

rapeseed mustard

Brassica napus L.

Synonyms: *Brassica campestris* ssp. *napus* (L.) Hook. f. & T. Anders., *B. napobrassica* (L.) Miller, *B. napus* var. *napobrassica* (L.) Reichenb., *B. napus* var. *oleifera* de Candolle, *B. oleracea* Linnaeus var. *napobrassica* Linnaeus

Other common names: canola, oilseed rape, rape, rapeseed, rutabaga, swede, swede rape, Swedish turnip

Family: Brassicaceae

Invasiveness Rank: 47 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

Rapeseed mustard is an annual or biennial plant that grows 30 to 150 cm tall from a taproot. Stems are branched above and glabrous or slightly hairy. Basal leaves are petiolated, 5 to 25 cm long, 2 to 7 cm wide, and pinnatifid to pinnately-lobed with large, rounded terminal lobes. Upper surfaces are glaucous, glabrous, or sparsely hairy. Petioles are often winged and up to 15 cm long. Stem leaves are lanceolate to oblong, smaller than the basal leaves, and sessile with clasping or lobed bases and entire or slightly wavy margins. Groups of 20 to 40 flowers form racemes at the ends of stems. Flower buds overtop or equal open flowers. Petals are cream-colored to pale yellow, broadly obovate, 10 to 16 mm long, and 6 to 9 mm wide with rounded tips. Siliques are spreading to ascending, 5 to 10 cm long, and 3.5 to 5 mm wide with beaks at the tips that are 7 to 16 mm long. Seeds are dark brown to gray-black, spherical, and 1.8 to 2.7 mm in diameter (Hultén 1968, eFloras 2008, Terekhina 2009, Klinkenberg 2010, Warwick 2010).



Leaf base of *Brassica napus* L. Photo by J. DiTomaso.



Flower buds overtopping open flowers on *Brassica napus* L. Photo by C. Franz.

Similar species: Rapeseed mustard is very similar to the introduced birdsrape mustard (*Brassica rapa*). Unlike *B. napus*, *B. rapa* has open flowers that equal or overtop the flower buds, flowers that are deep yellow as opposed to cream-colored or pale yellow, narrower petals that are 6 to 11 mm long and 3 to 6 mm wide, and basal leaves that are often bristly. Both *B. napus* and *B. rapa* can be confused with several other yellow-flowered, annual, introduced mustards: Indian mustard (*B. juncea*), white mustard (*Sinapis alba*), and wild mustard (*S. arvensis*). Indian mustard can be distinguished from both *B. rapa* and *B. napus* by the presence of upper stem leaves that do not clasp the stem and shorter (5 to 10 mm) beaks on its fruits. Unlike the *Brassica* species, both *Sinapis*

species have stiff, downward-pointing hairs on their stems and siliques with 3 to 5 veins (Hultén 1968, DiTomaso and Healy 2007, Gulden et al. 2008, Warwick 2010).

Ecological Impact

Impact on community composition, structure, and interactions: Rapeseed mustard colonizes disturbed areas (Warwick 2010) and may increase the density of plants in ruderal habitats. It reduces crop yields when growing as a weed in agricultural fields (Gulden et al. 2008), and it may reduce native plant populations. However, this species is not likely to persist beyond two to four years where natural successional processes are allowed to proceed (Crawley and Brown 1995). Deer, squirrels, and a variety of insects feed on cultivated rapeseed mustard in Canada (Gulden et al. 2008). This species contains glucosinolates (mustard oils) that may irritate the digestive tracts of animals and can be toxic if consumed in large quantities (DiTomaso and Healy 2007). Although rapeseed mustard is primarily self-pollinating, plants are visited by honeybees, bumblebees, solitary bees, and flies; the presence of this species may therefore alter native plant-pollinator interactions. Rapeseed mustard is associated with a wide variety of nematodes, fungi, and diseases (Gulden et al. 2008).

Impact on ecosystem processes: Rapeseed mustard requires large amounts of moisture (Terekhina 2003). It may reduce soil moisture and nutrient availability in disturbed areas.

