

SAINFOIN

Onobrychis viciifolia Scop.

Plant Symbol = ONVI

Contributed by: Aberdeen Plant Materials Center
and NRCS Idaho State Office



Figure 1. Mature sainfoin in flower.

Alternate Names

Onobrychis sativa Lam., *Onobrychis viciaefolia* Scop., *Hedysarum onobrychis* L., holy clover

Uses

Hay/pasture: Sainfoin is an introduced non-bloat causing legume which can be used as hay, or grazed in pastures alone or in a grass-legume mix. It is often grown as a mix with Russian wildrye or crested wheatgrass or Siberian wheatgrass. It is also commonly included in a mixed blend of sainfoin, meadow brome and birdsfoot trefoil and/or orchardgrass.

Sainfoin is highly palatable to sheep and cattle and is preferred over alfalfa. Long-term sainfoin dry matter

yields range from around 20 to 30% less than those of alfalfa. First cut hay yields are often greater than those for alfalfa but later cuttings commonly yield less than alfalfa (Baldrige and Lohmiller 1990). Sainfoin is well suited to haying due to its upright growth habit. Regrowth is poor however and it is recommended to be cut once/season at the half- to full-bloom stage. Protein quality for sainfoin is around 68 compared to 71 for alfalfa out of a possible score of 100 for an "ideal protein" (Kaldy et al 1979). Sainfoin is also not susceptible to alfalfa weevil.

Rangeland: Sainfoin is preferred over alfalfa by mule deer and other wildlife. It matures earlier in the spring than alfalfa and stays green during the summer (Stevens and Monsen 2004). Its large, deep tap root also makes this species fairly drought tolerant. High protein, high palatability and its non-bloat characteristic make it a good choice for range improvement for livestock or wildlife. The foliage is readily eaten by elk, deer and sage grouse, and the seed is eaten by many other birds and rodents.

Pollinators: Sainfoin blossoms produce copious amounts of nectar and are highly attractive to pollinating insects, particularly honey bees (Pellett 1947) in May through July (Ogle et al 2007). Pollen is also produced in abundance. Honey made from sainfoin is reported to be of the finest quality (Dubbs 1967).

Status

Consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, state noxious status, and wetland indicator values).

Description

General: Fabaceae (Legume family). Sainfoin is a deep-rooted perennial legume arising from a branching root crown. Flowers are showy and pink, white or purple and tightly arranged in a compact raceme with 20 to 50 flowers per head (figure 1). Leaves are odd-pinnately compound with 11 to 21 leaflets. Sainfoin typically grows taller than alfalfa reaching 8 to 36 inches tall. The seeding unit is a single-seeded pod (figure 2). Seeds are large with only 18,500 (pre-husked) seeds per pound (USDA 2008). $2n=28$ (Welsh et al 2003).

Distribution: Sainfoin has been used as a forage legume for hundreds of years in Europe and Asia and

was introduced to North America around 1900. It has since been widely used in the Intermountain and Rocky Mountain regions in hay plantings and reclamation plantings (Welsh et al 2003).

For current distribution, consult the Plant Profile page for this species on the PLANTS Web site.



Figure 2. Sainfoin fruit (pod) each contains a single seed. Picture courtesy of Tracey Slotta @ USDA-NRCS PLANTS Database (USDA 2008).

Habitat: Sainfoin can be found in western rangeland sites in 14 inch and greater precipitation areas. It is often associated with big sagebrush and mountain shrub communities in well-drained calcareous soils.

Adaptation: Early varieties from Western Europe did not perform well in the western United States. The plants were poorly adapted and had low forage yields. Newer varieties from Russia and Turkey however are better suited to western climates and perform similarly to alfalfa. (Baldrige and Lohmiller 1990).

Sainfoin is best adapted to soils at least 18 inches deep with a pH of 6.6 to 8.0 (USDA 2008). It is best adapted to sites receiving at least 14 inches mean annual precipitation (MAP). Rangeland plantings have been successful in sagebrush, pinyon-juniper and mountain shrub areas in deep, calcium based soils (Stevens and Monsen 2004). Sainfoin has low salt tolerance.

Sainfoin does not do well in sites with high water tables or wet soils.

Establishment

Sainfoin can be planted in the spring or fall. Seeding depth should be between 0.25 and 0.75 inches. All seed should be inoculated with the appropriate

rhizobium prior to planting. Full seeding rate for pasture plantings is 34 lb/ac. Seed 2 to 5 lb/ac when used as a component of a rangeland mix. Sainfoin should not be mixed with aggressive grass species; consider alternate row planting (Ogle et al 2008).

