Polygonum cuspidatum 简体中文 正體中文 **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae

Common name peashooter plant (English), donkey rhubarb (English), Japanese bamboo (English), huzhang (Chinese), sally rhubarb (English), German sausage (English), crimson beauty (English), reynoutria fleece flower (English), Japanese knotweed (English), Japanese fleece flower (English), Mexican-bamboo (English), Japanese polygonum (English), kontiki bamboo (English), itadori (Japanese), renouée du Japon (French, France)

Synonym
Fallopia japonica , (Houtt.) Dcne.
Pleuropterus cuspidatus , (Sieb. & Zucc.) Moldenke
Pleuropterus zuccarinii , (Small) Small
Polygonum cuspidatum , Sieb. & Zucc. var. *compactum* (Hook f.) Bailey
Polygonum zuccarinii , Small
Reynoutria japonica , Houtt.

Similar species

Summary *Polygonum cuspidatum* is an herbaceous perennial native to Japan. It has been introduced to Europe and North America as an ornamental and is also used to stabilise soil, especially in coastal areas. It requires full sun and is found primarily in moist habitats but also grows in waste places, along roadways and other disturbed areas. Once established, *P. cuspidatum* forms dense stands that shade and crowd out all other vegetation, displacing native flora and fauna, and the overwintering canes and leaves are slow to decompose.

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Species Description
Polygonum cuspidatum is an upright, shrub-like, herbaceous perennial that can rapidly grow to over 3m in height (Remaley, 1997). Red to purple shoots appear early in spring but as the canes grow, the leaves unfurl and the plant turns green. The mature canes are hollow and have a characteristic pattern of purple speckles. Flowering occurs in late summer/autumn and consists of creamy white flowers.
The base of the stem above each joint is surrounded by a membranous sheath. Leaf size is usually about 15cm long by 8 -10cm wide, broadly oval to somewhat triangular and pointed at the tip. Seeds are about 2.5mm long, and are triangular and shiny. The rhizome may extend as deep as 3m and up to 7m away from the parent plant, and is knotty and leathery brown. Its rhizome snaps like a carrot and usually possesses a dark orange central core with an orange to yellow outer ring. Both male and female flowers possess vestigial organs of the other sex.

Notes
Taxonomists continue to debate the classification and nomenclature of *P. cuspidatum*, with most European researchers splitting Polygonum and using *Fallopia japonica*, while their North American colleagues use *P. cuspidatum*. Morphological evidence suggests that *Polygonum* in the broad sense should be split into several genera, with *Fallopia* (including *Reynoutria*) having three sections: (i) erect rhizomatous perennials (including *Fallopia japonica*), (ii) climbing perennials, and (iii) climbing annuals. Recent molecular evidence has placed *P. cuspidatum* in a monophyletic group with all other sampled *Polygonum* taxa within *Polygonaceae*, but was unable to resolve whether Fallopia should be segregated as a distinct genus (Barney *et al*, 2006). The currently accepted name by Integrated Taxonomic Information System is *Polygonum cuspidatum* (IT IS, 2009)

Lifecycle Stages
Rhizomes can regenerate when buried up to 1 metre deep and have been observed growing through 5cm of asphalt (Locandro 1978, Pridham and Bing 1975, in Seiger, 1991). The ability of rhizomes to generate shoots was affected by the source of rhizome fragments as well as fragment size and depth planted, the optimal depth being just below the surface (Locandro 1973, in Seiger, 1991). Adult plants die back at the first frost, leaving the root material to overwinter and provide the stock for the coming year.

Habitat Description
Polygonum cuspidatum can tolerate a wide range of conditions, including full shade, high temperatures, high salinity and drought. It is found near water sources, such as along river banks, low-lying and disturbed areas. It can colonize coastal shores and islands. In its native range, it grows on volcanic soils with a pH less than 4 (Conolly, 1977, in Seiger, 1991). In the U.S.A., it grows in a variety of soil types, such as silt, loam, and sand, with pH ranging from 4.5 to 7.4. Its distribution appears to be limited by light, and it is found primarily in open sites such as roadsides or riparian zones (Sieger, 1991; Beerling, 1990).

Reproduction
The primary mode of reproduction of *Polygonum cuspidatum* in Europe and North America appears to be through extensive rhizomes (Seiger, 1991). Stem material can grow after cutting. Plants can reliably regenerate from less than 5 g of root material and the rhizomes beneath a square meter stand of knotweed can produce 238 new shoots. The rhizomes form pinkish nodules in early spring from which shoots develop in April. The exact timing of emergence depends on soil temperature and other climate factors. Some clumps of *P. cuspidatum* will have originated from a single rhizome and will have only one type of flower. Although previously thought to reproduce clonally, sexual reproduction and seed production was, in fact, found to occur in the United States. Results showed that wild *P. cuspidatum* produce large quantities of seed that typically have high germinability. Its flowers are insect pollinated. Its seeds are viable whether sown immediately after collection or subjected to various conditions during the winter season and germinated the following spring. Cultivars of knotweed also produce viable seed and can thus contribute to the invasiveness of this species. In addition, wild *P. cuspidatum* seedlings were observed at several field sites, with several of these seedlings surviving the winter and resprouting the following spring. That sexual reproduction and seedling survival occur in the wild has strong implications for the development of management strategies for this species (Bend & Turner, 2006; Forman & Kesseli, 2003).

