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Travois

**an alfalfa
for grazing**



B 525

**Agricultural Experiment Station
U.S. Department of Agriculture
Brookings, SD 57007**

Travois—an alfalfa for grazing*

Thousands of acres of grasslands are producing less forage than the environment would permit because of insufficient nitrogen. Native legume species which had contributed nitrogen to the soil and increased the quantity and quality of the associated species have been greatly reduced by grazing. Commercial nitrogen fertilizer is too expensive for such large areas. The most efficient way to add nitrogen to range and pasture lands may be the seeding of forage legumes. Many people concerned with improving ranges support the introduction of legumes to increase forage production.

Since most native legume species fail to grow and reproduce abundantly, and since alfalfa (*Medicago* spp.) is a range plant in much of Asia, agronomists have contended that it would be a desirable replacement. N.E. Hanson, USDA plant explorer No. 1, was perhaps the earliest advocate:

These alfalfas and clovers may be used in two ways: (1) as a cultivated crop for hay and pasture, and (2) to introduce as wild plants into the native ranges of the Prairie Northwest, where they will probably be able to hold their own with any plants now found there.¹

The genetic structure of alfalfa may be altered to develop strains adapted to the range environment. Such strains must exhibit the following characteristics:

1. Drought resistance
2. Winter hardiness
3. Persistent grazing survival
4. Disease and insect resistances
5. Ability to grow and reproduce in the range by seed or by a spreading root system.

* Revision of Bulletin 525, authored by M.D. Rumbaugh, G. Semeniuk, R. Moore, and J.D. Colburn¹. Revised and updated by F.R. Vigil, R. Pollmann, and A. Boe, 1982.

Of particular interest have been traits enabling alfalfa plants to "spread" or "creep."

It has been known for some time that some alfalfa plants are genetically capable of producing lateral rhizomes which form broad crowns.² Others develop shoot buds on the roots and are said to possess a "creeping"

root system.^{3,4} New plants originate from these buds. Teton and Rhizoma are varieties with the broad crowned habit. Rambler, Travois, and Spredor 2 possess root spreading characteristics. Root spreading appears to be the most promising trait for interseeding into grasslands.



Fig 1. Five-year-old native interseeded range, Norbeck, SD, interseeded with 2 pounds Travois alfalfa per acre.



Fig 2. Native interseeded range on left, native range on right of fence, 5 years after seeding, Pasture Research Center, Norbeck, SD.

Origin of Travois alfalfa

During 1949-1950 an extensive source nursery was established by SDSU agronomists. It contained plants from root proliferating strains used in breeding programs in Canada and from naturally occurring hybrids between Cossack and Semipalatinsk that were discovered in an old stand in Perkins County, South Dakota. The root proliferating trait in these populations is believed to have been derived from three yellow flowered alfalfas (S.P.I 28070, 28071, and 24455) collected by Dr. N.E. Hanson.

After evaluation of lateral spread by root proliferation, 23 clones were progeny tested for (1) lateral spread, (2) growth habit, (3) rapidity of recovery following cutting, and (4) resistance to bacterial wilt and other foliage and stem diseases. On these bases, 10 plants were retained and incorporated into the synthetic variety Travois. Travois was used by the French Canadians to describe a primitive vehicle consisting of two poles trailing from a harness on a dog or a horse and used by the Indians of the Great Plains to transport children, sick people, and goods. Therefore, Travois is associated with movement, describing the spreading growth form of this alfalfa variety.

Description of Travois

Travois has low (decumbent) growth, aggressive root proliferation, winter hardiness, predominantly yellow, variegated flowers, and a large percentage of pickle shaped seed pods. Its winter hardiness is superior to most alfalfa varieties tested throughout our region.^{5,6,7}

Plants of Travois have the ability to produce stem buds on laterally spreading roots. Shoots from the stem buds emerge at the soil surface and develop into young plants at distances which sometimes exceed 36 inches from the mother plant. This

characteristic permits a close association between grass and legume, reduces trampling injury, thickens stand, and decreases winter loss from soil heaving.

The root proliferating habit of a Travois alfalfa plant can be seen on the bulletin cover. Note the fibrous nature and the lateral spread of the root growth. Hay-type varieties such as Ladak 65 and Vernal typically have a tap root.

The spreading ability of Travois under optimal conditions is compared in Table 1 with broad-crowned rhizomatous varieties Nomad, Rhizoma, Sevelra, and Teton; the tap-rooted variety Vernal; and Rambler, another root "creeper." With heavy competition among plants and with low moisture, none of the varieties would be expected to develop as well as that shown in the table.

Bacterial wilt induced by *Corynebacterium insidiosum* is very destructive and causes rapid loss of stands in fields where it occurs. Travois is more resistant to wilt than many other varieties widely used in South Dakota. It is also highly resistant to the common leaf spot diseases which frequently cause major economic losses within the state. The variety is not known to be resistant to any injurious insects that attack alfalfa.

Travois was not developed as a hay variety. Forage yields are below hay type varieties in the

humid parts of the state, but comparable in the drier parts. Forage yield comparisons from Brookings and Highmore are listed in Tables 2 and 3. Travois and other very winter hardy varieties exhibit marked fall dormancy and slow recovery after cutting. Because of this the first cutting contributes a high proportion of the annual yield if it is to be used as hay.

Region of adaptation

Travois is well adapted to the severe climate of the Northern Great Plains. It meets the need for a hardy legume in areas with cold winters and less than 25 inches annual precipitation.

