

Aesculus glabra ‘LavaDak’ (Lavaburst® Ohio Buckeye): A New Compact, Upright Landscape Tree

Todd P. West, Connor C. Hagemeyer, and Gregory Morgenson

Department of Plant Sciences, North Dakota State University, Department 7670, PO Box 6050, Fargo, ND 58108, USA

Keywords. cold hardiness, Hippocastanaceae, Hippocastanoideae, leaf scorch, ornamental tree, Sapindaceae

LavaDak is a new cultivar of *Aesculus glabra* Willd. (Ohio buckeye) that is a narrow upright northern-hardy selection with shorter internode growth than that typical for the species. The original parent plant of ‘LavaDak’ is approximately 7.5 m tall and has a width of 4.5 m after 25 years. Based on species adaptation, ‘LavaDak’ will be well-adapted to US Department of Agriculture cold hardiness zones 3a to 7. Foliage shows greater resistance to leaf scorch than nonselected buckeyes and maintains a bright green color in summer that changes to orange–red in fall. Its compact upright growth habit makes this selection ideal for planting sites with limited space where a full-sized buckeye is not suitable. This is especially relevant when available space and overhead power lines are concerns.

Aesculus glabra Willd. is a deciduous tree in the family Sapindaceae and subfamily Hippocastanoideae with no listed autonyms, synonyms, or invalid designations (US Department of Agriculture, Agriculture Research Service, National Genetic Resources Program 2025). Commonly referred to as Ohio buckeye, it is native to the eastern, midwestern, and southern United States and Ontario, Canada (Hassler 2025). Dirr (2009) lists Ohio buckeye as US Department of Agriculture cold hardiness zones 3 to 7 with comments indicating that this species is a “good native tree best left in the wild... definitely not recommended for streets or the small residential landscape.” Contrary to Dirr’s recommendations, Ohio buckeye cultivars are an excellent choice for boulevard or landscape use because of interesting spring flowers that nourish pollinators, outstanding fall color, “utility-friendliness,” and ability to thrive in an urban environment. Ohio buckeye generally grows to a height of 6 to 12 m with equal spread with a typical

broadly rounded habit. A limited number of cultivars of the species and hybrids are available in the nursery trade, including Autumn Splendor (*A. × arnoldiana*), Bergeson (Prairie Torch®; *A. × ‘Bergeson’*), Homestead (*A.*

glabra), and JN Select (Early Glow™; *A. glabra*). Each of these cultivars has been selected primarily for leaf scorch resistance and fall color (Dirr 2009). LavaDak is the only cultivar primarily selected for growth habit.

Origin

‘LavaDak’ was selected from a single seedling grown in rural Cass County, ND, USA (lat. 47.0712, long. –97.1216). This seedling selection has been evaluated since 2012 as North Dakota State University trial selection TS12006 and evaluated at the North Dakota State University Research Arboretum (Amenia, ND, USA) (lat. 46.9859, long. –97.3549). The original source of the parent seedling is unknown. Selection traits were based on growth habit, foliage (summer and fall) quality based on color, and leaf scorch resistance (Fig. 1). The color of various plant



Fig. 1. ‘LavaDak’ (North Dakota State University sel. TS13006, Lavaburst® buckeye) summer foliage during summer drought (no leaf scorch) (top left). Fall orange–red fall color (top right). Growth habit comparison of ‘LavaDak’ upright branching (bottom left) with typical broader rounded branching habit of species and other commercially available buckeye cultivars (Homestead) (bottom right).

Received for publication 23 Apr 2025. Accepted for publication 12 May 2025.

Published online 11 Jul 2025.

Funding of this work was supported by the USDA NIFA (McIntire-Stennis Capacity Grant ND06216) and the North Dakota Agricultural Experiment Station.

T.P.W. is the corresponding author. E-mail: todd.p.west@ndsu.edu.

This is an open access article distributed under the CC BY-NC license (<https://creativecommons.org/licenses/by-nc/4.0/>).

