

TERNSTROEMIA (THEACEAE) IN THE ARKANSAS FLORA

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ABSTRACT

The first known occurrence of *Ternstroemia gymnanthera* outside of cultivation in Arkansas is reported here. One escaped plant of *T. gymnanthera* was discovered growing at the base of a steep slope, at the top of a stream bank of an intermittent stream in a disturbed, urban greenbelt in Clark County. Photographs of *T. gymnanthera*, including the escaped plant in habitat, along with notes on *Ternstroemia* and the Theaceae family in Arkansas, are provided.

In 2017, a single, escaped plant of *Ternstroemia gymnanthera* (Wight & Arnolt) Beddome (glossy ternstroemia) was found on the bank of an intermittent stream within a highly disturbed, urban greenbelt in Clark County (Figs. 1–2). The plant was growing at the top of the stream bank, at the base of a steep, semi-wooded slope. The site is directly bordered on both sides by residential areas. Three cultivated, reproductively mature plants of *T. gymnanthera* were present at one of the homesites bordering the greenbelt; these plants presumably were the source of the escaped plant. In addition to *T. gymnanthera*, a number of other non-native angiosperm species were naturalized at the site.

Voucher specimens: **Arkansas**. Clark Co.: Arkadelphia, urban greenbelt immediately NW of intersection of 24th St. and Crawford St., one escaped plant at top of bank of intermittent stream at base of steep slope in a disturbed, semi-wooded greenbelt, cultivated plants of *T. gymnanthera* about 12 m away at top of slope in adjacent residential area, 17 Nov 2017, *Serviss 8609* (HEND); Arkadelphia, highly disturbed area of homesite adjacent to intersection of 13th St. and Henderson St., spontaneous juvenile plant, less than 1 m tall, 28 Feb 2007, *Serviss 7113* (HEND).

Serviss and Peck (2008) previously documented the presence of spontaneous, juvenile plants of *Ternstroemia gymnanthera* in the immediate vicinity of cultivated individuals of the species; spontaneous juveniles of *T. gymnanthera* have been observed from multiple locations in Clark County

in 2005 and 2007 (Serviss, unpublished data—Fig. 3). The 2017 record of *T. gymnanthera*, although still in relative proximity to cultivated plants of the species, was separated from them downslope by more than 12 m, indicating probable seed dispersal (via birds or water and/or gravity) from the cultivated plants, followed by subsequent establishment of the escaped plant. The seeds probably are bird-dispersed (Min & Bartholomew 2007), which is supported by the red to reddish-orange, fleshy covering of the seeds. Cultivated plants of *Ternstroemia* (in Arkansas) sometimes produce fruits with seeds.

