

# Weed Risk Assessment: *Fallopia japonica*

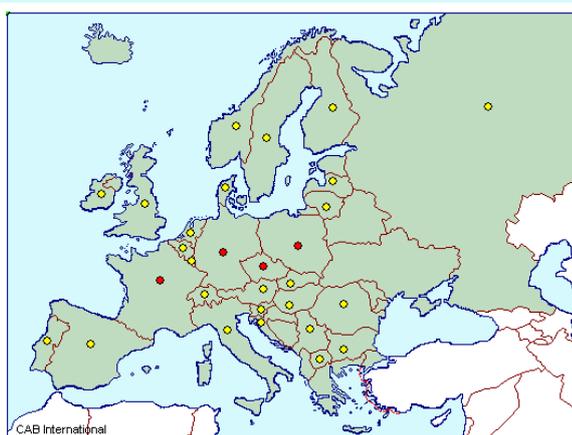
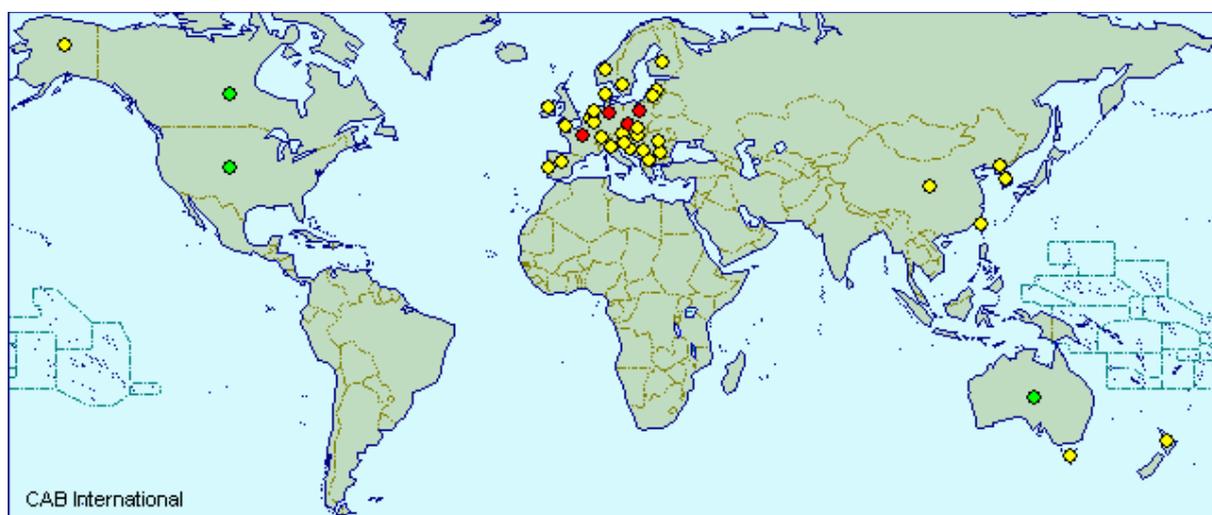
## 1. Plant Details

**Taxonomy:** *Fallopia japonica* (Houtt.) Ronse Decr. Family Polygonaceae. Synonyms: *Reynoutria japonica* (Houtt.), *Polygonum cuspidatum* Sieb. & Zucc. *Polygonum sieboldii* (De Vriese), *Polygonum japonicum* Meissn. (CHECK)

**Common names:** Japanese knotweed.

**Origins:** Native to East Asia (Japan, China), Korea, Taiwan (GRIN database).

**Naturalised Distribution:** Naturalised in Europe, Asia, North America, Canada, Australia and New Zealand (Crop Protection Compendium).



