

yellow flag iris

Iris pseudacorus L.

Synonyms: none

Other common names: paleyellow iris, water flag, yellow flag, yellow iris, yellow water iris

Family: Iridaceae

Invasiveness Rank: 66 The invasiveness rank is calculated based on a species' ecological impacts, biological attributes, distribution, and response to control measures. The ranks are scaled from 0 to 100, with 0 representing a plant that poses no threat to native ecosystems and 100 representing a plant that poses a major threat to native ecosystems.

Description

Yellow flag iris is a rhizomatous, perennial plant that grows from 40 to 150 cm tall. Rhizomes are pink, freely branching, and 1 to 4 cm in diameter. Stems are usually simple but sometimes branched, erect, and solid. Leaves are mostly basal, linear to lanceolate, erect to downward-curved, dark green, 40 to 100 cm long, and 1 to 4 cm wide with thick medians. Groups of four to 12 flowers are arranged in inflorescences on 2 to 5 cm long stalks. Flowers are pale to bright yellow and 8 to 10 cm in diameter. Floral tubes are 6 to 15 mm long. Petals are erect, narrowed at the middle, 2 to 3 cm long, and 4 to 5 mm wide. Sepals are broadly rounded, downward-curved, 5 to 7.5 cm long, and 3 to 4 cm wide with short, brown lines. Capsules are cylindrical to ovoid, 3.5 to 8 cm long, and obscurely three-angled with a groove running along each edge. Each capsule contains 50 to 120 seeds. Seeds are flattened and 6 to 7 mm wide (Sutherland 1990, Henderson 2002, Stone 2009, Klinkenberg 2010, NatureGate 2010).



Infestation of *Iris pseudacorus* L. in standing water. Photo by. L. Mehrhoff.

Similar species: Beachhead iris (*Iris setosa*) is native to Alaska and could be confused with yellow flag iris. Unlike yellow flag iris, beachhead iris has blue or purple flowers, petals that are 1 to 2 cm long, and capsules that are 25 mm long (Hultén 1968, Henderson 2002).



Yellow petals and yellow sepals with brown lines on *Iris pseudacorus* L.
Photo by H. Zell.

Ecological Impact

Impact on community composition, structure, and interactions: Yellow flag iris invades wetland and riparian communities throughout the United States (Stone 2009). In Connecticut and on Theodore Roosevelt Island in the Potomac River, the establishment of yellow flag iris reduced populations of the native plant green arrow arum (*Peltandra virginica*),

an important food source for the wood duck (Tu et al. 2003, Stone 2009). Yellow flag iris also displaces native plant species in brackish coastal marshes in Oregon (Tu et al. 2003). Yellow flag iris has the potential to form extensive, monotypic stands that increase the density of vegetation and reduce populations of native species in waterways and along shores (Tu et al. 2003, Stone 2009, Morgan 2010). It may impede the establishment and seedling survival of *Salix* species (Tu et al. 2003, Stone 2009). This species produces glycosides that are poisonous when consumed by most vertebrates (Sutherland 1990). Infestations can degrade stream habitats important to salmon (King County 2009). Many insect herbivores feed on this species, and it is associated with a large number of plant parasites. *Pseudomonas iridis* causes iris root rot disease in this plant. Yellow flag iris reduces bacteria populations when growing in water (Sutherland 1990). The flowers are attractive to hummingbirds and butterflies (Stone 2009) and are visited by many pollinating insect species, including bumblebees (*Bombus* species) and non-native honey bees (*Apis mellifera*) (Sutherland 1990). Therefore, the presence of yellow flag iris may alter native plant-pollinator interactions.

Impact on ecosystem processes: Along the Potomac River, infestations of yellow flag iris contributed to the conversion of riparian marshes to mesic woodlands (Tu et al. 2003). Infestations may alter natural successional processes (Stone 2009). They can increase sedimentation rates and reduce water flow in small streams. Rhizome growth compacts soil and prevents erosion (Tu et al. 2003, Stone 2009).