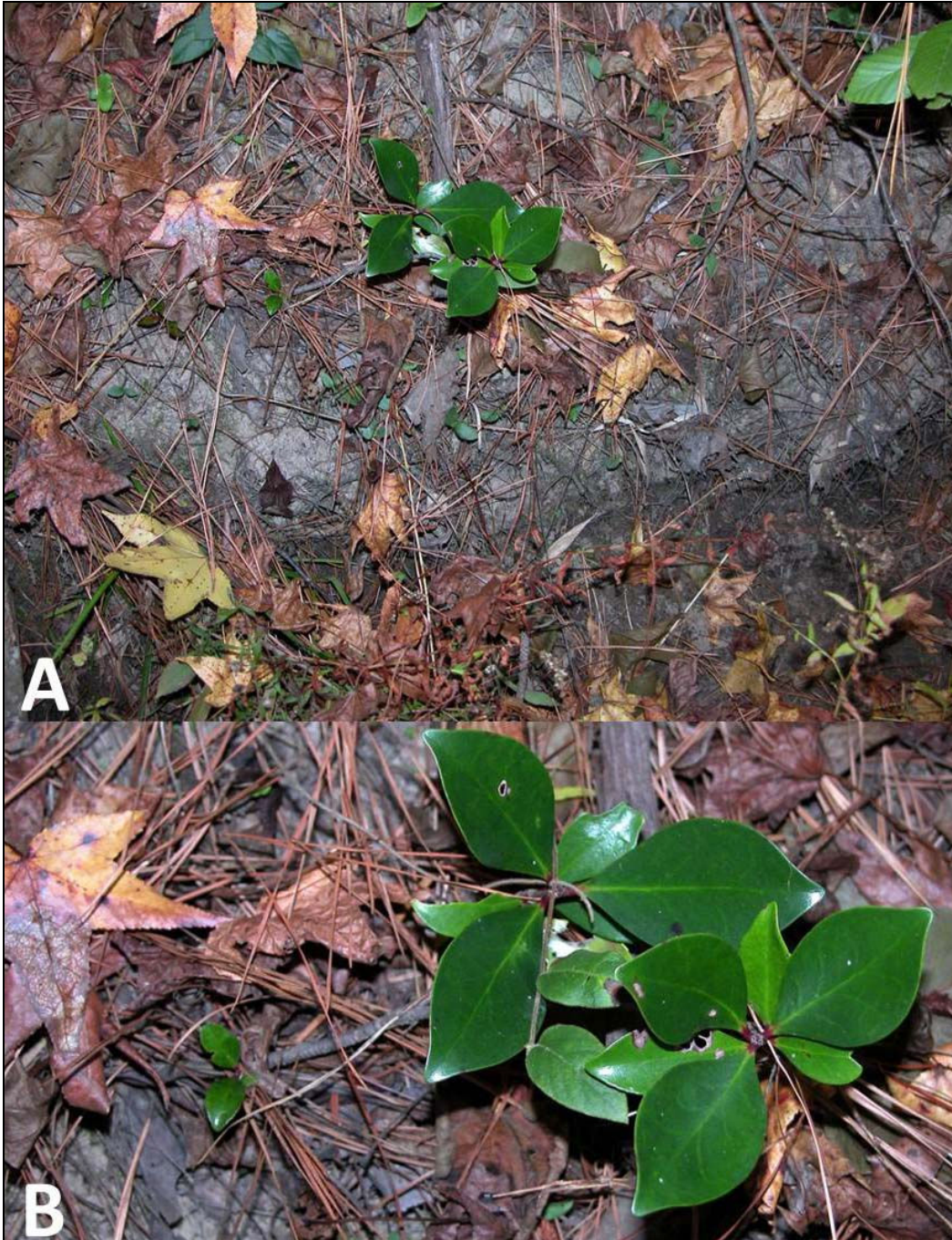


Figure 1. *Ternstroemia gymnanthera* escaped in Clark Co., Arkansas. (A) Plant was less than 1 m tall. A portion of the stream bank may be seen below the plant in Fig. 1A. (B) Close-up of plant. Notice the conspicuous red to reddish-purple petioles (also see Fig. 2).

