red clover
Trifolium pratense L.

Synonyms: *Trifolium pratense* L. var. *frigidum* auct. non Gaudin, *T. pratense* L. var. *sativum* (P. Mill.) Schreb.
Other common names: None
Family: Fabaceae

Invasiveness Rank: **53** 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
Red clover is a perennial herb that grows up to 91 cm tall from a taproot. The entire plant is covered with soft hairs. Stems are several and erect or ascending. Leaves are alternate and palmately trifoliate. Leaflets are ovate to elliptic and 1 ¼ to 6 ¼ cm long with V-shaped marks. Stipules are persistent, ovate to lanceolate, conspicuously veined, and up to one inch long. Flower heads are sessile, subtended by pairs of leaves, dense, spherical, and 2 ½ to 4 cm in diameter. Flowers are pink, purple, or red. Pods are egg-shaped and one- or two-seeded (Welsh 1974, Douglas et al. 1999).

Flower head of *Trifolium pratensis* L. subtended by a pair of leaves.

Similar species: Red clover can be confused with eight other *Trifolium* species that are known or suspected to occur as non-native species in Alaska: golden clover (*Trifolium aureum*), field clover (*T. campestre*), suckling clover (*T. dubium*), alsike clover (*T. hybridum*), lupine clover (*T. lupinaster*), smallhead clover (*T. microcephalum*), white clover (*T. repens*), and whitetip clover (*T. variegatum*). Unlike red clover, golden clover, field clover, and suckling clover have yellow flowers. White clover can be distinguished from red clover by its primarily white flowers and creeping stems that root at the nodes. Unlike red clover, alsike clover is glabrous and has flower stalks that are up to 5 cm long. Lupine clover can be distinguished from red clover by the presence of five leaflets per leaf and blue-purple flowers. Unlike red clover, whitetip clover has purple flowers with white tips and flower heads that are less than 1 cm in diameter. Smallhead clover can be distinguished from red clover by the presence of white flowers and flower heads that are less than 1 cm in diameter (Hultén 1968).

Leaf of *Trifolium pratensis* L.

Ecological Impact
Impact on community composition, structure, and interactions: Red clover is capable of creating very dense, high-biomass stands (Gettle et al. 1996a, b, Hofmann and Isselstein 2004), changing the structure of the community, and reducing populations of grass species (Gettle et al. 1996a). Moose and mule deer graze on red clover. The leaves of red clover provide food for

beavers, woodchuck, muskrats, meadow mice, and sharp-tailed grouse. Seeds are eaten by crows, horned lark, ruffed grouse, and sharp-tailed grouse. The flowers are visited by bumblebees and sometimes by introduced honeybees (Graham 1941).

Impact on ecosystem processes: Red clover increases nitrogen levels in soil by fixing atmospheric nitrogen (USDA, NRCS 2006). The alteration of soil conditions may delay the establishment of native species (Rutledge and McLendon 1996) and facilitate the colonization of other exotic species.

Biology and Invasive Potential

Reproductive potential: Red clover reproduces by seeds. Plants produce from 11 to 1,000 seeds per year (Densomore et al. 2001).

Role of disturbance in establishment: Red clover can establish in pastures (Gettle et al. 1996a, b). Soil disturbances and the cutting or grazing of competing vegetation facilitate the establishment of red clover (Guretzky et al. 2004, Hofmann and Isselstein 2004).

Potential for long-distance dispersal: Seeds are large and not well-adapted to long distance dispersal.

Potential to be spread by human activity: Red clover is planted as a forage crop, and its cultivation is documented in Alaska. It is also planted for erosion control. Seeds of red clover are commercially available (Panciera et al. 1990, Sparrow et al. 1993).

Germination requirements: For agricultural purposes, seeds should be inoculated. Seeds germinate in 6 to 12 ½ mm soil depth (USDA, NRCS 2006). The optimal temperature range for germination is from 15°C to 20°C (Brar et al. 1991).

Growth requirements: Red clover is best adapted to medium- and fine-textured, well-drained soils with pH between 6.0 and 7.5. It requires a minimum of 90 frost free days to grow and reproduce successfully (USDA, NRCS 2006). Seedlings of red clover can survive temperatures as low as -8.3°C (Meyer and Badaruddin 2001).

