

# ALLIGATORWEED

*Alternanthera philoxeroides* (Mart.) Griseb.

# HISTORY AND ECOLOGY IN NORTH AMERICA

Nathan E. Harms<sup>1</sup>, Ian A. Knight<sup>1</sup>, and Paul D. Pratt<sup>2</sup>

<sup>1</sup>US Army Engineer Research and Development Center, <sup>2</sup>USDA-ARS Invasive Species and Pollinator Health Research Unit

## SYNONYMS

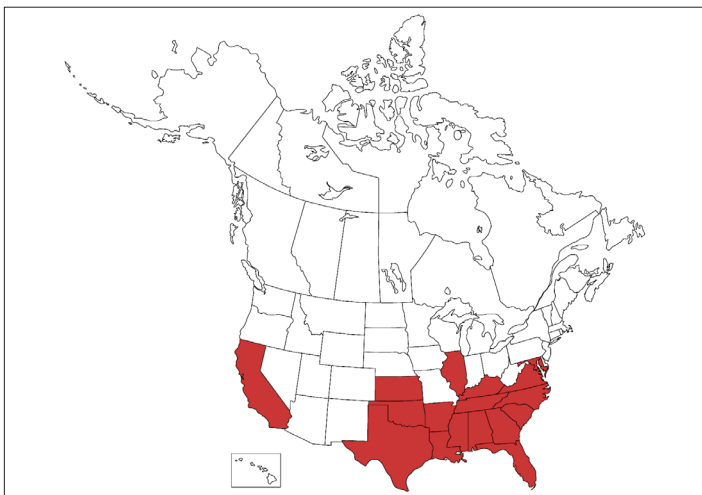
Alligator weed, *Achyranthes philoxeroides* (Mart.) Standl.

## CLASSIFICATION

RANKING	SCIENTIFIC NAME	COMMON NAME
Kingdom	Plantae	Plants
Subkingdom	Tracheobionta	Vascular plants
Superdivision	Spermatophyta	Seed plants
Division	Magnoliophyta	Flowering plants
Class	Magnoliopsida	Dicotyledons
Subclass	Caryophyllidae	
Order	Caryophyllales	
Family	Amaranthaceae	Pigweed family
Genus	<i>Alternanthera</i>	
Species	<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Alligatorweed

## HISTORY AND DISTRIBUTION

Alligatorweed is native to South America and was introduced to North America by 1897 in ship's ballast. It has since been reported in 17 states in the USA but is absent in Canada (Fig. 1).



**Figure 1.** Reported alligatorweed distribution in North America (Credit: EDDMapS, [www.eddmaps.org](http://www.eddmaps.org); USDA PLANTS Database, [plants.usda.gov](http://plants.usda.gov); both accessed 31 August 2021)

## IMPACT

Alligatorweed displaces native species, impedes water flow and water navigation, and damages fishing, hunting, boating, swimming, and other recreational sectors. The aquatic form also reduces yields in rice paddies, and the terrestrial form reduces pasture and crop production.

## IDENTIFICATION

### AT A GLANCE

Alligatorweed is a perennial plant with two growth forms: aquatic and terrestrial. Both forms often create dense mats; those of the aquatic form may be floating. Both forms are stoloniferous and have opposite, stalkless leaves typically up to 5½ in (14 cm) long. The aquatic form produces hollow stems that emerge above water, and its leaves are long, lance-shaped, and smooth. Stems of the terrestrial form grow much shorter than the aquatic form and are less hollow with shorter, rounder leaves. The flowers of both forms appear in ball-like clusters on long stalks. There are 6–20 flowers in each cluster, and each flower has five white, papery sepals that resemble petals. Seeds are smooth and lens-shaped, but are not typically produced in North America.