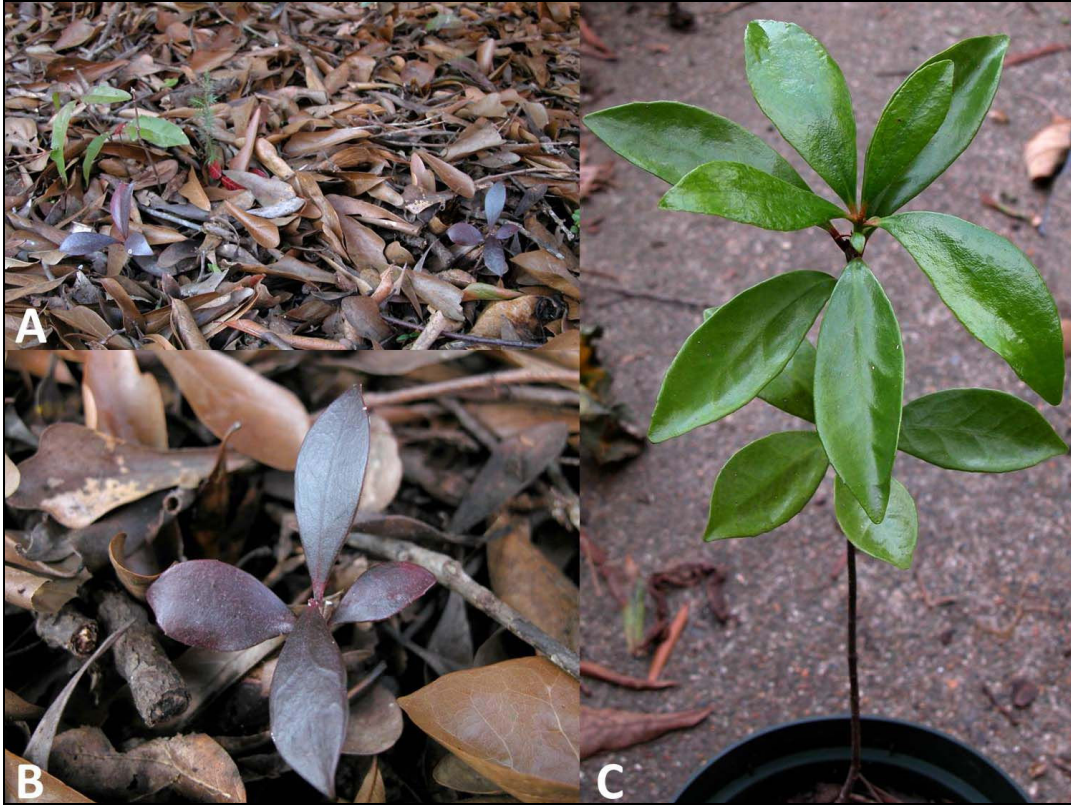


Figure 3. Spontaneous, juvenile plants of *Ternstroemia* in Clark County. (A–B) Small plants from self-seeding by a large, cultivated plant on the Henderson State University (HSU) campus; several similar seedlings were present in the area surrounding the cultivated plant (Fig. 3A shows two of these plants). (B) Close-up of one of the plants shown in Fig. 3A (notice the occasional, widely-spaced, serrate teeth on some of the leaves). The purple coloration seen on the plants in Figs. 3A–B sometimes occurs during winter periods and is normal, at least for young plants. (C) Slightly older plant than those shown in Figs. 3A–B (after discovery, some of these plants were collected and eventually transplanted to allow for continued observation).



Figure 2. Close-up of a portion of the escaped *Ternstroemia gymnanthera* plant showing new growth in spring (2018). The leaves sometimes are serrately-toothed, even in mature plants.

Ternstroemia gymnanthera is a large, evergreen shrub or small tree, sometimes to 10 or 15 m, native to China, India, Japan, Vietnam, and other areas of southern Asia (Bailey & Bailey 1976; Krüssmann 1978; Min & Bartholomew 2007). This species is an easily grown, shade-tolerant ornamental, with attractive, glossy, evergreen foliage. *Ternstroemia gymnanthera* regularly is cultivated in the southern USA, including Arkansas, and has been reported as a component of the naturalized floras of Alabama, Florida, and South Carolina (Payne 2010; Weakley 2015; Keener et al. 2018; Wunderlin et al. 2018). The genus was not treated in Flora of North America (Prince 2009).

At least some of the *Ternstroemia* material cultivated and naturalized in the southeastern USA is not unequivocally identifiable as *T. gymnanthera*—these taxa may represent other species, hybrids, or horticultural selections out of the normal morphological range of wild *T. gymnanthera* (a number of horticultural varieties of *T. gymnanthera* do exist), as described by Min and Bartholomew (2007) in the Flora of China (Weakley 2015). This is certainly the case for Arkansas, as many cultivated *Ternstroemia* plants observed produce flowers with pedicels considerably longer than the 1–1.5 cm attributed for that species in the Flora of China *Ternstroemia* treatment. Ohwi (1965) and Walker (1976), in two treatments of the Japanese flora, list a pedicel length for the flowers of up to 2 cm, which is somewhat closer to what has been observed in cultivated and spontaneous *Ternstroemia* plants in Arkansas. The University of Arkansas Cooperative Extension Service (2018) lists a pedicel length of ca. 1 in (2.54 cm); this is clearly within the range of pedicel lengths observed with Arkansas plants. The cultivated *Ternstroemia* plants that presumably generated the 2017 escaped plant described here had flowers with pedicel lengths ranging from 1.9–3.5 cm (Fig. 4), but in most, if not all other respects, appear similar to the plants classified as *T. gymnanthera* that regularly are cultivated in this country.



