

# AUTUMN COLOR FROM UNUSUAL WOODY PLANTS

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Autumn in New England and across parts of North America is a special time, for the countryside blazes with color from a wide array of trees, shrubs, and vines. While horticulturists and homeowners are familiar with colorful standards such as sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), winged euonymus (*Euonymus alata*) and bradford pear (*Pyrus calleryana* 'Bradford'), there are plants just as colorful which remain virtually unknown. The plants which follow are spectacular autumn performers at the Arnold Arboretum and ones which I believe deserve review and testing by professional plants people.

## TREES

*Acer heldreichii*

Balkan maple

Autumn color: clear to golden yellow

Size: 30-50 feet tall, 30-50 feet wide

Hardy to  $-25^{\circ}\text{C}$  ( $-10^{\circ}\text{F}$ ) (perhaps lower if more widely tested)

Balkan maple is native to Albania, northern Greece and southeast Yugoslavia. It has a deeply-lobed leaf which is visually attractive throughout the growing season. Branching structure is strong. This species of maple has proven successful enough at the Arnold Arboretum for numerous spontaneous seedlings to be occurring. Seeds germinate following 3 months cold stratification at  $50^{\circ}\text{C}$  ( $40^{\circ}\text{F}$ ).

*Acer maximowiczianum* (Syn.: *A. nikoense*)

Nikko maple

Autumn color: orange to orange-red to reddish-purple

Size: 25-40 feet tall, 25-40 feet wide

Hardy to  $-33^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ )

Nikko maple is small in stature, structurally strong and of easy culture. It remains little known outside of its Japanese and central China homelands because of a lack of viable seeds and a double dormancy which slows germination of the sound seeds. Seeds are available commercially from Fujita Seed Co., Ltd., P.O. Box 211, Osaka Central, Osaka, Japan.

*Acer pseudo-sieboldianum*

purplebloom maple

Autumn color: yellow to red-orange

Size: 10-20 feet tall, 10-20 feet wide

Hardy to approximately  $-36^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ ).

Purplebloom maple which is native to Korea and Northeastern China is almost unknown to North America. It is noteworthy because it possesses desirable landscape traits similar to Japanese maple (*Acer palmatum*) and full moon maple (*Acer japonicum*). While normally a large shrub, one specimen at the Arnold Arboretum approximately 65 years old is 18 feet tall and 25 feet wide. The serrated leaves possess 9-11 lobes, have a rich green summer color and an appearance similar to several cultivars of *Acer palmatum*. Flowering occurs in April with hanging clusters of purplish flowers which are ornamen-

tal when viewed against the unfolding spring foliage.

Arboretum taxonomist Richard Weaver describes *Acer pseudo-sieboldianum* as having the most spectacular autumn color of any plant he observed during a 1977 trip to Korea. He further states that this maple fills an ecological niche almost identical to *A. palmatum*.

Limited testing indicates that this tree may prove to be hardy in areas with low winter temperatures of  $-31^{\circ}\text{C}$  ( $-25^{\circ}\text{F}$ ) to  $-36^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ ) and this would make the species useful in locations where *Acer palmatum* and *Acer japonicum* cannot survive.

Propagation using cuttings has been attempted at the Arnold Arboretum. A 40% success rate was achieved, in limited testing, using a rooting hormone of 1% IBA and taking the cuttings in mid-June.

*Acer tegmentosum*

Manchurian striped maple

Autumn color: clear yellow

Size: 20-30 feet tall, 15-25 feet wide

Hardy to approximately  $-36^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ ) (perhaps lower if more widely tested)

*Acer tegmentosum* belongs to the striped-bark group of maples and bears stems and twigs which display white stripes on a green or brown background. The landscape combination of the attractive bark, rich yellow autumn color and preference for a lightly-shaded growing situation indicates that this tree may be useful in specialized urban landscape such as courtyards. Manchurian striped maple is native to Korea and Northeast China and is closely related to our native moosewood (*Acer pensylvanicum*).