Management

Do not graze for two seasons after planting. Stands should be allowed to naturally reseed every 2 to 3 years for reestablishment. Stands will persist 3 to 6 years under irrigation but will last longer if root and crown rot diseases are controlled. Some plantings in Montana have survived for over 60 years and are still used for pasture (Dubbs 1967). Sainfoin should not be planted next to shelterbelts because trees and shrubs will suffer from browsing by deer and elk (Stannard 2002).

Pests and Potential Problems

Although sainfoin is resistant to many alfalfa related pests, long-term stand survival is limited in irrigated or wet conditions due to root and crown rot diseases (Morrill et al 1998). These root pathogens enter the plant through scars created by root-feeding insects, especially weevils. Control of these insects decreases tap root disease occurrence and increases the longevity of the stand.

Use of sainfoin has been limited largely due to high establishment costs. The large seed, high seeding rate and high seed prices often reduce interest in using this species.

Environmental Concerns

Sainfoin has been widely used in reclamation and range enhancement seedings throughout the Great Plains, Rocky Mountains and Intermountain West and has become naturalized in some locations. It is not considered weedy or invasive, but may spread under ideal conditions via seed.

Seeds and Plant Production

The first seed crop can be harvested the second year after establishment. Seed yields can be as high as 1000 lb/acre under irrigated conditions. Under dryland conditions, seed yields are rarely more than 200 pounds per acre.

Seed should be harvested when seed moisture is <40% or when seed is beginning to shatter. Seed shatter can be a problem with this species and seed can be harvested by swathing followed by combining after 2 to 5 days of drying.

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

New types of sainfoin have been developed in the U.S. and in Canada. Sainfoin breeding programs have selected for increased disease resistance, improved nodulation and nitrogen fixation, and increased dryland (single-cut) and irrigated (multi-cut) yields.

'*Eski*' was released by Montana State University in 1964 and is the most common sainfoin used in western rangelands. It has performed well in pinyon-juniper, mountain big sagebrush, and mountain brush areas. Eski was selected from seed from Eskisehire, Turkey that survived severe winters at Sidney, Montana. The seed increased from these hardy plants was designated as breeder seed. Eski is recommended for dryland pasture hay in areas receiving at least 14 inches of precipitation or on irrigated land. Eski yields only one to two cuttings per season.

'*Melrose*' was released in Canada in 1971 by the Canada Department of Agriculture in Lethbridge. Melrose showed higher forage yields, seed yields and greater winter hardiness than Eski (Cooke et al 1971). Melrose is recommended for dryland hay or pasture and irrigated hay production in the Prairie Province region. Breeder seed is maintained by the Canada Department of Agriculture Research Stations at Melfort and Saskatoon, Saskatchewan and Lethbridge, Alberta, Canada.

'*Nova*' was released at Lethbridge by Agriculture Canada in 1980 from a Russian seed source. Nova is more vigorous and taller than Melrose, Eski and Remont. Regrowth is comparable to Melrose and Eski but slower than Remont (Hanna 1981). Nova has greater forage yields and winter hardiness than other varieties. Certified seed is maintained by SeCan Association, Ottawa, Ontario, Canada.

'*Remont*' was released by the Montana Agricultural Experiment Station in 1971, and was developed from

plants from Iran exhibiting rapid regrowth. Remont is recommended for two-or-three-cutting areas for hay and pasture. Remont and Eski produce similar annual yields, but Remont has higher yield potential under irrigation and in areas with a longer growing season. Remont begins growth earlier in the spring than Eski and regrows more rapidly after cutting than other varieties.

'*Renumex*' is a New Mexico State University release made in 1979 from plants selected from Remont. The variety was developed by the New Mexico Agricultural Experiment Station in 1979 for rapid regrowth under the hot, dry conditions of the Southwest.

'*Shoshone*' was developed and released for a high tolerance to northern root-knot nematode when compared to 'Remont'. Shoshone was jointly released in 2006 by the College of Agriculture, Agricultural Experiment Stations at the University of Wyoming, Montana State University and the USDA-NRCS. Foundation seed is maintained by the University of Wyoming, Seed Certification Service in Powell, Wyoming.

'*Delaney*' or UWRD is soon to be jointly released by the Montana Agricultural Experiment Station and Wyoming Agricultural Experiment Station. Delaney was developed from surviving plants of a 25 year old planting near Laramie, Wyoming. The original plants in that field included plants of Eski, Remont and multiple experimental accessions (precise percentages of each line are unknown). Delaney was developed to be a multiple-cut sainfoin with significantly higher yields than Shoshone, Remont and Eski. Third cut yields were also higher than those of Remont, Eski and Shoshone. Foundation seed will be maintained by the Foundation Seed Programs of Montana and Wyoming.

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