Figure 4. (A–B) Comparison of flowers and pedicel lengths between two of the cultivated *Ternstroemia* plants, which are the presumed source of the 2017 escaped *Ternstroemia* plant. Pedicel length in Fig. 4A ranges from 1.9–2.5 cm, in Fig. 4B from 2.4–3.5 cm. Overall, both plants were similar to one another in appearance but the 4A plant had slightly smaller leaves and a more dense growth habit. Petal width of the flowers shown in A is approximate to the stated range for the species; some of the flowers in B had slightly wider petals (to ca. 8 mm) than described for *T. gymnanthera* (Min & Bartholomew 2007).

Ternstroemia gymnanthera is the only species in the genus listed in Bailey and Bailey (1976) as cultivated in the USA, and it is the only cultivated *Ternstroemia* species listed in Griffiths (1992) and Krüssmann (1978), both of which offer a more broad-reaching scope of coverage for plants in cultivation. Interestingly, one of the spontaneous plants (documented from 2005, 2007—Figs. 3, 5A–D) produced flowers (in 2018) with pedicels 2 cm and longer. It is morphologically similar to cultivated *Ternstroemia* plants in the Arkadelphia area (and elsewhere). As a result of these apparent discrepancies, unequivocal identification of at least some Arkansas *Ternstroemia* material as *T. gymnanthera* is problematic. To date, however, escaped *Ternstroemia* plants documented from the state appear to resemble most closely *T. gymnanthera*.

The genus *Ternstroemia* is sometimes placed within the Pentaphragmaceae family, although traditional placement within the Theaceae is maintained here.

The Theaceae family in Arkansas predominately is represented by exotic taxa; only *Stewartia malacodendron* L. (silky camellia) is native. *Camellia sasanqua* Thunb. (fall-flowering camellia) is sparingly naturalized in the Arkansas flora (Serviss & Peck 2016), and elsewhere in the southeastern USA (Byrd & Diamond 2018). This species is shade-tolerant and often prolifically self-seeds, and numerous occurrences of spontaneous seedlings and juveniles, well over 100 plants in number, have been documented from multiple sites in Clark County (Serviss & Peck 2008; Serviss & Peck 2016); these occurrences almost always in direct association with cultivated individuals of *C. sasanqua*. Additional occurrences of escaped and naturalized plants of *C. sasanqua* should be expected in urban natural areas that occur in proximity to where plants of the species are cultivated.

Camellia japonica L. (Japanese camellia), while not currently known from truly naturalized plants in the state’s flora, has demonstrated the ability to generate spontaneous seedlings, which were observed previously in association to cultivated plants of *C. japonica* (Serviss & Peck 2008). *Camellia japonica* has been documented outside of cultivation in a few other southeastern states (Diamond 2013; Weakley 2015), and escaped or naturalized plants of *C. japonica* also should be expected in Arkansas.

The following key may be used to distinguish the Theaceae species currently known from the Arkansas flora.