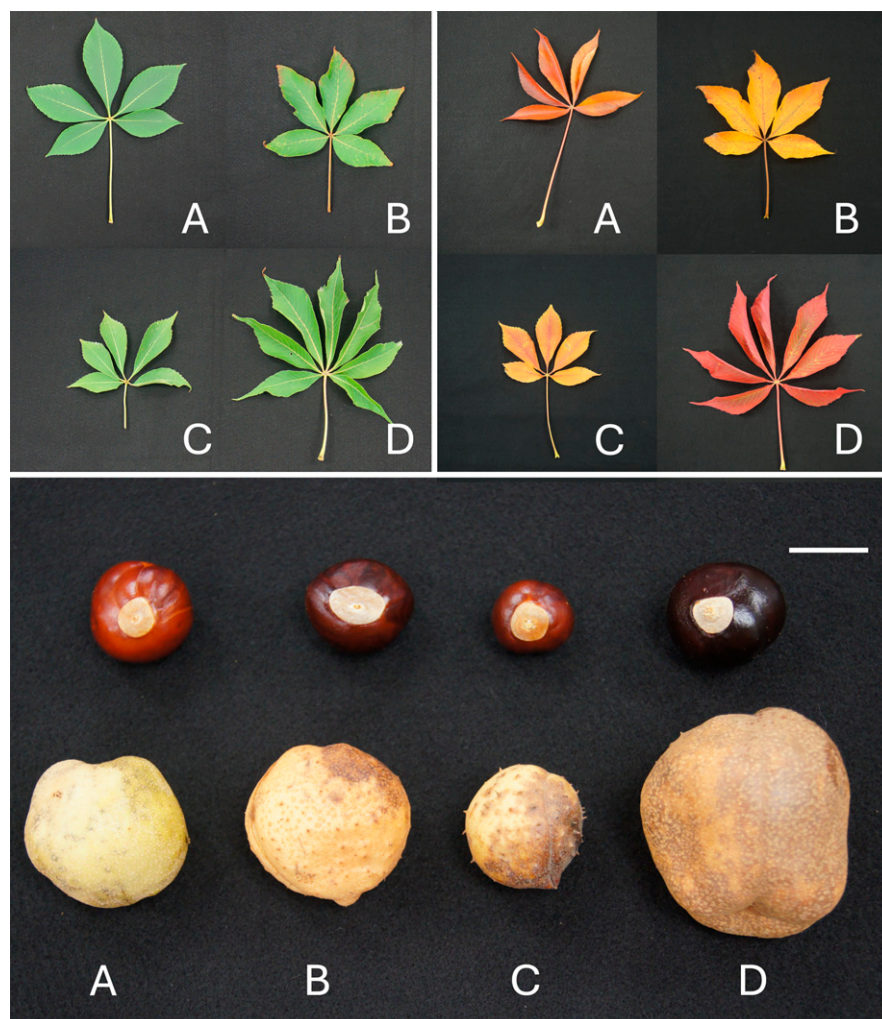


Fig. 2. Leaf and seed size comparison of ‘Autumn Splendor’ (A), ‘Homestead’ (B), ‘LavaDak’ (North Dakota State University sel. TS13006, Lavaburst® buckeye) (C), and ‘Bergeson’ (Prairie Torch®) (D). The summer foliage color is shown (top left). The fall foliage color is shown (top right). Scale bar = 3 cm for seed size comparisons.

parts was determined under natural light using the reprint of the Royal Horticulture Society (RHS) color chart (Royal Horticultural Society 2015).

Description

‘LavaDak’ is more compact, with a narrow upright habit, compared with the species and botanical cultivars (Fig. 1). It was selected from a single seedling (the parent seedling source is unknown) grown in rural Cass County, ND, USA, and evaluated at the North Dakota State University Research Arboretum. This selection has been fully hardy in US Department of Agriculture hardiness zone 3b (data not reported). Grown in full sod conditions for its length of evaluation, Lavaburst® has reached a height of approximately 7 m with a 4-m canopy spread, thus making it ideal for limited space landscapes including, but not limited to, streets, boulevards, and possibly under power lines and near other overhead structures. A mature height may exceed this in other areas of the country but, overall, it is a smaller, more compact upright Ohio buckeye selection. ‘LavaDak’ is a

narrow upright northern hardy Ohio buckeye selection with shorter internode stem growth (average annual growth of 10 cm) than is typical for the species and other *Aesculus* cultivars. This shorter internode stem growth gives ‘LavaDak’ a superior compact habit. Based on grafting trials conducted at North Dakota State University (data not reported), ‘LavaDak’ has reproduced the atypical shorter stem nodal lengths, setting it apart from other cultivar selections. With the shorter stem nodal lengths, ‘LavaDak’ supports a denser canopy as compared with that of other buckeye cultivars, casting medium to heavy shade. Winter-hardy in US Department of Agriculture cold hardiness zone 3b, it has survived recorded temperatures of -34.5°C . Leaves are palmately compound, with the typical five leaflets with opposite arrangement. Leaves are obovate with an acuminate tip, 8.9 to 11.4 cm long, 2.8 to 4.4 cm wide; they have margins that are doubly serrate at the apex and a cuneate base. The petiole is 12 to 13 cm long. Leaves are smaller than that of the other commercially available buckeye cultivars with similar summer foliage color (Fig. 2, top left). Foliage shows greater resistance to leaf scorch