Distribution maps from the Crop Protection Compendium. Red dots mean widespread in the region. Yellow dots mean present in the region. White dots mean present and localised

**Description:** *F. japonica* is a fast growing perennial that may reach 5m in height. It has stiff, hollow, bamboo-like stems that remain erect when leaves die in autumn and become woody and speckled with age. New stems may be purplish red. Leaves are large with a truncate base and pointed apex. Petioles have a distinct nectary pits and papery sheaths that disintegrate with age. Masses of small, white flowers are produced on slender spikes in summer. Fruit is a three-angled papery sheath that covers a single shiny black seed. Rhizomes are coarse, perennial and spreading.

## Biology and ecology:

**Habitat.** *F. japonica* has an altitudinal range from sea level to 2400m. It occurs in wet grassy lowland areas all over Japan but is also found on hillsides, high mountains, sunny sites in coastal areas, wetlands and riparian areas, especially if these are disturbed. In its naturalised distribution it is found predominantly along river banks, near human settlement and in waste areas (eg. Mandak et al, 2004, Wade et al, 2003). It grows in open or shaded situations, though it does not appear to grow as well in the former. It is found on a variety of soils and is tolerant of a wide pH range and can survive heavy metal and salt pollution in areas of low nitrogen (Crop Protection Compendium, 2004).



**Life cycle.** *F. japonica* in its native distribution, germinates in spring, flowers in summer and dies back over autumn and winter. In its naturalised distribution, the same pattern is followed although vegetative mechanisms may be more important and thus, instead of seedling germination, regrowth from rhizomes occurs in spring (Price et al, 2001).



**Reproduction and dispersal.** *F. japonica* is renowned for strong vegetative growth and reproduction in its naturalised distribution. Both rhizomes and stem fragments are capable of forming new plants. Rhizomes are thought to be extremely long-lived. Hollingsworth and Bailey (2000) contend that populations they sampled in Britain, Europe and the USA are consistent with one large clone, making *F. japonica* one of the world's largest vascular plants. Accordingly, *F. japonica* is often described as clonal species. However reproduction from seed has been documented recently by North American researchers and is common in its native distribution (Crop Production Compendium, 2004). Forman and Kesseli (2003) found high germinability in seeds collected from wild populations in the USA and green-house grown cultivars.

Viability was not affected by whether seeds were sown immediately or subject to various winter conditions and germinated the following spring. They also observed seedlings at field sites in the Massachusetts area. In addition, Bram and McNair (2004) document successful sexual reproduction in populations in areas of Philadelphia and record large amounts of seed with germination rates of up to 90%. Plants are dioecious so both male and female plants must be present in order for successful seed production to occur. Dispersal occurs when stem fragments are carried downstream or when soil contaminated with propagules is moved from one place to another.

**Hybridisation and genetics.** There are several *F. japonica* varieties, differentiated on the basis of chromosome number. Varieties include *F. japonica* var *japonica* and *F. japonica* var. *compacta*. These two produce a tetraploid hybrid that is rare but able to interbreed with its parents. The most common hybrid is that between *F. japonica* var. *japonica* and *F. baldshuanica* latter being a commonly planted invasive climber called Russian vine. It does not seem to have the aggressive attributes of its parents. *F. x bohemica* is considered to be a hybrid of *F. japonica* and *F. sachalinensis*. It is also described as invasive and Mandak et al (2004) contend that it is spreading twice as fast as the parents in the Czech Republic (Zika and Jacobson). Though partly fertile, if pollen from these plants was to pollinate *F. sachalinensis* in Europe, a fertile *F. x bohemica* would be produced which would be able to cross pollinate the female *F. japonica*, potentially replacing male *F. japonica* and hence allowing *F. japonica* to reproduce by seed (Crop Protection Compendium, 2004).



**Competition.** *F. japonica* is a highly competitive species that is capable of completely displacing other vegetation. It forms dense stands that shade out other species whilst the powerful rhizomes can tolerate digging, ploughing and dredging and can penetrate concrete, tarmac and displace stone and other structures. Studies of resource partitioning between shoot growth, storage and reproduction indicate that *F. japonica* is efficient at mobilising and redistributing photo-assimilate at different times of the year (Price et al, 2001). This may help explain the success of this plant as a rapid coloniser. This plant can colonise sites within 20 years of volcanic activity and is often the only pioneer species for 50 years after which it is replaced by other species. It often occurs in association with *Miscanthus sinensis* grassland on active volcanic sites but gives way eventually to grasses after dieback from the centre of the stand (Crop Protection Compendium, 2004).

