USDA United States Department of Agriculture

Natural Resources Conservation Service Plant Guide

Hairy Vetch

Vicia villosa Roth

Plant Symbol = VIVI

Common Names: Winter vetch, woollypod vetch

Figure 1. Hairy vetch in bloom stage.

Description

General: Hairy vetch (*Vicia villosa Roth*), of the Fabaceae (Leguminosae) family, is an annual or biennial herbaceous legume plant (Bryant and Hughes, 2011). Hairy vetch is a vine-like plant with weak sprawling stems that can grow up to six feet long. Stems and leaves are covered with thick long hair that gives a silvery appearance to the plant in the bloom stage. Leaves are alternate, pinnately compound ended with branched spiral tendrils that hold onto other objects for support. Each compound leaf contains 4-12 pairs of linear to narrow oval-shaped opposite leaflets of approximately 0.75 to 1 inch (19 to 25 mm) in size (Whitson et al., 2000). Hairy vetch has a taproot that can grow up to three feet long. It is a legume plant which means the roots have nodules with symbiotic rhizobia bacteria. Rhizobia bacteria converts atmospheric nitrogen and makes it available (biological nitrogen fixation) for plant uptake (Undersander et al., 2015). Hairy vetch has raceme inflorescence of approximately six inches long and consists of 20-60 flowers arranged as one-sided clusters on the stalk (fig.1). It blooms during the months of May to August. Fruit is a hairy pod in light green color that contains 2 to 8 spherical shaped seeds. Seeds turn black in color when the pods reach maturity (eFloras 2008).

Distribution: Hairy vetch is native to Europe, northern Africa, and West Asia and introduced worldwide including South and North Americas (Van de Wouw et al., 2001; ILDIS, 2015). It was planted in North America as a cover crop and forage for cattle. It is widely distributed in all states (USDA-NRCS, 2023). The Plant Profile on PLANTS Web site provides its current distribution in the USA.

Adaptation

Hairy vetch is commonly grown as a cover crop in most areas of the United States due to its useful traits that include winter hardiness, its survivability in wetter soil, and ability to provide nitrogen to subsequent crops through biological nitrogen fixation in the soil (Clark, 2007; Wilke and Snapp, 2008). Hairy vetch prefers well drained soils with a soil pH range of 6.0 to 7.0. It is typically planted as a cover crop in late summer or early fall after harvesting the summer crop. The optimum germination temperature ranges from 60 to 70° F (15 to 23°C) (Mosjidis and Zhang, 1995). It produces high biomass and provides vegetative cover when the field is fallow. The abundant lateral growth of vines prevents soil erosion and suppress weeds (Mischler et al., 2010; Frasier et al., 2017). Studies demonstrated a mixture of hairy vetch with cereal rye (*Secale cereale* L.) enables the successful adoption of hairy vetch through enhanced overwinter survival, plant diversity for vine climbing, and accelerate flowering (Brainard et al., 2012).

Uses

Cover Crop: Hairy vetch has become an important cover crop that fits into most of the arable cropping systems. Its adoption is highly suggested as an integral part of a nutrient management plan, especially in water quality risk prone landscapes due to nutrient run-off. The higher biomass production ability of hairy vetch helps to remove nutrients from the soil and sequester

them in their biomass. The mulch left after their termination will provide nutrients to subsequent summer cash crops through mineralization (Mirsky et al., 2017; Ackroyd et al., 2019). This mulch also helps to increase soil organic matter, conserve soil moisture, protect soil from erosion by promoting soil aggregate stability, and suppress weeds (Teasdale et al., 2004; Frasier et al., 2017). The planting date of hairy vetch depends on the planting and harvesting dates of the cash crop. It is commonly planted in late summer or early fall.

