crownvetch
Coronilla varia L.

Synonyms: *Securigera varia* (L.) Lassen
Other common names: crown-vetch, purple crown-vetch, purple crownvetch, trailing crown vetch, varia crownvetch
Family: Fabaceae

Invasiveness Rank: **68** 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
Crownvetch is a perennial legume that grows from extensive rhizomes. Stems are glabrous, spreading, branched above, and 20 to 100 cm tall. Leaves are dark green, alternate, 4 to 16 cm long, and pinnately compound with 7 to 25 leaflets per leaf. Leaflets are oblong to elliptic and 1 to 3 cm long with papery margins. Stipules are oblong and 2 to 5 mm long with blunt tips. Flowers are arranged in axillary umbels in groups of 6 to 25. Peduncles are usually longer than leaves. Calyxes are bell-shaped and 2 to 3 mm long. Corollas are white to purple and 9 to 12 mm long. Pods are slender, four-angled, ascending, segmented, and up to 6 cm long. Pods contain 3 to 8 seeds each. Seeds are cylindrical, 3 to 4 mm long, and 1 to 1.2 mm wide (Gucker 2009, Luneva 2009, Klinkenberg 2010).

Flowers of *Coronilla varia* L.

Similar species: Crownvetch can be easily confused with *Vicia* species. However, the terminal leaflets in crownvetch are replaced by tendrils in *Vicia* species. Crownvetch can be distinguished from other similar legumes in Alaska by a combination of the following characteristics: the presence of terminal leaflets, the absence of tendrils, flowers and leaves that arise from the main stems, and flowers that are arranged in axillary umbels (Hultén 1968, Gucker 2009).

Pinnately compound leaf of *Coronilla varia* L.

Ecological Impact
Impact on community composition, structure, and interactions: Crownvetch can climb over shrubs and outshade underlying vegetation (Tu 2003). Monospecific stands limit the establishment of native trees and shrubs (Gucker 2009) and reduce the diversity

and cover of native plant species (Symstad 2004). However, populations in Alaska appear to cause moderate changes to community structure and have not been observed climbing shrubs or trees (Rasy pers. comm.). Crownvetch produces high quality forage and is consumed by livestock, deer, elk, and rabbits. It provides cover for small mammals and ground-nesting birds (Tu 2003, Gucker 2009). Plants contain nitroglycosides that are toxic to horses when consumed in large quantities; these nitroglycosides may be toxic to other non-ruminants as well (Tu 2003, Campbell 2006, Gucker 2009). Many insects feed on crownvetch. Flowers are insect pollinated (Gucker 2009), and the presence of this species may alter native plant-pollinator interactions.

Impact on ecosystem processes: The extensive rhizomes of crownvetch reduce soil erosion (Losure et al. 2009). Roots are associated with bacteria that fix atmospheric nitrogen; thus, infestations significantly increase the availability of nitrogen in the soil (Tu 2003, Symstad 2004). The addition of nitrogen to the soil favors the establishment or increase of non-native species (Symstad 2004), which may delay natural successional processes (Gucker 2009). Removal of crownvetch does not immediately return nutrient cycling patterns to their pre-invasion states (Symstad 2004).

Biology and Invasive Potential

Reproductive potential: Crownvetch reproduces sexually by seeds and vegetatively by rhizomes (Losure et al. 2009). Seed production is usually low (Gucker 2009), but the number of seeds produced per plant has not been quantified. No viable seeds were found in the soil of crownvetch populations in Iowa (Losure et al. 2009). In other areas, however, seedlings have been observed in controlled sites after several years of monitoring (Tu 2003). Reports of the amount of time for which seeds remain viable vary from just 2 years to 15 years or more (Gucker 2009). While seeds are important for establishing new populations, existing populations primarily expand by extensive vegetative reproduction (Losure et al. 2009).

Role of disturbance in establishment: Crownvetch is intolerant of shade (Tu 2003) and is unlikely to establish under closed canopies. This species establishes best in sparsely vegetated open areas; seedling establishment is low in undisturbed vegetation. Once established, populations of crownvetch can spread to vegetated areas by rhizomes, where they outshade and displace native species (Gucker 2009). However, in Alaska, crownvetch has only occurred in anthropogenically disturbed areas (AKEPIC 2011, Graziano pers. obs.).