Biology and Invasive Potential

Reproductive potential: Rapeseed mustard reproduces by seeds only and is predominately self-pollinating. In Saskatchewan, this species produced from 700 to 15,000 seeds per plant. Seeds can remain viable in soil for ten years or longer. The longevity of seeds increases as the depth at which they are buried increases (Gulden et al. 2008).

Role of disturbance in establishment: Rapeseed mustard is not known to occur outside of agricultural fields and disturbed areas in North America (Gulden et al. 2008, Klinkenberg 2010, Warwick 2010).

Potential for long-distance dispersal: Rapeseed mustard produces fruits that shatter when mature, dispersing seeds a limited distance. It does not have any other specialized adaptations for dispersal. Seeds can be spread in the excrement of grazing animals (Gulden et al. 2008). Some seeds may be transported on the feet or fur of animals, but most seeds do not disperse far from the parent plant (DiTomaso and Healy 2007).

Potential to be spread by human activity: Rapeseed mustard is a common crop that is cultivated throughout much of the world. Cultivars include rutabaga and canola (Terekhina 2003, DiTomaso and Healy 2007, Warwick 2010, NatureGate 2011). This species is able

to escape from and persist after cultivation (Gulden et al. 2008). Human dispersal occurs when seeds cling to people, vehicles, machinery, clothing, or shoes (DiTomaso and Healy 2007). Grazing animals can spread seeds in their excrement (Gulden et al. 2008).

Germination requirements: Information specific to the germination of weedy rapeseed mustard varieties is not available. The germination of cultivated varieties declines sharply at temperatures lower than 5°C. Seeds can germinate throughout the growing season but primarily germinate in fall or spring. Seedlings can withstand temperatures as low as -20°C during the winter and snow cover increases the survival rate of seeds that germinate in the fall. Germination is inhibited by high salinity (Gulden et al. 2008). Cold stratification is not required for seeds to germinate (USDA 2011).

Growth requirements: Rapeseed mustard can grow on any soil type, but it grows best on moist, medium-textured soils that have pH levels between 5.5 and 8.3. It does not grow as well in waterlogged, sandy, saline, acidic, or alkaline soils. It is sensitive to low sulfur availability (Gulden et al. 2008). It requires large amounts of moisture and nutrients (USDA 2011).

Congeneric weeds: Indian mustard (*Brassica juncea*) is considered a noxious weed in Alaska. Birdsrape mustard (*B. rapa*) is known to occur as a non-native weed in Alaska with an invasiveness rank of 51 (AKEPIC 2011). Birdsrape mustard, Indian mustard, and black mustard (*B. nigra*) are each considered a noxious weed in one or more states of the U.S. or provinces of Canada (AKEPIC 2011, Invaders 2011, Michigan Department of Agriculture 2011, USDA 2011).

Legal Listings

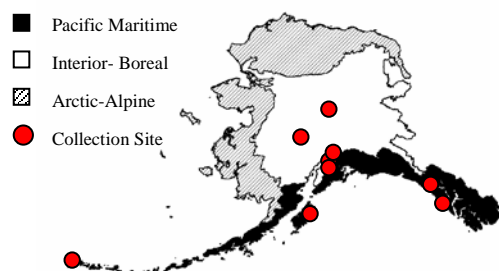
- Has not been declared noxious
- Listed noxious in Alaska
- Listed noxious by other states (all *Brassica* species are listed as noxious weeds in OK and as noxious weed seeds in AL, CT, LA, MA, ME, MI, MS, TX, VA, VT)
- Federal noxious weed
- Listed noxious in Canada or other countries

Distribution and Abundance

Many different cultivars of rapeseed mustard have been bred for a variety of purposes, such as vegetable crops and oilseed, and are grown throughout the world (DiTomaso and Healy 2007, Gulden et al. 2008, Terekhina 2009). This species is also cultivated as fodder (Terekhina 2003). It commonly grows as an agricultural weed, often germinating from seeds remaining from a previous year's crop of rapeseed mustard (Plant Biotechnology Office 1999, Gulden et al. 2008). Rapeseed mustard grows in anthropogenically disturbed sites, roadsides, and cultivated fields in North America (Klinkenberg 2010, DiTomaso and Healy 2007, AKEPIC 2011). Rapeseed mustard has been

documented from urban riparian habitats in the metropolitan areas of and surrounding Birmingham, England (Maskell et al. 2006).