Use in range and pasture

One of the primary uses of Travois is in the long-term improvement of pasture and rangeland. Travois should also be used in grass-alfalfa mixtures. The decumbent growth habit of Travois reduces the possibility of bloat.

For tame pasture mixtures Travois is seeded at 4 pounds per acre and may be used with any adapted grass species. Where seedbed preparation is not desirable or possible, Travois may be interseeded in the grass cover, at the rate of 1 to 2 pounds per acre with row spacings that vary from 24 to 48 inches. An interseeder especially

Table 1. Frequency distribution of plant width at soil level at Brookings, SD. (Plants were 18 months old at time of measurement and were spaced 42 inches apart; nursery was not overseeded with grass.)

Variety	Plant width classes (inches)							Mean width (inch)	Maximum width (inch)
	0-6 (%)	7-12 (%)	13-18 (%)	19-24 (%)	25-30 (%)	31-36 (%)	36 + (%)		
Travois	0	19	25	20	8	11	17	23	49
Rambler	2	42	30	11	1	7	6	17	47
Teton	1	52	37	7	3	0	0	13	27
Nomad	6	67	22	5	0	0	0	11	22
Rhizoma	0	26	40	24	10	0	0	16	28
Sevelra	16	75	8	0	0	0	0	9	16
Vernal	0	76	22	0	3	0	0	11	28

Table 2. Annual forage yields at Brookings during the 1975-1980 growing seasons. Site seeded April 16, 1974.

Varieties	Yield (dry tons/acre)						Total
	1975	1976	1977	1978	1979	1980	
	Harvests						
	3	2	2	2	2	3	11
Pasture types							
Rambler	3.19	1.65	1.76	2.84	2.18	2.75	14.37
Teton	3.05	1.40	1.85	3.08	2.62	2.83	14.83
Travois	3.13	1.52	1.89	3.14	2.65	3.32	15.65
Hay types							
Agate	3.31	1.60	1.97	2.80	2.69	3.55	15.92
Dawson	3.40	1.76	2.00	2.56	2.25	3.51	15.48
Iroquois	3.66	1.84	1.94	3.11	2.60	3.88	17.03
Ladak 65	3.44	1.73	1.93	3.00	2.79	3.88	16.74
Vernal	3.64	1.85	1.98	2.91	2.81	3.79	16.95

Table 3. Annual forage yields at Highmore during the 1978, 1979, and 1981 growing seasons. Site seeded April 17, 1977.

Variety	Yield (dry tons/acre)				Percent Vernal
	1978	1979	1981	Total	
	Harvests				
	1	1	2	4	
Kanza	1.49	1.94	2.38	5.81	97
Baker	1.45	1.88	2.38	5.71	95
Daneb 1	1.39	1.97	2.45	5.81	97
Vernal	1.68	1.84	2.48	6.00	100
Dawson	1.45	2.04	2.44	5.93	99
Travois	1.47	2.11	2.71	6.29	105
Saranac	1.44	1.93	2.38	5.75	96

Table 4. Average gains, stocking rates, and grazing season length for yearling steers on three forage management systems during 1977, 1978, and 1979 at Norbeck, SD.¹

Management system ²	Pounds			Days of grazing season
	Gain/acre	ADG ³	AUM ⁴ /acre	
Native	53	1.47	.85	156
Interseeded	85	1.54	1.28	156
Tame	83	1.49	1.32	178

¹ Differences of 21 pounds/acre and 0.20 AUM's are significant ($p = 0.05\%$).

² Data shown is for average gain across the three levels of corn supplement fed.

³ Average Daily Gain

⁴ Animal Unit Months

designed for use in semiarid ranges has been developed by the South Dakota Agricultural Experiment Station.⁸

The range or pasture should be managed to insure new seedling establishment, and

livestock access should then be controlled to sustain high yields. Figure 1 shows an established interseeded range 5 years after seeding. Figure 2 shows a fenceline contrast of native and native interseeded range after being grazed several weeks.

Native interseeded and tame pasture management systems were compared at Norbeck, SD, during the 1977, 1978, and 1979 grazing seasons. Pounds of animal gain per acre and average daily gain were determined for yearling steers which received three levels of corn supplementation. Animal unit months per acre (the number of cow-calf pairs supported for one month on one acre) were also determined.⁸

Pounds of gain per acre were increased 60% after 2 pounds per acre of Travois were seeded in the range. Animal unit months (AUM) per acre were increased 50% (Table 4).

Climatic conditions during these three years were excellent. During periods of drought this difference is not expected to be as great. Significant differences in pasture production due to grazing season are expected in the Northern Great Plains.

Travois should be seeded in early spring. Spring day lengths are long enough for vigorous seedling growth to establish ample stands, provided other conditions are favorable.

Alfalfa stand density considered desirable by the farm or ranch operator will vary depending on climate, site, and type of animal grazing the area. In eastern South Dakota, interseeding in bluegrass or brome grass pastures should yield from 10,000 to 17,000 plants per acre. In the western rangelands 5,000 to 8,000 plants per acre is considered a good stand.

Seed increase program

At the time of its release in 1963 and until recently, seed production and availability of Certified Travois alfalfa seed were poor. This scarcity of seed inhibited the widespread use of this variety. In 1979, Foundation Seed fields were established in seed producing areas, and it is expected that an adequate supply of Certified Travois will be available in the future.

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