Rates of Seeding Rambler Alfalfa with Dryland Pasture Grasses

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Highlight

Rambler alfalfa, crested wheatgrass, and Russian wild ryegrass were combined to give five rates of seeding. These rates were achieved by mixing 0.25, 0.5, 1.0, 1.5, and 2.0 lb of the alfalfa with 3 lb of seed of each grass and seeding the mixtures at these rates per acre. In four of the seven harvest years the mixture seeded at 1 lb/acre of alfalfa significantly outyielded those seeded at 0.25 and 0.5 lb/acre, however, there was no difference in yield between the three highest rates of seeding treatments. Increasing the seeding rate of alfalfa resulted in increased plant density of the mixture by increasing the alfalfa component while not affecting the density of the grass component. It was concluded that the creeping-rooted Rambler alfalfa need not be seeded at a rate exceeding 1.0 lb/acre when grown in combination with grass for dryland forage production.

The creeping-rooted alfalfa variety Rambler (*Medicago media* Pers.) was developed especially for use in the dry prairie plains of Canada (Heinrichs and Bolton, 1958; Heinrichs, 1954). Heinrichs, in discussing the agricultural possibilities of creeping-rooted alfalfas, suggested that more agronomic research would be required before the true value of the creeping-rooted character could be assessed.

The excellent winterhardiness of Rambler has been demonstrated in several Canadian studies (Ashford and Heinrichs, 1967; Heinrichs and Bolton, 1958; Heinrichs, 1963; Heinrichs et al., 1960). The superior persistence of Rambler over other alfalfa varieties when grown in competition with grasses over a period of dry years has also been shown (Kilcher and Heinrichs, 1966; Kilcher et al., 1966; Kilcher and Heinrichs, 1966).

This study was undertaken to determine the minimum rate at which Rambler alfalfa may be seeded in pasture mixture with crested wheatgrass (*Agropyron cristatum* L.) and Russian wild ryegrass (*Elymus junceus* Fisch.) without sacrificing yield.

Materials and Methods

Rambler alfalfa seed was mixed in increasing amounts with a fixed amount of grass seed to provide five rates of seeding. In lb/acre the mixture seeding rates were 6.25, 6.5, 7.0, 7.5, and 8.0. Each rate treatment contained 3 lb/acre of Russian wild ryegrass and of crested wheatgrass. Thus, grass made up a fixed 6 lb/acre amount within each treatment with the remainder being alfalfa seed. Alfalfa was therefore included at 0.25, 0.5, 1.0, 1.5, and 2.0 lb/acre. In number of seeds the ratio of alfalfa to grass in the five rate treatments was approximately 1 : 20, 1 : 10, 1 : 5, 1 : 3, and 1 : 2.

The test was seeded in 1955 on a dryland, fallow, clay–loam soil at Swift Current, Saskatchewan. Plot sizes were 6 × 30 ft with interrow spacings of 12 inches. The design of the test was a random block with 6 replications.

Data were obtained in 1956 and continued for 6 successive years thereafter. They included 2 cuttings a year for dry matter yield determinations and yearly estimates of stand and composition as determined by the point quadrat method. The cuttings were made during the first half of June and during the latter part of July or early in August, whereas estimates of stands were determined in May of each year. Recovery and regrowth after the second cutting were never sufficient to warrant taking a third cutting.

Results and Discussion

Dry Matter Yield.—Dry matter yields and year-to-year variation in yields were typical for grass–alfalfa mixtures grown in the semiarid brown soil region of the Canadian Prairies (Clark and Heinrichs, 1957; Kilcher and Heinrichs, 1966). In four of seven years mixtures containing 1.0 lb/acre of alfalfa produced significantly (P = .05) higher seasonal D.M. yields than treatments having less alfalfa (Table 1). However, there was no further increase in yields at the alfalfa rates higher than 1.0 lb/acre. The 7-year annual average yield advantage from the 1.0 lb/acre of alfalfa was 38% greater than that from the treatment containing 0.25 lb/acre of alfalfa and 26% greater than the one containing 0.5 lb/acre of alfalfa.

The increased yields from the treatment containing 1.0 lb/acre of alfalfa seemed more marked in

Table 1. Seasonal grass–alfalfa mixture yields (lb/acre) from two cuttings in each of seven years.[1]

Seeding rate treatment lb/ac	Annual dry matter yields							
	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	7-yr av
6 grass + 0.25 alf.	1771	755	366	774	846	373	607	784
6 grass + 0.5 alf.	1841	801	413	899	978	428	656	860
6 grass + 1 alf.	2562	909	511	1159	1128	407	905	1082
6 grass + 1.5 alf.	2473	820	491	1192	1132	458	783	1050
6 grass + 2 alf.	2562	750	488	1053	1116	401	749	1017
Mean	1362	808	454	1016	1014	414	741	886
D value (P = .05)	640	N.S.	142	249	230	N.S.	N.S.	237
S.E.M. %	11.1	12.7	13.1	9.4	10.4	17.1	15.2	6.1

[1] Annual precipitation for each of the 7 years 1956 to 1962, inclusive, was 13.2, 11.8, 11.5, 14.0, 12.4, 8.9, and 13.2 inches.

