

Figure 1 Botanical illustration from N.L. Britton and A. Brown. 1913. - An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols. Charles Scribner & Sons, New York. Vol. 1: 663, Public Domain

Polygonum erectum Devil's shoestring

Synonyms: *Polygonum aviculare*. var. *erectum*

Common (Vernacular) Names: English: Devil's shoestring, erect knotweed, Leathery knotweed, Striate knotweed, Wireweed French: renouée dressée French:

Meaning of Names (Etymology): Genus: "Polygonum" comes from the Greek words for "many" ("polys") and "knees" ("gonu"), referring to the swollen nodes on the stem that give the plant a zig-zagging look. Specific epithet: *erectum* from Latin for upright, referring to the growth habit of the plant. This species of knotweed grows upright unlike *P. aviculare*.

Family: Polygonaceae (Buckwheat Family)

Status: native, possibly extirpated in Ontario. *Polygonum erectum* is considered to be globally secure. However, it is uncommon throughout much of its range, and population have declined dramatically in some regions. It is listed as endangered in New Hampshire and New York.

Range (Distribution): found mostly in the northeastern and north-central parts of the USA, but with disjunct populations in other parts of the US and Canada. Canada:

AB, ON, QC USA: AL, AR, CA, CT, DC, DE, GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, NH, NJ, NM, NV, NY, OH, OK, OR, PA, RI, SC, TN, TX, VA, VT, WA, WI, WV

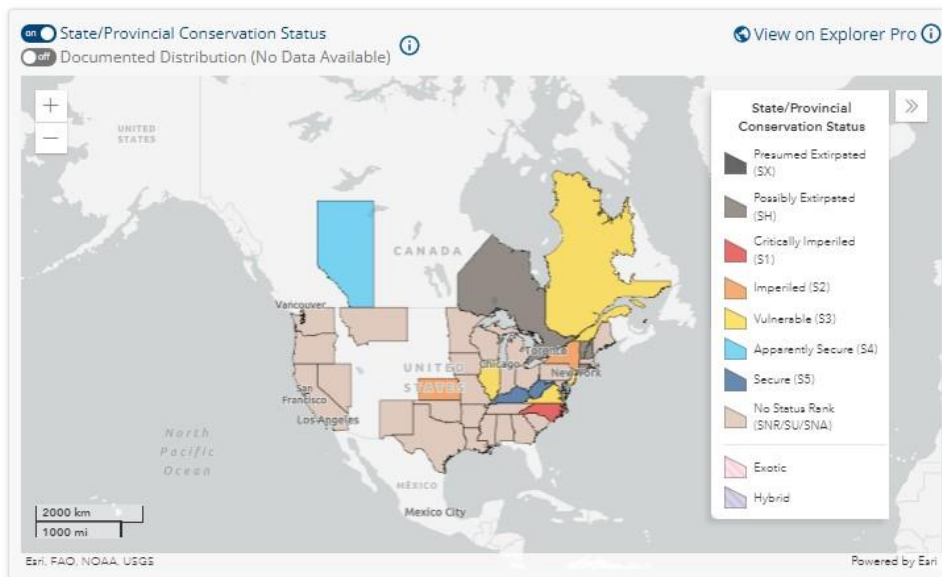


Figure 2 Status Map, NOAA, Public Domain

Habitat: Bottomland forests, streambanks, spring branches, thickets, forest openings, shores of rivers or lakes and anthropogenic sites such as pastures, old fields, lawns, farmyards, roadsides, railroad

embankments and other open disturbed areas.

Longevity (Duration): annual.



Figure 3 Herbarium Specimen, Bill Harms, Public Domain, SEINet

Description: Form: a small, light green or yellowish herb with oval-shaped leaves and multiple branches. Size: 10–75 cm tall. Stems: slim, round, smooth, yellowish green, erect to ascending, with many to few, non-wiry branches. Leaves: Alternate, simple, dimorphic: the blades of main stems 18-60 mm, those of secondary branches 4-10 mm. Leaves are, mostly 2-4 times as long as wide, ovate to elliptic or obovate, yellowish green to bright green, the secondary venation obscure, the margins entire. Ocreae (stipules) 4–8 mm long, funnel-shaped, paper-white, often torn and ragged, shredding into fibres with age. The pedicels are shorter or equal the length of the calyx and typically longer than the ocreae. Roots: taproot.

