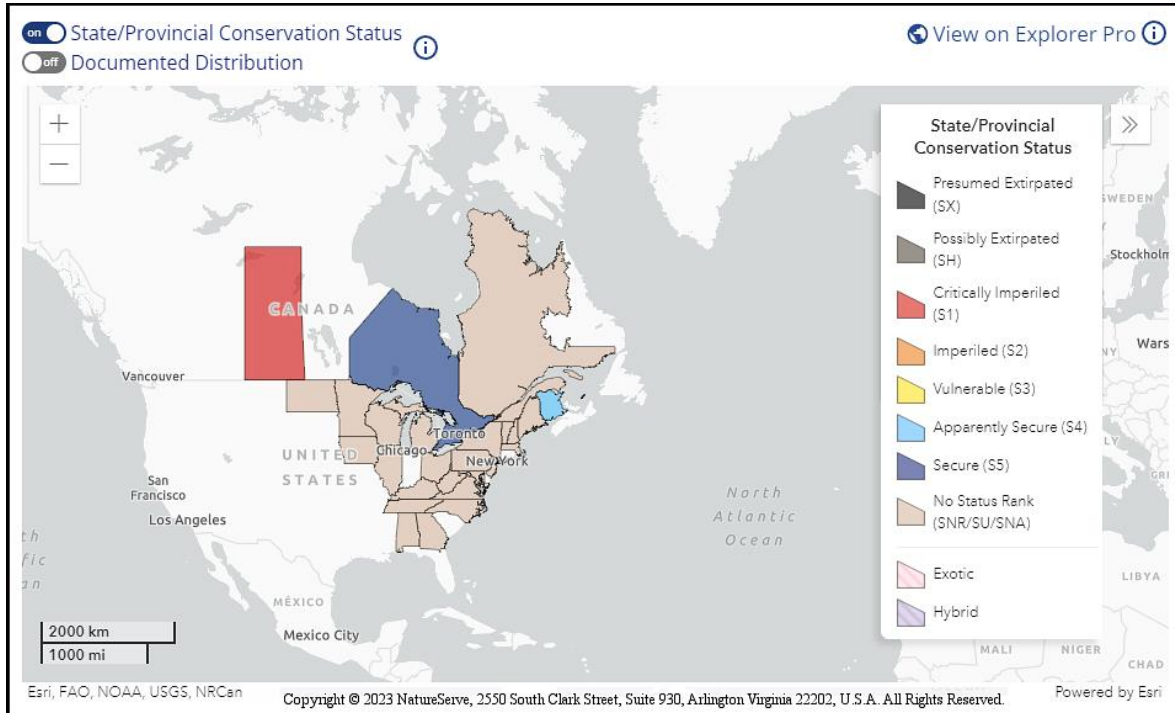


Figure 3. Conservation status of *A. sanguinea* in North America (NatureServe 2023).

Amelanchier sanguinea is ranked S1.1 in New Jersey, meaning that it is critically imperiled due to extreme rarity. A species with an S1.1 rank has only ever been recorded at a single location in the state. Hough (1983) reported an earlier sight record of *Amelanchier sanguinea* in Sussex County, but the location of the state's only confirmed occurrence was not documented until 1992 (NJNHP 2022). *A. sanguinea* is also listed as an endangered species (E) in New Jersey, meaning that without intervention it has a high likelihood of extinction in the state. Although the presence of endangered flora may restrict development in certain communities being listed does not currently provide broad statewide protection for plants. Additional regional status codes assigned to the species signify that Round-leaf Service-berry is eligible for protection under the jurisdictions of the Highlands Preservation Area (HL) and the New Jersey Pinelands (LP) (NJNHP 2010).

Threats

New Jersey's one occurrence was last visited in 1992. At that time, no mention was made of specific threats to the species other than the fact that it was a small colony in a single location, and as such was determined to have poor estimated viability (NJNHP 2022). The population was located adjacent to a quarry that had recently closed; it is not known whether or how the population has been affected by property use since then (NJNHP 2022). It is possible that past human activity (e.g., quarry construction/resource extraction) had an impact on this and other populations that may have been in the area in the past.

While human activities such as logging and development are often threats to rare plant populations, in Georgia neither are considered to have had much of an impact on *A. sanguinea* populations to date because high elevation and dry, rocky habitat has made the sites relatively inaccessible. However, recreational activity is an ongoing concern (Chafin 2019). That may not be the case elsewhere in the range.

Herbivory has not been noted as a major threat to *A. sanguinea* although the Ohio Department of Natural Resources (ODNR) website (2020) does mention deer as well as grouse and/or squirrels as potential browsers on the twigs, buds, bark, or fruits of *A. sanguinea* and Martin et al. (1951) do include deer on their list of hoofed browsers that feed on the foliage and twigs of service-berries. According to Perdomo et al. (2003), the related Canadian Service-berry, Downy Service-berry, and Allegheny Service-berry are considered “seldom severely damaged” by White-tailed Deer (*Odocoileus virginianus*). Of course, the susceptibility of plants to deer herbivory depends in a large part on the size of the deer population, location and type of habitat, and weather conditions.

