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IPOMOEA BATATAS (CONVOLVULACEAE) SPONTANEOUS IN THE ARKANSAS FLORA, WITH ADDITIONAL NOTEWORTHY RECORDS OF ANGIOSPERMS FOR THE STATE

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ABSTRACT

Ipomoea batatas (L.) Lam. is here documented for a first occurrence in the Arkansas flora. In 2015, a single plant of *I. batatas* was discovered growing in a rubbish pile in a partially dry streambed in Clark County, Arkansas. Propagules apparently were transported by stream water from horticultural discards or cultivated plants and deposited at this site, subsequently allowing for establishment of the spontaneous plant. Additionally, in 2016 and/or 2017, six species of angiosperms: *Colocasia esculenta* (L.) Schott, *Forsythia suspensa* (Thunb.) Vahl, *Forsythia viridissima* Lindl., *Hydrangea macrophylla* (Thunb.) Ser., *Kerria japonica* (L.) DC., and *Malvaviscus arboreus* Dill. ex Cav. var. *drummondii* (Torr. ex Gray) Schery, are reported for only their second occurrences in the Arkansas flora, outside of cultivation.

In 2015, a single plant of *Ipomoea batatas* (L.) Lam. (sweet potato) was discovered growing in a rubbish pile located in the streambed of Mill Creek in Clark Co., Arkansas. Propagules apparently were transported by stream water from horticultural discards or possibly cultivated plants and deposited at this site, with subsequent establishment of the spontaneous plant (Fig. 1). This record represents the first documented occurrence of this species in Arkansas, outside of cultivation.

Ipomoea batatas is widely cultivated in the southern USA, including Arkansas, and has been documented as persistent and/or escaped from cultivation in a number of other southern states (Kartesz 2015; Weakley 2015; USDA, NRCS 2017). The species is cultivated both for horticultural purposes as an ornamental groundcover for its rapid growth and colorful foliage types, ranging from chartreuse green to reddish–purple and dark purple forms, and for its edible roots. The spontaneous plant discovered in Arkansas is one of the ornamental varieties/forms commonly planted as a ground cover.

Figure 1. Voucher specimen of spontaneous plant of *Ipomoea batatas* from Clark Co., Arkansas. Notice the adventitious roots at the top of the specimen. Establishment was likely via stem fragments that were dumped as horticultural waste and/or transported by stream water to the site, allowing for establishment of the plant.

Voucher specimen. **Arkansas**. Clark Co.: One spontaneous plant growing on rubbish heap in streambed, Mill Creek, off 26th St., immediately N of Feaster Trail parking area, Arkadelphia, 15 Oct 2015, *Serviss 8197* (HEND).

Other noteworthy angiosperm records for Arkansas

Six additional angiosperm species — *Colocasia esculenta* (L.) Schott, *Forsythia suspensa* (Thunb.) Vahl, *Forsythia viridissima* Lindl., *Hydrangea macrophylla* (Thunb.) Ser., *Kerria japonica* (L.) DC., and *Malvaviscus arboreus* Dill. ex Cav. var. *drummondii* (Torr. and Gray) Schery — are documented for only their second occurrences in the state, outside of cultivation. All were documented along or within the proximity of highly disturbed, semi–wooded, urban areas in Clark and/or Garland counties. The Clark County site is a riparian zone surrounded on three sides by residential areas, with low woods immediately to the east. The stream of the main riparian zone enters and continues through the adjacent woods, where a number of non-native species, in addition to the ones cataloged in this paper, have become established. The Garland county site is at the edge of a series of old, remnant home sites, although only minor evidence of these still remains.

1. Colocasia esculenta (elephant ear, taro) is a tuberous, sometimes stoloniferous, perennial that is native to Asia, and is commonly cultivated and well–naturalized along rivers, streams, swamp margins, pond edges, drainage ditches, and bottomland hardwood forests in the southeastern USA (Godfrey & Wooten 1979; Thompson 2000; Wunderlin & Hansen 2011; Weakley 2015). Aggressive, highly stoloniferous forms of the species sometimes are referred to as *C. esculenta* var. *aquatilis* Hasskl. *Colocasia esculenta* has been documented from Arkansas previously only from Garland County (Gentry et al. 2013). In 2017, 100s of naturalized plants of *C. esculenta* were discovered as a series of scattered individuals and colonies distributed along a highly disturbed, semi–wooded riparian zone and adjacent low woods in Clark County.

