

English holly

Ilex aquifolium L.

Synonyms: none

Other common names: none

Family: Aquifoliaceae

Invasiveness Rank: 67 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

English holly is a small, evergreen shrub or tree with numerous, short, erect to spreading branches. It commonly grows 2 to 5 m tall, but it can grow up to 17 m tall in its native range. Young twigs are green and develop grey bark with age. Leaves are alternate, petiolated, ovate to oblong, entire or lobed, leathery, and 2.5 to 6 cm long with glossy, dark green upper surfaces and spine-like teeth. Male and female flowers are usually found on separate plants. Flowers are 6 mm in diameter, white, and borne in few-flowered, axillary clusters. Fruits are 7 to 12 mm in diameter, red, smooth, and clustered with 2 to 8 single-seeded nutlets each. Nutlets are convex and ridged (DiTomaso and Healy 2007, eFloras 2008, Klinkenberg 2010).



Fruit and foliage of *Ilex aquifolium* L. Photo by F. Vincentz.



Ilex aquifolium L. tree. Photo by H. Zell.

Similar species: No other species in Alaska are likely to be confused with English holly.

Ecological Impact

Impact on community composition, structure, and interactions: English holly invades undisturbed forests in the Pacific Northwest (Polster 2004, King County 2010, Klinkenberg 2010), and it has escaped cultivation and become invasive in moist, coastal forests in California (DiTomaso and Healy 2007). This species is considered one of the ten most invasive garden plants for sale in Tasmania. It invades bushland areas and threatens native species in several regions of Australia (Groves et al. 2005). English holly is known to form pure stands in its native range (Peterken and Lloyd 1967). Because this species is a tall shrub, it often shades out native vegetation and suppresses the germination and growth of native trees and shrubs (King County 2008, King County 2010, Klinkenberg 2010). Thus, English holly has the potential to increase the density of tall shrub layers and decrease the density of underlying layers in Alaska. English holly has spiny leaves. The berries are consumed by birds, and many animals, including a variety of insect herbivores, feed on the leaves and twigs. During winter, mammals eat the bark. Roots have been associated with mycorrhizal fungi in Europe. English holly is a known host of eight species of plant parasites (Peterken and Lloyd 1967). Flowers are pollinated by bees (Roberts and Boller 1948, Peterken and Lloyd 1967, King County 2008); thus, their presence has the potential to alter native plant-

pollinator interactions in Alaska.

Impact on ecosystem processes: English holly requires significant moisture (King County 2008) and may reduce the amount of soil moisture available to surrounding native species. No other impacts on ecosystem processes have been documented.

Biology and Invasive Potential

Reproductive potential: Under favorable conditions, mature plants can produce up to 120,000 seeds per year. Seeds remain viable for at least three years (DiTomaso and Healy 2007). In Spain, seed banks are transient due to seed predation by rodents (Herrera and García 2010). English holly is also capable of vegetative reproduction. Low-hanging branches can root if in contact with the soil or covered by leaf litter, leafy twigs broken off the parent plant can form roots if covered by moist litter, and new plants can sprout from the horizontal roots of parent plants (Peterken and Lloyd 1967).

Role of disturbance in establishment: Seeds can germinate in undisturbed coastal forests, woodlands, and riparian areas in California and the Pacific Northwest (Polster 2004, DiTomaso and Healy 2007, King County 2010). They also germinate in gardens, cultivated land, and disturbed areas (Roberts and Boller 1948, DiTomaso and Healy 2007, AKEPIC 2010, Klinkenberg 2010). This species typically does not grow well in high light and low temperature conditions; often, growth is promoted by a taller canopy layer (Gray 2005). Birds primarily disperse seeds to areas with tree or shrub canopy cover (Herrera and García 2010). All recorded infestations in Alaska, however, are associated with anthropogenic disturbances (AKEPIC 2010).

Potential for long-distance dispersal: Seeds are primarily dispersed by birds after being ingested. Small mammals, such as foxes, occasionally ingest and disperse seeds (Peterken and Lloyd 1967, Herrera and García 2010). Vegetative reproduction contributes to the density of plants within a population, but does not aid the dispersal of populations (Peterken and Lloyd 1967).

Potential to be spread by human activity: English holly is commonly cultivated as an ornamental and is grown commercially in the Pacific Northwest (Roberts and Boller 1948, DiTomaso and Healy 2007, Klinkenberg 2010). All recorded infestations in Alaska are associated with fill importation (AKEPIC 2010).

Germination requirements: Seeds usually germinate in the spring, after two or three years of dormancy. Seeds that have passed through digestive systems often germinate sooner (Peterken and Lloyd 1967).

Growth requirements: English holly tolerates a variety of soil textures and moisture conditions but grows best on deep, fertile, well-drained soils. This species has been found growing in soil with 80% calcium carbonate (CaCO₃) content in England. Leaves can photosynthesize during winter if the light level and temperature are high enough. Severe frost can kill the

stem cambium, and late spring frost can kill leaf and flower buds. The aboveground portion of the plant is susceptible to fire, but plants resprout after they have been burned (Roberts and Boller 1948, Peterken and Lloyd 1967).

Congeneric weeds: No other *Ilex* species are known or suspected to occur as non-native species in Alaska (AKEPIC 2010). Chinese holly (*Ilex cornuta*) and Japanese holly (*Ilex crenata*) are naturalized in Georgia but are not considered problem species in natural areas (GAEPPC 2006).

