



Nebraska Weed Control Association

“To encourage and develop better weed control practices”

Prepared by

Nebraska Weed
Control Association

Weed Management
Strategy Committee

September 30, 2010

Assessment of the Weed Risk Potential of

Fallopia japonica (Japanese knotweed)



APHIS Weed Risk
Assessment Model



United States
Department of
Agriculture

Animal and Plant
Health Inspection
Service

Assisted and reviewed by:

Plant Epidemiology and Risk Analysis Laboratory
Center for Plant Health Science and Technology
Plant Protection and Quarantine
Animal and Plant Health Inspection Service
United States Department of Agriculture
1730 Varsity Drive, Suite 300
Raleigh, NC 27606

Species
Fallopia japonica

WRA Conclusion
High Risk

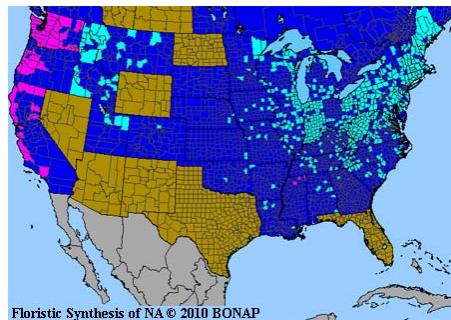
Risk Assessment

Fallopia japonica (Hout.) Ronse Decr. (Polygonaceae) Japanese knotweed

Initiation: This assessment is being prepared to support designation as a noxious weed in Nebraska while *Fallopia japonica*, its cultivars, hybrids and congeners are in their very early invasion stages and with the hope that other states could use it as support in designating it a noxious weed in their state.

Foreign distribution: Native to China and Eastern Asia. Introduced in Australia, New Zealand, Europe and Canada. (GRIN)

U.S. distribution & status:



Fallopia japonica has been detected in all states except AZ, FL, HI, ND, NM, NV and TX. Wild plants have only been detected in the Omaha area in Nebraska. It is a designated noxious weed in 10 states. It is particularly abundant in the eastern United States and in the coastal areas of Washington and Oregon. Several \$million have been spent to control river banks in Washington since 2004. Most states and provinces list a weed as noxious only in the late stage of the invasion process when it is a large, landscape-scale problem. Organizing by invasion stage emphasizes rapid response to new invaders which has been shown to be more cost-effective than prolonged management of widespread species.

WRA area: The WRA area is the state Nebraska. A template for Nebraska with adjusted Geographic Potential was used. Other states could get a ranking for their state by using a template with adjusted Geographic Potential for their state.

Risk Element Score (Mean Uncertainty)

Summary

Establishment/Spread Potential
22 (0.6)

F. japonica is naturalised in many European countries (Sukopp & Sukopp 1988), up to at least 68 degrees N latitude (Jalas & Suominen 1979, Sebold et al. 1990, Lid & Lid 2005), and also in south European countries like Croatia, Macedonia, and Bosnia and Herzegovina (Trinajstić 1990). In the U.K. *F. japonica* has spread extensively, occurring in half of the 10 km x 10 km quadrates in the national grid (Shaw & Seiger s.d.). Sexual reproduction and seed germination in the United States will increase the invasiveness. (Smith et al. 2007).

Impact Potential
3.5 (0.6)

Fallopia japonica threatens open and riparian areas where it spreads rapidly and forms dense near monoculture stands. It dramatically reduces species diversity and alters habitat for wildlife. In riparian habitats *F. japonica* 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. Prolific rhizome and shoot growth can damage foundations, walls, pavements, drainage works, and flood prevention structures. (ANHP, 2006).