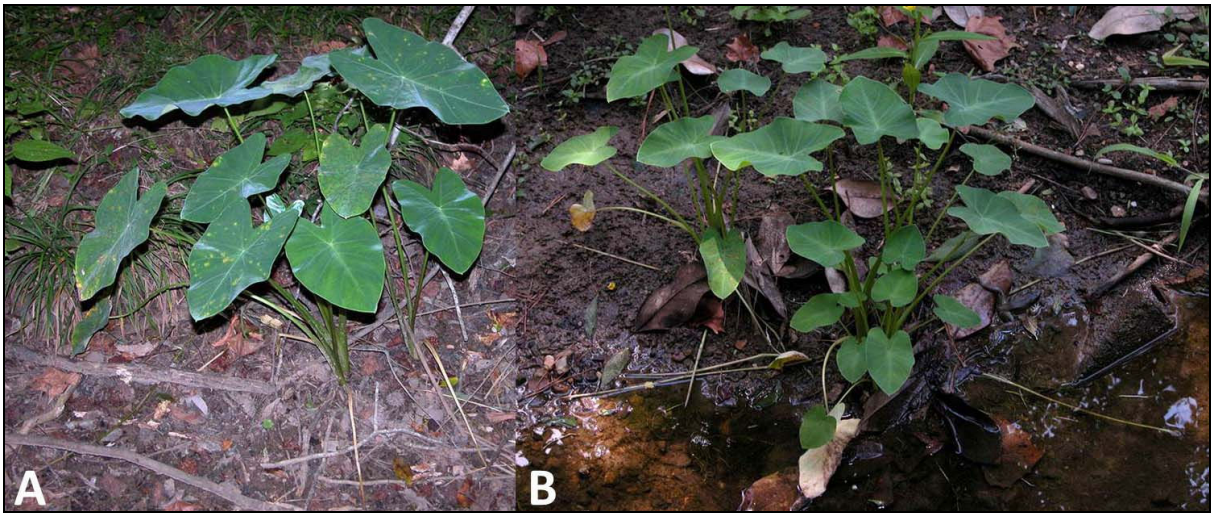

Figure 2. A–B. Naturalized plants of *Colocasia esculenta* from Clark County. Notice the elongate, several centimeter–long stolons emanating from each plant.

In the riparian zone, plants were present both in standing water of the streambed and along the banks (Figs. 2–3). Several plants also were documented at the edge of and within low woods that occurred to the east of the main riparian zone (Fig. 4). Stoloniferous offsets appeared to be the principal means of spread and naturalization.

The stolons of *C. esculenta* are extremely brittle, which allows for stolon fragmentation and subsequent transport of stoloniferous offsets by stream water, facilitating spread and establishment in the area. Many small stoloniferous offsets, such as the one shown in Figure 5, were observed.

Figure 3. Colony of naturalized *Colocasia esculenta* in streambed of riparian zone. Numerous plants, both as single individuals and small to large colonies, were present along the stream.

Figure 4. Portion of a large, expansive colony of naturalized *Colocasia esculenta* in wet woods east of the main riparian zone.

Figure 5. Presumed stoloniferous offset growing at waterline of stream. This plant was small, less than 0.5 m tall, with no other plants of *Colocasia esculenta* in the immediate vicinity.

Voucher specimen. **Arkansas**. Clark Co.: 100s of plants naturalized in and along stream of disturbed riparian zone and adjacent low woods, plants occurred both as individuals and small to large colonies, off Elaine Circle, S and E of the intersection of Elaine Circle and 21st St., Arkadelphia, 1 Sep 2017, *Serviss 8592* (HEND).