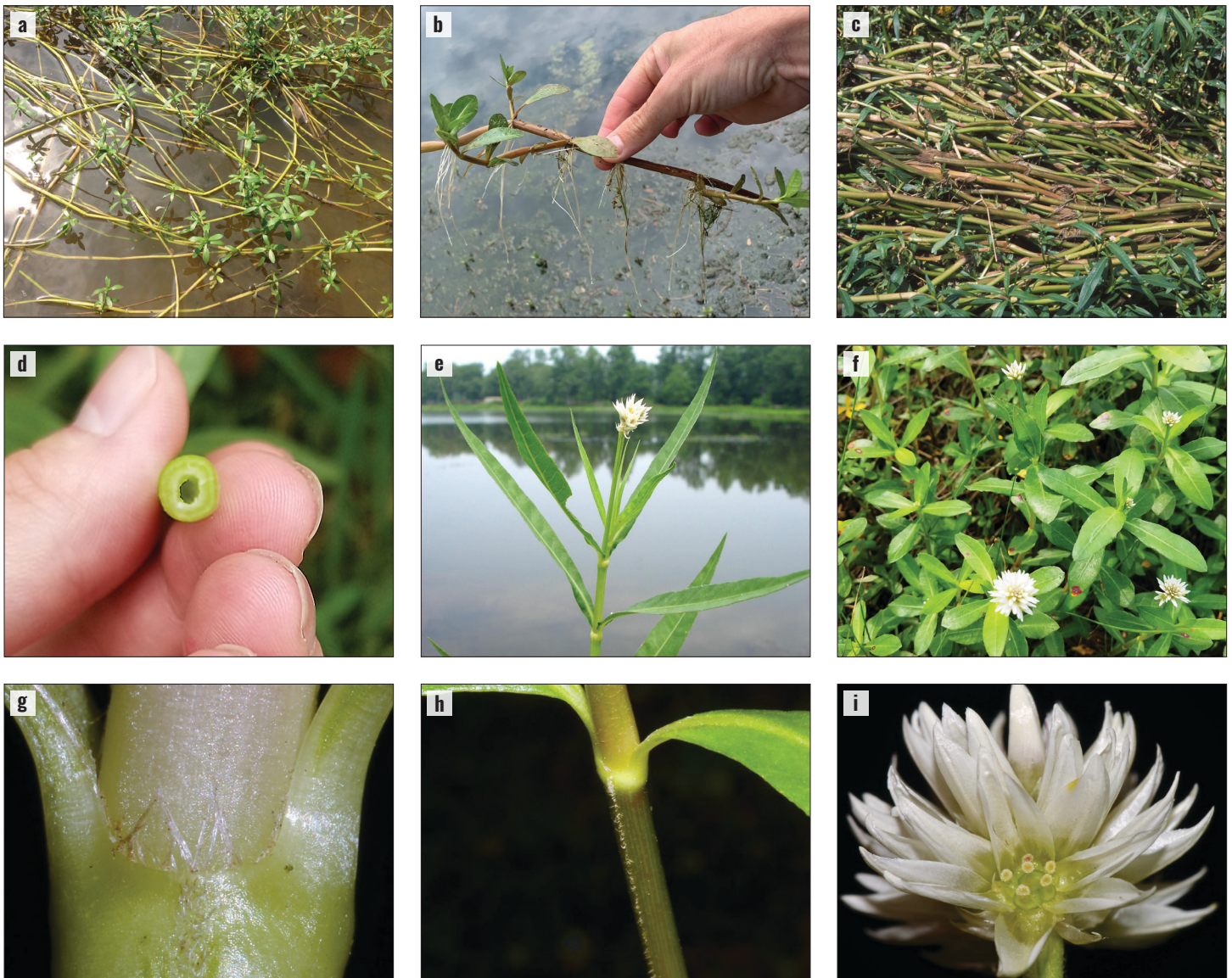
**Figure 2.** Alligatorweed plant (Michael Day, Biosecurity Queensland, CC BY-NC 4.0)

## ROOTS AND STOLONS

Mats of the aquatic form of alligatorweed may be free-floating or rooted in the hydrosol, while the terrestrial form is rooted with rhizomes. Plants produce long stolons that may extend outward up to 33 ft (10 m; Fig. 3a). New shoots and roots are produced at stolon nodes (Fig. 3b). Both forms can form thick, sprawling, interconnected mats (Fig. 3c).

## STEMS AND LEAVES

Both forms have opposite, stalkless leaves typically 1–5½ in (2–14 cm) long. The aquatic form produces stems that emerge up to 20 in (50 cm) above water and are hollow at



**Figure 3.** Alligatorweed (a) stolons; (b) stolon with roots and stems arising from nodes; (c) dense mat of interconnected stolons; (d) hollow stem of the aquatic form; (e) long, narrow leaves and stems of the aquatic form; (f) shorter, more rounded leaves and stems of the terrestrial form; (g) line of white hairs at leaf axils; (h) short, fine line of hairs on both sides of internodes; (i) flower clusters, each flower with 5 white papery sepals resembling petals (a: RJ Taylor, iNaturalist.org CC BY-NC 4.0; b: John C., iNaturalist.org CC BY-NC 4.0; c: James H. Miller, USDA FS, Bugwood.org CC BY-3.0 US; d: Sean Patton, iNaturalist.org CC BY-NC 4.0; e: Graves Lovell, Alabama DCNR, Bugwood.org CC BY 3.0 US; f: Eric Keith, iNaturalist.org CC BY-NC 4.0; g–i: J. Richard Abbott, iNaturalist.org CC BY-NC 4.0)

maturity (Fig. 3d), which aids in floatation. Leaves of the aquatic form are long, lance-shaped, and smooth (Fig. 3e). The terrestrial form grows much shorter and produces stems that are less hollow with shorter, rounder leaves compared to the aquatic form (Fig. 3f). In both forms, there is a fine line of hairs at leaf axils (Fig. 3g) and a shorter line of fine hairs on each side of the stem internodes (Fig. 3h).

