

## *Viburnum dilatatum* Thunb. — a new, potentially invasive species for Missouri

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ABSTRACT. — The Asian shrub *Viburnum dilatatum* is reported new to Missouri from Shaw Nature Reserve in Franklin County, where it is documented as an invasive in woodland understory that has persisted for at least 20 years. Multiple age classes ranging from seedlings to mature fruiting shrubs occur over several acres. Based on its performance at Shaw and data and observations from other states, this species has the potential to be a problem invasive in woodlands due to its abundant fruiting, tolerance of shaded understory conditions, quick maturation, and red fruit which will likely lead to ornithochory.

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*Viburnum dilatatum* Thunb., sometimes known as Linden Arrowwood, is a large shrub native to Japan and eastern China that was first cultivated in the United States before 1845 (Dirr 1998). Despite this species having exhibited invasive behavior in several states in the Mid-Atlantic (Swearingen & Barger 2016, UCPD 2020), it remains popular and widely promoted for its adaptability, abundant attractive flowers, and especially for its prolific production of attractive red fruits which remain long-persistent on the branches and attract birds (see cover illustration). The horticultural popularity of the plant is attested to by the availability of at least 13 named cultivars selected for their growth habit, autumn color, and heavy fruit set and color (Dirr 1998).

First reported as invasive in New England and the Mid-Atlantic states (Swearingen and Barger 2016), *V. dilatatum* has since been documented as escaped and spreading in Illinois (Basinger 1999), North Carolina (Weakley 2015), and most recently in Kentucky (Brock 2020). The closest naturalized populations to Missouri are in Carbondale in Jackson County, Illinois (Basinger 1999) where the senior author has observed plants of all age classes extensively distributed through woodland understory at the Marberry Arboretum.

In Missouri, *Viburnum dilatatum* has not previously been documented to occur spontaneously outside of cultivation. Here we report a large, long-established, and apparently slowly spreading population from the Missouri Botanical Garden's Shaw Nature Reserve (SNR) in Franklin County, Missouri, where it has presumably spread from plants originally cultivated at the site. Glenn Beffa (pers. comm.) has known of this location for more than 20 years, although Bill Davit, former botanist at SNR, had not observed it at the site prior to this account.

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The well-established population at Shaw Nature Reserve includes plants of all age classes from seedlings to large mature individuals up to 6 m tall. Individual stems on mature multi-stemmed plants range up to 5 cm diameter. Determination of the age of the older plants in the population is difficult due to their multi-stemmed growth form and stem die-back and resprouting, but we have counted 16 growth rings on one large stem. The population occurs near the old plant nursery at SNR, in an area that consisted of extensive open fields and woody fencerows in a 1941 aerial image of the site. These former fields have reverted to a mature successional woodland with a closed canopy of large ash (*Fraxinus* sp.), red cedar (*Juniperus virginiana*), and shingle oak (*Quercus imbricaria*), shading a nearly continuous shrub layer consisting of *V. dilatatum* mixed with border privet (*Ligustrum obtusifolium*) and bush honeysuckle (*Lonicera maackii*). This population of *V. dilatatum* fruited abundantly in 2019. Current extent of the population, the presence of numerous immature shrubs beneath and around mature plants, and the lack of long-distance dispersal in the region, suggest that distant ornithochorous dispersal has not yet occurred at SNR (Fig. 1).



**Figure 1.** Aerial image of a portion of Shaw Nature Reserve showing distribution of *Viburnum dilatatum*. Red polygons indicate areas of dense infestation (12 acres), the blue area (7 acres) contains low levels of infestation, the green area (12 acres) contained a few individuals, and the purple area (14 acres) was searched but no plants were found.

Using the key to Missouri *Viburnum* in Yatskievych (2006), *V. dilatatum* would key to *V. molle* or *V. ozarkense* (= *V. bracteatum* fide Estes 2010). Another species occurring in Missouri, *V.*

*rafinesquianum*, also appears similar. All of these native species have dark, bluish black to black fruits. The petioles of *V. dilatatum* are densely pubescent, whereas the petioles in the other species are glabrate to moderately pubescent. All of these species can have small (to ca. 0.13 mm) stipitate glands on the petioles, but in *V. molle* they are typically abundant, while in the other species they are sparse to rare. Additionally, the leaves of *V. dilatatum* have rounded to shallowly subcordate bases, whereas the leaves of *V. molle* are usually distinctly cordate at their bases. Although there is considerable overlap in the size and number of teeth along the leaf margins, *V. dilatatum* is usually more finely serrate, often averaging 3.5 or more teeth/cm, while the other species are typically more coarsely dentate, often averaging 3 or less teeth/cm.

Given its abundant fruit production even in shaded habitats, continuing availability as a nursery shrub, and its documented ability to become established and self-perpetuating over at least short distances in Missouri habitats, it is likely that this species will become established in other woodlands in the state.

*Specimen cited:* **U.S.A. MISSOURI:** FRANKLIN CO.: Shaw Nature Reserve, understory shrub in old successional woodland; 3 October 2019, 38.480748°N 90.816435°W; *Saxton s.n.* (MO).

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