**Harmful properties.** Closely related plants may cause photo-sensitivity in susceptible people (Plants for a Future Database).

**Economic benefit.** *F. japonica* roots have been used for various medicinal purposes and the leaves, root, seeds and stems may be eaten in moderation provided they are cooked to reduce the oxalic acid content (Plants for a Future Database). Its Japanese name ‘Itadori’ means ‘to take away pain’. It has also been investigated as for biofuel potential but this was found to be limited (Crop Protection Compendium, 2004).

## 2. Weed Risk

### World weed status

*F. japonica* is considered a serious weed in parts of the USA, Britain and Europe. It is regulated in at least 3 states in the USA (GRIN database). It is also regulated in Britain. It is one of the 100 worst invasive species as identified by the IUCN.

### Australian weed status

*F. japonica* is naturalised in New South Wales, Victoria and Tasmania. It is regulated in Victoria and is permitted entry to Australia.

### Weed potential in Tasmania.

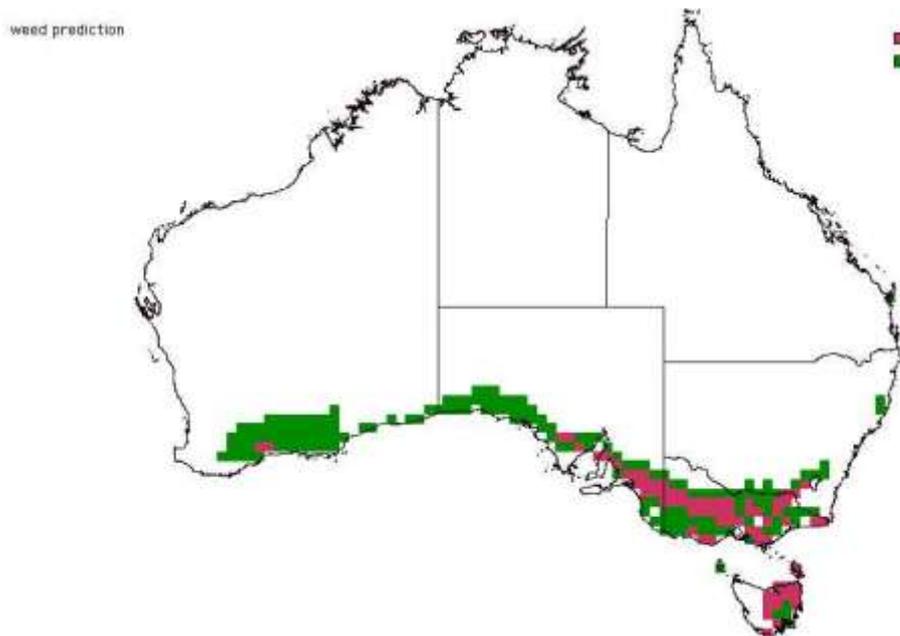
*F. japonica* is naturalised in Tasmania, probably since the 1940s but its distribution is relatively limited. Plants have been recorded around Launceston, Beauty Point, Scottsdale, usually in riparian situations. All populations are subject to eradication efforts and attempts to encourage property owners to remove garden populations also occur, albeit sporadically.

Climate matching indicates the plant is likely to grow well in a range of Tasmanian environments, The following analyses indicate the weed potential of *F. japonica* in Tasmania is significant.

### Weed risk assessment

Weed risk assessment undertaken by DPIWE involves use of a point scoring system devised by Pheloung (1996). *F. japonica* scores 17 on a scale that is positively correlated to weediness. The nominal score for rejection of a plant on this scale is 7 or greater (see Appendix 1 for risk assessment scoring).

