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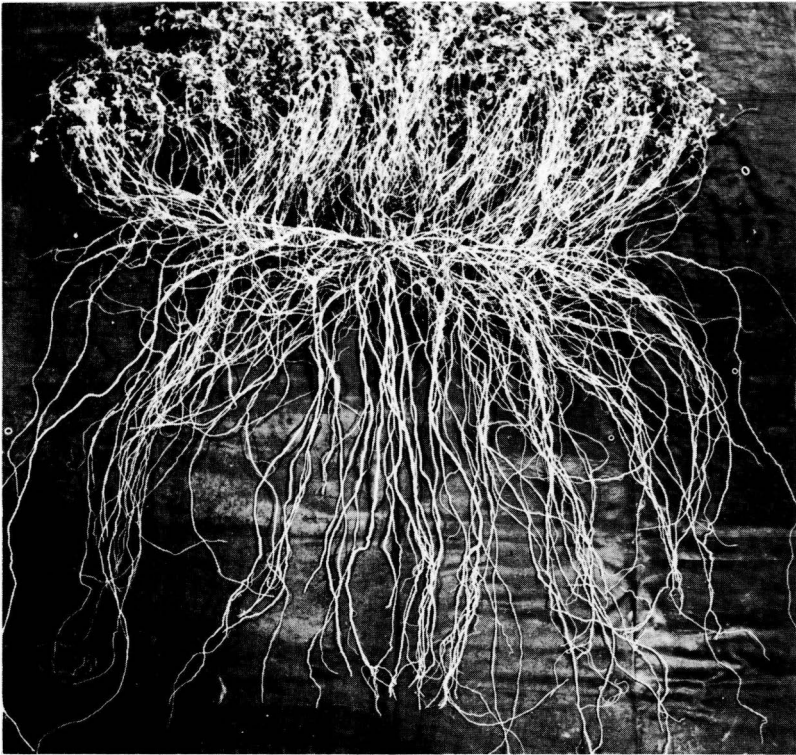
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## **TRAVOIS—An Alfalfa for Grazing**



**AGRONOMY DEPARTMENT  
AGRICULTURAL EXPERIMENT STATION  
SOUTH DAKOTA STATE UNIVERSITY, BROOKINGS**

# TRAVOIS—An Alfalfa for Grazing

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In 1948, M. W. Adams and G. Semeniuk recognized the economic potential of introducing alfalfa into ranges and pastures of the more arid parts of South Dakota. They initiated a breeding program directed toward developing very hardy, disease resistant alfalfas which would persist indefinitely when grazed by livestock. Travois is an outgrowth of that program and is believed to meet these requirements.

Thousands of acres of grasslands are producing less feed than the environment would permit because sufficient nitrogen is not available to range plants. Native legume species which had contributed nitrogen to the soil and increased the quantity and quality of the associated grass forage are no longer present. Research and trials have demonstrated that nitrogenous fertilizers applied to rangeland do not pay in many arid and semi-arid sites.

Many people concerned with improving ranges believe that re-introduction of legumes would be beneficial and should be considered in a number of range improvement and management programs. Since most native legume species fail to grow and reproduce abundantly, agronomists have contended that alfalfa (*Medicago* spp.) would be a

desirable replacement. Alfalfa is a range plant in much of its native Asian land. The remarks of an early plant explorer, N. E. Hansen<sup>1</sup>, are of interest in this regard.

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. As regards food value the peasants of Siberia have long ago determined that these alfalfas are suitable for all kinds of stock.

Plant breeders have proposed that the genetic structure of alfalfa varieties may be altered to develop strains adapted to the range envi-

<sup>1</sup>Hansen, N. E. *Cooperative Tests of Alfalfa from Siberia and European Russia*. South Dakota Agricultural Experiment Station Bulletin 141. 1913.

ronment. Such strains must exhibit the following characteristics:

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

Of particular interest have been traits enabling alfalfa plants to "spread" or "creep." It has long been known that some alfalfa plants are genetically capable of producing lateral rhizomes (underground stems) which form broad crowns. Others develop shoot buds on the roots. New plants originate from these shoot buds. Varieties such as Teton and Rhizoma are examples of the broad crowned habit. Rambler and Travois (Travois<sup>2</sup>) have the root spreading characteristic.<sup>2</sup> At present the root spreading type appears to be the most promising trait for varieties to be interseeded in grassland.

#### ORIGIN OF TRAVOIS ALFALFA

During 1949-1950 an extensive source nursery was established. It was made up of plants from root proliferating strains used in breeding programs in Canada and from naturally occurring hybrids between Cossack and Semipalatinsk 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. Hansen.