General Impacts
Polygonum cuspidatum threatens open and riparian areas where it spreads rapidly and forms dense near monoculture stands, which compete with and displace native vegetation and prohibiting their regeneration. It dramatically reduces species diversity and alters habitat for wildlife. A study found that plots adjacent to *P. cuspidatum* stands had 1.6-10 times as many species. A total of 63 species were found outside knotweed stands, of which 78% were native. Only 13 species, 58% of which were native, were found within stands. Invasion by *P. cuspidatum* can also reduce invertebrate biodiversity by half or more and reduce the quality of ecosystems for amphibians, reptiles, birds and mammals whose diets are largely composed of arthropods. For example, the Green frog (*Rana clamitans*) was found to experience decreased foraging in knotweed stands. In raparian habitats *P. cusidatum* may also increase the risk of flooding and river bank erosion as it establishes monospecific stand that die back in the winter leaving banks exposed. Its tough shoots can break through gravel, tarmac, and even concrete. Prolific rhizome and shoot growth can damage foundations, walls, pavements, drainage works, and flood prevention structures. Its dead stems and leaf litter decompose very slowly and form a deep organic layer, which prevents native seeds from germinating and alters natural succession. The UK Governments Department for Environment, Food and Rural Affairs has estimated a cost of £1.5 billion to control this invasive in United Kingdom alone. In Germany, annual costs for knotweed control and subsequent restoration of waterways and watercourses have been put at almost €30 million; yearly control along only 1% of the total railway system has been calculated at €2.4 million (Aguilera *et al*, 2009; Gerber *et al*, 2008; Kurose *et al*, 2009a; Maerz *et al*, 2005; Pysek, 2006; ANHP, 2006).

Management Info
Preventative measures: The U.K. Wildlife and Countryside Act states that it is illegal to cause *Polygonum cuspidatum* to grow in the wild. *Polygonum cuspidatum* is subject to control legislation in some US states.
Physical: Mechanical control methods such as cutting, mowing and pulling can be effective over a long time scale but needs to be consistent, and the disposal of material must be done with care. It is effective for small, initial populations or environmentally sensitive areas where herbicides cannot be used (Remaley, 1997). Control by cutting alone is ineffective and may increase stem density and the lateral spread of clumps (Beerling *et al*., 1994). Regrowth is very rapid. Pulling or digging out the weed has some effect if repeated regularly but all waste plant material must be burned. Burning the plant in situ has not proved effective. Cutting or mowing every 4 weeks will reduce rhizome growth but will not eliminate the plant (Weber, 2003). Two cuts, the first in May-June, the second in late summer and repeated annually until no new shoots appear is said to work eventually. Mowing every 2 weeks effectively eliminated the weed in 2 years (Baker, 1988; Child *et al*., 1993). Pulling by hand in July when plants were well grown took 3 years to eliminate just a small patch of the weed. In larger patches the weed had not been eliminated after 10 years of annual pulling (Bond & Turner, 2006).

Pathway
Polygonum cuspidatum was introduced from Japan to the United Kingdom as an ornamental in 1825 (Conolly 1977, Patterson 1976, Pridham and Bing 1975, in Seiger, 1991).*Polygonum cuspidatum* was introduced from United Kingdom to North America in the late nineteenth century as an ornamental (Conolly 1977, Patterson 1976, Pridham and Bing 1975, in Seiger, 1991).Bee keepers have planted it for its abundant nectar secretion (Locandro 1978, in Doll and Doll, 1998).Remaley (1997) states that *Polygonum cuspidatum* was first introduced as an ornamental and has also been used for erosion control and for landscape screening.Imported infested topsoil

Principal source:

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)
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ALIEN RANGE

[3] AUSTRALIA
[1] CENTRAL EUROPE
[1] DENMARK
[1] FRANCE
[1] GUERNSEY
[1] ISLE OF MAN
[1] MEDITERRANEAN AREA
[1] RUSSIAN FEDERATION
[1] SLOVAKIA
[41] UNITED STATES
[6] CANADA
[1] CZECH REPUBLIC
[1] EUROPE
[1] GERMANY
[1] IRELAND
[1] ITALY
[1] NEW ZEALAND
[1] SAINT PIERRE AND MIQUELON
[3] UNITED KINGDOM

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Summary: The database of alien plants in Ireland contains detailed information on 715 alien plant taxa currently occurring in (semi-) natural habitats in Ireland (both the Republic and Northern-Ireland). This database was developed in 2006 at the School of Natural Sciences, Trinity College Dublin, as part of the BioChange project, funded by the Environmental Protection Agency (EPA), Ireland.
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