

ACALYPHA DEAMII (LARGE-SEEDED MERCURY) POPULATIONS IN ILLINOIS

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## INTRODUCTION

Acalypha deamii (Weatherby) Ahles (Large-seeded Mercury, Two-seeded Mercury) has a very limited range in east-central United States. Fernald (1950) recorded this taxon from damp woods, banks and roadsides of southern Ohio and Indiana, while Gleason and Cronquist (1991) recorded it from mesic sites at scattered localities and increased its range to include Tennessee and Arkansas. Due to its small range and the few known populations this species has been considered for listing as a federally endangered species, and the Illinois Endangered Species Protection Board has been reviewing its status.

Acalypha deamii is a small annual that rarely exceeding 40 cm in height. The stem is usually simple, pubescent with short, incurved hairs and occasional long spreading hairs. The ovate to rhombic, opposite leaves are 3-10 cm long, and have been reported by various authors (Fernald 1950, Gleason and Cronquist 1991, Steyermark 1963, Weatherby 1927) to have abruptly drooping blades. The axillary, pistillate bracts are 5-9 lobed, and usually stipitate-glandular. The capsules are mostly 3-4 mm long, 2-lobed and 2-seeded, and the seeds are 2.2-3.2 mm long. It is very similar to A. rhomboidea Raf., and has sometimes been considered a variety of that species. Acalypha rhomboidea, however, has much smaller, 3-lobed and 3-seeded capsules while the seeds are 1.2-2.0 mm long.

Large-seeded Mercury, which occurs in floodplain and terrace forests, is presently known from only a few states in east-central United States (Arkansas, Illinois, Indiana, Iowa, Ohio, and Tennessee). In Illinois it has presently been reported from scattered areas, with the highest concentration being in the east-central counties of Clark, Coles and Vermilion, from Massac County in extreme southern Illinois, and Montgomery County in central Illinois (Mohlenbrock and Ladd 1978). It was first reported for Illinois by Jones and Fuller (1955) based on a specimen collected in a thinly wooded river bottom along Salt Fork, three miles south of Fithian, Vermilion County, Illinois (Ahles # 6989). Wintarringer and Evers (1960) do not list this taxon, while Jones (1963) listed it for only Vermilion County, Illinois. More recently Mohlenbrock and Ladd (1978) listed it for five counties, the same recorded by Mohlenbrock (1986). The present study was undertaken to determine if Acalypha deamii was still present at the site for which it had been found previously, and to locate additional populations.

## NOMENCLATURE OF ACALYPHA DEAMII

This taxon was originally described as A. virginica L. var. deamii Weatherby (1927) based on a specimen collected on 20 October 1924 (Deam # 41,107) in a roadside along Whitewater River northeast of Logan, Deaborn County, in southern Indiana (type in Deam's Herbarium). Later, Weatherby (1937) determined that the name A. virginica should apply to another species, and transferred variety deamii to A. rhomboidea Raf. More recently

H. E. Ahles (Jones and Fuller 1955) gave this taxon specific rank, and most subsequent authors have accepted this view.

#### MATERIAL AND METHODS

Most populations of Acalypha deamii were originally located by examining herbarium specimens from most state herbaria (EIU, ILL, ILLS, ISM, MWI, SIU), consulting literature sources, and contacting many of the state's field botanists. All sites were then visited and searched for populations of this species. Also, other potential sites were examined, mostly in east-central Illinois.

At each site where a population of Acalypha deamii was found a 25 m X 25 m plot was established to determine the overstory composition, and the density (#/ha) basal area (m<sup>2</sup>/ha) and average diameter (cm) of all tree species (above 10 cm dbh) encountered. The woody sapling (2.5-10.0 cm dbh) encountered were also recorded in the 25 m x 25 m plots and the density (#/ha) determined. Herbaceous species found associated with the population were recorded and the extent of the herbaceous ground cover estimated. Population size, exact locality, and any factor that could potentially effecting the survival and viability of this species were also recorded.

#### RESULTS AND DISCUSSION

Sites where Acalypha deamii has been found in Illinois: Listed below are sites where Acalypha deamii populations have been reported and/or for which herbarium specimens are available, or where populations were found during the present study.

