Effect of Time of Grazing in First Crop Year on Subsequent Productivity of Russian Wildrye

N.W. HOLT, T. LAWRENCE, AND M.R. KILCHER

Abstract

Russian wildrye (*Elymus junceus* Fisch.) is an important rangeland grass. It is slow to establish and could be damaged by grazing too soon after seeding. To test this hypothesis the effect of date of first grazing on the productivity of a newly established Russian wildrye pasture was determined for the first crop year, that is, the year after establishment, and 3 subsequent years at Swift Current, Saskatchewan. In the first crop year the grazing days per hectare with yearling steers was 134 days and 138 kg/ha total liveweight gain was obtained for a grazing period beginning on 15 June. When grazing was started 1 May or 1 August, carrying capacity was not different but beef production was 60 and 84 kg/ha, respectively. In the second year, when all pastures were grazed continuously from 4 May, the greatest number of days grazing were obtained when grazing had been delayed until 1 August the previous year. However, date of first grazing in the first production year did not affect liveweight gain in the second year nor liveweight gain or grazing days in the subsequent 2 years of grazing with steers. It was concluded that grazing of newly established Russian wildrye pastures should be delayed in the first crop year until the plants are fully headed (about mid-June).

Russian wildrye (RWR) (*Elymus junceus* Fisch.) is an important pasture grass for the semiarid prairies of the Northern Great Plains (Heinrichs et al. 1976, Smoliak and Slen 1974, Berdahl and Barker 1984). While the variety Swift has better establishment vigor than older varieties (Lawrence 1979), *Elymus* species tend to develop more slowly than other grasses (Lawrence and Kilcher 1972). In eastern Montana RWR and Altai wild rye (*Elymus angustus* Trin.) produced the least forage of 7 grass species in the first year after seeding, the first crop year, but were among the species which produced the most forage in the second year after seeding (White and Wight 1981). White and Wight reported the highest dry matter yield of RWR from the July harvest in the first crop year and from a June harvest in the second year after establishment. In a simulated grazing study at Swift Current, Saskatchewan, Leyshon (1983) compared the effects of 6 different harvest dates of RWR (25 May to 29 July) in the first crop year (1977) on productivity in 4 subsequent years when harvests were taken whenever 10 cm of grass were available. Leyshon found that highest yields in the first crop year were obtained with a July harvest. However, in the 3 following years, the greatest yield of forage was obtained when the first crop year harvest was delayed at least until mid-June. Leyshon concluded that RWR should not be grazed in the first crop year until the time of flower (mid to late June).

The objective of this study was to test, under grazing conditions, the hypothesis that delayed harvest of RWR in the first crop year would increase productivity in the second and subsequent years, especially if defoliation was continuous as with grazing animals.

Materials and Methods

This grazing test was conducted at Swift Current, Saskatchewan, on a Swinton loam soil (aridic haploborall). In May of 1980 12 paddocks (previously fallowed) of 1.62 ha each were sown to 'Swift' RWR at 90-cm row spacings. No fertilizer was applied during the course of the trial. Available soil phosphorus was 7.2 ppm (0–15 cm) and available soil nitrogen was judged to be adequate. A good stand was obtained and the treatments were assigned to the pastures in a randomized complete block design for 4 replicates. The three 1981 treatments were: grazing to commence 1 May; 15 June (early flower); and 1 August (mature seed). Three yearling Hereford steers (275 kg average weight) were used to graze each paddock each year. In 1981 a put-and-take system was used for the May treatment but other pastures were grazed continuously. From 1981 to 1984, all pastures were grazed continuously from the same date in early May (when 10 cm of forage was available). Animals were removed when grass was grazed to 3 cm or when animals showed no weight gain over the 2-week period since the previous weighing. Cattle were weighed after 16 hours off feed and water. Days of grazing and cattle weight changes were used to compare treatments. Data were analyzed for each year. The mean square for the interaction of treatment and replicate was used to test the significance of the treatment effects and to determine a least significant difference (LSD).

Results and Discussion

With the exception of 1982, yearly precipitation for the years 1980 to 1984 was below the long-term average 359 mm for the Swift Current area. In 1 year, 1984, April– August precipitation was below the long-term average of 209 mm.

A delayed start to grazing RWR in 1981, the first crop year, did not increase the total grazing days per hectare (Table 1). In 1982, when all pastures were grazed from 4 May, the delayed grazing in 1981 increased the total animal days of grazing per hectare in 1982. In 1983 and 1984, there were no differences among the treatments for animal grazing days.