Propagation experiments conducted at the Arnold Arboretum indicate that 75 cuttings were taken on August 15 from a parent tree which was 31 years old. Cuttings were treated with Hormodin No. 3, inserted into coarse sand and placed within a closed case. By September 17, 67 cuttings had rooted and were potted up.

*Acer triflorum*

three-flowered maple

Autumn color: orange to scarlet

Size: 25-40 feet tall, 25-40 feet wide

Hardy to  $-33^{\circ}\text{C}$  ( $-30^{\circ}\text{F}$ )

Brilliant is the only term to describe the autumn foliage of the three-flowered maple whose fall coloration is a serious rival for the display put forth by sugar maple (*Acer saccharum*). An additional landscape feature is showy bark color which ranges from tan-brown to brownish-white. This tree is closely related to paperbark maple (*Acer griseum*) but grows twice as fast. The largest specimen of this Korean tree at the Arnold Arboretum is 56 years old and is 35 feet tall with a 35-foot spread.

Seeds of *Acer triflorum* have a double dormancy and require two years in outdoor seed beds to germinate. A 50% success rate was achieved by taking cuttings from forced-stock plants in February. The cuttings were not treated with rooting hormone; they were inserted in a medium of sand and placed within a closed case.

*Pseudolarix kaempferi*

golden larch

Autumn color: golden yellow

Size: 40-60 feet tall, 30-40 feet wide

Hardy to  $-29^{\circ}\text{C}$  ( $-20^{\circ}\text{F}$ )

This magnificent deciduous conifer is native to but rare in China. Growth is irregular from tree to tree and the general impression is one of asymmetry. Foliage is fine in texture. Cones are highly ornamental and resemble tan ar-

tichokes. Upon ripening, the cones shatter and disperse the seeds. Plants at the Arnold Arboretum are distinctly alternate in cone production; there was a prolific crop in 1978 and almost none in autumn 1977 or 1979. A small grove of trees at the Arnold Arboretum produces abundant viable seeds which germinate best with a pretreatment of 60 days at 5°C (40°F).

*Sorbus aucuparia* F. Beissneri

Beissner European mountain ash

Autumn color: golden yellow with pink tints

Size: 20-25 feet tall, 10-15 feet wide

Hardy to -37°C (-33°F).

Autumn color is one of several features which make this plant worth review. It bears white flowers in May followed by clusters of yellowish fruit in autumn. The most significant trait is the stem color which is copper to orange and is bright enough to be visible and distinct from a quarter-mile away. The habit of Beissner European mountain ash is upright, making it useful in narrow spaces.

This cultivar originated as a single individual found in the mountains in Germany in the late 1800s. It can be maintained by grafting it onto *Sorbus aucuparia* understock.

*Sorbus rufoferruginea*

flameberry mountain ash

Autumn color: brilliant red to purple red

Size: 15-20 feet tall, 8-12 feet wide

Hardy to -23° (-10°F) (perhaps lower if more widely tested)

Flameberry mountain ash is native to the mountains of Honshu, Shikoku and Kyushu in Japan. It bears terminal clusters of white flowers in May, followed by small reddish fruit in October. It needs to be evaluated for resistance to borers.

This plant falls within the *Aucuparia* section of mountain ash which indicates that it could be grafted or budded onto *S. aucuparia* understock. Seeds germinate after 3 months of cold at 5°C (40°F).

*Sorbus esserteauiana*

Chinese mountain ash

Autumn color: yellow, orange, red and bronze are determined by the amount of sunlight

Size: 20-30 feet tall, 15-20 feet wide

Hardy to -36°C (-30°F) (perhaps lower if more widely tested)

In May the tree bears large terminal clusters of white flowers followed by orange-yellow fruits in the autumn. Upon ripening, the fruits are quickly eaten by birds. This species of mountain ash shows no sign of borer damage at the Arnold Arboretum.

According to E.H. Wilson in *Plantae Wilsonianae*, he found this plant growing in Western Szechuan, China on cliffs and in woods, describing it as "rare".