Table 2. Comparisons between first and second cuttings for yield advantages of mixture containing 1 lb/acre of alfalfa.

Year	Relative yield[1]	
	First cutting	Second cutting
1956	129	151
1957	114	122
1958	122	137
1959	121	152
1960	119	132
1961	108	129
1962	143	131
Mean	122	136

[1]Relative yield of mixture having 1 lb/acre alfalfa as percent of mixtures having less alfalfa.

the second cut (Table 2). Second cut from grass–alfalfa mixtures is traditionally richer in alfalfa than from the first cut since the deeper rooted legume is better able to recover and grow. This probably explains why the treatments containing a higher proportion of alfalfa show an increased yield benefit in second cuttings.

Basal Cover and Composition.—The basal ground cover of the grass component was virtually unaffected by differences in alfalfa seeding rates (Table 3). On the other hand, the different seeding rates of alfalfa did result in notable differences in the basal ground cover of the legume, particularly between the 0.25, 0.5, and 1.0 lb/acre levels (Fig. 1). Above the 1.0 lb/acre rate the differences in alfalfa ground cover were small. A similar relationship between treatments was measured for the percent composition of alfalfa within each mixture (Fig. 2).

It was concluded that where Rambler alfalfa is grown with adapted dryland grasses in the semiarid region of the more northerly part of the Northern Great Plains it should be included at a rate not less than 1.0 lb/acre, and that there is little or no advantage in seeding it at higher rates.

Table 3. Relative basal ground cover of the grass component (in percent) throughout the test years.

Seeding rate treatment lb/ac	Year						
	1st	2nd	3rd	4th	5th	6th	7th
6 grass + 0.25 alf.	5.0	12.1	20.4	19.4	23.6	22.2	21.5
6 grass + 0.5 alf.	5.4	10.1	19.3	18.2	24.0	22.8	21.6
6 grass + 1 alf.	5.2	12.6	19.0	18.9	23.6	22.5	21.9
6 grass + 1.5 alf.	4.8	11.6	19.6	19.0	23.8	22.0	21.0
6 grass + 2 alf.	4.3	9.9	19.9	18.6	22.2	21.6	20.0
Mean	4.9	11.3	19.6	18.8	23.4	22.2	21.2
D value (P = .05)	1.0	2.4	N.S.	N.S.	N.S.	N.S.	N.S.

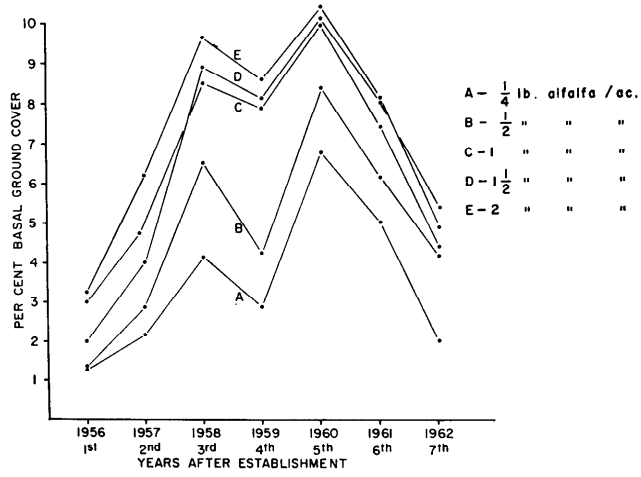

FIG. 1. Relationship of ground cover of Rambler alfalfa and rate of seeding.

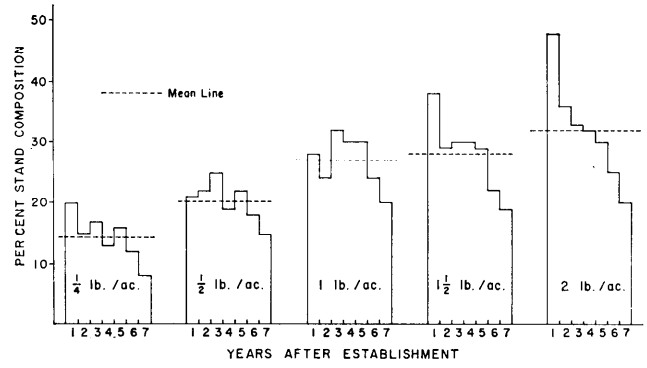

FIG. 2. Percent of total stand made up of Rambler alfalfa as influenced by seeding rate.

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