Potential distribution  
of *Fallopia japonica*  
in Australia using  
CLIMATE  
(Pheloung, 1995)



## 3. Weed Impact Assessment

Weed impact assessment is based on the DPIWE scoring system designed for that purpose. *F. japonica* scores 7 points on a scale where 4 points or more indicates a plant has significant potential impact. The impact scoring system requires that questions be answered with a particular land use and density in mind. *F. japonica* was assessed for its potential impacts upon natural environments at moderate to high densities.

**Economic impact.** The economic impact of *F. japonica* in Tasmania is mostly relevant to situations in which it could compromise the value of ecotourism ventures. In addition, the habit of the plant means uncontrolled infestations may form a barrier to vehicles and people, especially along riparian areas. In the UK in 1994, control costs were estimated at US\$500 000.

**Environmental impact:** *F. japonica* is highly invasive in natural environments due to its colonising ability, rapid growth rate, shade tolerance and its capacity to persist via rhizomes. It appears to have significant potential to replace native species in Tasmanian riparian communities. Its deciduous habit means infested areas may be vulnerable to erosion over winter. Groves et al., list it as an environmental weed in Australia. It may also increase risk of flooding by colonising riparian areas. Dead stems can persist for 2-3 years producing large amounts of debris and slowly decomposing litter which can reduce floristic diversity. A build up of dead stems can also impede flow (Crop Protection Compendium, 2004).

**Social impact.** *F. japonica* may cause destruction of urban infrastructure (footpaths, buildings, sewage pipes) and roads if it extends its distribution in Tasmania. It may also give rise to painful skin conditions in certain people. In the UK, large stands of *F. japonica* have become litter traps and fire hazards.

#### **4. Management Feasibility.**

Weed eradication assessment is based on the DPIWE scoring system designed for that purpose. *F. japonica* scores 9 points on a scale where 6 points or more indicates there is potential for the plant to be eradicated successfully from the entire state.

**Current distribution:** *F. japonica* has a limited known distribution in Tasmania at this time having only been recorded around Launceston, Beauty Point and Scottsdale. The distribution of this plant across the state has never been thoroughly investigated and formal survey work is recommended.

**Detectability:** This plant is conspicuous for its large size, large leaves and stiff, bamboo like stems that remain erect after the leaves have fallen.

**Control Options:** A number of methods are known to be effective for *F. japonica* control. These include grubbing of isolated plants such that the whole root is removed and spraying with a metsulfuron/glyphosate mix. The latter has been used to good effect in the back yard, waste and amenity area situations in which this plant has been found so far.

**Chance of Reinvasion:** The introduction of *F. japonica* to Tasmania is unclear but likely to be via ornamental trade. The extent of ornamental planting is not known. Therefore, even if sale of this plant is prohibited, re-invasion is possible. The limited distribution of the plant at this time however means eradication and awareness programs in affected areas may help encourage and facilitate compliance by people who harbour this plant in their gardens.

**Persistence:** The rhizomes of this plant are very long-lived so unless control is undertaken diligently and with adequate follow up, the plant is likely to persist for many years. This has implications for resource requirements for both the state and affected landowners.

**Compliance Issues or Conflicts of Interest:** The single most important compliance issue is likely to arise in relation to people who value this plant for its ornamental appeal and who therefore will be reluctant to remove it from their gardens. There may also be a conflict of interest with people wishing to sell the plant. Both situations can be addressed by referring to the range of alternatives available.

**Eradication Feasibility:** Eradication of *F. japonica* from Tasmania at this time appears both achievable and desirable.

## 5. Declaration Recommendation.

*F. japonica* appears to have potential to establish, reach high densities and cause significant environmental harm in certain vegetation communities in Tasmania as well as damaging roads, buildings and other infrastructure. Therefore it should be nominated for declaration under the *Weed Management Act 1999*. This will support removal of the plant from trade and timely eradication of existing infestations.

## 6. References.

Crop Protection Compendium at <http://www.cabicompendium.org>.

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