2. Forsythia suspensa (weeping forsythia) is a deciduous shrub to about 3 m tall that is native to China (Chang et al. 1996). It is naturalized in several states in the USA (Kartesz 2015; USDA, NRCS 2017). It was first documented outside of cultivation in Arkansas by Serviss et al. (2015). In 2016 and 2017, three additional naturalized occurrences of *F. suspensa* in Arkansas were documented from Clark and Garland counties (Fig. 6). All sites had multiple naturalized plants of *F. suspensa*. Some plants were colonial and apparently spreading vegetatively via air layering of stems. Spread via seed also is plausible, as some plants at some of the sites had fruits.

Voucher specimens. **Arkansas**. Clark Co.: Small colony of naturalized plants on bank of stream, Mill Creek, S of HSU campus, between 12th St. and 15th St., Arkadelphia, 3 Jul 2016, *Serviss 8354* (HEND); a few naturalized plants in disturbed urban woods and edge, adjacent to Pinewood Dr. and edge of HSU campus, immediately W of the Reddie Athletic Center, Arkadelphia, 17 Jun 2016, *Serviss 8350* (HEND). Garland Co.: Seven plants naturalized along small ravine, off Sleepy Valley Rd. immediately E of intersection of Sleepy Valley Rd. and Gulpha Gorge Rd., Hot Springs National Park, Hot Springs, 18 Jul 2017, *Serviss 8575* (HEND).

Figure 6. Naturalized plants of *Forsythia suspensa* growing on slope of shallow ravine in Garland County; about seven plants of *F. suspensa* were present.

3. Forsythia viridissima (greenstem forsythia) is a deciduous to semi–evergreen shrub to about 3 m tall that is native to China (Chang et al. 1996). Like *F. suspensa*, *F. viridissima* is naturalized in several states (Kartesz 2015; USDA, NRCS 2017) and was first documented outside of cultivation in Arkansas by Serviss et al. (2015). In 2017, a second naturalized occurrence of *F. viridissima* was documented from Garland County (Fig. 7). Colonies of naturalized plants of *F. viridissima* were observed from two different areas at this location. One colony consisted of nine plants established along the slope and base of a shallow ravine. The other colony consisted of numerous plants growing in and at the edge of a large thicket; this colony spanned ca. 6–7 meters across. Spread and establishment of the Garland County *F. viridissima* plants is likely a combination of vegetative air layering and also plausibly via seeds, as some plants had mature fruits.

Figure 7. Naturalized plants of *Forsythia viridissima* from Garland County. These plants occurred at the edge of disturbed woods at the bottom of a shallow ravine. Additional plants are present on a slope to the right of the area shown in the photograph. Some plants had mature fruits.

Forsythia suspensa and *F. viridissima* are morphologically similar and easily confused. For distinguishing characteristics of the two species, along with detailed photographs, see Serviss et al. (2015).

Voucher specimen. **Arkansas**. Garland Co.: Nine plants naturalized along small ravine, some plants with mature fruits, off Sleepy Valley Rd. immediately E of intersection of Sleepy Valley Rd. and Gulpha Gorge Rd., Hot Springs National Park, Hot Springs, 18 Jul 2017, *Serviss 8579* (HEND).

4. Hydrangea macrophylla (bigleaf hydrangea) is a deciduous shrub to 3 m tall that is native to Japan and commonly cultivated in the southern USA (Bailey & Bailey 1976; Krüssmann 1977; Wei & Bartholomew 2001), including Arkansas. It was first documented in the Arkansas flora by Serviss et al. (2016), which also represented only the second documented occurrence of this species outside of cultivation in the USA (Jaster et al. 2016; Serviss et al. 2016). Two additional escaped/naturalized plants of *H. macrophylla* were documented in 2017 from Clark County. Although both individuals were from the same general location, they were separated by more than 50 meters. The larger of the two plants, about 2 m tall, occurred along a small stream of a riparian zone, just above the waterline (Fig. 8).

Figure 8. Photograph of the larger of the two naturalized plants of *Hydrangea macrophylla* from Clark County. This plant was ca. 2 m tall and growing just above the water line along a small stream in a highly disturbed, semi–wooded riparian zone. Some of the lower braches were rooting via air layering, offering a potential route for localized spread and expansion.

This plant showed evidence of air layering of some of the lower branches, which were well–rooted into the soil, indicating some limited asexual spread. The second plant, which was less than 1 m tall, occurred within disturbed woods immediately east of the main riparian zone (Fig. 9). The origin of the two *Hydrangea* plants is unclear; however, horticultural discards and their potential transport via stream water to the sites of establishment is presumed.