### FLOWERS

The flowers of both forms appear in ball-like clusters 0.6 in (1½ cm) in diameter on long stalks arising from the axils of upper leaves. There are 6–20 flowers in each cluster. Individual flowers have five white, papery sepals that resemble petals (Fig. 3h).

### FRUITS AND SEEDS

Fruits are small brownish capsules that each produce one smooth, lens-shaped seed. Seeds are not typically produced (or viable) in North America.

### ECOLOGY

Alligatorweed grows year-round in warm climates. At cold locations, frost and ice kill exposed stems and leaves; however, stems protected by other vegetation or mud survive to support the next season's growth. This species primarily reproduces vegetatively in North America. Fragmentation of plant stolons (e.g., from disturbances such as flooding or mechanical control) can yield numerous fragments with at least one node, which are then moved from one place



to another on currents, boats, machinery, etc., and take root in suitable habitats. The aquatic form produces dense floating mats from the hollow stems and may be rooted to the shoreline or free-floating. The terrestrial form produces an extensive rhizomatous root system from which new stems arise. Flowering occurs in mid to late summer, but seeds are typically not produced in North America.

## HABITAT

Alligatorweed is most often found growing in shallow water along the banks of all types of water bodies (Fig. 4), including brackish water. The terrestrial form is also found in dried beds of water bodies as well as pastures, lawns, and some crops (Fig. 4b). Both forms tolerate cold winters but cannot survive prolonged freezing temperatures.

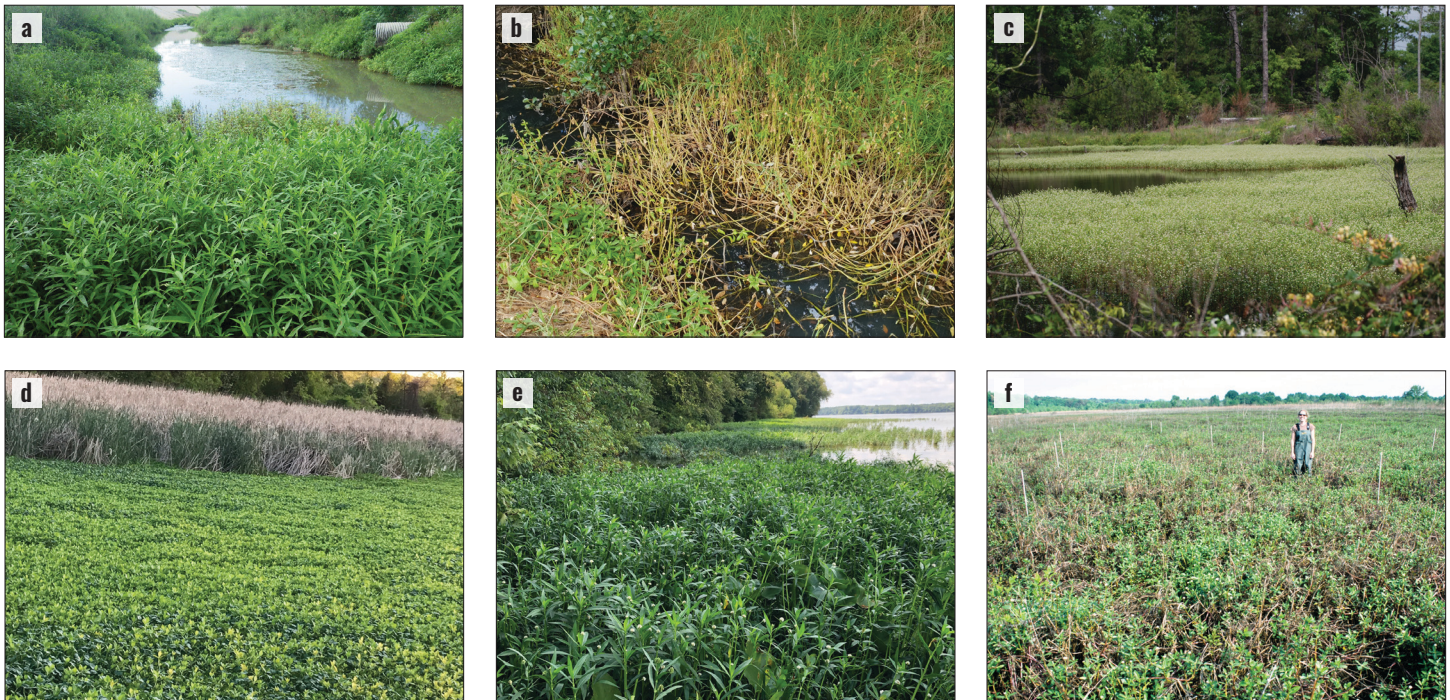
## SIMILAR SPECIES

There are several congeners established in North America, including both natives and exotics. Most of these, such as the introduced sessile joyweed (*Alternanthera sessilis*), differ from alligatorweed by having stalkless flower clusters and smaller growth forms, or they grow in much drier habitats. *Alternanthera flavescens* (whose native status in North America is debated) has stalked flower clusters similar to alligatorweed, but it differs by growing smaller with more delicate stems and smaller flower clusters. Several other more distantly related aquatic plants established in North America resemble alligatorweed from a distance by their overall shape