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. From these bases, 10 plants were retained and incorporated into the synthetic variety, Travois. The word, travois, was used by the French Canadians to describe a primitive vehicle consisting of two trailing poles used by the Indians of the Great Plains. 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 and variegated flowers, and sickle shaped seed pods.

Winter injury in Travois is very low. Winterhardiness of the variety appears equal to Teton and superior to most available alfalfa varieties. Table 1 demonstrates the superior hardiness of Travois in South Dakota. Similar results have been observed in other states.<sup>3</sup>

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

<sup>2</sup>A detailed discussion of these forms was presented by Graumann, H. O. "Creeping Alfalfa." *Crops & Soils* 10:18-19, 37. 1958.

<sup>3</sup>e.g. Carter, Jack F. *Alfalfa Production in North Dakota*. North Dakota Agricultural Experiment Station Bulletin 448. 1964.

**Table 1. Percent of Alfalfa Plants Killed During the Winter of 1961-62 at Brookings, South Dakota**

Variety	Stand Change (%)
Buffalo .....	-57
Cossack .....	-19
Grimm .....	0
Ladak .....	-20
Rambler .....	- 3
Ranger .....	-10
Rhizoma .....	- 8
Travois .....	0
Teton .....	0
Vernal .....	- 5

at distances which sometimes exceed 36 inches from the mother plant. Such a characteristic permits a close association between grass and legume, reduces trampling injury, thickens stand, and decreases winter loss from heaving. Figure 1 shows the root proliferating habit of a Travois alfalfa plant. Note the fibrous nature and the lateral spread of the root growth compared to the more usual narrow tap root typical of hay varieties such as Ladak and Grimm.

Only one other root proliferating variety, Rambler, is available. The comparative ability of Travois and Rambler to spread is seen in Table 2. Data for the broad crowned rhizomatous varieties Nomad, Rhizoma, Sevelra, and Teton, and for the tap-rooted variety, Vernal, are also shown. With heavy competition among plants and with low moisture none of the varieties would be expected to develop or yield as well as that shown in Figure 1 and Table 2.

Bacterial wilt induced by *Corynebacterium insidiosum* is very de-

structive and causes rapid loss of stand 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 disease which frequently causes major economic losses within the state. The variety is not known to be resistant to any of the injurious insects that attack alfalfa.

Travois was not developed as a hay variety. Forage yields are below those of such varieties. Comparisons from four stations in South Da-

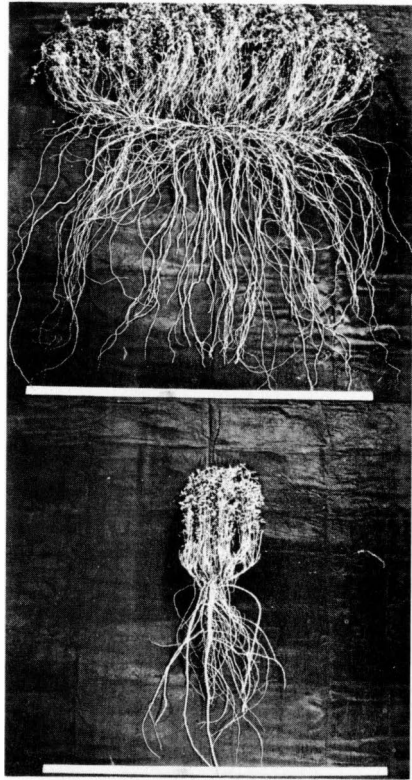


Figure 1. Upper plant illustrates proliferating root system of Travois in contrast to the tap root system of common hay type alfalfa below.

kota are shown in Table 3. In common with other varieties with very high levels of winter hardiness, Travois exhibits marked fall dormancy and slow recovery after cutting. Because of this, the first cutting contributes a relatively high proportion to the total annual yield.

Seed yields of Travois in South Dakota are low. It is believed that the variety is inferior to Ladak and

Ranger in this respect and about equal to Teton. Because of this, the price per pound of Travois seed may exceed that of widely grown hay varieties.