Table 1. Effect of date of first grazing in the first crop year on the carrying capacity of Russian wildrye pastures in the first crop and subsequent years.

Date grazing commenced 1981	1981	1982	1983	1984	Total
	animal days/ha				
May 1	122	240	253	184	799
June 15	134	297	253	210	894
August 1	127	329	253	178	887
LSD (P=.05)	NS[1]	66	NS	NS	NS

[1]NS = not significant at $P = 0.05$.

In 1981, postponement of grazing until 15 June produced the highest average daily gain and total weight gain by the steers (Table 2). A further delay in date of first grazing did not result in further gains; in fact, as the grass matured and quality declined (Lawrence and Troelsen 1964), average daily gain decreased. Lowest productivity was obtained when grazing started on 1 May. Date of first use in 1981 did not affect average daily gain for the years 1982 to 1984. Although beef production in 1982 was numerically greatest for those pastures where grazing was delayed in 1981, the differences among treatments were not significantly different at P = 0.05. Leyshon (1985) found forage yields to be higher in the year after a delayed harvest of the first crop. He reported on effects of delayed harvest in a period of slightly below normal annual precipitation. In this study precipitation in 1982 for April–August may have

Authors are forage agronomist, grass breeder and range scientist (retired), respectively, Agriculture Canada, Research Station, Swift Current, Saskatchewan. S9H 3X2.

The authors wish to express their appreciation to Mr. Helmut Peters for technical assistance and supervision of the research.

Manuscript accepted 6 March 1986.

Table 2. Effect of date of first grazing on the productivity of Russian wildrye pastures.

Date grazing commenced 1981	Lightweight gain				Beef production				
	1981	1982	1983	1984	1981	1982	1983	1984	Total
	kg/day				kg/ha				
May 1	0.50	0.90	0.63	0.61	60	214	159	109	542
June 15	1.05	0.86	0.62	0.62	138	246	157	132	673
August 1	0.65	0.71	0.61	0.65	84	233	156	117	590
LSD (P=.05)	0.21	NS[1]	NS	NS	49	NS	NS	NS	62

[1]NS = not significant at $P = 0.05$.

helped the RWR pastures recover from early grazing in 1981. Total production over the 4 years was significantly favored by delayed grazing in first crop year.

Beef production per hectare was much greater in the second year after establishment than in the first. This has also been reported for dry matter (White and Wight 1981, Leyshon 1983). In our study, productivity declined in 1983 and 1984 due to a lack of precipitation.

It is a temptation for producers to graze a new seeding of RWR early in the first crop year so as to begin to obtain some return for the costs of establishment. Although RWR has been promoted for early season use, this experiment demonstrated that in the first crop year, productivity will be greater if the date of first grazing is delayed until mid June. The benefits of allowing the new plants to develop may be carried over into the second and later years.

Literature Cited

Berdahl, J.D., and R.E. Barker. 1984. Selection for improved seedling vigor in Russian wild ryegrass. Can. J. Plant Sci. 64:131-138.

Heinrichs, D.H., R.W. Lodge, and M.R. Kilcher. 1976. Russian wild ryegrass and Altai wild ryegrass for early summer pasture. Can. J. Plant Sci. 56:287-291.

Lawrence, T. 1979. Swift Russian wild ryegrass. Can. J. Plant Sci. 59:515-518.

Lawrence, T., and M.R. Kilcher. 1972. Emergence, seedling growth, and yield of Altai wild ryegrass and other grasses as influenced by soil temperature and fertility. Can. J. Plant Sci. 52:795-800.

Lawrence, T., and J.E. Troelsen. 1964. An evaluation of 15 grass species as forage crops for southwestern Saskatchewan. Can. J. Plant Sci. 44:301-310.

Leyshon, A.J. 1983. Effect on the subsequent productivity of newly seeded pastures of time and intensity of first use. p. 51-56. *In:* 1982 Research Hi-Lites, Research Station, Swift Current, Saskatchewan.

Smoliak, S., and S.B. Slen. 1974. Beef production on native range, crested wheatgrass and Russian wild rye pastures. J. Range Manage. 27:433-436.

White, L.M., and J.R. Wight. 1981. Seasonal dry matter yield and digestibility of seven grass species, alfalfa, and cicer milkvetch in eastern Montana. Agron. J. 73:457-462.