Potential for long-distance dispersal: Most seeds land near the parent plant, but some are dispersed long distances in the excrement of deer or other animals (Gucker 2009).

Potential to be spread by human activity: Crownvetch most often escapes into natural areas from sites where it has been intentionally planted (Gucker 2009). It has been planted as an ornamental ground cover and pasture plant and for erosion control, mine reclamation, and soil fertilization (Tu 2003, Losure et al. 2009). It is a contaminant in alfalfa seed (Gucker 2009).

Germination requirements: Many seeds have hard seed coats, and scarification increases germination rates. Seeds germinate best when they are buried near the surface in moist, non-saline soils. The optimal temperature range for germination is 20°C to 25°C. Seedlings that emerge after July are not likely to survive over winter (Gucker 2009).

Growth requirements: Crownvetch grows well in many soil types, but highly compacted soils can limit the growth of this species. It is tolerant of calcareous soils, drought, and partial shade. This species does not grow well in soil with pH less than 5.0, and it may grow best on neutral or alkaline soils (Gucker 2009). It is therefore unlikely to establish and spread on acidic soils in Alaska (Conn pers. obs.). Crownvetch can grow in regions that receive as little as 53 cm or as much as 165 cm of precipitation annually (Gucker 2009).

Congeneric weeds: Mediterranean crownvetch (*Coronilla valentina*) is a non-native shrub that occasionally escapes cultivation in California (DiTomaso and Healy 2007).

Legal Listings

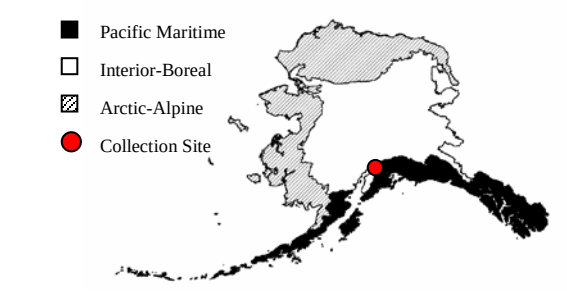
- ☒ Has not been declared noxious
- ☐ Listed noxious in Alaska
- ☐ Listed noxious by other states
- ☐ Federal noxious weed
- ☐ Listed noxious in Canada or other countries

Distribution and Abundance

Crownvetch grows as a weed in agricultural fields in southern Russia (Luneva 2009). In the U.S., it has been intentionally grown as an ornamental ground cover and pasture plant and for erosion control, mine reclamation, and soil fertilization (Tu 2003, Losure et al. 2009). Crownvetch invades stream banks (Gucker 2009). It has invaded native grassland prairies and dunes in the central U.S. (Tu 2003, Gucker 2009). In Kentucky, crownvetch reduces the establishment and flowering of the endangered Short's goldenrod (*Solidago shortii*) (Walck et al. 1999, Gucker 2009).

Native and current distribution: Crownvetch is native to the Mediterranean region of Europe, southwest Asia, and North Africa (Tu 2003). It has been introduced to North America and New Zealand (Tu 2003, Landcare Research 2011). Crownvetch grows in all states of the U.S. except North Dakota. It also grows in much of southern Canada (USDA 2011). This species grows in subarctic regions of coastal Norway as far north as 63.3°N (Vascular Plant Herbarium Trondheim 2011).

Crownvetch has been documented from Anchorage in the Interior-Boreal ecogeographic region of Alaska (AKEPIC 2011).



Distribution of crownvetch in Alaska

Management

Manual removal or covering with opaque material may eradicate small populations as long as all stem, root, and rhizome fragments are removed (Tu 2003, Gucker 2009). Mowing several times per growing season is thought to prevent the spread of crownvetch (Cortés-Burns and Flagstad 2009). Herbicide application is the most effective method for control. Foliar applications of 2, 4-D amine, 2% glyphosate, 2% triclopyr, or 0.25% clopyralid with 0.5% surfactant have proven successful (Tu 2003). Control measures will likely need to be repeated for several years. Controlled sites should be monitored, as plants can regenerate from rhizome fragments and stem fragments that contain at least one node (Tu 2003, Losure et al. 2009).

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