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'UCONNAM012' (Ground Hug®) and 'UCONNAM165' (Low Scape Mound®): Two Low-growing Cultivars of Black Chokeberry (*Aronia melanocarpa*)

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The chokeberries (*Aronia*) are a group of largely overlooked shrubs that have tremendous potential for use as ornamental landscape plants. *Aronia* species are in the Rosaceae family and are multistem, flowering and fruiting deciduous shrubs. Hardin (1973) recognizes three species of *Aronia: Aronia arbutifolia* (L.) (red chokeberry), *Aronia melanocarpa* (Michx.) Ell. (black chokeberry), and *Aronia prunifolia* (Marsh.) (purple chokeberry). Chokeberries are native to the northeastern United States, from New England southward along the Appalachian Mountains, and westward to the Great Lakes states and eastern Texas. *Aronia* sp. are valued as tough shrubs that can tolerate various environmental stresses, including drought, poor soils, exposed locations, and cold winters, and their status as native North American plants enhances their desirability for many consumers. The black chokeberry typically attains a mature height of 1.2 to 3 m and can spread via rhizomes to form dense plants and colonies. *Aronia melanocarpa* has outstanding, lustrous, dark-green summer foliage that turns a pleasing blend of red, orange, and yellow in the fall. White flowers are borne in May in rounded corymbs and are showy for 7 to 10 d, and then produce black fruit in the summer. The two cultivars described herein are both diploid forms of *A. melanocarpa*. The black chokeberries exist as either diploids, which are found only in New England, or as tetraploids, which are found in the western and southern parts of the natural range (Brand et al. 2022). Recently, an additional group of individuals were identified in the southern portions of the natural range that warrants description as a new southern species of black-fruited *Aronia* (Brand et al. 2022). In addition, there is a black-fruited *Aronia* species (*Aronia mitschurinii*) that is an intergeneric hybrid with *Sorbus aucuparia* and is the type with large fruit used for pomological applications in eastern Europe, Russia, and the United States (Brand 2010; Leonard et al. 2013).

The *Aronia* breeding program at the University of Connecticut was started in the early 2000s with the goals of developing novel and improved ornamental cultivars for landscape use, and of adding more cultivars to those available for use in commercial fruit production. A significant effort was made to assemble the largest germplasm collection of the genus *Aronia* from all regions of the native range to serve as a reservoir of unique genetic phenotypes for use in breeding efforts (Brand 2010). Much of this germplasm has been provided to the North Central Regional Plant Introduction Station located in Ames, IA, USA, and some is available through the Germplasm Resources Information Network. Access to a range of unique germplasm allowed us to breed novel forms of *A. melanocarpa* that have distinctly low-growing or prostrate habits that have not been available previously in the nursery and landscape trades. Existing *A. melanocarpa* cultivars include Autumn Magic, Hugin, and Morton Iroquois Beauty™, which grow to between 1.5 to 1.8 m tall, and var. *elata*, which grows 2.4 to 3 m tall (Dirr 2009). 'UCONNAM165' and 'UCONNAM012' provide two heights of low growing alternatives to these existing cultivars while retaining the landscape adaptability, showy flowers, black fruit, and colorful fall foliage of the species. Compact form, low maximum height, and spreading habit is useful in today's smaller landscapes in the form of flowering shrubs and groundcovers.

Origin

'UCONNAM165' originated from cross-pollinations conducted during Spring 2006 at the University of Connecticut Plant Science Floriculture Greenhouses in Storrs, CT, USA. The new cultivar is a hybrid between two wild *A. melanocarpa* accessions that were collected from two locations in coastal Maine. The female parent was University of Connecticut accession UC012 (collected near South Thomaston, ME, USA), which has a highly prostrate (< 15-cm tall) groundcover-like habit, but is rather loose and open in form, with dull-green summer foliage. The male, or pollen, parent was University of Connecticut accession UC017 (collected in Bremen, ME, USA), which has an upright, spreading form to 1.5 m tall and wide, but with very glossy, dark-green summer foliage. Both female and male parents are known diploid accessions. The breeding objective was to produce a dense, low-growing plant with glossy, dark-green foliage and a robust flowering display. Seedlings from the cross between UC012 and UC017 were grown for six annual growth cycles and were observed when flowering, during summer vegetative growth, during fruiting, during fall foliage coloration, and through overwintering. 'UCONNAM165' was selected in 2011 as the best individual among the 50 seedlings that resulted from the cross between accessions UC012 and UC017.