Native and current distribution: Rapeseed mustard is native to Eurasia. It grows as a weed in North America, South America, Australia, and New Zealand (Gulden et al. 2008, Warwick 2010). This species grows in 38 states of the U.S. and most of Canada (USDA 2011). It is known to occur in arctic regions of western Russia (Terekhina 2003) and as far north as 68.5°N in Norway (University Museums of Norway 2010). Rapeseed mustard has been documented from the Pacific Maritime and Interior-Boreal ecogeographic regions of Alaska (Hultén 1968, AKEPIC 2011, UAM 2011).



Distribution of rapeseed mustard in Alaska

References:

- AKEPIC database. Alaska Exotic Plant Information Clearinghouse Database. 2010. Available: <http://akweeds.uaa.alaska.edu/>
- Crawley, M., and S. Brown. 1995. Seed limitation and the dynamics of feral oilseed rape on the M25 motorway. *Proceedings: Biological Sciences*. 259(1354). 49-54 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.
- eFloras. 2008. Published on the Internet <http://www.efloras.org> [accessed 10 February 2011]. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.
- Gulden, R., S. Warwick, and A. Thomas. 2008. The Biology of Canadian Weeds. 137. *Brassica napus* L. and *B. rapa* L. *Canadian Journal of Plant Science*. 88(5). 951-996 p.
- Hultén, E. 1968. *Flora of Alaska and Neighboring Territories*. Stanford University Press, Stanford, CA. 1008 pp.
- Invaders Database System. 2011. University of Montana. Missoula, MT. <http://invader.dbs.umt.edu/>
- Klinkenberg, B. (Editor) 2010. *Brassica napus* 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. [9 February 2011] Available: <http://www.geog.ubc.ca/biodiversity/eflora/index.shtml>
- Maskell, L., J. Bullock, S. Smart, K. Thompson, and P. Hulme. 2006. The distribution and habitat associations of non-native plant species in urban riparian habitats. *Journal of Vegetation Science*. 17(4). 499-508 p.
- Michigan Department of Agriculture. 2011. Prohibited and Restricted Weeds. <http://www.michigan.gov/mda> [14 October 2010].
- NatureGate. 2011. Finland Nature and Species. Helsinki, Finland. [9 February 2011] Available: <http://www.luontoportti.com/suomi/en/>
- Plant Biotechnology Office. 1999. The Biology of *Brassica rapa* L. Regulatory Directive 1999-02. Canadian Food Inspection Agency, Nepean, ON.
- Terekhina, N. 2003. Crops, The Area of Annual rape (*Brassica napus* L. ssp. *olifera* Metzg.). AgroAtlas. Interactive agricultural ecological atlas of Russia and neighboring countries: Economic plants and their diseases, pests, and weeds. [9 February 2011] http://www.agroatlas.ru/en/content/cultural/Brassica_napus_K/map/
- Terekhina, N. 2009. Crops, *Brassica napus* L. ssp. *olifera* Moench – Annual rape. AgroAtlas.

Interactive agricultural ecological atlas of Russia and neighboring countries: Economic plants and their diseases, pests, and weeds. [9 February 2011]
http://www.agroatlas.ru/en/content/cultural/Brassica_napus_K/

UAM. 2011. University of Alaska Museum, University of Alaska Fairbanks. Available:
<http://arctos.database.museum/home.cfm>
University Museums of Norway. 2010. Accessed through GBIF (Global Biodiversity Information Facility) data portal

(<http://data.gbif.org/datasets/resource/1996>, 2011-02-09). Oslo, Norway.
USDA. 2011. The PLANTS Database. National Plant Data Center, Natural Resources Conservation Service, United States Department of Agriculture. Baton Rouge, LA.
<http://plants.usda.gov>
Warwick, S. 2010. *Brassica napus* L. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 12+ vols. New York and Oxford. Vol. 7, p. 422.