Figure 9. Small, naturalized plant of *Hydrangea macrophylla* growing in low, wet woods immediately east of the riparian zone. Plant showed evidence of deer browse and subsequent regrowth. Its origin, although uncertain, is likely via transport of horticultural discards by water with subsequent deposition and establishment.

Voucher specimens. **Arkansas**. Clark Co.: One large plant, ca. 2 m tall, growing at edge of stream near waterline, disturbed, semi–wooded riparian zone within residential area, off Elaine Circle, S and E of the intersection of Elaine Circle and 21st St., Arkadelphia, 1 Sep 2017, *Serviss 8587A* (HEND); one small plant in disturbed, low woods, adjacent to small, intermittent stream, immediately E of Elaine Circle, Arkadelphia, 1 Sep 2017, *Serviss 8587B* (HEND).

5. Kerria japonica (Japanese kerria, Japanese yellow rose) is a deciduous shrub to 3 m tall that is native to China and Japan (Li et al. 2003; Henrickson & Weakley 2014) and is naturalized in several scattered states in the eastern USA (Henrickson & Weakley 2014; USDA, NRCS 2017). It was first documented outside of cultivation in Arkansas by Peck and Serviss (2016) from Garland County, based on a 2006 specimen (*Peck 06-046*). It is important to note that, although this second occurrence also is from Garland County, it is from a different location than the original Peck specimen and documented more than a decade later.

In 2017, naturalized plants of *K. japonica* were observed growing at the base of a slope of a shallow ravine in Hot Springs National Park. Plants appeared to be spreading via root suckers, which is typical for this species (Fig. 10). The origin of the naturalized plants may have been cultivated plants of *K. japonica*, as the location of the naturalized plants is adjacent to a series of old home sites.

Figure 10. Naturalized plants of *Kerria japonica* in Garland County, Hot Springs National Park. About 10 plants/clones were present at this location, presumably established via root suckering. To the left is the base of the ravine which may hold water intermittently. The darker colored plants more to the background (right side of photograph) are *Forsythia viridissima*, which also was naturalized at this location.

Voucher specimen. **Arkansas**. Garland Co.: About 10 plants naturalized on slope of small ravine near base, plants appearing to be spreading vegetatively via root suckers, off Sleepy Valley Rd. immediately E of intersection of Sleepy Valley Rd. and Gulpha Gorge Rd., Hot Springs National Park, Hot Springs, 18 Jul 2017, *Serviss 8580* (HEND).

6. Malvaviscus arboreus var. **drummondii** (wax mallow) is a small, evergreen shrub (semi–woody subshrub in Arkansas) to ca. 3 m tall that is native to Mexico and Texas and naturalized in a few southeastern states (Bailey & Bailey 1976; Krüssmann 1977; Diggs et al. 1999; Weakley 2015). It only has been documented previously in Arkansas from Drew County (Sundell 1986; Gentry et al. 2013). In 2017, a single, large, naturalized plant of *M. arboreus* var. *drummondii* was documented growing at the top of a stream bank in a disturbed, semi–wooded riparian zone in Clark County (Fig. 11). No other plants of *M. arboreus* var. *drummondii* were observed in the vicinity.

The mature fruits of *M. arboreus* var. *drummondii* are bright reddish–orange and presumably (the seeds) are bird–dispersed. *Malvaviscus arboreus* var. *drummondii* is occasionally cultivated in the Arkadelphia area, and bird–mediated dispersal of seeds from cultivated plants is presumably the source of the naturalized plant.

Figure 11. Naturalized plant of *Malvaviscus arboreus* var. *drummondii* in Clark County. A single plant occurred in a highly disturbed, mostly open area at the top of the stream bank, growing amidst a large population of *Chamaecrista fasciculata*.

Voucher specimen. **Arkansas**. Clark Co.: One plant growing on top of stream bank in open area of disturbed riparian zone, plant with flowers, off Elaine Circle, S and E of the intersection of Elaine Circle and 21st St., Arkadelphia, 1 Sep 2017, *Serviss 8585* (HEND).

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