Flowers: in small axillary clusters (cymes), on erect pedicels that are 3–7 mm long (usually about as long as the sheathing stipules). Individual flowers: perfect, short-stalked. Tepals 5, with 2 in an inner whorl and 3 in an outer whorl, 2.8-4.0 mm long, greenish white to yellowish green, often with yellow margins, longer than the fused portion, usually incurved above the fruit, the outer 3 lobes longer than the 2 inner lobes and more or less enclosing them, boat-shaped to hooded at the tips, the inner 2 lobes shorter and flat. Stamens 5-8.



Figure 4 Bill Harms, Public Domain, SEINet



Figure 5 Flower, William Thomas, Public Domain, SEINet

Phenology: Flowering May-Oct.

Fruit: Achene 3-angled, enclosed in the persistent calyx-lobes. Achenes can be of several different types as noted in N.G. Mueller's research. The forms the achene depend on the time of year (seasonally controlled achene dimorphism). One type is dark brown with a shiny surface and is broadly egg-shaped, typically about 2.5 mm long. Another achene type is dull brown, exsert and egg-shaped, and 3–3.5 mm long. Another form of achene fruits (rarely) in late season and is 4 to 5 mm long.

Comparisons: The plant is generally identified as a *Polygonum* by the ocreae on the stems and small axillary flowers which are often hooded. Identification to species is far more difficult, and taxonomy has shifted considerably as the understanding of family relationships has evolved over time. For example, some taxonomists consider this species as *Polygonum achoreum*.

Sometimes confused with *Polygonum achoreum*: tepals basally connate for 40–55% of their length, achenes uniformly papillose, and leaf blades blue-green (vs. *P. erectum*, with tepals basally connate for 20–38% of their length, achenes striate-papillose, smooth, or irregularly roughened, and leaf blades usually bright green to yellow-green). Sometimes confused with *Polygonum ramosissimum*: leaf blades

linear to narrow-elliptic, mostly 1–8 mm wide, and achenes smooth or irregularly roughened (vs. *P. erectum*, with leaf blades elliptic to ovate, mostly 10–30 mm wide, and achenes striate-papillose). Sometimes confused with: *P. aviculare* and often growing in company with it, but having larger leaves and flowers and standing erect at a height 10-30 cm or more.

Ecology: (see Faunal Associations).