'UCONNAM012' was grown from open-pollinated seeds collected in 2003 from the diploid *A. melanocarpa* 'BPMe' (collected near South Thomaston, ME, USA) growing in a research nursery in Mansfield, CT, USA. The pollen parent is unknown, but it is likely the seeds were produced by self-pollination, because the maternal plant was isolated from other *Aronia* plants. 'UCONNAM012' was selected from a group of seedlings in 2006 after it was observed to exhibit a very prostrate habit with dense growth and glossy foliage.

Description

'UCONNAM165' has a very dense, compact, upright habit and develops a mounded form (Fig. 1). Two-year-old plants in 11.4 L nursery containers will grow to ≈60 cm tall and 90 to 120 cm wide. The plant spreads readily by rhizomes, so ultimate plant width can be > 120 cm over time (Fig. 2A). The leaves of 'UCONNAM165' are alternate, elliptical to obovate, and ≈6 cm long by 3 cm wide, with broadly cuneate bases and apices that vary from broadly cuneate to rounded with slightly acuminate tips (Fig. 2B). The leaf margins are evenly crenate. The adaxial (upper) leaf surface is smooth and very shiny, whereas the abaxial (lower) surface is slightly rough, waxy, and very slightly pubescent. Young leaves on the upper surface are close to Royal Horticultural Society (RHS) yellow-green (143A) and are tinged red (42B) along the margins. Lower surface colors for young leaves are close to RHS yellow-green (146C) with a red (42B) tinge along the margins. All colors in the descriptions for 'UCONNAM165' were designated using the RHS color charts (Royal Horticultural Society 2007). The upper surface of mature foliage is green (RHS 139A), whereas the lower surface is near yellow-green (RHS 148B) (Fig. 2B).

Profuse flowering in early May (Connecticut, USA) is a characteristic of 'UCONNAM165', with the blooming period lasting between 10 and 14 d (Fig. 3). There are typically 12 inflorescences per 30-cm length of stem. Flowers are produced in corymbs composed of outward-facing flowers. Corymbs are 2 to 3 cm in height and width, and mostly contain between 10 and 15 flowers. Individual flowers are symmetric and rotate, with five petals and a diameter of 12 to 14 mm. Flower color is white (RHS 155B)

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Fig. 1. Three-year-old plants of *Aronia melanocarpa* 'UCONNAM012' and 'UCONNAM165' grown in 11.4 L containers under nursery production. 'UCONNAM012' exhibits a mature prostrate form whereas 'UCONNAM165' exhibits a more upright and spreading branching habit.

and may display a blush of red-purple (RHS 62C) at first opening. Small pome fruit ≈8 mm in diameter are produced by 'UCONNAM165' in late summer. Fruit are not produced in great abundance, but occur in clusters of three to eight pomes. The rounded, glossy fruit have a ripe color that is near gray-purple (RHS N186A) and black (RHS 202A). As with all *A. melanocarpa*, the fruit of 'UCONNAM165' are edible, but the genotype was not selected for human fruit consumption. Autumn foliage color for 'UCONNAM165' in full sun exposure is a vivid mix of red (RHS N45C and RHS N45D) in combination with a small amount of orange (RHS N25C) toward the plant interior (Fig. 4A). In low-light situations, fall foliage has a base color of orange (RHS N25C) with significant amounts of red (RHS N45C and N45D) highlights.

'UCONNAM012' has a very prostrate growth form with a spreading habit (Figs. 1 and 5A). Two-year-old plants in no. 3 nursery containers are ≈19 cm tall and 26 cm wide. The cultivar spreads readily by rhizomes, so the ultimate plant width can be > 26 cm over

