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'Shoshone' Sainfoin



Figure 1. Seed field of Shoshone sainfoin at the Archer Substation at Huntley, WY. Note the pink rose-colored flowers.

Sainfoin, *Onobrychis viciifolia* Scop. (holy grass, holy hay), is a member of the Fabaceae (Leguminosae) family. It is a perennial, non-bloating, forage legume native to regions around the Mediterranean, Black and Caspian Seas and north into Russia. It has been cultivated in Europe as a forage crop for at least 450 years. It was introduced from Turkey into the northern Great Plains of the U.S. in Montana and North Dakota in the 1960s. From these early introductions, Montana State University released the varieties 'Eski' in 1964 and 'Remont' in 1971. Both have and still are being grown successfully in Montana and other western states.

Sainfoin is an extremely palatable and nutritious forage crop with feed value similar to alfalfa. However, it is preferred over other forage species by cattle, sheep and deer. However, unlike alfalfa, sainfoin can be grazed without fear of bloat in ruminant animals (Figure 2). It matures much faster than alfalfa providing early spring forage.



Figure 2. Lambs grazing on sainfoin in a mixed legume-grass pasture.

Both can be cut and baled at 10% bloom. Sainfoin can also be used for wildlife habitat restoration, for wildlife enhancement as a component with other forage species

or as a legume component under the Conservation Reserve Program and in mine land reclamation. Due to sainfoin's extreme palatability and current limited acreage, deer fencing was required at several test sites in Wyoming and Montana in order to obtain seed and forage production data. Beekeepers indicate honey yields with sainfoin are much greater than from alfalfa.

Development of 'Shoshone'

'Shoshone' sainfoin was developed from the intercross of surviving plants remaining in an irrigated sainfoin variety trial infested with the Northern Root-knot nematode (*Meloidogyne hapla*) in southeastern Wyoming. The Northern Root-knot nematode was first described on sainfoin in the U.S. from Wyoming in 1986. It was previously known to be widespread on other dicot crop species, including alfalfa, throughout the middle and northern tier of states.

In greenhouse tests Shoshone expressed a higher level of tolerance to this root parasite than 'Remont' sainfoin by having greater shoot and root weight, as well as lower plant mortality. A search for resistance to this nematode in other sainfoin varieties and plant introductions was unsuccessful.

Shoshone was evaluated in Wyoming and Montana for forage production from 1996 through 2003 under both dryland and irrigated conditions. Average two cut yields adjusted to 12% moisture were 4.37 T/A when irrigated and 1.21 T/A when grown under dryland conditions. Under irrigation, Shoshone intercropped in alternate rows with 'Manska' intermediate wheatgrass yielded 3.97 T/A and yielded 0.95 T/A under dryland conditions when intercropped with 'Bozoisky' Select Russian wildrye grass. It had the second highest four-year forage yield (5.49 T/A, 12% moisture) of 16 forage legumes including alfalfa, birdsfoot trefoil and cicer milkvetch grown under irrigation in a one- or two-cut regime at Bozeman, Montana.

Shoshone was jointly released in 2005 by the College of Agriculture, Agricultural Experiment Stations at the University of Wyoming and Montana State University, and by the United States Department of Agriculture, Natural Resources Conservation Service at Bridger, MT. The variety was named 'Shoshone' in honor of Chief Washakie of the Eastern Shoshone Tribe. Shoshone has recently been registered in Crop Science (Reg. no. CV-258, PI 639688).

Attributes and Uses of Shoshone Sainfoin

- Excellent forage crop for haying or grazing.
- Does not cause bloat in ruminant animals.
- Good drought tolerance and winterhardiness.
- Resistant to the alfalfa weevil.
- Tolerance to the Northern root-knot nematode.
- Resistant to the Alfalfa Stem Nematode.
- Legume component in plantings for the Conservation Reserve Program.
- Legume component in seed mixtures used for wildlife habitat restoration and as a mixture in mine land reclamation.
- Excellent honey produced in seed production fields.
- Non-invasive species.
- Excellent for horses on small acreages.

Breeder class seed of Shoshone was produced at the UW Archer, Wyoming Research and Extension Center. Foundation and registered class seed were produced at the Powell R&E Center. Certified seed of Shoshone is now available from the following companies and growers:

Allied Seed, Worland, WY	877-574-7150
Brian Duyck, Powell, WY	307-754-8150
Bruce Seed, Townsend, MT	406-266-3103
Cedera Seed, Swan Valley, ID	208-483-3683
Jerry Habets, Conrad, MT	406-278-3477
Rick Rice, Powell, WY	307-754-2403
Sandy Snyder, Powell, WY	307-754-0220
Vance Vanderploeg, Greybull, WY	307-272-9259

Establishing Sainfoin

It is preferable to establish sainfoin following a grassy crop such as small grain, corn or forage grass and when broadleaf weeds are under control. Amount of sainfoin seed to plant (seeding rate) depends on whether it is to be irrigated or grown under dryland conditions, and whether it is to be a pure stand or planted in a mixture, usually with perennial grass. Also, the actual seedling rate is based on seed purity (pure live seed = PLS) and the seed germination rate of the seed lot. Although pure

live seed rates are given, you will need to adjust, or increase the amount of seed based on purity and germination. To determine PLS, use seed bag label information, if current. If for example, purity is 90% and germination rate is 80%, then multiply the two and multiply by 100. This gives a PLS of 72%. Then divide the recommended seeding rate by this percentage, i.e., 25 lb recommended seeding rate, divided by .72, yielding 35 lb/acre for this particular seed lot.

Calculations for seeding rates are based on 123,000 seeds/lb. Sainfoin requires a different strain of Rhizobium inoculant than alfalfa and is available commercially from Nitragin® Company, <http://www.nitragin.com>. Although sainfoin seed is usually sold and planted in the pods, it can be shelled prior to planting (Figure 3).



Figure 3. Seed of 'Shoshone' sainfoin showing a single shelled seed and several unshelled seeds. (Photo by Raina Spence)

Sainfoin under irrigation, as in a solid stand, should be planted in 7- to 12-inch wide rows at 25-30 lb per acre (10.5-12.6 seeds/linear row foot). If a grass or other

associated species is seeded as well, the sainfoin seed rate should be reduced one-third, 17 to 20 lb/acre (7-9 seeds/linear row foot).

Irrigation of Sainfoin versus Alfalfa

Sainfoin should receive less water than alfalfa since it makes most of its growth in the spring when temperatures are cooler.

Sainfoin Grown Under Dryland. When sainfoin is grown under dryland conditions as a solid stand, it should be planted in 21- to 30-inch rows at 15-20 lb per acre (6-8 seeds/linear row foot). If a sainfoin-grass mixture is planted, cut the sainfoin seeding rate to 10-12 lb/acre and plant sainfoin and grass in alternate rows, for example, 14-inch row spacing. Separating legume and grass is even more important in dryland seedings because of moisture competition. Alternatively, sainfoin can be planted in 14- to 21-inch wide rows, followed by seeding grass in a perpendicular direction. This is an advantage in controlling wind erosion, particularly on erosive soils and when planting a bunch, rather than a sod-forming grass.

The lower limit for sainfoin production in Wyoming and surrounding states seems to be about 13 inches average precipitation per year; however, distribution of rainfall is more important than averages. Several consecutive years of below-normal rainfall can cause a decline in sainfoin stands.

Controlling Weeds

It is important to make sure weeds are under control prior to planting sainfoin. This is especially true under irrigation, as well as, in sainfoin/grass plantings. Before using a herbicide, consult your extension weed specialist for those labeled for use on sainfoin.

References

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