

Evaluation of Native U.S. Shrubs at Purdue

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In 1954, a small group of dedicated horticulturists under the leadership of Professor S.A. McCrory of South Dakota State College (now University) recognized the inconsistency of plant performance across the Midwest resulting in the formation of the NC-7 (North Central project number 7) Regional Ornamental Plant Trials. Objectives of the program are to better assess plant performance across a broad range of environments and climatic extremes and expand the range of useful landscape plants, while placing emphasis on detailed, long-term evaluations. The trials are one of the longest-running landscape plant evaluation networks in the U.S. Each year a small number of promising new trees and shrubs are offered for testing to approximately 30 trial sites across 18 states. Plants selected for trial are acquired through plant explorations, seed or other propagule exchange, or direct donations from other institutions. Factors influencing plant selection include assessments of hardiness and aesthetics, ease of propagation and culture, naturalization potential, and specific interests of trial site cooperators. Non-native species are evaluated through this program, but a large number of the selections are native to the U.S.

There is a growing demand for native plants in the landscape (McMahan, 2006). Native plants account for an increasing proportion of all plant sales (Hamill, 2003) and the use of native plants by landscape designers has increased in recent years (Brzuszek et al., 2007). Regardless of whether a plant is native or introduced, genetics and the environment influence plant performance. Plants vary genetically in growth patterns, flowering, and susceptibility to insects and disease. Environmentally, plants may or may not establish in extreme cold or hot temperatures or succumb to prolonged dry or wet soil conditions. For example, a plant that is native to an area with warm winters and abundant annual rainfall (e.g., Storrs, CT) may flourish in that environment, but perform very poorly in a site that experiences very cold winters and minimal amounts of annual rainfall (e.g., Bismarck, ND).

Since 2007, the Mickelbart lab at Purdue has been evaluating the native plant materials available through the NC-7 program. Plants are established in mulched rows, fertilized minimally each year, and irrigated as needed to avoid stress, especially during establishment. Once established, plants are observed and evaluated throughout the seasons at one, five, and ten years after planting. In addition to making a 10-year commitment to evaluate the plants, our goal is to keep them growing for the foreseeable future for evaluation and as a demonstration plot for anyone who wants to see how a particular selection is growing in central Indiana.

This report gives details of the selections growing at the Purdue horticulture farm and their growth to date under the conditions described. Table 1 gives details of each of the selections growing at the horticulture farm, as well as their current size.

‘September Sun’ Seaside Alder (*Alnus maritima* subsp. *oklahomensis*). Native to a small area of south-central Oklahoma, subsp. *oklahomensis* forms a large, multi-trunked shrub with dark green foliage and pendulous catkins of yellow male flowers from mid-August to late-September (Figure 1). Foliage of ‘September Sun’ can become mottled blends of orange and yellow during autumn. The fruits of ‘September Sun’, brown cone-like strobili, persist on branches through winter, providing subtle ornamental value. Additional description information on ‘September Sun’ was published in the report by Graves

and Schrader (2004). This selection has excellent resistance to flooding and is also more drought tolerant than are other cultivated alders. Its symbiotic relationship with the ubiquitous, nitrogen-fixing soil bacteria, *Frankia*, makes ‘September Sun’ an excellent shrub for nitrogen-poor soils. It should be planted in moist to wet soils and in full sunlight. ‘September Sun’ was selected from a large seedling trial at Iowa State University, Ames, Iowa by Dr. Bill Graves. The seed source for ‘September Sun’ was collected from a natural stand along the Blue River near Tishomingo, Oklahoma. ‘September Sun’ can be propagated from softwood cuttings and can reach 2 m (6 feet) in height within two seasons of growth. The plants at the Purdue horticulture farm were moved in 2009, which may explain their relatively small size (Table 1).

Red Chokeberry (*Aronia arbutifolia*). Native to the southeastern United States, *Aronia arbutifolia* ranges from eastern Texas to northern Florida continuing north into New England. Red chokeberry can be found growing in bogs, savannahs, moist rocky seeps, and moist pine barrens as a multi-stemmed, upright (but suckering) shrub reaching 1 to 3 meters (3 to 9 feet) tall and 1 to 1.5 meters (3 to 4.5 feet) wide. The genus *Aronia* is rapidly gaining popularity as both a versatile ornamental landscape shrub and nutraceutical fruit crop (Brand, 2010). Red Chokeberry is an excellent choice of native plant for the landscape as it provides ornamental interest almost all year round. In early spring, Red



Figure 1. ‘September Sun’ seaside alder at the Purdue horticulture farm.

Table 1. List of native shrubs planted at the Meigs Horticulture Farm in Tippecanoe Co., Indiana. Height and width were collected on three plants of each species in June 2012.