Fallopia japonica (Hout.) Ronse Decr. (Polygonaceae) Japanese knotweed

Analysis

Model Probabilities:

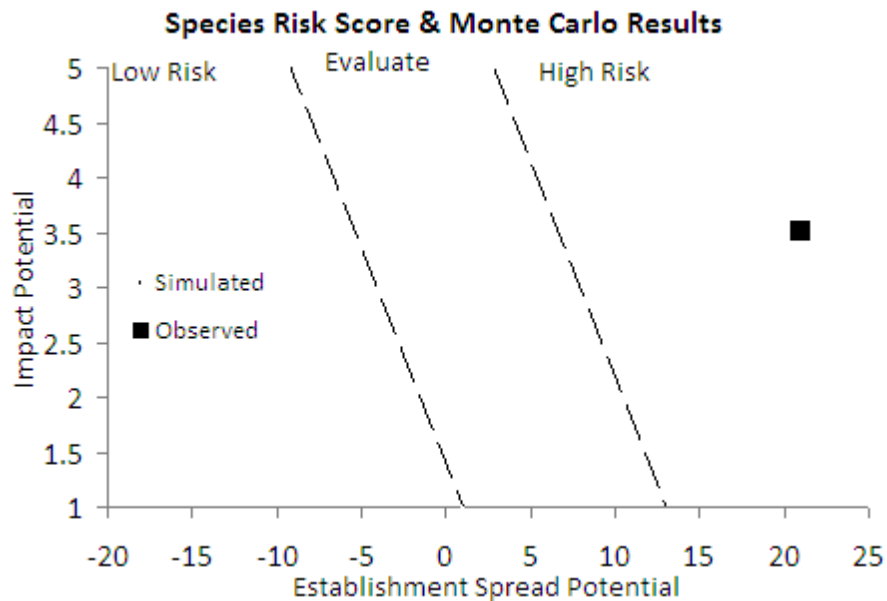
P(Maj-I) = 0.959

P(Min-I) = 0.040

P(Non-I) = 0.001

Result: High Risk

2° Screening: N/A



Risk Element Score (Mean Uncertainty) Summary

Geographic Potential It has established in 43 states and has the potential of establishing in the remaining states. Cold: 1.0 It can establish in USDA hardiness zones 4 to 9 , especially in areas with 20 inches or more of rainfall and in riparian areas having less than 20 inches of rainfall.

Climate: 1.0

Precip.: 0.5536

Entry Potential

1.0 (0.0)

Fallopia japonica is already present in the United States and Nebraska; therefore, an assessment of its entry potential was not necessary.

Final Conclusion & Discussion:

When compared with 200+ other assessments, Japanese knotweed ranked in the top five of all high risk plants based upon its reported ability to establish and spread. It has proven itself to be a relentless invader with the intentional and unintentional help from humans and assistance from its cultivars, hybrids and congeners. In the U.K., *F. japonica* has spread extensively without sexual reproduction. The spread has been by ornamental plantings, rhizomes and the movement of these rhizomes and other plant parts. In the United States there has been a joint wild invasion of Japanese knotweed and its hybrid, Bohemian knotweed. Bohemian knotweed, Japanese knotweed cultivars planted in gardens, other hybrids and congeners all contribute to seed production of Japanese knotweed. Seed production provides for long distance dispersal by wind in addition to vegetative dispersal providing potentially for a more rapid advance. It has spread all the way across eastern 1/2 United States and has entered Nebraska. In Nebraska, wild Japanese knotweed and Bohemian knotweed sites have been found in the Omaha area. There are Japanese knotweed cultivar plantings in Omaha, Lincoln and western Nebraska. Japanese knotweed in the Colorado South Platte river basin could infest western Nebraska. Required control and stopping the sale of Japanese knotweed, all its cultivars, hybrids and congeners is needed to stop the invasion. Its preferred habitat is similar to phragmites, and if not eradicated as it enters the state, it has the potential to invade the phragmites' recently controlled areas. See river infestations below.



Connecticut



Poland



Washington

Literature Cited:

- Alaska Natural Heritage Program. Non-Native Plant Species of Alaska, Family: Polygonaceae 2006
- Bailey, J.P. (1990). Breeding behaviour and seed production in Alien Giant Knotweed in the British Isles. Industrial Ecology Group of the British Ecological Society at the University of Wales College of Cardiff, September 20-21, 1990.
- Barney, Jacob N., Tharayil, Nishanth, DiTomaso, Antonio, Bhowmik, Prasanta C. 2006. The biology of invasive alien plants in Canada. 5. *Polygonum cuspidatum* Sieb. & Zucc. [= *Fallopia japonica* (Houtt.) Ronse Decr.]. Canadian Journal of Plant Science. 86(3). JUL 2006.
- Beerling, D. J., J. P. Bailey, and A. P. Conolly. 1994. Biological flora of the British Isles no. 183 *Fallopia japonica* (Houtt.) Ronse Decraene (*Reynoutria japonica* Houtt.; *Polygonum cuspidatum* Sieb. & Zucc.). J. Ecol 82:959–979.
- Beerling, D.J. & Perrins, J.M. (1993) *Impatiens glandulifera* Royle (*Impatiens roylei* Walp.). *Journal of Ecology*
- Boehmer, H.J., Heger, T. & Trepl, L. (2001): Fallstudien zu gebietsfremden Arten in Deutschland – Case studies on Aliens Species in Germany: *Robinia pseudoacacia*, *Reynoutria japonica*, *Senecio inaequidens*, *Dreissena polymorpha*, *Ondatra zibethicus*, *Mustela vison*. Texte des Umweltbundesamtes 2001(13), 126 pp.
- Botanical Society of the British Isles, www.bsbi.org.uk
- Bram, M. R. and J. N. McNair. 2004. Seed germinability and its seasonal onset of Japanese knotweed (*Polygonum cuspidatum*). Weed Science 52 (5): 759-767.
- Brock, J. and M. Wade 1992. Regeneration of Japanese knotweed (*Fallopia japonica*) from rhizome and stems: Observations from greenhouse trials, pp. 85-93. IX *Àome Colloque International Sur la Biologie des Mauvaise Herbes*. September 1992, Dijon, France. ANPP, Paris, France.
- Brock, J. H., Child, L. E., Waal, L. D. de, Wade, M. The invasive nature of *Fallopia japonica* is enhanced by vegetative regeneration from stem tissues. School of Planning and Landscape Architecture, Arizona State University, Tempe, AZ 85287-2005, USA.
- Child, L. and M. Wade. 2000. The Japanese knotweed manual - the management and control of an invasive alien weed. Packard Publishing Limited, Chichester, UK
- City of Chicago Guide to Land-Based Invasive Plants 2009, City of Chicago Department of Environment
- Czarapata, E. J. 2005. Invasive Plants of the Upper Midwest. The University of Wisconsin Press. Madison, WI. 215 pp.
- Daves Garden davesgarden.com/
- Dawson, F.H. & Holland, D. (1999) The distribution in bankside habitats of three alien invasive plants in the UK in relation to the development of control strategies. *Hydrobiologia*, 415, 193–201.
- de Waal, L. C. 2001. A viability study of *Fallopia japonica* stem tissue. Weed Res 41:447–460.
- DiTomaso and Healy. 2006. Weeds of California. UC DANR Publication # 3488
- European and Mediterranean Plant Protection Organization (EPPO) 1 rue Le Nôtre, 75016 Paris, France www.eppo.org
- Forman, J. and R. V. Kesseli. 2003. Sexual reproduction in the invasive species *Fallopia japonica* (Polygonaceae). Am. J. Bot 90:586–592.
- Global Invasive Species Database www.invasivespecies.net/database
- Grime, J.P., J.G. Hodgson, R. Hunt. 1988. Comparative Plant Ecology. Unwin Hyman, London.
- Haber, E. 1999. Invasive Exotic Plants of Canada Fact Sheet No. 12 - Japanese Knotweed.
- Haeupler, H & Schonfelder, P 1989: Atlas der Farn- und Blütenpflanzen der Bundesrepublik Deutschland. – Ulmer Verl., Stuttgart
- Hoffie Nursery Inc 17102 Marengo Road Union, IL 60180-9511 Hoffienursery.com
- Holzner, W. & Numata, M. (1982): Biology and Ecology of Weeds. The Hague, Boston, London: Dr. W. Junk Publishers.
- Invasive Plant Watch Network www.rspee.glu.org/