- 1. Plant deciduous, leaves not leathery; flowers white, filaments of stamens purple; native and rare in the Arkansas flora **Stewartia malacodendron**
- 1. Plant evergreen, leaves more or less leathery; flowers white to yellowish-cream, or variously colored in shades of pink, lavender, lilac, magenta, purple, or red, stamens yellow to orange-yellow; introduced.
 - 2. Leaf margins entire or nearly so (occasionally with one or a few large teeth, especially on young plants); seeds small (ca. 6 mm long), red to reddish-orange **Ternstroemia gymnanthera**
 - 2. Leaf margins with numerous, small, serrate teeth; seeds large (ca. 9 mm long or longer), dark brown.
 - 3. Stems, leaves, ovaries, and fruits with oppressed pubescence **Camellia sasanqua**
 - 3. Stems, leaves, ovaries, and fruits glabrous **Camellia japonica**

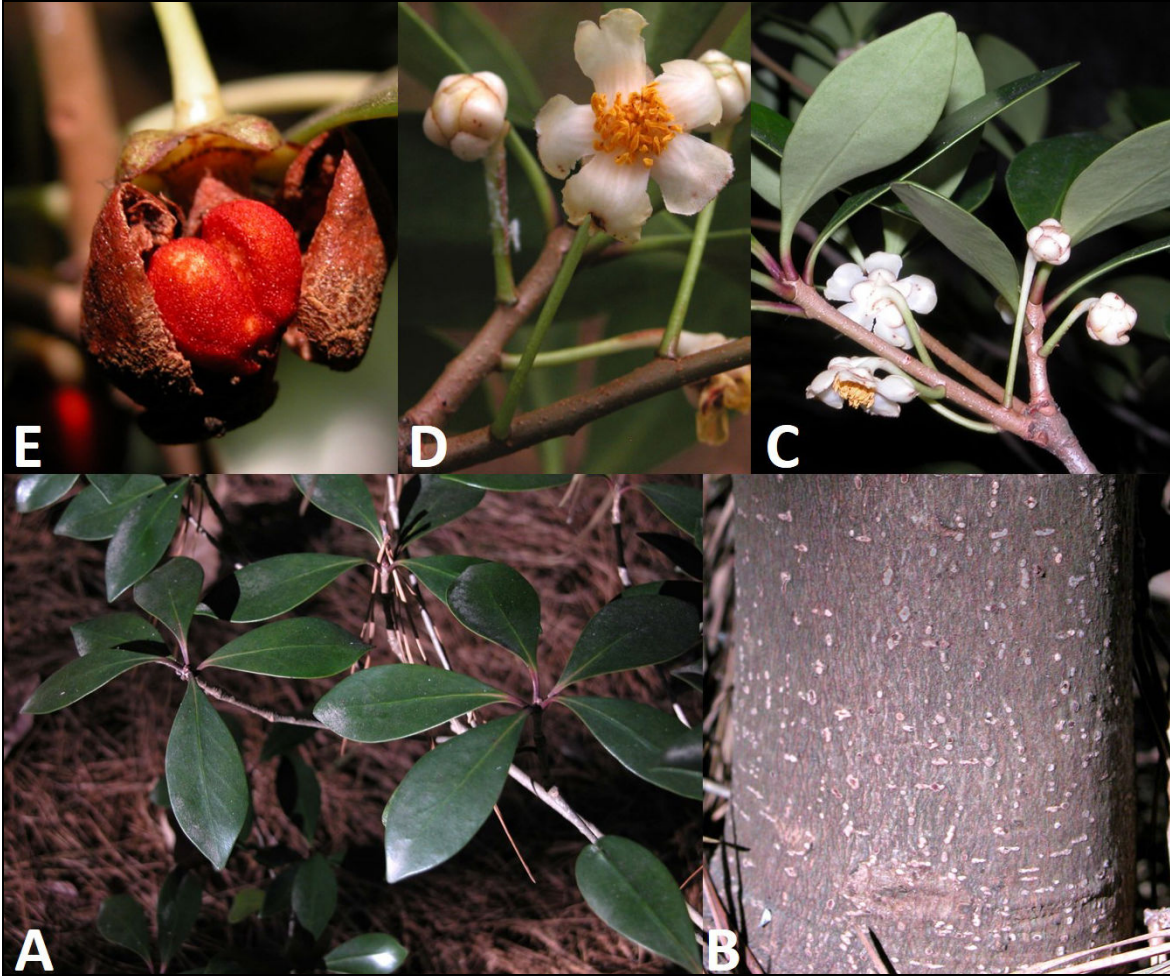


Figure 5. *Ternstroemia gymnanthera* plant and habit (from Arkansas plants). (A) Leaves. (B) Bark. (C–D) Flowers—the flower shown in D is staminate. (E) Mature fruit with seeds. The photographs shown in Figs. 5A–D were taken in 2018 and are from one of the spontaneous Arkansas plants (shown in Fig. 3) over a decade subsequent to discovery. Figure 5E is from a cultivated *Ternstroemia* plant on the HSU campus.