Botanic name	Selection	Cultivar	Common name	Family	Source	Year planted	Height (ft)	Width (ft)	Hardiness
<i>Alnus maritima</i>	Ames 27961	'September Sun'	Seaside alder	Betulaceae	Iowa	2007	4.5	4.5	4
<i>Aronia arbutifolia</i>	PI 658641		Red chokeberry	Rosaceae	South Carolina	2011	2.5	2.0	4
<i>Cercis canadensis</i>	Ames 27321		Eastern redbud	Fabaceae	Iowa	2007	8.5	8.0	4
<i>Cercis canadensis</i>	Ames 27322		Eastern redbud	Fabaceae	Iowa	2007	9.0	8.5	4
<i>Physocarpus opulifolius</i>	Ames 27797		Common ninebark	Rosaceae	Pennsylvania	2007	4.0	6.5	2
<i>Physocarpus opulifolius</i>	Ames 27970	'Center Glow'	Common ninebark	Rosaceae		2008	6.5	8.0	3
<i>Rhus copallinum</i>	Ames 13815	'Morton' Prairie Flame™	Shining sumac	Anacardiaceae	Illinois	2009	3.5	5.0	5 to 7

Chokeberry displays small 8-12 mm (~½ inch) white flowers arranged in clusters (corymbs) that are commonly visited by small solitary bees, bumblebees, hemipterans, and flies (Hardin, 1973). Flowers are contrasted against dull green leaves that are pubescent underneath. Scarlet red leaves intermixed with shades of green slowly appear in the fall, ultimately turning to all red. After leaves drop, bright red fruits are persistent throughout winter. Although fruits are not initially targeted by wildlife most likely due to strong tannins (Brand, 2010), fruits are eventually consumed in late winter. The seeds of this accession were collected in Pickens County, South Carolina by Dr. Joe-Ann McCoy.

Eastern Redbud (*Cercis canadensis*). As one crosses the Nebraska state line into Kansas in April the feeling of spring is truly alive, especially when the redbuds are in peak bloom. Variable shades of pink and red flower clusters generally form on older stems creating graceful splashes of color in the landscape even from great distances. Growing across open hillsides, popping up in clearings and edges of forest canopies, and thriving along fence lines, this spring phenomena can be greatly appreciated, especially by those who come from parts of the country where this species is uncommon or absent. Redbuds with exceptional cold hardiness are needed to expand the range of adaptation. Seed of both accessions growing at Purdue were collected by Mark P. Widrlechner and Sharon K. Dragula in the southeastern portion of Iowa. We have planted these with our shrubs because of their size, even though

they will attain the height and form of small trees. Their moderate size and dense foliage make them useful as large shrubs in the landscape.

NCRPIS Compact Selection Common Ninebark (*Physocarpus opulifolius*). The popularity of this species has become evident over the last couple of years, largely due to the vibrant, purple-leaved cultivars available in the nursery trade. Common ninebark is typically a minor component of dry, rocky, upland habitats in the North Central U.S. However, this species can be found growing in lowland areas of standing water or along stream banks in the Eastern U.S. This ability to grow in a variety of habitats makes it a potential landscape selection regardless of soil conditions. In addition, this species displays beautiful (but small) whitish 6 mm (¼-inch) flowers forming 5 cm (2-inch) clustered corymbs during the first part of June. Long flaky pieces of bark start developing on older stems creating a bit of winter interest. Occasionally, the small inflated follicles will show off splashes of red color. This trait seems to be quite variable across populations. Due to the large 2.5 m x 2.5 m (8 feet x 8 feet) size of a typical *Physocarpus opulifolius*, this green-leaved, compact selection (mature size unknown) may find a place in the landscape or prove to be quite valuable as breeding material. This clone with compact internodes and slower growth was selected out of a seedling population collected from the Manderville Preserve located in Bucks County, Pennsylvania.

'Center Glow' Common Ninebark (*Physocarpus opulifolius*). This ninebark (Figure 2) is a purple-leaved cultivar selected by Harold Pellett from the Landscape Plant Development Center located in Mound, MN. 'Center Glow' (Plant Patent No. 16,894) is a hybrid between 'Diablo' and 'Dart's Gold'. Ornamental attributes include newly-emerging leaves that are mostly rosy-red but which display a bright yellow-green base. The foliage slowly matures to a deep burgundy color. Light pink flowers in June are followed by bright red corymbs of small, inflated seed capsules. Used as a border, landscape specimen, or foundation planting, this selection can reach 2.5 to 3 m (8 to 10 feet) tall and 1.8 to 2.5 m (6 to 8 feet) wide.

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Figure 2. 'Center Glow' common ninebark at the Purdue horticulture farm.



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Figure 3. 'Morton' Prairie Flame™ shining sumac at the Purdue horticulture farm.

'Morton' Prairie Flame™ Shining Sumac (*Rhus copallinum*). This male selection of shining sumac has been under evaluation at the NCRPIS station since 1990. The provenance of this accession traces back to a seed collection made at the Iroquois County Conservation Area in Illinois. Subsequent germination at the Morton Arboretum in Lisle, Illinois resulted in the selection of this clone for its dwarf growth habit, dark green, glossy foliage, drought tolerance and bright red fall color. It has been given the cultivar name 'Morton' and is being marketed by Chicagoland Grows under the trademark Prairie Flame™. Even though this clone may be described as having a dwarf growth habit, it is not uncommon for it to reach a height of 2 to 3 m (7 to 10 feet) after 10 to 15 years of growth. Plants at Purdue (Figure 3) are only a little over 1 m (3.5 feet) tall after 2 full seasons of growth. Generally not known for its floral display, one can still appreciate its creamy white clusters of flowers accented by vibrant yellow anthers during mid-late July. Slight susceptibility to verticillium wilt has been documented under field conditions at NCRPIS. In comparison to typical populations of this species, this clone has a slower tendency to spread via roots even after many years of establishment.

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