

# birdsrape mustard

## *Brassica rapa* L.

Synonyms: *Brassica campestris* Linnaeus, *B. campestris* var. *oleifera* de Candolle, *B. chinensis* Linnaeus, *B. pekinensis* (Loureiro) Ruprecht, *B. rapa* ssp. *chinensis* (Linnaeus) Hanelt, *B. rapa* ssp. *pekinensis* (Loureiro) Hanelt, *Sinapis pekinensis* Loureiro

Other common names: bird's rape, field mustard, rape, rape mustard, turnip rape, wild mustard, wild rutabaga, wild turnip

Family: Brassicaceae

**Invasiveness Rank:** 50 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

Birdsrape mustard is an annual, winter annual, or biennial plant that grows from thin, slender roots. The stems are usually 30 to 100 cm tall and have either no branches or few distal branches. Basal leaves are bright green, lyrate, setose, 10 to 40 cm long, and 3 to 10 cm wide with toothed to pinnatifid margins. They are petiolated with one to four pairs of lateral lobes towards the base. The terminal lobes are larger than the lateral lobes. Stem leaves are lanceolate, glaucous, simply toothed, sessile, and clasping. Flowers are arranged in short inflorescences. Open flowers overtop or equal buds. Each flower has four petals that are yellow, obovate, 6 to 11 mm long, and 3 to 6 mm wide. The sepals are spreading. Siliques (fruits) are ascending to spreading, torulose, terete, and single-veined. They are 3 to 8 cm long and gradually narrow to form beaks that are 10 to 15 mm long. Seeds are spherical, 1.5 to 3 mm in diameter, and brown (Hultén 1968, DiTomaso and Healy 2007, eFloras 2008, Warwick 2010).

*Similar species:* Birdsrape mustard is very similar to the introduced rapeseed mustard (*Brassica napus*). Both *Brassica rapa* and *B. napus* can be confused with several other yellow-flowered, annual, introduced mustards: Indian mustard (*Brassica juncea*), white mustard (*Sinapis alba*), and wild mustard (*S. arvensis*). Unlike the *Brassica* species, both *Sinapis* species have stiff, downward-pointing hairs on their stems and siliques with 3 to 5 veins. *Brassica juncea* can be distinguished from both *B. rapa* and *B. napus* by leaves that do not clasp the stem and shorter (5 to 10 mm) beaks on its fruits. *B. napus* can be differentiated from *B. rapa* by its longer flower buds that overtop the open flowers, flowers that are cream-colored to pale yellow as opposed to yellow, broader petals that are 10 to 16 mm long and 6 to 9 mm wide, and basal leaves that are usually glabrous (Hultén 1968, DiTomaso and Healy 2007, Gulden et al. 2008, Warwick 2010).



Flowers overtopping buds on *Brassica rapa* L. Photo by P. Slichter.



Clasping leaf base of *Brassica rapa* L. Photo by N. Kramer.

### Ecological Impact

*Impact on community composition, structure, and interactions:* Deer, squirrels, and a variety of insects feed on cultivated birdsrape mustard in Canada (Gulden et al. 2008). Birdsrape mustard contains glucosinolates that can irritate the digestive tracts of animals and are toxic if consumed in large quantities (DiTomaso and Healy 2007). Plants are visited by flies, honeybees,

bumblebees, and solitary bees and may compete with native plants for insect pollinators. Birdrape mustard is associated with a wide variety of nematodes and plant diseases. Birdrape mustard can hybridize with several other non-native mustards, including wild mustard (*Sinapis arvensis*) and dogmustard (*Erucastrum gallicum*) (Gulden et al. 2008). As dead plant materials from birdrape mustard decompose, glucosinolates and myrosinase from the plant tissues form phytotoxic isothiocyanates that suppress the growth of surrounding plants. Living plants also release isothiocyanates into the soil, but to a lesser degree than do decomposing plant tissues (Petersen et al. 2001, Siemens et al. 2002, Gulden et al. 2008).

**Impact on ecosystem processes:** Birdrape mustard colonizes open ground and disturbed areas (DiTomaso and Healy 2007), where it may decrease nutrient availability for native species. This species can form a new forb layer on recently disturbed sites (Carlson pers. obs.). It may prevent the establishment of some native species in areas that are regularly disturbed. In Canada, birdrape mustard populations are generally displaced by other species as successional processes occur, as long as repeated disturbance is prevented (Plant Biotechnology Office 1999). In the Intermountain West, however, birdrape mustard populations establish and persist in naturally open areas (Million pers. obs.). In Southeastern Alaska, birdrape mustard appears to integrate into beach rye coastal communities (AKEPIC 2010).