Green Manure: Hairy vetch forms a symbiotic association with rhizobia bacteria and harbors them in their root nodules. Rhizobia bacteria converts atmospheric nitrogen into forms usable by the plants through biological nitrogen fixation (Miguez and Bollero, 2005). Vetch functions as a green manure by accumulating nutrients in their biomass during the fall-winter season. These nutrients are provided to the succeeding summer cash crop after termination by incorporating nutrients sequestered in the biomass into the soil (Campiglia et al., 2010; Tosti et al., 2012).

Wildlife and Pollinator Food: Hairy vetch serves as a food source for wildlife including bobwhite quail, turkey, and rabbit (Surrency et al., 2001). The flowers attract a wide variety of insects and pollinators, and they help enhance biological diversity of landscapes.

Status

Threatened or Endangered: None

Wetland Indicator: None

Weedy or Invasive: Hairy vetch is not currently a threat to the biological integrity of native prairies. It is considered a weed in turf landscapes and disturbed sites. It can be easily controlled mechanically by pulling up plants before the seed matures or spraying them with a systemic herbicide.

PLANTS Web site (http://plants.usda.gov/) and your state's Department of Natural Resources can provide accurate information on the current status (e.g., threatened or endangered species, state noxious status, and wetland indicator values) for hairy vetch.

Planting Guidelines

Hairy vetch can be seeded either by broadcasting or drilling during early September to mid-October and often determined by the planting and harvesting date of the cash crop. Hairy vetch seed is very viable and able to germinate for 5 years or longer. Generally, seedbed preparation is not required for planting hairy vetch, but fine textured soils such as heavy clay soils require tillage prior to seeding. Inoculate seed with a rhizobium strain (e.g., *Rhizobium leguminosarum biovar viceae*) before planting. Broadcasting requires a higher seeding rate of 20-30 lb/acre compared to the drilling method which requires 15-20 lb/acre. Seeding rate also depends on factors such as time of planting and physiographic conditions of the field. For instance, a higher seeding rate is required for fields with a steep slope gradient. Planting depth depends on the moisture conditions and soil texture. Generally, seed is drilled into a seedbed at ½ to ¾ inch depth. After the seed has been broadcast planted, a light disking or rolling is recommended for good seed-to-soil contact. Delayed planting can lead to a poor stand due to winterkill (Teasdale et al., 2004). Sometimes hairy vetch is planted in combination with small grains such as cereal rye, triticale (×T*riticosecale* Wittm. ex A. Camus [*Secale* × *Triticum*], oats (*Avena sativa* L), wheat (*Triticum aestivum* L.), or barley (*Hordeum vulgare* L.) (Brainard et al., 2012). Small grains grow faster and provide quick cover and protect young hairy vetch seedlings from winterkill. They also provide support for the viny and climbing stems of hairy vetch. Small grains such as wheat and triticale are better suited for hairy vetch in terms of termination compatibility because they do not mature seed prior to termination (Brainard et al., 2011).

Management

Hairy vetch plants can survive a soil pH range of 5 to 7.5, but the optimum soil pH range is 6.0 to 7.0. Use a soil test to determine pH and follow the best management practice for correcting pH for optimum plant health. As an integral part of a landowner's nutrient management plan, hairy vetch is planted as a catch crop to hold excess nutrients in the soil and provide vegetative cover for delivering soil health benefits. It performs well in conventional and no-till planted crop rotations. Generally, it is not a common practice to apply fertilizer unless they are mixed with small grains. Hairy vetch doesn't require nitrogen fertilizer, but it requires high phosphorus, potassium, and sulfur contents as other legumes (Mosjidis and Zhang, 1995). It is more drought tolerant and requires relatively less soil moisture to establish in the fall and resume its vegetative growth in spring (Clark, 2007).