Amelanchier sanguinea is considered an early-successional forest tree and grows best in open areas, beneath canopy openings, or along forest edges. It is possible that canopy closure over time may reduce habitat suitability for the species (ODNR 2020). In Georgia, Chafin (2019) noted that diseases such as fire blight (caused by the bacterium *Erwinia amylovora*) or other diseases of related species (such as of cultivated apples, pears, roses, blackberries) may be spread by pollinators even to the “remote locations” where this plant is found.

Climate change is affecting all species, and *Amelanchier* is no exception. The date of first flowering in related *A. canadensis* as studied by Abu-Asab et al. (2001) was found to have advanced by six days over a 30-year period (from 1970–1999) in Washington, DC due to the warming climate. It is likely that the rate of change has accelerated since then, for an even earlier date of first flowering in the ensuing 20-year period. Because service-berries are pollinated by a diversity of insect species the threat of pollinator mismatch may not be an issue despite this advancement in flowering time. (Pollinator mismatch may occur when the emergence of a specialist pollinator and the blooming period of the target flower species no longer coincide.)

However, climate change is altering local environments with impacts apart from earlier flowering dates. Diseases such as fire blight mentioned above have spread farther north and become more virulent in recent years (Robbins 2019) due in part to changing climatic conditions. Native to North America, the disease mainly affects commercial orchards and ornamental trees (including *Amelanchier* spp.); its potential to spread to wild relatives is unknown. In Georgia, it

was noted that climate change may cause higher elevation habitats to become too hot and dry to support this species in the future (Chafin 2019). Similarly, the New Jersey Department of Environmental Protection (NJDEP) (2020) predicts altered precipitation patterns and higher incidences of periods of summer drought. Although *Amelanchier sanguinea* may be relatively tolerant of drier soils once it has become well established, drier conditions overall may negatively affect seed germination and reduce survival in future years.

Management Summary and Recommendations

An important priority for this species is to conduct a new site visit to ascertain the status of the population, its current viability, and to identify existing and potential threats should the population remain extant. Once an assessment is completed, it will become more clear what management actions are needed. Issues that might be considered include overstory management, fencing or deer control, or invasive species removal.

Continued research is needed to determine the actual status throughout the species' range and whether there are any unique life history requirements that warrant special habitat management or treatment. Another potential question of interest: Has habitat fragmentation played a role in the decline such that, despite animal dispersal, seeds may not be moved sufficient distance to become established in new suitable habitat patches?

In Georgia, management recommendations for Round-leaf Service-berry populations included the protection of its high elevation outcrops from recreational use (e.g., rock climbing, rappelling, and camping) and the relocation of hiking trails away from known populations of the species. Preventing or deterring development on high elevation ridges and outcrops (Chafin 2019) was also noted as important.

This species has been reported from a wide geographic range, from Georgia north to Canada. However, it is considered by many to be more characteristic of northern regions or higher elevations. As such, the climate changes that are occurring do not bode well for the survival of this species as those habitats continue to warm up and become drier. In particular, New Jersey's single extant population may struggle to persist over the longer term.

Synonyms

The accepted botanical name of the species is *Amelanchier sanguinea* (Pursh) DC. Orthographic variants, synonyms, and common names are listed below (Campbell et al. 2020; ITIS 2023; POWO 2023; Weakley et al 2022). Until relatively recently, two varieties of *A. sanguinea* were recognized, the one in New Jersey being *A. sanguinea* var. *sanguinea*. The other variety, *A. sanguinea* var. *gaspensis*, occurs only in Canada, Maine, and Michigan and is now widely treated as a full species, *A. gaspensis* (Campbell et al. 2020; ITIS 2023; Kartesz 2015; NatureServe 2023; POWO 2023).

Botanical Synonyms

Amelanchier sanguinea (Pursh) DC.
Amelanchier amabilis Wiegand
Amelanchier canadensis var. *rotundifolia* (Michx.) Torr. & A. Gray
Amelanchier huronensis Wiegand
Amelanchier pallida var. *arguta* Greene
Amelanchier sanguinea var. *grandiflora* (Wiegand) Rehder

Amelanchier sanguinea var. *sanguinea*
Amelanchier sanguinea (Pursh) Nutt.
Amelanchier sanguinea var. *arguta* (Greene) P. Landry
Mespilus canadensis var. *rotundifolia* Michx.
Pyrus sanguinea Pursh

Common Names

Round-leaf Service-berry
Roundleaf Juneberry
Huron Serviceberry
Shore Shadbush
Red-twiggged Shadbush
New England
Serviceberry
Roundleaf Shadbush
Rock Serviceberry

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