Seeds of this species germinate after being stratified for 3 months at 5°C (40°F). Scions can be grafted onto *Sorbus aucuparia*.

*Sorbus serotina*

Autumn color: brilliant red

Size: 15-20 feet tall, 10-12 feet wide

Hardy to -29°C (-20°F) (perhaps lower if more widely tested)

A large shrub or small tree native to Korea, *Sorbus serotina* has a delicately-textured leaf composed of 15-17 sharply-toothed leaflets. The plant has terminal clusters of small white flowers followed by clusters of yellow-

orange fruit in autumn. The fruit color contrasts ornamentally against the autumn foliage.

*S. serotina* should bud or graft successfully onto *S. aucuparia* understock. Seeds germinate after 3 months of cold at 5°C (40°F).

## SHRUBS

*Aesculus parviflora* bottlebrush buckeye

Autumn color: clear yellow  
Size: 8-12 feet tall, 6-18 feet wide  
Hardy to -36°C (-30°F)

A large, multi-stemmed, spreading shrub which bears 8- to 12-inch tapering clusters of white flowers in July. It is native to Georgia and Alabama where bottlebrush buckeye grows as an understory plant in wooded areas; it also thrives in full sun.

Because of the toughness of the plant and adaptability to a wide range of growing situations, this plant might be ideal for colonizing areas along superhighways and as a foundation plant for large institutional buildings.

Seeds germinate without pretreatment but they must be gathered quickly for they are a favorite food for squirrels. The plant can also be stock-increased by division and cuttings.

*Aronia arbutifolia* 'Brilliantissima' red chokeberry

Autumn color: crimson red  
Size: 6-10 feet tall, 4-8 feet wide  
Hardy to -29°C (-20°F).

Brilliant is the only term to describe this native plant which inhabits bogs and low pinelands from Florida and Louisiana, north to Minnesota and Nova Scotia. This shrub bears clusters of small white flowers in May flowered by bright purple-red fruits which provide a distinct contrast against the colorful autumn foliage. Fruits persist into the winter.

*Aronia arbutifolia* 'Brilliantissima' is easily propagated by greenwood cuttings taken in July.

*Enkianthus perulatus* white enkianthus

Autumn color: yellow to scarlet  
Size: 3-6 feet tall, 3-8 feet wide  
Hardy to -23°C (-10°F).

This Japanese shrub bears a multitude of tiny white urn-shaped flowers in May. The bark on stems and branches is smooth and gray. A slow growth rate may be viewed as a disadvantage by nurserymen, but in the home landscape this slow growth rate can be used to advantage to create low maintenance landscapes.

Propagation success has been achieved by taking softwood cuttings in mid-June. The heel cuttings are treated with Hormodin No. 2, placed in equal parts of peat and perlite and placed under mist. Once rooted, the cuttings must be allowed to remain undisturbed through the first winter and potted only after they have resumed new season growth.

*Euonymus hamiltoniana* var. *yedoensis*  
(Syn.: *E. yedoensis*, *E. sieboldianus*) Yeddo euonymus

Autumn color: pink  
Size: 8-12 feet tall, 8-15 feet wide  
Hardy to -29°C (-20°F)

*Yeddo euonymus* bears fruit which is highly ornamental for weeks after the leaves have fallen. Capsules are rose-pink and upon ripening, open to display a shiny orange aril. This plant is high resistant to aerial salts; in Rhode Island mature plants thrive within a few hundred feet of the Atlantic Ocean. One disadvantage is that this Japanese shrub is susceptible to scale insects.

Propagation is easily accomplished through seed which results in plants displaying variation in form, autumn color and fruit productivity. Greenwood cuttings taken in July or August provide a means of perpetuating clonal material.