**REGION OF ADAPTATION**

Travois is well adapted to the severe climate of the Northern Great Plains and it is anticipated that this is the region where it will

**Table 2. Frequency Distribution of Plant Width at Soil Level of Root Proliferating and Rhizomatous Alfalfa Varieties at Brookings, South Dakota. (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 (in.)	Maximum Width (in.)
	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 3. Annual Forage Yields of Alfalfa Varieties at Four Locations (averaged 1960-1963 inclusive).**

Variety	Yield (Dry Tons/Acre)				Average
	Brookings	Cottonwood	Eureka	Redfield*	
Cossack	2.95	1.09	1.19	4.91	2.54
Grimm	3.01	1.06	1.15	5.06	2.57
Ladak	2.73	1.26	1.74	4.89	2.65
Narragansett	3.06	1.16	1.45	5.41	2.77
Rambler	2.64	1.15	1.52	4.39	2.42
Ranger	3.12	1.00	1.44	4.82	2.60
Rhizoma	2.83	1.12	1.42	4.71	2.52
Teton	2.63	.81	1.06	4.02	2.13
Travois	2.64	.71	1.49	4.14	2.25
Vernal	3.50	.94	1.66	5.43	2.88
L.S.D. (0.05)	.39	.23	.40	.69	.33
(0.01)	.52	.30	.53	.92	.44

\*The Redfield test was irrigated.

be most widely grown. It will meet the need for a hardy legume in areas where cold winters with inadequate snow cover are common and where the annual precipitation is less than 25 inches.

#### USE IN RANGE AND PASTURE

Travois should be used primarily in permanent or semi-permanent pastures or in ranges. Where short term rotation pastures are desired, a more productive variety such as Vernal should be seeded unless bloat is feared. The lower productivity and decumbent growth of Travois will reduce the incidence of bloat.

For tame pasture mixtures, 4 pounds of seed per acre of Travois may be used with any adapted grass species. Where seed bed pre-

paration is not desirable or possible on permanent pastures or ranges, Travois may be interseeded in the grass cover. Seeding methods must maximize the chances of obtaining adequate stands of the introduced legume and minimize the disturbance to the existing sod. Drills should be heavily constructed and especially designed for interseeding. The drill destroys existing vegetation to some extent, reducing competition for moisture. The desired species is seeded in contour furrows about a foot wide and 3 to 3½ feet apart.

When Travois is seeded in this manner the plants gradually spread. A seeding rate of 1 pound per acre is sufficient. Management of the range or pasture is based on the new seeding until the alfalfa is well



Figure 2. Alfalfa seedlings developing in native range in Harding County, South Dakota, 4 months after interseeding in 1963.



**Figure 3.** A 2-year-old stand of alfalfa in Lyman County, South Dakota, obtained by interseeding.

established. Thereafter livestock access to the range should be controlled to benefit the economic productivity of the grass.

Figure 2 shows an initial stand of alfalfa obtained from range interseeding in Harding County, South Dakota, in 1963. The rows were 3 feet apart seeded at the rate of 1 pound of seed per acre with modified corn planter units. The risk of loss of the initial stand to drought and grasshoppers was quite high. From limited experience to date, it is believed that properly conducted interseeding operations will result in establishment of partially or completely satisfactory alfalfa stands about 80% of the time.

Travois should be seeded in early spring or so late in the fall that the seed will not germinate until spring. The fall dormancy charac-

teristic of Travois is initiated partly in response to short days. This limitation on the pre-winter growth of early fall seedlings may result in some winter kill. The longer spring days do not restrict growth so that seedling vigor is usually ample to obtain satisfactory stands. Use of a phosphate fertilizer may be advisable for some sites where soil tests show that the element is inadequate for normal seedling development.

The alfalfa stand density considered desirable by the farm or ranch operator will vary a great deal depending upon climate, fear of bloat, and other factors. In eastern South Dakota, interseeding in bluegrass or bromegrass pastures should yield 10,000 or more alfalfa plants per acre. In much of the western rangeland of the state the objective should be to attain a maximum



stand level of 3 to 5 thousand plants per acre. Figure 3 shows an exceptionally dense stand obtained with a grassland drill in Lyman County, South Dakota.

#### **SEED INCREASE PROGRAM**

Seed of Travois will be increased under a restricted generation increase program in which the registered seed class will be omitted. Breeders seed will be the open pollinated seed produced from vegetative cuttings of the 10 parent clones grown together in isolation from other alfalfa. Breeders seed will be sown in isolated fields to produce foundation seed. When foundation seed is planted under satisfactory

conditions of isolation, the subsequent seed crop will be eligible for certification as Certified Seed to be planted for forage production. Fields planted with Certified Seed will not be certified.

An increase program such as this will provide an adequate supply of seed to farmers and ranchers and will assure the seed purchaser that Travois will exhibit those superior characteristics for which it was selected and recommended.

Travois has been favorably reviewed by the National Certified Alfalfa Variety Review Board and has been registered as Number 20 with the Crop Science Society of America.