than standard seedling buckeyes and maintains a bright green (adaxial side: RHS 141C—strong yellowish green; abaxial side: RHS 147B—moderate yellow green) color in the summer (leaf sample color evaluated 7 Jul 2024) that changes to “lava” orange red (RHS N167D—moderate orange yellow to 173C—moderate orange) in early fall (leaf sample color evaluated 23 Sep 2024) and to a deeper red (RHS 180B—moderate red) in late fall (leaf sample color evaluated 18 Oct 2024). The fall color is distinguishable from other commercially available cultivars (Fig. 2, top right). Fruit production is significantly reduced (80 to 90%; data not reported) compared with that of the species and other commercially available cultivars. This reduced fruit production is highly desirable because buckeye fruit (seed) are considered poisonous and can be messy in a formal landscape (Dirr 2009). Fruit (seed) size is also smaller (average fruit size diameter, 4 cm) compared with that of other commercially available cultivars (diameter, >5 cm) (Fig. 2, bottom). The compact growth and upright habit make this selection ideal for planting sites with limited space where a full-size, rounded-form buckeye is not suitable. ‘LavaDak’ is soil-adaptable but prefers a well-drained, nondroughty soil and tolerates higher pH (>7.5) levels.

Resistance to Pests and Stress

‘LavaDak’ has exhibited no major disease issues with leaf blot and powdery mildew, which generally affect the species. Foliage has exhibited no chlorosis symptoms growing in soil with a pH higher than 7.5. Foliage shows greater resistance to leaf scorch than nonselected buckeyes.

Outstanding Characteristics and Use

LavaDak is the only cultivar that was primarily selected for its growth habit and not based on fall color or timing of coloring. The compact, narrow growth habit makes this selection ideal for limited space planting sites where a full-sized buckeye is not suitable. ‘LavaDak’ fills the need for a small, narrow buckeye for use in boulevard and landscape plantings. This is especially relevant where available space or overhead power lines are a concern.

Propagation and Culture

‘LavaDak’ was selected in soils that are classified as Fargo-Ryan (thick solum silty clays) with 0% to 1% slopes with a pH of 7.7. Easily transplanted, it adapts well to a variety of soils, including dense clay soils (Fargo, ND, USA evaluations; lat. 46.8772, long. -96.7898). ‘LavaDak’ has a medium growth rate but slower than standard species seedlings because of the more compact growth. Propagation is by side or cleft graft onto seedling *Aesculus* rootstocks and will perform best on *A. glabra* in northern climates to insure root hardiness.

Availability

‘LavaDak’ is sold under the trademark Lavaburst® (U.S. Trademark reg. no. 5,103,464) and is available for nonexclusive licensing. For more information, contact the North Dakota State University Research Foundation (1735 NDSU Research Park Drive, Suite 124, Department 4400, PO Box 6050, Fargo, ND 58108-6050, USA; phone: +1 (701) 231-6681; <http://www.ndsuresearchfoundation.org/>). Plant material for vegetative propagation can be obtained from the North Dakota State University Department of Plant Sciences Woody Plant Improvement Program or designated nursery (subject to availability). There is a horticultural

royalty of \$1.50 (US) per plant through the North Dakota State University Research Foundation upon licensing this plant for commercial production. ‘LavaDak’ is commercially available as grafted liners from, but not limited to, Heritage Seedling & Liners, Inc. (Salem, OR, USA) and as bareroot whip or calipered tree from J. Frank Schmidt (Boring, OR, USA).

References Cited

Dirr MA. 2009. Manual of woody landscape plants, their identification, ornamental characteristics, culture, propagation and uses (6th ed). Stipes Pub LLC, Champaign, IL, USA.

Hassler M. 2025. World plants. Synonymic checklist and distribution of the world flora (version 25.04, last update 1 Apr 2025). www.worldplants.de. <https://www.worldplants.de/world-plants-complete-list/complete-plant-list>. [accessed 1 Apr 2025].

Royal Horticultural Society. 2015. RHS colour chart (2nd ed). Royal Horticultural Society, London, UK.

US Department of Agriculture, Agriculture Research Service, National Genetic Resources Program. 2025. Germplasm resources information network (GRIN). National Germplasm Resources Laboratory, Beltsville MD, USA. <https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomydetail?id=1626>. [accessed 1 Apr 2025].