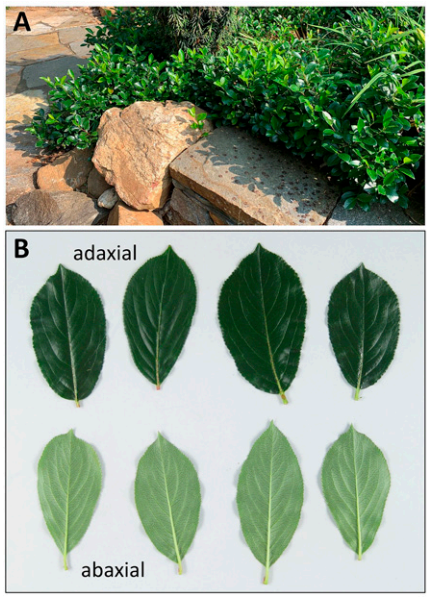

Fig. 2. *Aronia melanocarpa* 'UCONNAM165'. (**A**) Colonizing and rhizomatous growth habit in a landscape setting and (**B**) glossy, dark-green adaxial leaf surface (top row) and lighter colored abaxial surface (bottom row), as well as elliptical to slightly obovate leaf shape.

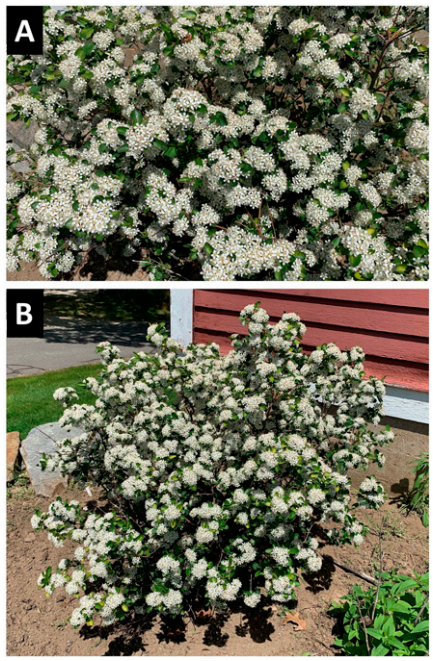

Fig. 3. Profuse flowering of *Aronia melanocarpa* 'UCONNAM165' in early May. (**A**) Detail of densely held corymb inflorescences and (**B**) a recently established plant in the landscape at full bloom.

time. It is a dwarf plant that has dense, glossy foliage. The leaves of 'UCONNAM012' are alternate, elliptical, and ≈6 cm long by 2.5 cm wide, with cuneate bases and apices (Fig. 5B). The leaf margins are evenly crenate. The adaxial (upper) leaf surface is smooth, waxy, and shiny, whereas the abaxial (lower) surface is waxy and very slightly pubescent. Young leaves on the upper surface are close to green (RHS NN137A), and the lower surface color for young leaves is close to gray-green (RHS 191A). All colors in the descriptions for 'UCONNAM012' were designated using the RHS color charts (Royal Horticultural Society 2015). The upper surface of mature foliage is green (RHS NN137A), whereas the lower surface is gray-green (RHS 191A) (Fig. 5B).

'UCONNAM012' flowers heavily in early May (Connecticut, USA), with flowers lasting between 10 and 14 d (Fig. 6). There are typically seven inflorescences per 30-cm length of stem. Flowers are produced in corymbs composed of outward-facing flowers. Corymbs are 2 to 3 cm in height and width, and mostly contain between 5 and 10 flowers. Individual flowers are symmetric and rotate, with five petals and an average diameter of 11 mm. The Flower color is white (RHS 155B) and may display a blush of red-purple (RHS 62C) at first opening. Small pome fruit ≈8 mm in diameter are produced by 'UCONNAM012' in late summer in clusters of three to eight pomes. Fruit are somewhat pear-shaped instead of the typical round fruit found on most *A. melanocarpa*. The color of ripe fruit is near gray-purple (RHS N186A) and the skin has a matt finish. As with all *A. melanocarpa*, the fruit of 'UCONNAM012' are edible, but the genotype was not selected for human fruit consumption. Autumn foliage color for 'UCONNAM012' in full sun