and size. Other species with similar growth forms can be distinguished by their lack of opposite leaves or dramatically different flowers. The most similar species are described in Table 1, along with key characteristics that can be used for differentiating them from alligatorweed and from each other.

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**Figure 4.** Alligatorweed is often found growing along or on top of various waterbodies, including (a) irrigation canals and (b) ditches; (c) natural ponds; (d) wetlands, rivers; and (e) lakes. However, the terrestrial form can also be found in pastures, lawns, and (f) fields. (a: Andy Newman, iNaturalist.org CC BY-NC 4.0; b: Juditgee, iNaturalist.org CC BY-NC 4.0; c: Nancy Loewenstein, Auburn University, Bugwood.org CC BY-3.0 US; d: Eric Stokes, iNaturalist.org CC BY-NC 4.0; e: Luke Treadway, iNaturalist.org CC BY-NC 4.0; f: James H. Miller, USDA FS, Bugwood.org CC BY-3.0 US)



**Table 1.** Key traits for differentiating alligatorweed from similar species established in North America.

SPECIES	SIMILARITIES	DIFFERENCES	PLANT	LEAF	FLOWER
<p><b>Sessile joyweed</b></p> <p><i>Alternanthera sessilis</i> Amaranthaceae</p> <p>Exotic annual or perennial</p>	<p>Habitat: often grows prostrate, rooting at nodes; leaves opposite, lance-shaped; flowers with 5 whitish sepals; capsule fruit</p>	<p>Grows smaller, stolons not as long; leaves less than half the size; flower clusters smaller, stalkless, occur around stem at leaf axils</p>			
<p><b>Yellow joyweed</b></p> <p><i>Alternanthera flavescens</i> Amaranthaceae</p> <p>Native perennial</p>	<p>Sometimes habitat: leaves opposite, somewhat lance-shaped; flower clusters with stalks from leaf axils; flowers with 5 whitish sepals; capsule fruit</p>	<p>Restricted to Florida in USA; often in more coastal habitat; often clammers over other vegetation, structures; stems may appear more delicate; leaves smaller; leaf shape with wider base, pointier tip; flower clusters smaller</p>			
<p><b>American water-willow</b></p> <p><i>Justicia americana</i> Acanthaceae</p> <p>Native perennial</p>	<p>Habitat: overall shape; forms dense colonies; highly rhizomatous; leaf shape; leaves opposite</p>	<p>Grows taller out of the water; leaves longer; flowers more orchid-like, purplish-white, have purple pollinator guides</p>			
<p><b>Yerba de hico tea</b></p> <p><i>Hygrophila costata</i> Acanthaceae</p> <p>Native perennial</p>	<p>Habitat: often forms dense mats either floating or terrestrial; roots from stem nodes; lance-shaped leaves opposite</p>	<p>Grows much taller out of the water; young stems square; leaves larger; flowers 2-lipped, tubular, occur in whorls from leaf axils, pink but quickly turn brown; fruit with numerous tiny seeds</p>			
<p><b>Water seedbox</b></p> <p><i>Ludwigia palustris</i> Onagraceae</p> <p>Native perennial</p>	<p>Habitat: roots from nodes of lower stems; when growing above water, may sprawl; leaves opposite</p>	<p>Grows smaller, sometimes mostly underwater; stems somewhat succulent, may be red; leaves smaller, more ovate, may be reddish; flowers tiny, stalkless, arise from leaf axils; each flower with green sepals but no obvious petals; fruits 4-chambered with many tiny seeds</p>			

**Photos:** sessile joyweed plant (Steven Kurniawidjaja), leaves (Aniruddha Singhamahapatr), flowers (Kathy); yellow joyweed plant, leaves (Tom), flowers (Matthew Salkiewicz); American water-willow plant (Dawn Carrie), leaves (Jeff Skrentny), flowers (Tukun); yerb de hico tea plant, leaves (Dezmond Wells), flowers (Santiago); water seedbox plant (Grant Fessler), leaves (Jim\_keesling), flowers (Chantel) (all iNaturalist.org CC BY-NC 4.0)

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### SUGGESTED CITATION

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