- JOHN C. MAERZL, *, BERND BLOSSEY1 and VICTORIA NUZZO Green frogs show reduced foraging success in habitats invaded by Japanese knotweed Biodiversity and Conservation (2005) 14:2901–2911
- Learn2Grow 1655 Palm Beach Lakes Blvd West Palm Beach, FL, 33401 www.learn2grow.com/
- Locandro, R.R. (1978). Weed watch: Japanese bamboo - 1978. Weeds Today 9:21-22.
- Lockton, A.J. 7/7/10 Species account: *Fallopia japonica* & *F. sachalinensis*. Botanical Society of the British Isles, www.bsbi.org.uk.
- Maruta, E. (1976). Seedling establishment of *Polygonum cuspidatum* on Mt. Fuji. Jap. J. Ecol. 26:101-105.
- Palmer JP (1994) *Fallopia japonica* (Japanese knotweed) in Wales. Pages 159–172 in L. C. De Waal, L. Child, M. Wade, and J. H. Brock, editors. Ecology and management of invasive riverside plants. John Wiley & Sons, Chichester UK
- Palmer, J.P. (1990). Japanese knotweed (*Reynoutria japonica*) in Wales. In: The biology and control of invasive plants. Conference organized by the Industrial Ecology Group of the British Ecological Society at the University of Wales College of Cardiff, September 20-21, 1990
- Price, E.A.C, Gamble, R., Williams, G.G. and Marshall, C., 2001, Seasonal patterns of partitioning and remobilisation of C-14 in the invasive rhizomatous perennial Japanese knotweed (*Fallopia japonica* (Houtt.) Ronse Decraene. *Evolutionary Ecology*. 15 (4-6)
- Pysek, Petr. 2006. *Fallopia japonica*. Delivering Alien Invasive Species Inventories for Europe (DAISIE)
- Scott, R., and R.H. Mars (1984). Impact of Japanese knotweed and methods of control. Aspects of applied biology 5, Weed control and vegetation management in forestry and amenity areas
- Seiger, L. A. 1991. Element stewardship abstract for *Polygonum cuspidatum*: Japanese knotweed, Mexican bamboo. The Nature Conservancy, Arlington, VA, USA.
- Seiger, L.A. and H.C. Merchant (1991). Effects of site on survivorship and size of *Polygonum cuspidatum*. Bull. Ecol. Soc. Am. 72(2 suppl.):
- Shaw, R, L Seiger. 2002. Japanese knotweed. In Van Driesche, R, et al. Biological Control of Invasive Plants in Eastern United States. USDA Forest Service Publication FHTET-2002- 04.
- Shoichi Kawano, Hiroshi Azuma, Motomi Ito, Kunio Suzuki Extrafloral nectaries and chemical signals of *Fallopia japonica* and *Fallopia sachalinensis* (Polygonaceae), and their roles as defense systems against insect herbivory Plant Species Biology Volume 14, Issue 2, pages 167–178, August 1999
- Smith, J.M.D., J.P. Ward, L.E. Child, and M.R. Owen. 2007. A simulation model of rhizome networks for *Fallopia japonica* (Japanese knotweed) in the United Kingdom. Ecological Modelling 200: 421-432.
- Soll, J. 2004. Controlling knotweed (*Polygonum cuspidatum*, *P. sachalinense*, *P. polystachyum* and hybrids) in the Pacific Northwest. <http://tncweeds.ucdavis.edu/moredocs/polspp01.pdf> (December 2005).
- Sukopp, H. and U. Sukopp (1988). *Reynoutria japonica* Houtt. in Japan und in Europa. Veroff. Geobot. Inst. ETH, Stiftung Rubel, Zurich 98:354-372.
- Trinajstic, I. (1994): Prolog poznavanju rasprostranjenosti vrste *Reynoutria japonica* Houtt. (Polygonaceae) u Jugoslaviji. Fragmenta herbologica Jugoslavica 19(2): 139-143.
- USDA Forest Service, Forest Health Staff, Newtown Square, PA. WOW 09-14-04
- USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network (GRIN), online database at ww.ars.grin.gov/cgi-bin/ngps/html, National Germplasm Resources Laboratory, Beltsville, Maryland.
- Wade M. L. Child 2001 Getting to grips with Japanese knotweed. *Enact* 9: 4-7
- Washington State Department of Ecology Knotweeds IPM Profile Updated November 2007
- Wilson, L. M. 2007. Key to Identification of Invasive Knotweeds in British Columbia. Kamloops, B.C British Columbia Ministry of Forestry and Range, Forestry Practices Branch. 10.