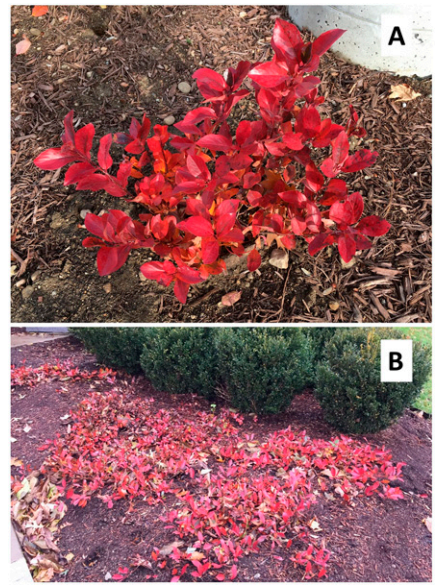

Fig. 4. Brilliant red-orange fall foliage color development for *Aronia melanocarpa* (**A**) 'UCONNAM165' and (**B**) 'UCONNAM012'.

exposure is a vivid mix of red (RHS 53A and 46C) on the upper surface and gray-red (RHS 180C) on the lower surface (Fig. 4B).

Landscape Use and Culture

Plant performance statements and recommendations are based on information provided by the collaborators of Spring Meadow Nursery (Grand Haven, MI, USA) and the Proven Winners Program, as well as performance

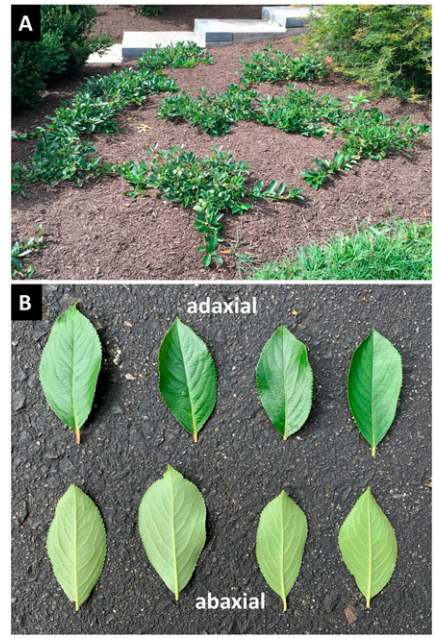

Fig. 5. *Aronia melanocarpa* 'UCONNAM012'. (**A**) Recently installed landscape plants exhibiting their natural creeping and prostrate growth form, with plant height rarely exceeding 15 cm, and (**B**) summer foliage adaxial (bottom row) and abaxial (top row) leaf surfaces as well as overall leaf shape.

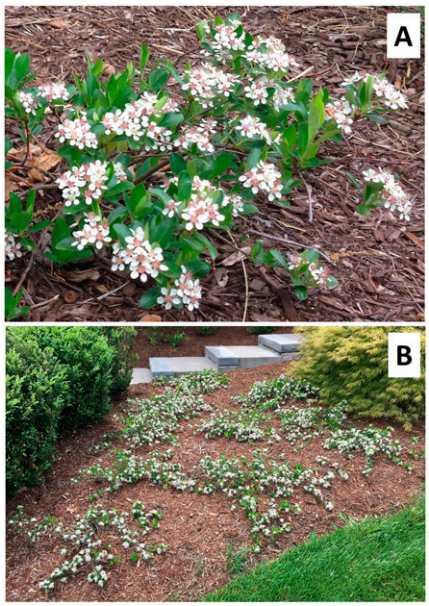

Fig. 6. Flowering in early May of *Aronia melanocarpa* 'UCONNAM012'. (**A**) Detail of individual flowers and corymb inflorescences, and (**B**) plants in full bloom under landscape conditions.

in replicated landscape installations at the University of Connecticut campus in Storrs, CT, USA. 'UCONNAM012' and 'UCONNAM165' have performed well in regions as cold as USDA hardiness zone 3 and as warm as zone 8 (US Department of Agriculture–Agricultural Research Service 2023). Both cultivars are adapted to full sun or partial shade conditions and are tolerant of challenging landscape situations, including dry soils, once established. The dense, compact forms of 'UCONNAM012' and 'UCONNAM165' are useful in smaller landscapes and where large shrubs are unwanted. They work excellently for durable low-growing mass plantings or low hedges and fill in nicely as facer plants around taller species. 'UCONNAM012' can be used where an extremely low groundcover is demanded because it does not get much taller than 15 cm, whereas 'UCONNAM165' is appropriate to serve as a groundcover that fills in to ≈60 cm tall or less. These low-growing, rhizomatous cultivars of *Aronia* are useful substitutes for other low-growing deciduous shrubs, such as certain *Cotoneaster* species, *Deutzia gracilis*, *Spiraea japonica*, *Rhus aromatica* 'Gro-Low', and *Vaccinium angustifolia*. Some of these existing low and spreading deciduous shrubs have significant disease, insect, and cultural limitations for which lower maintenance and native alternatives are important.