Biology and Invasive Potential

Reproductive potential: Yellow flag iris reproduces sexually by seeds and vegetatively from rhizomes in a radial pattern. Rhizomes fragment after approximately ten years. Hundreds of flowering plants can be interconnected by rhizome networks (Sutherland 1990, Stone 2009). Yellow flag iris produced 400 to 480 seeds per plant in Britain (Sutherland 1990) and 150 to 240 seeds per plant in Montana (Stone 2009). Seeds are known to remain viable for at least one year, but there is no indication that they remain viable for more than three years or that they form long-lived seed banks (Sutherland 1990, Stone 2009). The importance of vegetative and sexual reproduction is environmentally dependant. In a salt marsh in Ireland, plants propagated mainly by rhizomes in the upper levels of the marsh, whereas many of the plants in the lower levels of the marsh were seedlings (Sutherland and Walton 1990).

Role of disturbance in establishment: Yellow flag iris requires open soil for germination. Disturbances, often in the form of flooding, are necessary for the establishment of this species (Coops and van der Velde 1995, Stone 2009). Although all infestations recorded in Alaska are associated with anthropogenic disturbances

(AKEPIC 2010), yellow flag iris establishes in areas that have been naturally disturbed by the movement of water in much of North America (Coops and van der Velde 1995, Stone 2009).

Potential for long-distance dispersal: Most seeds can remain floating for two months. They can germinate after being soaked in seawater for 31 days (Sutherland 1990). Seeds and rhizome fragments are spread in waterways and by floods. Seeds germinate along shorelines when water levels recede (Coops and van der Velde 1995, Stone 2009).

Potential to be spread by human activity: Yellow flag iris is grown in the U.S. as an ornamental plant and is able to escape cultivation (Stone 2009, Morgan 2010). Several infestations in southeast Alaska appear to be associated with ornamental plantings (AKEPIC 2010).

Germination requirements: Most seeds germinate during the spring the year following their maturation. Scarification increases germination rates. Seeds do not have innate dormancy; fresh seeds had a germination rate of 48% in Britain. Seedlings are rare in most habitats in Europe (Sutherland 1990). Seeds germinate best in moist, but not waterlogged, conditions (Stone 2009).

Growth requirements: Yellow flag iris grows well in soil with a constant high water content and pH between 3.6 and 7.7. It is also capable of growing in dry sand. This species requires large amounts of nitrogen (Sutherland 1990). It tolerates fluctuating water levels and can grow in water up to 25 cm deep (Sutherland 1990, Stone 2009). Plants can survive as mats floating in water, and the rhizomes are able to grow over submerged rocks with roots penetrating between rocks to underlying soil. Yellow flag iris tolerates saline conditions; persistent populations have been found growing in estuarine water with a salinity of 24%. This species grows well in full sunlight and partial shade but is intolerant of full shade (Sutherland 1990).

Congeneric weeds: Douglas iris (*Iris douglasiana*) and Rocky Mountain iris (*I. missouriensis*) are both problematic, non-native species that are considered noxious weeds in California (DiTomaso and Healy 2007, Invaders 2010, USDA 2010).

Legal Listings

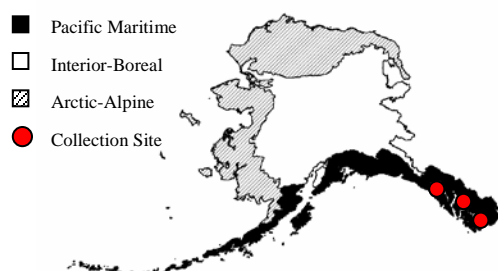
- Has not been declared noxious
- Listed noxious in Alaska
- Listed noxious by other states (MT, OR, WA; considered invasive in CT and NH; prohibited in MA)
- Federal noxious weed
- Listed noxious in Canada or other countries

Distribution and Abundance

Yellow flag iris is often deliberately grown in ponds and gardens as an ornamental plant. Many different cultivars have been developed (Sutherland 1990, Tu et al. 2003, Morgan 2010). This species has also been planted

purposely to control erosion and to remove metals from water in sewage treatment plants (Tu et al. 2003). In North America, yellow flag iris grows in wetlands, floodplains, swamps, river banks, lake shores, freshwater and brackish cattail marshes, moist ditches, sloughs, and rocky coasts (Henderson 2002, Stone 2009, Klinkenberg 2010).