##### Clark County, Illinois:

Site # 1. Ebinger # 9217: Lowland woods, 1/2 mile S of Cleone, Ill. 1 October 1969. SE1/4 Sec 12 T11N R14W

Site # 2. Observed by J. E. Ebinger, September 1975: Low terrace at Hammond-Redman woods, 5 miles SW of Westfield, Ill. SW1/4 Sec 7 T11N R13W

##### Coles County, Illinois:

Site # 1. Ebinger # 25575: Terrace forest at Fox Ridge State Park, 7 miles S of Charleston, Ill. 1 September 1992. SW1/4 Sec 13 T11N R10E

Site # 2. Ebinger # 7941: Opening in floodplain forest on the Embarras River W of Diona, Ill. 26 October 1968. NW1/4 Sec 23 T11N R9E

Site # 3. Ebinger # 26421: In yard and flower garden, base of sandstone cliff at edge of Embarras River (Carl Ball's cabin), 3 miles E of Charleston, Ill. 10 September 1994. NW1/4 Sec 17 T12N R10E

Site # 4. Ebinger # 26458: Floodplain and hillside of small stream near junction with the Embarras River, 2 miles S of Charleston, Ill. 21 September 1994. NW1/4 Sec 38 T12N R10E

Site # 5. F. P. Kloker # 320: Floodplain of Embarras River at Walkers Ford, 5 miles S of Charleston, Ill. 26 September 1968. SW1/4 Sec 3 T11N R9E

##### Crawford County, Illinois:

Site # 1. Ebinger # 16515: Floodplain forest of Racoon Creek, 1 mile W of West York, Ill. 22 September 1977. SE1/4 Sec 1 T8N R12W

##### Jasper County, Illinois:

Site # 1. Ebinger # 16573: Floodplain forest of the North Fork Embarras

River, 2 miles E of Ste. Marie, Ill. 24 September 1977. SW1/4 Sec 29 T8N R14W

Massac County, Illinois:

Site # 1. Ebinger # 14252: Open woods 3 miles E of Joppa, Illinois next to the Halesia Nature Preserve. 25 October 1973. SW1/4 Sec 28 T15S R4E

Montgomery County, Illinois:

Site # 1. R. Vogel # 328: Floodplain forest at edge of Shoal Creek, 6 miles SW of Hillsboro, Ill. 12 September 1975. SW1/4 Sec 9 T7N R4W

Tazewell County, Illinois:

Site # 1. V. H. Chase # 12152: Woodland roadside, East Peoria, Ill. 6 September 1951. (Verified by Lillian Wood Miller, June 1964)

Vermilion County, Illinois:

Site # 1. H. E. Ahles # 8989 and 8086: Thinly wooded river bottom along Salt Fork, 3 miles S of Fithina, Ill. 19 October 1952 and 18 July 1954. N1/2 Sec 31 T19N R13W. (Verified by Lillian Wood Miller, June 1964)

Results of field studies during September 1994: During the present study all of the sites mention above were visited during September 1994 and searched for Acalypha deamii. At about half of the sites no individuals were observed, though at most sites suitable habitat was available. The results of the field study at each site are listed below.

Clark County, Site # 1: A total of nine individuals of Acalypha deamii were found in the 25 m X 25 m plot and about 20 more in the same general area. All individuals were found within 30 m of the North Fork Embarras River, and most were less than 20 cm tall. The overstory consisted of low terrace species with Aesculus glabra L. dominating, having an Importance Value (IV) of 77.5 (out of a possible 200). Other common species included Celtis occidentalis L. (IV of 34.1), Platanus occidentalis L. (IV of 21.4) and Ulmus rubra Muhl. (IV of 20.8). Overall, the woody overstory averaged 576 #/ha with a basal area of 42.2 m<sup>2</sup>/ha, and a average diameter of 25.6 cm. The understory was open, Aesculus glabra dominated with 992 saplings/ha, along with very few individuals of Celtis occidentalis and Acer negundo L. The herbaceous layer was dominated by Laportea canadensis (L.) Webb. with scattered individuals of Pilea pumila (L.) Gray, Rudbeckia laciniata L., Elymus virginicus L., Eupatorium rugosum Houtt., Cryptotaenia canadensis (L.) DC., Cinna arundinacea L. and a few species of Viola.

