

Some pertinent facts:

1. *Sainfoin is not a new crop. Varieties were released by MSU in the 1960's and 1970's. It never took off because of the high required seeding rates (\$60 to \$130 per acre).*
2. *It is only suited to well-drained soils with a pH over 7. It is more sensitive to acid soils and saline conditions than alfalfa. It will not persist very long in heavy soils with flood irrigation.*
3. *Sainfoin has about the same establishment vigor as alfalfa. Due to the seed costs, you do not want to cut corners on interseeding projects into existing stands.*
4. *Recent yields of the regrowth-type varieties are competitive with alfalfa, but stands do not persist as long. Sainfoin is susceptible to several root and crown pathogens that limit its longevity.*
5. *Similar to other perennial legumes, sainfoin that is routinely hayed or grazed has shorter longevity than if it were grown to full maturity and cut for seed.*

Sainfoin Making a Comeback in 2006

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There is a lot of new interest this winter about sainfoin for hay or pasture. Sainfoin (*Onobrychis viciifolia* Scop.) is an ancient crop originating in Asia and first domesticated in Europe several centuries ago. It is a forage legume adapted to similar regions and uses as alfalfa, however its main advantage is its bloat-free characteristic. A significant amount of sainfoin research and variety development occurred in the Western U.S. and Canada during the 1970's, but the crop was never widely grown. Sainfoin is best adapted to well-drained, calcareous soils in the West, and under these conditions it is competitive with alfalfa in its production and longevity. Under irrigation, high rainfall or in humid areas, the longevity of sainfoin is not equivalent to alfalfa, primarily due to root and crown rot diseases.

Sainfoin is well-adapted to the hay-stockpiling system used by ranchers in Montana and the northern Great Plains. In this system, first-cut hay is harvested, and the resulting aftermath is used for fall grazing. Sainfoin at mid-bloom retains its leaves and nutrient content better than other forage legumes, and first-cut yields of sainfoin are consistently higher than those of alfalfa. Sainfoin is bloat-free due to its levels of condensed tannins, however it is highly palatable to livestock and wildlife. The current interest in sainfoin appears to be due to two factors:

1) Ranchers looking for high-quality pasture mixes to reduce haying. Since the 1970's several producers have used the bloat-free "Cooper Mix" for hay-stockpiling or direct grazing. This seed mix is based on sainfoin, with varying proportions of meadow

bromegrass, birdsfoot trefoil and/or orchardgrass developed by former ARS scientist C.S. Cooper.

2) Current inexpensive sources of seed that are available that are about 50% of historic prices. The major limitation to the widespread use of sainfoin is its large seed size and resulting high seeding rates and costs. Specifically, sainfoin is planted for pure stands at 30 to 35 pounds of pure live seed (PLS) per acre (23 seeds per square foot) and 40 to 45 pounds PLS on irrigated ground (30 seeds per square foot). At past prices ranging from \$2 to \$3 per pound, this required \$60 to \$135 of seed per acre for a pure stand!

Sainfoin's adaptability and production have been documented in Montana for the past 40 years, and we are encouraging producers to consider it for new hay or pasture plantings. In designed pasture mixes such as the Cooper Mix where only 20 to 25 pounds are used, it is more economical than ever. Below are some resources to help producers with their decisions:

Seed Sources:

Most sainfoin varieties tested are suitable for Montana production, however the multiple-cut varieties (such as 'Remont') yield more under irrigation. Some sources of 'Melrose' and 'Eski' are priced around \$1.20 per pound for the first time this year. One seed grower in Conrad, MT is retailing a product called "Rocky Mountain Remont" for \$1.25 per pound. Use any of these varieties, and be sure the seed has a recent germination and purity test, and is properly inoculated before planting.

Growing sainfoin (our MSU Extension MontGuide):

<http://www.montana.edu/wwwpb/pubs/mt9321.pdf>

Seed inoculation:

Sainfoin requires a specific *Rhizobium* inoculant for nodulation, and it is not found naturally in many Montana soils. Buy pre-inoculated seed or inoculant to treat before planting.

<http://animalrangeextension.montana.edu/articles/forage/General/LegumeInoculationMTGuide.pdf>

Some recent performance data in MAES trials (attached tables):

Performance data in irrigated trials are shown; similar trials under dryland at Moccasin had low yields (< 0.8 tons per acre) during drought years in 1999 through 2002. In the irrigated trials, note that some sainfoin lines statistically out-yielded alfalfa.

Variety performance data is available at:

http://animalrangeextension.montana.edu/articles/forage/Species/2004_MiscLegume_Summary.pdf

<http://ag.montana.edu/nwarc/forages/forageone.htm>

Table 1. 2000 Forage Legume Trial, Bozeman, MT (est. 4/21/2000)

Managed for ideal production under irrigation, and harvested on a 3-cut alfalfa schedule.