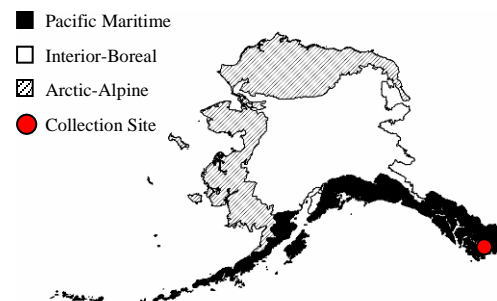
Legal Listings

- Has not been declared noxious
- Listed noxious in Alaska
- Listed noxious by other states
- Federal noxious weed
- Listed noxious in Canada or other countries

Distribution and Abundance

English holly is commonly cultivated, and many different varieties have been developed (Peterken and Lloyd 1967). This species is grown commercially in the Pacific Northwest for sale as Christmas decorations (Roberts and Boller 1948, DiTomaso and Healy 2007, Klinkenberg 2010). In North America, English holly grows in disturbed areas, mesic and coastal forests, woodlands, and riparian areas (DiTomaso and Healy 2007, Klinkenberg 2010).

Native and current distribution: English holly is native to Europe and mountainous areas in North Africa and Asia Minor. It has been introduced to North America and Australia (Peterken and Lloyd 1967, Thorpe and Wilson 1998, USDA 2010, Klinkenberg 2010). This species is known from high elevations in subarctic Norway (Vascular Plant Herbarium Oslo 2010), but has not been documented from arctic regions. In the U.S., English holly has been found in Alaska, California, Hawaii, Oregon, and Washington (USDA 2010). English holly has been documented from the Pacific Maritime ecogeographic region in extreme southeastern Alaska (AKEPIC 2010).



Distribution of English holly in Alaska

Management

English holly can be difficult to eradicate once established. Plants can be hand-pulled or dug when they are small. Mechanical and chemical control methods are more effective when combined to successfully eradicate large plants. Stems can be cut near the base, and a glyphosate herbicide applied to the cut area (King County 2008).

References:

- AKEPIC database. Alaska Exotic Plant Information Clearinghouse Database. 2010. Available: <http://akweeds.uaa.alaska.edu/>
- Bañuelos, M., J. Kollmann, P. Hartvig, and M. Quevedo. 2004. Modelling the distribution of *Ilex aquifolium* at the northeastern edge of its geographical range. *Nordic Journal of Botany*. 23(1). 129-142 p.
- DiTomaso, J., and E. Healy. 2007. Weeds of California and Other Western States. Vol. 1. University of California Agriculture and Natural Resources Communication Services, Oakland, CA. 834 p.
- Georgia Exotic Pest Plant Council (GAEPPC). 2006. List of Non-native Invasive Plants in Georgia. Center for Invasive Species and Ecosystem Health, University of Georgia. Tifton, GA. [25 October 2010] <http://www.gaepc.org/list.cfm>
- Gray, A. 2005. Eight nonnative plants in western Oregon forests: Associations with environment and management. *Environmental Monitoring and Assessment*. 100(1). 109-127 p.
- Groves, R., R. Boden, W. Lonsdale. 2005. Jumping the Garden Fence: Invasive garden plants in Australia and their environmental and agricultural impacts. CSIRO report prepared for WWF-Australia. WWF-Australia, Sydney. 173 p.
- Herrera, J. and D. García. 2010. Effects of Forest Fragmentation on Seed Dispersal and Seedling Establishment in Ornithochorous Trees. *Conservation Biology*. 24(4). 1089-1098 p.
- Invaders Database System. 2010. University of Montana. Missoula, MT. <http://invader.dbs.umt.edu/>
- ITIS. 2010. Integrated Taxonomic Information System. <http://www.itis.gov/>
- King County. 2008. Weed Alert, English Holly, *Ilex aquifolium*. Noxious Weed Control Program, Water and Land Resources Division, Department of Natural Resources and Parks. King County, WA. [25 October 2010] <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds.aspx>
- King County. 2010. Noxious Weeds, English Holly, *Ilex aquifolium*. Noxious Weed Control Program, Water and Land Resources Division, Department of Natural Resources and Parks. King County, WA. [25 October 2010] <http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds.aspx>
- Klinkenberg, B. (Editor) 2010. *Ilex aquifolium* 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. [25 October 2010] Available: <http://www.geog.ubc.ca/biodiversity/eflora/index.shtml>
- Peterken, G. and P. Lloyd. 1967. Biological Flora of the British Isles, *Ilex aquifolium* L. *Journal of Ecology*. 55(3). 841-858 p.
- Polster, D. 2004. Restoration Encyclopedia: Invasive Species in Ecological Restoration. 16th International Conference, Society for Ecological Restoration, August 24-26, 2004, Victoria, Canada. 7 p.
- Roberts, A. and C. Boller. 1948. Holly Production in Oregon. Station Bulletin 455. Agricultural Experiment Station, Department of Horticulture, Oregon State College. Corvallis, OR. 32 p.
- Thorpe, J. and M. Wilson. 1998. Holly, *Ilex aquifolium*. Weeds Australia, Australian Weeds Committee. [25 October 2010] <http://www.weeds.org.au/>
- 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>
- Vascular Plant Herbarium, Oslo. 2010. Accessed through GBIF (Global Biodiversity Information Facility) data portal (<http://data.gbif.org/datasets/resource/1078>, 2010-10-19). Natural History Museum, University of Oslo. Oslo, Norway.