

Evaluation of Alfalfa Varieties Broadcast Sod-Seeded into Native Rangeland

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The peak aboveground herbage biomass produced by native rangeland is less than the peak biomass produced by domesticated pasture grasses. It has long been assumed that the peak herbage biomass on native rangeland would be increased if alfalfa could be seeded into the established plant community.

The famous alfalfa horticulturist N.E. Hansen suggested in the early 1900's that *Medicago falcata* alfalfas would probably be able to hold their own with any native range plants if introduced as wild plants into the prairie (Rumbaugh circa 1979). During the first two decades of the 1900's, South Dakota Agricultural Experiment Station attempted to help increase production on the prairie by making alfalfa seed packets available to Northern Plains homesteaders, who were informed that alfalfa could be grown as a cultivated crop or introduced as wild plants into the prairie (Rumbaugh circa 1979). Spreading alfalfa seed over an intact plant community with a method that imitated seed distribution of wild plants seemed to be a feasible planting technique. Alfalfa seed from innumerable packets was undoubtedly scattered onto prairie sod across the region. Even though there are a few known locations that have *Medicago falcata* alfalfa plants growing in grassland communities, the outcomes of these alfalfa seeding efforts were never reported and the effectiveness of broadcast seeding alfalfa into sod is unknown.

The possibility of using a broadcast sod-seeding method would make the practice of introducing alfalfa into existing plant communities more attractive to producers by simplifying the process and greatly reducing the costs. A trial was conducted to evaluate the performance of *Medicago falcata* alfalfa varieties seeded by a broadcast technique and to determine the feasibility of broadcast sod-seeding alfalfa into native rangeland without chemical or mechanical sod control.

Procedure

The alfalfa variety broadcast sod-seeding trial was established at the Dickinson Research Extension Center Ranch Headquarters, NE $\frac{1}{4}$, NW $\frac{1}{4}$,

SW $\frac{1}{4}$, sec. 23, T. 143 N., R. 96 W., in 1983. Thirty 10 X 10 foot plots were arranged in a randomized block design with three replications (figure 1). The established vegetation was mixed grass prairie on Vebar fine sandy loam soil. The alfalfa varieties were Anik, Drylander, Kane, Prowler, Rangelander, Spredor II, Travois, Ladak 65, and Vernal. The seed was inoculated with rhizobium bacteria. The varieties were seeded by a broadcast technique at a rate of 1.0 lb PLS/ac on 29 April 1983. The plots were closely examined monthly in June, July, and August. The observed alfalfa seedlings were counted and the data were recorded (Manske 1983).

Results and Discussion

Nine alfalfa varieties were evaluated during this trial (table 1). The portion of parental material originating from *M. falcata* sources ranged from 45% to 100% for the varieties. Vernal, the standard control variety, has *M. falcata* at a level of about 33% of its parentage.

Precipitation levels during the growing season of 1983 were near normal (table 2). A water deficiency occurred during April, and May had below-normal rainfall. June and July had precipitation at normal levels, and August was wet. A water deficiency occurred during September, and October was dry.

The number of seedlings for each alfalfa variety that grew from seed broadcast into native rangeland is shown in table 3. Kane was the only variety that produced a seedling by the broadcast sod-seeding method. The one alfalfa seedling observed in July did not survive even though high rainfall occurred in August.

The conditions needed for an alfalfa seed to develop into an established plant within an intact grassland community include access to mineral soil, adequate soil water, sufficient quantities of nutrients and minerals, and abundant sunlight. Disruption in the supply of any of these necessities to the alfalfa seedling terminates further plant development.

Although there is a remote possibility that all of the conditions needed for a seedling to survive could occur, the rate of successful establishment of alfalfa plants by broadcast sod-seeding into native rangeland is phenomenally low. The results from this trial showed that interseeding techniques with greater potential for success than the broadcast sod-seeding technique need to be developed.

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Table 1. Parental origin of alfalfa varieties.

Alfalfa Variety	Parental Varieties
Anik	M. falcata
Drylander	M. falcata, M. media, M. sativa, Rambler
Kane	Beaver, M. falcata, Rambler
Prowler	Spredor I, Travois, Kane, Rambler, M. sativa
Rangelander	Rambler, Roamer, Drylander, M. falcata
Spredor II	Rambler, Travois, Vernal, M. sativa
Travois	Cossack X Semipalatinsk (M. falcata), Rambler
Ladak 65	Ladak (M. falcata)
Vernal	Cossack, M. falcata X Ladak, Kansas Common

Table 2. Precipitation in inches for growing-season months at DREC Ranch Headquarters.

	Apr	May	Jun	Jul	Aug	Sep	Oct	Growing Season
Long-term mean	1.41	2.15	3.27	2.72	1.80	1.44	1.22	14.01
1983	0.21	1.53	3.26	2.56	4.45	0.86	0.72	13.59
% of LTM	14.9	71.2	100.0	94.1	247.2	59.7	59.0	97.0

Table 3. Alfalfa variety seedlings established by broadcast seeding into native rangeland.

Alfalfa Variety	20 Jun	18 Jul	22 Aug
Anik	0.0	0.0	0.0
Drylander	0.0	0.0	0.0
Kane	0.0	1.0	0.0
Prowler	0.0	0.0	0.0
Rangelander	0.0	0.0	0.0
Spredor II	0.0	0.0	0.0
Travois	0.0	0.0	0.0
Ladak 65	0.0	0.0	0.0
Vernal	0.0	0.0	0.0

Fig. 1. Alfalfa broadcast sod-seeded into native rangeland.



Literature Cited

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