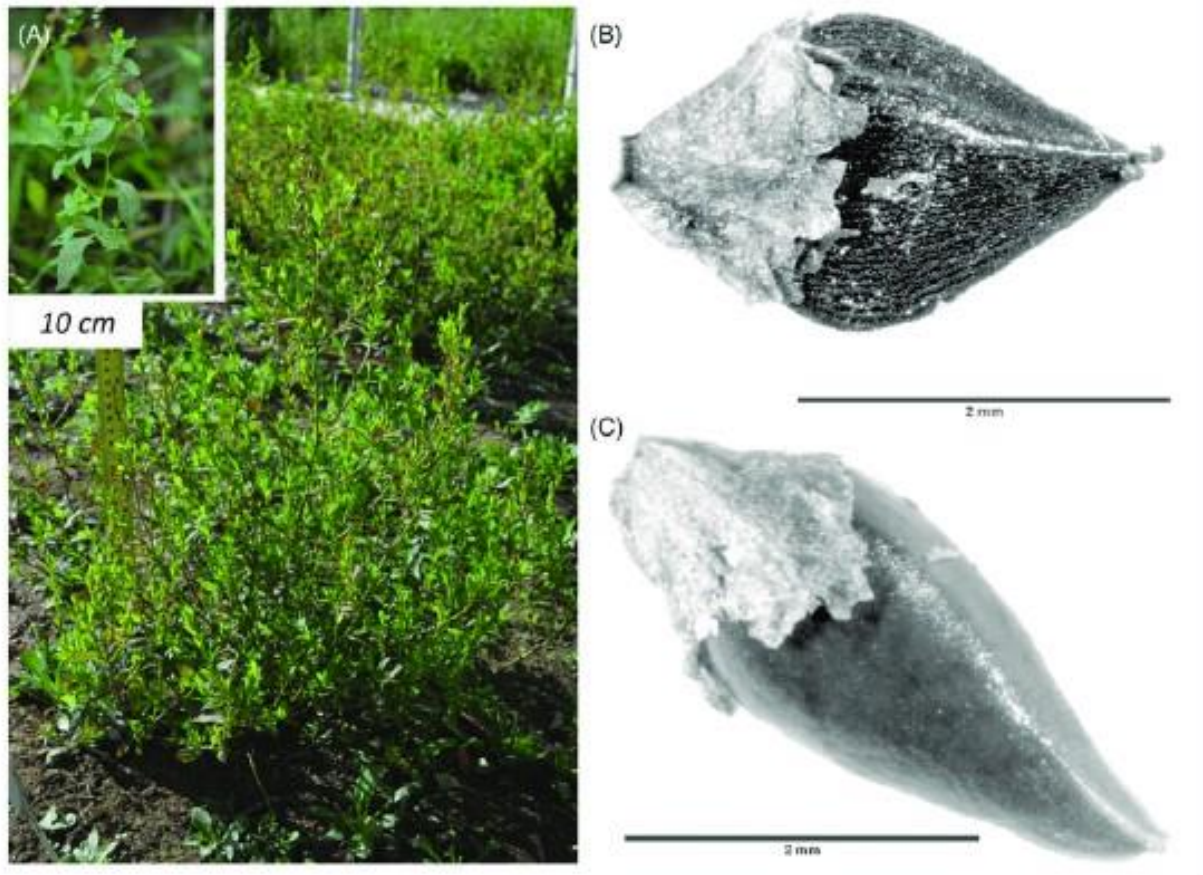


Figure 6 Erect knotweed (*Polygonum erectum*) grown under natural and cultivated conditions. (a) A knotweed plant grown in a garden, compared to a typical wild knotweed plant (inset) at the same scale. Both images were taken in Central Missouri in late September. From Zeder, Melinda. 2018 Why evolutionary biology needs anthropology: Evaluating core assumptions of the extended evolutionary synthesis. *Evolutionary Anthropology: Issues, News, and Reviews*. 27. 10.1002/evan.21747. Photo credit: Natalie G. Mueller

Edible Uses: First Nations altered the length and shape of *P. erectum*'s achenes to make it more reliable as a crop and to increase the yield, as part of the group of crops known as the Eastern Agricultural Complex. (see C. M. Scarry 1993).

“Eastern agricultural complex: Most laypeople believe that eastern native Americans didn't start farming until corn, beans, and squash made their way north from Mexico, becoming common crops around 1000 AD. But well before then, Native Americans in the area shaded on this map had domesticated a whole suite of other crops. These plants, known as the Eastern Agricultural Complex, may have made up as much as 67% of the diet of the Native Americans 2500 years ago, with the history of the plants' cultivation extending perhaps as far back as 2050 BC.”

https://www.waldeneffect.org/blog/Eastern_agricultural_complex/

“Masses of erect knotweed achenes are often recovered from archaeological sites in eastern North America dating to ca. 3000–600 BP. Several paleoethnobotanical assemblages from the later part of this era (ca. 1000–600 BP) contain achenes that are outside the range of natural variation for erect knotweed. The most well preserved of these archaeological assemblages, a desiccated cache of achenes from the Whitney Bluff site, Arkansas (ca. 900 BP), is compared to four closely related species and subspecies of *Polygonum* L. The Whitney Bluff achenes are most similar to those of *P. erectum*, but differ from modern fruits of this species in three respects: (1) fruits are larger, (2) average pericarp thickness is reduced, and (3) fruit dimorphism is greatly reduced. These differences are typical of domestication syndrome in annual seed crops. The Whitney Bluff assemblage is described as the type specimen of a domesticated subspecies, *P. erectum* subsp. *watsoniae* N. G. Muell.:

https://www.researchgate.net/figure/Erect-knotweed-Polygonum-erectum-grown-under-natural-and-cultivated-conditions-a-A_fig1_329005220

Medicine: None known.

Other Human Uses: None known.

Faunal Associations: pollinated by bumblebees including *Bombus bifarius*, *Bombus flavifrons*, *Bombus frigidus*, *Bombus melanopygus*, *Bombus sylvicola*, *Bombus occidentalis*, *Bombus pensylvanicus*, *Bombus insularis*, and *Bombus kirbiellus*

Warning: See warning for *P. aviculare*.

Other info: More about the photo of the achenes above: Erect knotweed (*Polygonum erectum*) grown under natural and cultivated conditions. (a) A knotweed plant grown in a garden, compared to a typical wild knotweed plant (inset) at the same scale. Both images were taken in Central Missouri in late September. The garden grown knotweed plant is more branched, has a woody main stem, is taller, with a larger rosette and much more seed than the knotweed plant grown under natural conditions. (b) A "tubercled" seed morph protected by thick layers of cuticle and wax that delay germination as a form of bet hedging. (c) A "smooth" seed morph with thin pericarp that germinates more readily. Photo credit: Natalie Mueller [Colour figure can be viewed at wileyonlinelibrary.com] from Zeder, Melinda. 2018 Why evolutionary biology needs anthropology: Evaluating core assumptions of the extended evolutionary synthesis. *Evolutionary Anthropology: Issues, News, and Reviews*. 27. 10.1002/evan.21747.

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