'UCONNAM012' and 'UCONNAM165' provide multiseason interest in the landscape through showy spring flowers; glossy, dark-green summer foliage; black summer fruit; and red-orange fall foliage. Both new *A. melanocarpa* cultivars can provide significant ecological services to landscapes. Ricker et al. (2019) found that 'UCONNAM012' and 'UCONNAM165' were visited by many pollinators, and especially by Andrenidae bees and pollinating flies. The fruit of *A. melanocarpa* are eaten by some mammals, including chipmunks, squirrels, foxes, coyotes, and black bears (Hilty 2020). Birds such as wild turkeys, ruffed grouse, black-capped chickadees, bluebirds, northern mockingbirds, blue jays, robins, and cedar waxwings are attracted to black chokeberry fruit in summer and autumn (Hannemann 2022).

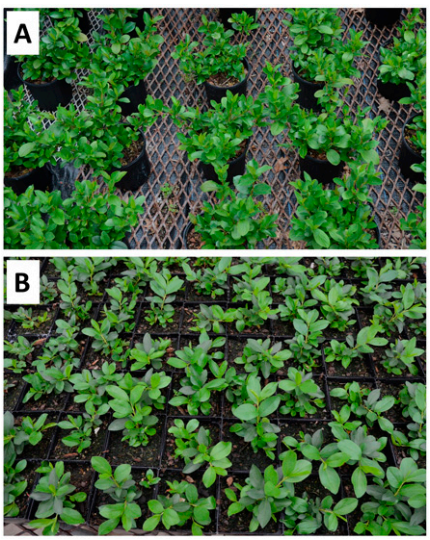

Fig. 7. *Aronia melanocarpa* (**A**) 'UCONNAM165' plants in 1-gal containers propagated via tissue culture micropropagation and (**B**) 'UCONNAM012' plants in quart containers propagated via tissue culture micropropagation.

Clonal Propagation

'UCONNAM012' and 'UCONNAM165' are propagated easily by softwood cuttings collected from mid-June to mid-July. Rooting percentages of > 90% and profuse root systems can be expected. Peatmoss:perlite (50:50, vol:vol) or similar propagation media and intermittent mist work well to root cuttings. Cuttings can be double-wounded and treated with 3000 ppm indole-3-butyric acid. Rooted cuttings can be potted and fertilized to produce new growth, and they overwinter well without losses.

Micropropagation can also be used to propagate 'UCONNAM012' and 'UCONNAM165' clonally (Fig. 7). Shoot multiplication in vitro can be achieved using Murashige and Skoog medium and vitamins (Murashige and Skoog 1962), 0.5 mg·L^{-1} benzyladenine, 3% sucrose, and 0.8% agar with a pH of 5.7 (Brand and Cullina 1992). Cultures should be maintained at ≈25 °C, with a 16-h photoperiod of 40 μmol·m^{-2}·s^{-1} provided by cool-white fluorescent lights, or appropriate light-emitting diode (LED) lighting, with a subculture cycle of between 28 and 35 d. At least an 8× shoot multiplication rate can be expected. Microshoots are rooted easily (near 100%) under nonsterile conditions in clear, plastic salad trays containing a 1:1 (vol:vol) peatmoss:vermiculite mix under fluorescent or LED lighting. Microcuttings root in 3 weeks and can then be acclimated to drier air over a period of 10 to 14 d before being moved to a greenhouse. Greenhouse acclimation is aided using clear, plastic, humidity dome covers and 50% shadecloth.

Availability

'UCONNAM165' and 'UCONNAM012' have both been patented by the University of Connecticut (Brand 2017, 2020). Both cultivars have been licensed exclusively to Spring Meadow Nursery, Grand Haven, MI, USA, and are part of the Proven Winners® product line of flowering shrubs. 'UCONNAM012' has been assigned the trade name Ground Hug® and 'UCONNAM165' has been assigned the trade name Low Scape Mound®.

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