

Montana Guide

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Agriculture

Sainfoin

by

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Sainfoin (*Onobrychis viciifolia* Scop.) is a deep-rooted, perennial legume widely adapted throughout the Rocky Mountain region. The French word for sainfoin, “esparcette,” means wholesome hay. Sainfoin is an excellent, non-bloat legume useful as pasture or a hay crop.

Sainfoin was grown in Europe and Asia for hundreds of years and in Montana prior to 1900, but did not attract attention as a forage crop in Montana until 1964, when the variety ‘Eski’ was released by the Montana Agricultural Experiment Station.

Sainfoin grows to a height of 3 feet or more and is somewhat taller than alfalfa. The stems appear to be coarse, but are soft and readily eaten by all classes of livestock. Like vetches, sainfoin plants have a large number of leaflets per leaf. The rose-pink flowers are borne on a spike-like head called a raceme. The large, brown seeds are borne singly in pods that remain intact during seed harvest and cleaning. Sainfoin seed is larger than that of most common forage legumes. A pound of dehulled sainfoin contains about 32,400 seeds compared to 220,000 seeds in a pound of alfalfa.

Establishment

Uniform, firm seedbeds are essential for good stand establishment. Sainfoin is best suited to soils in the neutral to slightly alkaline range (pH 7.0 to 8.0). Soils should be tested and amended with appropriate levels of phosphorus and potassium prior to planting. The large, hulled sainfoin seeds require heavier seeding rates than small-seeded legumes such as alfalfa, but can be planted with an ordinary grain drill. Seeding

rates for pure stands should be 34 pounds of pure live seed per acre (about 23 seeds per square foot) on dryland, and 45 pounds (about 31 seeds per square foot) for irrigated land. For mixtures, sainfoin and grass should be planted in alternate rows. Sainfoin-grass mixtures generally have higher yields and quality than grasses alone. Once established, sainfoin maintains itself well in mixed vegetation in dryland areas.

Seed must be inoculated with sainfoin-specific Rhizobium. The inoculants for alfalfa and other legumes are not effective for sainfoin.

Yield reductions, poor stand establishment and short persistence have all been reported to limit sainfoin establishment and production. The best stands are obtained by planting in a firm seedbed, early in the spring, at a depth of 1/2 to 3/4 inch. Despite its large seed, sainfoin does not emerge from deep planting. Drills with depth bands or other means to control the planting depth will give the best results.

Although vigorous, the seedlings do not compete well with cereal grains. Therefore, sainfoin should not be planted with a small grain companion crop. Weed competition can be reduced in the seedling year by mowing, grazing or with herbicides.

Varieties

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 yields.

‘Eski’, ‘Melrose’, ‘Remont’, ‘Nova’, and ‘Renumex’ are the primary sainfoin varieties grown in the U.S. and Canada. Eski was selected from plants grown from seed obtained from Eskisehire, Turkey,

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that survived 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 13 inches of precipitation and irrigated land that yields only one to two cuttings.

Remont, released by the Montana Agricultural Experiment Station in 1971, was developed from sainfoin plants from Iran that exhibited 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 long growing season. Remont begins growth earlier in the spring than Eski and regrows more rapidly after cutting than other varieties.

Melrose was released by Agriculture Canada in 1972 from a Russian introduction. It is a winter-hardy variety, but like Eski does not have rapid regrowth.

Nova was released at Lethbridge by Agriculture Canada in 1980 from a Russian seed source. This variety has not been tested in Montana.

Renumex is a rapid-regrowth type 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.

Production

Under many production environments, sainfoin yields as well as or better than alfalfa. Yields generally decline in the fourth or fifth season due to root and crown diseases under irrigation. However, several fields in Montana have persisted for over 20 years.

Crown and root rots that may severely shorten the longevity of stands are the most limiting factor for sainfoin production. Three bacterial and two fungal pathogens are responsible for reduced stands and yields in Montana. The pathogens infect the roots of seedlings, and diseased plants show crown and root discoloration. Research studies indicate that more than half of the plants are infected within six months of planting. Crown rots develop as the pathogens move down the hollow stems into the crown.

Table 1. Average hay yields of sainfoin grown by the Montana Agricultural Experiment Station (1975-1983).

Variety	Irrigated Locations			Dryland Locations		
	Bozeman	Huntley	Kalispell	Kalispell	Moccasin	Sidney
	Tons of Dry Matter/Acre					
Eski	3.49	4.26	4.44	3.48	1.28	1.72
Melrose	3.42	4.01	4.23	3.67	1.54	1.53
Remont	2.95	4.20	4.41	3.37	0.85	1.29

Insects have not been a major problem in sainfoin production. The major pests are a weevil that feeds on the root nodules and lygus bugs that damage seed pods. Severe damage to buds caused by heavy lygus infestations may result in the loss of a seed crop.

Sainfoin has excellent nutritive value. It retains its leaves longer than alfalfa and can be harvested when the plants are in the 50 percent bloom stage without loss in nutritive value. Sainfoin is higher in carbohydrates than alfalfa, but has less crude protein, crude fiber and ash. Sainfoin hay is equal to alfalfa in feed efficiency and digestibility for beef cattle.

MSU feeding trials demonstrated that ground sainfoin is equivalent to alfalfa in swine diets. Pasture studies showed that cattle and sheep prefer sainfoin to other legumes. Sainfoin hay yields are summarized in Table 1.

Sainfoin is an ideal pasture crop because it does not cause bloat and is readily consumed by livestock. Varieties resistant to crown and root-rot diseases would increase longevity of stands to make sainfoin a highly important legume for irrigated pastures. Sainfoin now is recommended only for short-term rotations in pure stands or for planting in grass-legume mixtures (along with alfalfa, birdsfoot trefoil, meadow brome grass or orchardgrass) that persist after the sainfoin declines.

References:

- Baldrige, D.E. and R.G. Lohmiller. 1993. Montana Interagency Handbook. Montana State University Extension Service. EB 69. 337 pp.
- Ditterline, R.L. and C.S. Cooper. 1975. Fifteen years with sainfoin. Montana Agricultural Experiment Station Bulletin 681.