Congeneric weeds: Eight other *Trifolium* species are known or suspected to occur as non-native species in Alaska: golden clover (*Trifolium aureum*), field clover (*T. campestre*), suckling clover (*T. dubium*), alsike clover (*T. hybridum*), lupine clover (*T. lupinaster*), smallhead clover (*T. microcephalum*), white clover (*T. repens*), and whitetip clover (*T. variegatum*) (AKEPIC 2010). No *Trifolium* species are considered noxious weeds in the U.S. or Canada (USDA, NRCS 2006, Invaders 2010).

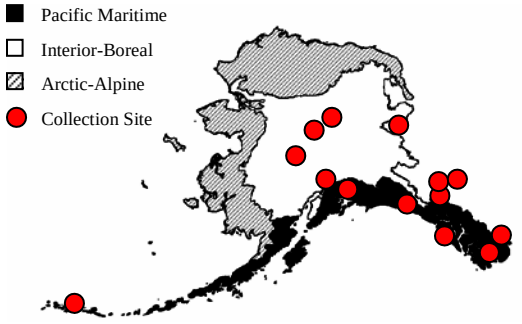
Legal Listings

- ☒ 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

Red clover has been planted as a forage crop in Alaska. It often escapes cultivation and becomes established in roadsides, clearcuts, lawns, gardens, and meadows (Welsh 1974, Rutledge and McLendon 1996).

Native and current distribution: Red clover is native to southeastern Europe and Asia Minor. It has been introduced to Africa and North America (Hultén 1968). Red clover can be found throughout the United States and Canada (USDA, NRCS 2006). It has been documented from the Pacific Maritime and Interior-Boreal ecogeographic regions of Alaska (Hultén 1968, AKEPIC 2010, UAM 2010).



Distribution of red clover in Alaska

Management

Red clover can be controlled by mechanical methods (Densmore et al. 2001). It is resistant to some herbicides (Rutledge and McLendon 1996).

References:

AKEPIC database. Alaska Exotic Plant Information Clearinghouse Database. 2010. Available: http://akweeds.uaa.alaska.edu/

Brar, G.S., J.F. Gomez, B.L. McMichael, A.G. Matches and H.M. Taylor. 1991. Germination of twenty forage legumes as influenced by temperature. Agronomy Journal 83: 173-175.

Densmore, R. V., P. C. McKee, and C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.

Douglas, G.W., D. Meidinger and J. Pojar. 1999. Illustrated flora of British Columbia. V. 3. Ministry of Environment, Lands and Parks Ministry of Forests. British Columbia. 170 p.

eFloras. 2008. Published on the Internet

http://www.efloras.org [accessed 19 October 2010]. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.

Gettle, R.M., J.R. George, K.M. Blanchet, D.R. Buxton and K.J. Moore. 1996a. Frost- seeding legumes into established switchgrass: establishment, density, persistence, and sward composition. Agronomy Journal. 88. 98-103.

Gettle, R.M., J.R. George, K.M. Blanchet, D.R. Buxton and K.J. Moore. 1996b. Frost- seeding legumes into established switchgrass: forage yield and botanical composition of the stratified canopy. Agronomy Journal 88: 555-560.

Graham, E.H. 1941. Legumes for erosion control and wildlife. U.S. Department of Agriculture. Publication No. 412. United States Government Printing Office, Washington.

Guretzky, J.A., K.J. Moore, A.D. Knapp and E.C. Brummer. 2004. Emergence and survival of legumes seeded into pasture varying in landscape position. Crop Science 44: 227-233.

Hofmann, M. and J. Isselstein. 2004. Effects of drought and competition by a ryegrass sward on the seedling growth of a range of grassland species. Journal of Agronomy and Crop Science 190: 277-286.

Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 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/

Meyer, D.W. and M. Badaruddin. 2001. Frost tolerance of ten seedling legume species at four growth stages. Crop Science 41: 1838-1842.

Panciera, M.T., S.D. Sparrow, R.G. Gavlak and W.E. Larson. 1990. Evaluation of forage legume potential at Fairbanks, Point MacKenzie, and Soldotna. Research Progress Report 13. Alaska Agricultural and Forestry Experimental Station, School of Agriculture and Land Resources Management, University of Alaska Fairbanks. 4 p.

Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/plants/explant/index.htm (Version 15DEC98).

Sparrow, S.D., V.L. Cochran and E.B. Sparrow. 1993. Herbage yield and nitrogen accumulation by seven legume crops on acid and neutral soils in a subarctic environment. Canadian Journal of Plant Science 73: 1037-1045.

UAM. 2010. University of Alaska Museum, University of Alaska Fairbanks. Available: http://arctos.database.museum/home.cfm

USDA, NRCS. 2006. The PLANTS Database, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Welsh, S. L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham University Press. 724 pp.