*Fothergilla gardenii*

dwarf fothergilla

Autumn color: yellow-orange to scarlet

Size: 2-3 feet tall; 2-4 feet wide

Hardy to  $-29^{\circ}\text{C}$  ( $-20^{\circ}\text{F}$ )

A compact, multi-stemmed shrub which bears white flowers in May, dwarf fothergilla is native from Virginia to Georgia, but like so many worthwhile native plants, it has been neglected as a landscape plant. This small shrub tolerates an exposure of sun or shade, adapts to a wide range of varying soil types. As a result, it appears to be a perfect candidate for extensive use by landscape architects, since it can be used as an understory plant in groups or masses. It is being grown and marketed in containers by Herman Losely and Son, Inc. of Perry, Ohio.

Propagation records at the Arboretum indicate that cuttings rooted 100% when taken the 26th of July, treated with Hormodin No. 3, placed in a medium of equal parts peat and perlite and placed under mist. This is a plant which should be overwintered in the propagation container and transplanted only after new season growth resumes in the spring.

*Itea virginiana*

Virginia sweetspire

Autumn color: red to reddish purple

Size: 6-10 feet tall, 6-8 feet wide

Hardy to  $-29^{\circ}\text{C}$  ( $-20^{\circ}\text{F}$ ).

Another neglected American native shrub which ranges from New Jersey southward to Florida and west to Louisiana, *Itea virginiana* forms a large, multi-stemmed mass which normally grows along streams in moist, poorly-drained soils. It also occurs in wooded areas, but where it does not receive sufficient light, the plant becomes thin and straggly. Flowering occurs in July when terminal clusters of fragrant white flowers appear. In autumn, the tan seed capsules are handsomely displayed among the reddish-purple autumn foliage.

This plant is being grown by Losely Nursery in Perry, Ohio and they report that the plant is sometimes subject to winter damage when temperatures reach  $-29^{\circ}\text{C}$  ( $-20^{\circ}\text{F}$ ) and where the plant is in low wet soils.

*Itea virginiana* is easily propagated by stem cuttings. High percentages of rooting occur using a five-second quick dip of 8000 ppm of IBA in 50% alcohol. The cuttings are inserted in equal parts of peat and perlite and placed under mist. Cuttings will root in high percentages any time of the year.

*Lindera angustifolia*

narrowleaf spicebush

Autumn color: dull but attractive rose-red

Size: 8-12 feet tall, 8-10 feet wide

Hardy to approximately  $-27^{\circ}\text{C}$  ( $-17^{\circ}\text{F}$ ).

This rare Chinese shrub was brought to our attention by Bill Collins, Horticulturist for American Garden Cole in Circleville, Ohio. The autumn foliage

is rose-red and then the leaves turn brown and persist throughout the winter providing the shrub with an evergreen-like effect when viewed from a distance. Branching is multistemmed and the total effect is that of a rounded mass. Mr. Collins reported that their plants suffered stem damage when winter temperatures hit  $-17^{\circ}\text{F}$  but they recovered the following summer.

Seeds of *Lindera angustifolia* germinated after being stratified 3 months at  $40^{\circ}\text{F}$ . We have not been successful in rooting cuttings.

*Lindera obtusiloba*

Japanese spicebush

Autumn color: butter yellow

Size: 15-20 feet tall, 12-18 feet wide

Hardy to approximately  $-29^{\circ}\text{C}$  ( $-20^{\circ}\text{F}$ ).

A large, multistemmed, rounded shrub valued for its early-season flowering period, female plants of *Lindera obtusifolia* are said to bear attractive small yellowish flowers which have a slightly lemony fragrance. E.H. Wilson in *Plantae Wilsonianae* describes this plant as being common in the woods of Western Hupeh, China and in spring, "very conspicuous on account of the brilliant colour of the young leaves".

Preliminary tests conducted at the Arnold Arboretum indicate that cuttings taken in early June can be rooted using a five-second quick dip of 8000 ppm IBA in 50% alcohol. Cuttings are placed in a medium of equal parts sand and perlite, under mist.