Burndown herbicides such as glyphosate, 2,4-D or dicamba, chlopyralid, paraquat, atrazine or mixes are used to terminate hairy vetch. The timing of termination depends on the planting time of the subsequent cash crop. Ten to fourteen days are recommended before planting the summer cash crop. Chemically terminating cover crops is a popular practice in no-till

cropping systems (Teasdale et al., 2007; Yenish et al., 1996). Other options for cover crop termination include roller crimpers, mowers, flail choppers, and flame weeders (Vincent-Caboud et al. 2019). Roller-crimpers are becoming a more popular mechanical option to terminate cover crops. Roller-crimpers have a hollow drum with blunt blades that crushes vascular tissue and places the residue flat on the soil surface (Vincent-Caboud et al. 2019). Hairy vetch can be successfully terminated by roller-crimping at late bloom stage (Hoffman et al., 1993).

Pests and Potential Problems

Hairy vetch may attract pests such as soybean cyst nematodes (*Heterodera glycines*) and root-knot nematodes (*Meliodogyne* spp.). The harmful nematode infestations can be controlled by either growing another cover crop type or selecting plant nematode-resistant cash crops (House and Alzugaray,1989). Seed yield of hairy vetch can be severely reduced by the attack of pests such as vetch weevil or vetch bruchid (Sarrantonio,1994). Hairy vetch also attracts several kinds of beneficial predators including lady beetles, flower bugs (*Orius insidiosus*), pirate bugs (*Orius tristicolor*) and big-eyed bugs (*Geocaris* spp.; Bugg et al.,1990). It can get diseases such as anthracnose, leaf spot, downy mildew, stem and root rots, and rust.

Environmental Concerns

Hairy vetch plants provide several agronomic benefits and has not been recorded to cause any environmental problems. Few cases of slight toxicity were reported in cattle and horses over the years due to grazing on vetch plants. Seeds are the toxic component of vetch plants which contains several anti-nutritional compounds such as cyanogenic glycosides and a diglucoside (USDA, 2002).

Control

Despite several agronomic benefits of hairy vetch, it can become a problematic weed in either subsequent crops or in open spaces. Its weediness can be attributed to self-reseeding capacity, ability to colonize rapidly in open spaces, and the persistence of its hard seed in the soil for one or more seasons (Moschler et al., 1967; Clark, 2007). Hairy vetch seed can persist in the soil for an extended time, germinate at unwanted times and in unwanted places, causing interference with the performance of cash crops. Harvest hairy vetch prior to full seed maturity and use appropriate harvesting equipment to avoid scattering the seed (Mirsky et al., 2011; Mirsky et al., 2017). Mechanical weed control methods such as close mowing (e.g., high-speed flail mower) can be done at the peak flowering stage to kill hairy vetch plants. Several systemic herbicides are also available for killing hairy vetch. Consult your local extension weed specialist for herbicide recommendations.

Seeds and Plant Production

Hairy vetch is indeterminate in flowering and seed maturity. Fall planted seed will generally produce a seed crop by mid to late May. Seed is typically harvested with a conventional combine when the lower half of the pods are fully ripe and upper pods are fully formed. Plants can also be cut, windrowed, and combined to avoid seed shattering. Hairy vetch seeds may remain viable for five years if they are stored in a temperature and humidity-controlled environment.

Cultivars, Improved, and Selected Materials (and area of origin)

USDA developed early flowering cultivars including ‘Purple Bounty’ and ‘Purple Prosperity’ (Comis, 2008). Cultivars such as ‘Auburn’, ‘Oregon’, and ‘Lana’ perform well in warm winter regions (Sjoerd et al., 2010). ‘Oregon’ is a later-flowering cultivar. ‘Madison’ variety is known for its better winter survival (Sjoerd et al., 2010). Auburn University released ‘AU Early Cover’ and ‘AU Merit’ enable landowners to plant cash crops at an earlier date (Teasdale et al., 2004; Mosjidis, 2002). ‘Vinter’ is known for superior winter survival and heavy biomass production during the spring (Sheaffer and Ehlke, 2022). ‘Americus’ was released 1993 by the USDA-NRCS Jimmy Carter Plant Materials Center as a winter legume for conservation tillage systems in the Southeast.

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