

## New York City EcoFlora

### Guide to Asian Bittersweet (*Celastrus orbiculatus* Thunb)



**Description:** Woody vine (liana) from thick, orange roots, climbing by twining; bark on older stems silvery-gray to yellow-brown with prominent cracked lenticel fields, the younger stems gray, yellow-green, brown or purplish with prominent raised lenticels, glabrous; leaves alternate, simple, quite variable from ovate, orbicular to obovate, often with an abrupt tapering tip (caudate), the margins distinctly scalloped or crenate; inflorescences in leaf axils or subterminal, the flowers male, female or bisexual, small and greenish; fruit a spherical, three-lobed capsule splitting into reflexed, yellow valves exposing several seeds coated by fleshy, red arils.

**Where found:** Native to temperate east Asia; invasive throughout the eastern US from Maine to Minnesota and Louisiana to Georgia, particularly in the northern states; disturbed areas along rights-of-way, forest gaps and edges, wetlands and many other communities; widespread in New York City from upland woods to seashores, particularly on walls, fences and other artificial supports. The sale, transport or trade of the species is prohibited by New York State Law, [Part 575](#).

**Natural History:** Asian Bittersweet fruits are dispersed by birds and mammals attracted to the bright red arils. Plants are spread anthropogenically by contaminated soil and discarded holiday wreaths. The seeds have a high germination rate (up to 95%), especially under low light levels (Fryer, 2011). Young plants employ a “wait and see” strategy, growing slowly until sufficient light and support are available, at which point they double their photosynthetic capacity and grow rapidly upward (Greenberg et al., 2001). The invasive Porcelain-berry (*Ampelopsis brevipedunculata*) exhibits a similar growth pattern (Frampton et al., 2018). The extremely flexible stems of Bittersweet twine around any firm object like poles, fences and tree trunks. Like many lianas, the plants expend prodigious energy producing upward growing stems without flowering and fruiting. When they can climb no longer and are exposed to ample sunlight (like the tree canopy or the top of a pole), the stems twine around themselves and the plant shifts to the reproductive stage. The woody stems increase in diameter every year and when encircling a tree they can choke the flow of water and nutrients through the cambium. The accumulated weight in the canopy of trees greatly increases damage during wind and ice storms. The plants inhibit the growth of trees and herbaceous species impoverishing biodiversity.

**Cultural History:** Like Porcelain-berry, Asian Bittersweet was first introduced to North America in the late 1880s through the nursey trade into New York City (Del Tredici, 2014). Escaped populations were noted as early as 1912, but no action was taken until relatively late in the century, much too late for easy control. The festive colors, abundance of the plants and ease of collection make

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Asian Bittersweet a tempting material for holiday wreaths. Unfortunately, many of these wreaths are discarded outdoors with other yard waste, thereby spreading the plant to new areas. Cutting large vines will immediately arrest the aerial growth and kill the upper portions of the plant. Large plants often die after being cut, but repeated cutting of stump sprouts may be necessary to eventually exhaust the roots and kill the plant entirely (NRCS, nd; Travis & Kiviat, 2016).

**Name Notes:** The generic name, *Celastrus* is derived from *kelastros*, the ancient Greek name for an evergreen tree. The epithet, *orbiculatus* refers to the nearly circular leaf shape of the Asian species. The geographic “Asian” or “Oriental” is added to “Bittersweet” to distinguish it from the European “Bittersweet” generally reserved for the better known *Solanum dulcamara*. The Merck Manual of the 19th Century, *Kings American Dispensatory* reports that the root bark of the American Bittersweet (*Celastrus scandens*) has “a bitter, afterward sweetish, rather nauseous taste” (Felter and Lloyd, 1898).

**Species Notes:** *Celastrus* is another of the many genera with sister species relationships with Asian relatives (Like *Ampelopsis*, *Podophyllum*, *Liriodendron*, etc...). The American Bittersweet (*Celastrus scandens* L) was formerly widespread from Maine to Montana and common in the northeastern United States but has been outcompeted by its invasive, Asian twin and is now rare or uncommon in much of its former range (Steward et al., 2003). In addition to its growth and metabolic advantages, the Asian Bittersweet readily hybridizes with the native species, producing offspring that outcompete either parent (Pooler et al, 2002). The native species tends to have narrower leaves tapered at both ends, but there is much overlap in leaf shape between the two species. The outer fruit valves of the native species are orange, while those of the Asian species are tan or yellow and highly contrasting with the red arils, but there is overlap here too. The most reliable distinguishing trait is the position of the inflorescences. In the native species, the male and female inflorescences are terminal on the twigs, but in the Asian species, the females are strictly axillary (but the male inflorescences may be subterminal). The only other twining woody vine in our area is the introduced Japanese Honeysuckle (*Lonicera japonica*). That species has opposite leaves (and leaf scars). The young stems are brown and distinctly pubescent and they never get more than a few centimeters in diameter when older.



**Links:** iNaturalist [observations](#) from New York City. [Specimens](#) from the Mid-Atlantic Herbaria Consortium. Global biotic [interactions](#) from GloBI.

**References:** Pooler, M.R., R.L. Dix and J. Feely. 2002. Interspecific hybridizations between the native bittersweet *Celastrus scandens* and the introduced invasive species *Celastrus orbiculatus*. *Southeastern Naturalist* 1: 69–76. Fryer, J.L. 2011. *Celastrus orbiculatus*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). <https://www.fs.fed.us/database/feis/plants/vine/celorb/all.html> [2018, December 5]. Greenberg, C.H., L.M. Smith, D.J. Levey. 2001. Fruit fate, seed germination and growth of an invasive vine—an experimental test of ‘sit and wait’ strategy. *Biological Invasions*. 3(4): 363–372. Frampton, L., P. Valencia, and A. Zimmerman. 2018. Using a controlled environment to test porcelain berry (*Ampelopsis brevipedunculata*) shade tolerance in comparison to light levels in a natural habitat. *Purchase College Journal of Ecology* 2: 17–25. Travis, K.B. and E Kiviat. 2016. Best management practices for priority invasive plants in the lower Hudson Valley. [Report to the Lower Hudson Partnership for Regional Invasive Species Management](#). 72 pp. Felter, H.W. and J.U. Lloyd. 1898. *Kings American Dispensatory*. The Ohio Valley Company, Cincinnati, Ohio. NRCS. nd. Natural Resources Conservation Service. Brush Management – Invasive Plant Control, Oriental Bittersweet – *Celastrus orbiculatus*. Conservation Practice Job Sheet [NH 314](#). Pooler, M.R., R.L. Dix and J. Feely. 2002. Interspecific hybridization between the native bittersweet, *Celastrus scandens*, and the introduced invasive species, *C. orbiculatus*. *Southeastern Naturalist* 1: 69–76.