## VINES

*Vitis amurensis*

Amur grape

Autumn color: crimson to purple

Habit: vigorous climber

Hardy to  $-29^{\circ}\text{C}$  ( $-20^{\circ}\text{F}$ )

This grape is native to northeast China and adjacent areas in the Soviet Union. In addition to purplish autumn color, the vine bears small grapes about  $\frac{1}{3}$  inch across, containing 2 to 3 seeds.

While grapes are not often considered as landscape plants, this species could be used to create quick shade on a trellis or arbor, or it could be used to dress up some of the drab fencing used in urban areas.

Seeds germinate readily after 3 months of stratification at  $5^{\circ}\text{C}$  ( $40^{\circ}\text{F}$ ). Both hardwood and greenwood cuttings root easily.

*Vitis davidii*

Briar grape

Autumn color: brilliant red

Habit: vigorous climber

Hardy to  $-23^{\circ}\text{C}$  ( $-10^{\circ}\text{F}$ )

Briar Grape bears large heart-shaped leaves and old branches have prickles. Fruit is about one-half inch in diameter, black and is said to be edible and sweet.

Seeds and cuttings are treated as for *Vitis amurensis*.

Descriptive information and details concerning propagation is sparse for each of the plants described and any plant could make an interesting project for an enterprising student of horticulture or botany. All of the foregoing plants are presently growing at the Arnold Arboretum in Jamaica Plain, Massachusetts. Climatic data for this site is as follows:

Maximum temperature	27°C (100°F)
Minimum temperature	-22.7°C (-9°F)
Average length of growing season	165 days
Average rainfall	(109.2 cm) 43 inches

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RALPH SHUGERT: Question for Jack Alexander. How are you propagating *Lindera obtusiloba*?

JACK ALEXANDER: We have had some success with softwood cuttings when treated with 8,000 ppm IBA in 50% alcohol.

HENRY KOCK: Are *Acer pseudo-sieboldianum* and *A. sieboldianum* synonymous?

GARY KOLLER: In *A. sieboldianum* the leaves have 7-9 lobes while *A. pseudo-sieboldianum* has 9-11 lobes. *A. pseudo-sieboldianum* is about 20°F more cold hardy.

BOB McNIEL: The plants of *Acer tegmentosum* I have seen have not been growing well when exposed to full sun. Can you comment on this?

GARY KOLLER: Our most successful plants are growing under light shade. This plant may therefore have an advantage in city conditions where shade is viewed as a problem. The plant also declines rather fast if the bark is injured.

ED MEZITT: *Sorbus americana* has always been a rather weak shrubby plant for us. Are there stronger plants available?

VOICE: We grow nothing but *S. americana* in the Chicago area. It is native to Lake County, Illinois and generally grows as a clump. It lives longer, gets less borers and has no fireblight. It also has better fall color than *Sorbus aucuparia*.

## INTRODUCTION, TESTING, AND EVALUATION OF ORNAMENTAL PLANTS<sup>1,2</sup>

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Plant introduction, in its broadest sense, is the introduction of wild plants into cultivation. Throughout the development of civilization, wherever man has gone, he has always taken along seeds of the plants with which he was familiar. The search for new or better plants was often an underlying reason for many of his explorations into unknown parts of the world.

### THE HISTORY OF PLANT INTRODUCTION

Plant introduction in North America existed long before the colonial period. Only a few plants, from which the United States derives the major portion of its food and fiber, are native to North America north of Mexico. Some of the most important native plants, in terms of economic worth to U.S. agriculture, are sunflower, cranberries, blueberries, strawberries, conifers, and hardwoods. All of our major crops and most of our important fruits and ornamental plants have been introduced from foreign lands.

Although numerous valuable crop and plant species had been previously introduced, it was not until 1812 that the government of the new nation turned to any official consideration of agriculture and its development. Much progress was made through efforts of various individuals such as Benjamin Franklin and Thomas Jefferson. The latter was especially active

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<sup>2</sup> Journal Paper No. J-9765 of the Iowa Agriculture and Home Economics Experiment Station. Project No. 1018.

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