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LITERATURE CITED

- Bailey, L.H. and E.Z. Bailey. 1976. *Hortus Third. A Concise Dictionary of Plants Cultivated in the United States and Canada. Vol. 2.* MacMillan.
- Byrd, T.C. and A.R. Diamond. 2018. New vascular plant records for Alabama. *Phytoneuron* 2018–5: 1–5.
- Diamond, A.R. 2013. New and noteworthy woody vascular plant records from Alabama. *Phytoneuron* 2013–47: 1–13.
- Griffiths, M. 1992. *Index of Garden Plants.* Timber Press, Portland.
- Keener, B.R., A.R. Diamond, L.J. Davenport, P.G. Davison, S.L. Ginzburg, C.J. Hansen, C.S. Major, D.D. Spaulding, J.K. Triplett, and M. Woods. 2018. *Alabama Plant Atlas.* [S.M. Landry and K.N. Campbell (original application development), Florida Center for Community Design and Research. University of South Florida]. University of West Alabama, Livingston, Alabama.

- Krüssmann, G. 1978 (1986). *Manual of Cultivated Broad-Leaved Trees and Shrubs*. Vol. 3. Timber Press, Portland.
- Min, T. and B. Bartholomew. 2007. *Ternstroemia*. Pp. 430–434, in Z.Y. Wu and P.H. Raven (eds.). *Flora of China*. Vol. 12 (Hippocastanaceae through Theaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis.
- Ohwi, J. 1965. *Flora of Japan: In English: A combined, much revised, and extended translation* (F.G. Meyer and E.H. Walker, eds.). Smithsonian Institution Press, Washington, DC. P. 1067.
- Payne, D. 2010. A survey of the vascular flora of Beaufort County South Carolina. All Thesis. Paper 924, Clemson University, Clemson, South Carolina.
- Prince, L.M. 2009. Theaceae. Pp. 322–328, in *Flora of North America* Editorial Committee (eds.). *Flora of North America North of Mexico*. Vol. 8. Oxford Univ. Press, New York and London.
- Serviss, B.E. and J.H. Peck. 2016. *Camellia sasanqua* (Theaceae) in the Arkansas flora. *Phytoneuron* 2016–28: 1–7.
- Serviss, B.E. and J.H. Peck. 2008. New and noteworthy records of several non–native vascular plant species in Arkansas. *J. Bot. Res. Inst. Texas* 2: 637–641.
- University of Arkansas Cooperative Extension Service. 2018. *Ternstroemia gymnanthera*, Little Rock. Univ. of Arkansas Division of Agriculture, Research and Extension. <<https://www.uaex.edu/yard-garden/resource-library/plant-database/shrubs/japanese-ternstroemia.aspx>> Accessed June 2018.
- Walker, E.H. 1976. *Flora of Okinawa and the Southern Ryukyu Islands*. Smithsonian Institution Press, Washington, DC.
- Weakley, A.S. 2015. *Flora of the Southern and Mid–Atlantic States*. Working draft of 21 May 2015. Univ. of North Carolina Herbarium (NCU), Chapel Hill. <<http://www.herbarium.unc.edu/flora.htm>> Accessed January 2018.
- Wunderlin, R. P., B. F. Hansen, A. R. Franck, and F. B. Essig. 2018. *Atlas of Florida Plants*. [S.M. Landry and K.N. Campbell (application development), USF Water Institute.] Institute for Systematic Botany, University of South Florida, Tampa. <<http://florida.plantatlas.usf.edu/>> Accessed January 2018.