### **Biology and Invasive Potential**

**Reproductive potential:** Birdrape mustard reproduces by seed only. Seed counts specific to weedy populations are not available, however, plants produced between 19 and 187 fruits per plant in a naturalized population in California. When grown as a crop in Turkey, plants produced 217 to 404 fruits per plant, and each fruit contained 10 or 11 seeds. Seeds remained viable after three years in arable soil seed banks and likely remain viable longer (Gulden et al. 2008). Snow cover greatly increases the survival rates of seeds during winters in Alaska (Sparrow et al. 1990).

**Role of disturbance in establishment:** Birdrape mustard is a colonizer of disturbed habitats, roadsides, and waste areas (DiTomaso and Healy 2007). It requires disturbed ground to germinate (Plant Biotechnology Office 1999). Large volunteer populations of birdrape mustard grow in fields in interior Alaska during years after the plant has been cultivated (Sparrow et al. 1990).

**Potential for long-distance dispersal:** Fruits shatter when mature and disperse seeds a limited distance. Birdrape mustard 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 animal feet or fur, but most seeds do not disperse far from the parent plant

(DiTomaso and Healy 2007).

**Potential to be spread by human activity:** Birdrape mustard is a common crop that is cultivated throughout much of the world. Cultivars include turnip, pakchoi, and canola (DiTomaso and Healy 2007, eFloras 2008, Warwick 2010). Cultivation of this plant has been documented in interior Alaska (Sparrow et al. 1990). Birdrape mustard reverts to its weedy wild type after it escapes from cultivation (DiTomaso and Healy 2007, eFloras 2008). Human dispersal occurs when seeds attach to people, vehicles, machinery, clothing, or shoes (DiTomaso and Healy 2007). Grazing, domesticated animals can spread seeds in their excrement (Gulden et al. 2008).

**Germination requirements:** Information specific to the germination of weedy birdrape mustard is not available. The germination of cultivated varieties declines sharply at temperatures lower than 3°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 (Sparrow et al. 1990, Gulden et al. 2008). Cold stratification is not required for seeds to germinate (USDA 2010).

**Growth requirements:** Birdrape 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 (Gulden et al. 2008). Birdrape mustard can grow in soil that has high calcium carbonate (CaCO<sub>3</sub>) content. It requires large amounts moisture and nutrients. The plant can withstand temperatures as low as -25°C (USDA 2010).

**Congeneric weeds:** Indian mustard (*Brassica juncea*) and rapeseed mustard (*B. napus*) are known to occur as non-native weeds in Alaska (AKEPIC 2010). Black mustard (*B. nigra*), Saharan mustard (*B. tournefortii*), elongated mustard (*B. elongata* ssp. *integrifolia*), and Mediterranean cabbage (*B. fruticulosa*) are problem weeds in the U.S. (DiTomaso and Healy 2007).

### **Legal Listings**

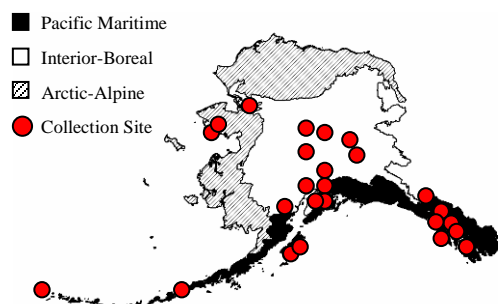
- Has not been declared noxious
- Listed noxious in Alaska
- Listed noxious by other states (all *Brassica* species are listed as noxious weeds in OK and as noxious weed seeds in AL, CT, LA, MA, ME, MI, MS, TX, VA, VT)
- Federal noxious weed
- Listed noxious in Canada or other countries (QC, SK)

### **Distribution and Abundance**

Birdrape mustard commonly grows along roads and railroads in Canada and the U.S. (DiTomaso and Healy 2007, Gulden et al. 2008). It can be a serious weed problem in interior Alaska in fields on which it has been

previously cultivated (Sparrow et al. 1990). Birdsrape mustard is self sustaining outside of arable fields. It is most abundant near urban areas and fields where it has been cultivated (Gulden et al. 2008).

*Native and current distribution:* Birdsrape mustard is native to Eurasia (Warwick 2010). It was introduced to North America as an agricultural crop and as a contaminant in crop seed (Gulden et al. 2008). Its current range includes most of the United States, Canada, Europe, Asia, and Africa. Populations are also present in Mexico, South America, and Australia (Warwick 2010). In northwestern Europe, populations are stable to the middle boreal zone, and populations are present in Iceland (Elven 2007). Birdsrape mustard has been documented growing in fields in interior Alaska after being cultivated, beach rye coastal communities in Southeast Alaska, and disturbed areas throughout the state (Sparrow et al. 1990, AKEPIC 2010).



Distribution of birdsrape mustard in Alaska

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