Native and current distribution: Yellow flag iris is native to Europe, North Africa, and temperate Asia. It has been introduced to North America and New Zealand (Sutherland 1990, Stone 2009). This species grows in 41 states of the U.S. (USDA 2010). Populations have been documented in coastal Norway as far north as 68°N (Sutherland 1990). Yellow flag iris has been documented from the Pacific Maritime ecogeographic region of Alaska (AKEPIC 2010).



Distribution of yellow flag iris in Alaska

References:

- AKEPIC database. Alaska Exotic Plant Information Clearinghouse Database. 2010. Available: <http://akweeds.uaa.alaska.edu/>
- Coops, H., and G. van der Velde. 1995. Seed dispersal, germination, and seedling growth of six helophyte species in relation to water-level zonation. *Freshwater Biology*. 34(1). 13-20 p.
- DiTomaso, J., and E. Healy. 2007. Weeds of California and Other Western States. Vol. 2. University of California Agriculture and Natural Resources Communication Services, Oakland, CA. 974 p.
- Henderson, N. 2002. *Iris pseudacorus* Linnaeus. In: *Flora of North America* Editorial Committee, eds. 1993+. *Flora of North America North of Mexico*. 12+ vols. New York and Oxford. Vol. 26, p. 390.
- Hultén, E. 1968. *Flora of Alaska and Neighboring Territories*. Stanford University Press, Stanford, CA. 1008 pp.
- Invaders Database System. 2010. University of Montana. Missoula, MT. <http://invader.dbs.umt.edu/>
- King County. 2009. Best Management Practices. Yellow-flag iris (*Iris pseudacorus*). King County Noxious Weed Control Program, Water and Land Resources Division, Department of Natural Resources. Seattle, WA. [1 December 2010] Available: <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/yellow-flag-iris-control.pdf>
- Klinkenberg, B. (Editor) 2010. *Iris pseudacorus* L. In: *E-Flora BC: Electronic Atlas of the Plants of British Columbia*. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia. Vancouver, BC. [2 December 2010] Available: <http://www.geog.ubc.ca/biodiversity/eflora/index.shtml>
- Morgan, V. 2010. *Iris pseudacorus*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL. [3 December 2010] <http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=1115>
- NatureGate. 2010. Finland Nature and Species. Helsinki, Finland. [3 December 2010] Available: <http://www.luontoportti.com/suomi/en/>
- Stone, K. 2009. *Iris pseudacorus*. In: *Fire Effects Information System* [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. [2 December 2010] Available: <http://www.fs.fed.us/database/feis/>
- Sutherland, W. 1990. Biological Flora of the British Isles. 169. *Iris pseudacorus* L. *Journal of*

Management

Mechanical control methods that remove the entire plant and rhizome system can successfully control small infestations. Controlled areas should be revisited to remove plants resprouting from rhizome fragments. Repeated mowing or cutting of plants before seed set can prevent the spread of yellow flag iris by seed and may eventually kill plants, especially if they are cut below the water surface (King County 2009, Stone 2009). This species can be controlled by the application of herbicides, but it is resistant to Terbutryne (Sutherland 1990). Glyphosate, 1% Imazapyr with 1% non-ionic surfactant, or 1% Imazapyr with 2.5% glyphosate can effectively control infestations. Cutting followed by herbicide application is an effective combination of mechanical and chemical control methods (Tu et al. 2003, King County 2009).

Ecology. 78(3). 833-848 p.
Sutherland, W., and D. Walton. 1990. The changes in morphology and demography of *Iris pseudacorus* L. at different heights on a saltmarsh. *Functional Ecology*. 4(5). 655-659 p.
Tu, M., J. Randall, and B. Rice. 2003. Element Stewardship Abstract for *Iris pseudacorus* L. yellow flag iris, water flag. Wildland Invasive Species Team, The Nature Conservancy. [2

December 2010] Available:
<http://www.imapinvasives.org/GIST/ESA/esapages/documnts/irispse.pdf>
USDA. 2010. The PLANTS Database. National Plant Data Center, Natural Resources Conservation Service, United States Department of Agriculture. Baton Rouge, LA.
<http://plants.usda.gov>