	Forage Yield, tons DM/A						
	2000	2001	2002	C1	C2	2003	2000-2003
	2-cut Total	3-cut Total	3-cut Total	6/3/2003	8/11/2003	2-cut Total	Total
exp. RDY sainfoin	4.22	8.77	5.62	2.17	2.19	4.36	22.96
Shoshone sainfoin	4.17	8.24	4.86	2.09	2.34	4.43	21.70
Remont sainfoin	3.24	7.88	4.70	2.06	2.27	4.32	20.15
Nova sainfoin	4.15	7.38	4.11	1.66	2.69	4.35	19.99
Eski sainfoin	3.22	7.82	4.87	1.84	1.86	3.70	19.61
Shaw alfalfa	2.82	6.60	5.45	1.68	2.57	4.25	19.11
Forager alfalfa	2.98	6.50	5.55	1.81	2.24	4.05	19.08
Ladak 65 alfalfa	3.02	6.48	5.04	1.93	2.33	4.26	18.80
Empire birdsfoot trefoil	2.29	4.27	3.47	0.64	2.59	3.23	13.24
exp. L2 Syn-1 birdsfoot trefoil	2.37	3.93	3.48	0.76	2.28	3.04	12.82
Tretana birdsfoot trefoil	2.39	3.70	3.64	0.70	2.19	2.89	12.62
Viking birdsfoot trefoil	2.08	4.06	3.70	0.68	2.04	2.73	12.57
Leo birdsfoot trefoil	2.24	3.87	2.67	0.76	1.72	2.48	11.26
Lutana cicer milkvetch	0.98	3.07	2.63	1.33	1.77	3.10	9.78
Windsor cicer milkvetch	0.75	3.07	2.50	1.23	1.60	2.83	9.15
Monarch cicer milkvetch	0.43	2.44	2.52	1.29	1.59	2.88	8.28

Values in **bold** within a column are not statistically different from the highest yield ($P = 0.05$).

Mean	2.58	5.50	4.05	1.42	2.14	3.56	15.70
Isd (0.05)	0.37	0.56	0.63	0.22	0.56	0.66	1.64
CV%	10.1	7.0	10.8	11.0	18.1	12.9	7.3

Species Means

<i>Sainfoin mean</i>	3.80	8.02	4.83	1.97	2.27	4.23	20.88
<i>Alfalfa mean</i>	2.94	6.53	5.35	1.81	2.38	4.19	19.00
<i>Birdsfoot trefoil mean</i>	2.27	3.96	3.39	0.71	2.16	2.87	12.50
<i>Cicer milkvetch mean</i>	0.72	2.86	2.55	1.28	1.66	2.94	9.07

Table 2. 1999 Forage Legume Trial at Kalispell, MT (est. 4/99).

Managed for ideal production under irrigation, and harvested on a 3-cut alfalfa schedule.

	Forage Yield, tons DM/A				1999-2002 Total
	C1 6/27/2002	C2 8/1/2002	C3 10/2/2002	2002 3-cut Total	
exp. RDWY sainfoin	5.00	2.00	0.50	7.49	25.81
exp. 97-1 sainfoin	4.78	1.82	0.41	7.01	23.30
Remont sainfoin	5.06	1.92	0.44	7.42	23.24
Alfalfa (3 lb)/sainfoin (16 lb)	4.31	2.33	0.74	7.37	22.98
Shoshone sainfoin	4.93	1.57	0.20	6.69	22.56
AC Grazeland alfalfa	4.11	1.95	0.84	6.90	20.74
Alfalfa (3 lb)/sainfoin (8 lb)	3.64	2.12	0.65	6.41	20.19
Ladak 65 alfalfa	4.04	1.63	0.72	6.39	20.11
Windsor cicer milkvetch	5.34	1.11	0.33	6.78	16.93
Monarch cicer milkvetch	4.87	1.07	0.18	6.12	15.76
Lutana cicer milkvetch	4.96	1.02	0.22	6.19	15.72
exp. L2 Syn-1 birdsfoot trefoil	2.51	1.19	0.09	3.78	12.11
Eski sainfoin	2.69	1.00	0.10	3.79	10.99
Tretana birdsfoot trefoil	1.88	0.79	0.09	2.75	9.05
Mean	4.15	1.54	0.39	6.08	18.54
Isd (0.05)	1.04	0.24	0.12	1.15	2.65
CV%	17.6	10.8	20.5	13.2	10.0

Values in **bold** within a column are not statistically different from the highest yield ($P = 0.05$).*Species Means*

<i>Sainfoin mean</i>	4.49	1.66	0.33	6.48	21.18
<i>Alfalfa mean</i>	4.07	1.79	0.78	6.64	20.43
<i>Cicer milkvetch mean</i>	5.05	1.07	0.25	6.36	16.14
<i>Birdsfoot trefoil mean</i>	2.19	0.99	0.09	3.27	10.58