Clark County, Site # 2: Acalypha deamii was not found at this site, though it was observed here in 1975. This area, the Hammond-Redman Woods, was surveyed by Nyboer and Ebinger (1976). The area where Acalypha deamii had been found was in the low terrace where Aesculus glabra, Acer negundo, Celtis occidentalis, and Platanus occidentalis dominated. It is very possible that this species is still present, being an annual it may not appear every year, and the area was extremely dry this season.

Coles County, Site # 1: More than 500 individuals of Acalypha deamii were found at this site, the drier portion of a floodplain forest at Fox Ridge State Park. The author has observed this species in the floodplain and low terrace forests for many years. The site where the plants were located is

one of the floodplain forest studied by Crites and Ebinger (1989). Here Populus deltoides Marsh. was the dominant species with an IV of 101.1, followed by Acer negundo (IV of 74.1) and Acer saccharinum L. (IV of 62.9). No saplings were found, and the herbaceous layer was dominated by Laportea canadensis.

Coles County, Site # 2: Acalypha deamii was not found at this site, but in a wetter year could probably be found as suitable habitat is common in the area.

Coles County, Site # 3: Six individuals of Acalypha deamii were found at this site, growing at the base of a sandstone cliff in the yard and flower garden. This area is within 25 m of the Embarras River, and was part of a forested floodplain before cabins were built in the area more than 40 years ago.

Coles County, Site # 4: Fifteen individuals of Acalypha deamii were found in the floodplain. The overstory and herbaceous layer is very similar to that found at Fox Ridge State Park (Coles County, Site # 1).

Coles County, Site # 5: Acalypha deamii was not found at this site. Since the original collection in 1968 most of the floodplain forest has been cut and is now in cultivation.

Crawford County, Site # 1: Acalypha deamii was not found at this site. Since the original collection in 1977, some of the floodplain forest has been cut, and grazing is evident.

Jasper County, Site # 1: Acalypha deamii was not found at this site. The area has not changed since the original collection in 1977, but last years flooding and the dry conditions this year may have caused a problem for this species. Suitable habitat is present in the area, and if a seed bank is available, plants should be located at this site in future years.

Massac County, Site # 1: Acalypha deamii was not found at this site. The overstory is more closed than in the past, which may present a problem for this species.

Montgomery County, Site # 1: More than 2000 individuals of Acalypha deamii were found at this site, a floodplain forest along Shoal Creek. The species was doing extremely well in a disturbed path over which off-road vehicles commonly traveled as well as in the forest. The forest was dominated by Populus deltoides with an IV of 108.0, followed by Acer negundo (IV of 69.5), and scattered individuals of Salix nigra Marsh., Ulmus americana L. and Acer saccharinum. Tree density was 592 #/ha with a basal area of 28.9 m<sup>2</sup>/ha, and an average diameter of 21.9 cm. The woody understory was sparse, averaging 288 saplings/ha with Acer negundo dominating. The herbaceous layer was dominated by Laportea canadensis.

Tazewell County, Site # 1: Acalypha deamii could not be located in the area. The poor locality information (wooded roadside, East Peoria) made it impossible to determine where the original collection had been made.

Vermilion County, Site # 1: Though plenty of good habitat is available

along Salt Fork in the area south of Fithian, no individuals of Acalypha deamii could be located. A more complete search of the area may located specimens, but the dry condition this year probably was responsible for the lack of success.

Habitat of Acalypha deamii: In general, the habitat of Acalypha deamii appears to be the drier parts of the floodplain forests which are dominated by Populus deltoides, Acer negundo and Acer saccharinum and the low terrace forests where Aesculus glabra, Celtis occidentalis and Platanus occidentalis dominate. In general the woody understory is open, while the herbaceous layer is dominated by Laportea canadensis. Acalypha deamii is usually most common in areas where the Laportea is not very dense, and at the point where the floodplain meets the adjacent hillside. Though other herbaceous species are found in this association, they are in very low numbers.

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