Kura Clover Pasture Mixtures: Companion grasses and seeding rates

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Kura clover is a very persistent pasture legume that spreads by underground "stems" known as rhizomes. It is being grown on an extremely limited area in Ontario at present but is being evaluated in a series of tests coordinated through New Liskeard Research Station.

This trial evaluates three companion grasses in binary mixtures with kura clover. Each grass species is evaluated under a high and a low seeding rate, while the kura clover is evaluated under low, medium and high seeding rates (Table 1). The trial was sown in 1997 in New Liskeard and Kemptville.

Table 1. Treatments in kura clover mixtures and seeding rates trial.

Factor	Details
A) Companion Grass	
Orchard	Variety Kay
Brome	Variety Baylor
Reed Canary	Variety Venture
B) Grass Seeding Rate	Kay 2 vs 4 kg/ha
Low	Baylor 3 vs 6 kg/ha
High	Venture 3 vs 6 kg/ha
C) Kura Seeding Rate	Variety Endura
Low	4 kg/ha
Medium	8 kg/ha
High	12 kg/ha

Results:

First Production Year:

In the first production year at both locations, total seasonal yields were lower when only 4 kg/ha of kura clover seed was used as compared to 8 kg/ha or 12 kg/ha (Table 2). At New Liskeard, the species of grass used in the mixture did not affect seasonal yields, but at Kemptville, reed canary mixtures were lower yielding than orchard or brome mixtures. Reed canary is known to be slow to establish. Grass seeding rate had no effect on seasonal yields at either site.

At both sites, legume content of the mixture increased as kura clover seeding rate increased (Table 2). Ground cover data from Kemptville also showed that cover increased with kura seeding rate (not shown). At New Liskeard, the legume content was much higher in brome mixtures as compared to orchardgrass or reed canary mixtures. Legume content was similar across the three grass mixtures at Kemptville (Table 2), but ground cover ratings in the first production year showed lower ground cover with brome mixtures than with orchard or reed canary (ground cover data not shown).

Table 2. First production year seasonal yield (kg/ha) and legume content.

Treatment	Seasonal Yield New Liskeard	Seasonal Yield Kemptville	% Legume New Liskeard	% Legume Kemptville
A) Grass Species				
Orchard	7,139	9,787a	66b	33
Brome	7,296	10,149a	82a	46
Reed Canary	8,037	9,145b	58b	55
B) Grass Seeding Rate				
High	7,491	9,774	71	48a
Low	7,491	9,614	66	41b
C) Kura Seeding Rate				
4 kg/ha	6,834b	8,862c	65 b	31c
8 kg/ha	7,801a	9,702b	67ab	47b
12 kg/ha	7,837a	10,517a	74a	56a
Grand Mean	7,490	9,694	69	45
Significance[1]				
(A)	ns	*	**	ns
(B)	ns	ns	ns	**
(C)	***	*	*	***
(AxB)	ns	ns	ns	*
(AxC)	ns	ns	ns	ns
(BxC)	ns	ns	ns	ns
(AxBxC)	ns	ns	ns	ns
CV[2] **(%)**	8.6	9.1	15.7	32.0

[1]. ns=not significant; *, **,*** significant at $P<0.05$, $P<0.01$ and $P<0.001$ respectively [2]. coefficient of variation
Within a column, means for (A), (B) or (C) followed by different letters are significantly different

Second Production Year:

In the second production year at New Liskeard, lower yields were produced by the 4 kg/ha seeding rate as compared to the 8 kg/ha and 12 kg/ha rates, however kura seeding rate did not have a significant effect on total forage yield at Kemptville (Table 3). The species of grass used in the mixture did not affect total yields at New Liskeard but at Kemptville orchardgrass mixtures were significantly lower yielding than brome or reed canarygrass. This was due to the virtually complete winterkill of orchardgrass from the Kemptville test. Composition data showed that the orchardgrass mixtures at Kemptville were actually 100% legume (Table 3). Grass seeding rates did not effect forage yield at either site.

Increasing seeding rates of kura clover increased legume content of the mixtures at both sites (Table 3). Grass seeding rate had no effect on mixture composition. At New Liskeard, bromegrass mixtures continued to have higher legume content than the other two mixtures.

Table 3. Second production year seasonal yield (kg/ha) and legume content.

Treatment	Seasonal Yield New Liskeard	Seasonal Yield Kemptville	% Legume New Liskeard	% Legume Kemptville
A) Grass Species				
Orchard	10,338	5,155b	67b	100a
Brome	10,817	7,020a	82a	61c
Reed Canary	10,375	6,696a	71b	75b
B) Grass Seeding Rate				
High	10,799	6,251	73	78
Low	10,255	6,330	74	79
C) Kura Seeding Rate				
4 kg/ha	9,812b	6,136	69b	77 b
8 kg/ha	10,777a	6,320	74a	79ab
12 kg/ha	10,992a	6,415	78a	80a
Grand Mean	10,527	6,290	74	79
Significance[1]				
(A)	ns	**	*	***
(B)	ns	ns	ns	ns
(C)	***	ns	***	*
(AxB)	ns	ns	ns	ns
(AxC)	ns	ns	ns	ns
(BxC)	ns	ns	ns	*
(AxBxC)	ns	ns	ns	*
CV[2] (%)	9.1	9.7	10.3	5.2

[1]. ns=not significant; *, **,*** significant at $P<0.05$, $P<0.01$ and $P<0.001$ respectively [2]. coefficient of variation
Within a column, means for (A), (B) or (C) followed by different letters are significantly different

Summary and Interpretation: To date, this test has shown that the forage yield of kura clover mixtures can be increased by increasing the seeding rate of kura in the mixture to 8 kg/ha from 4 kg/ha. Within the limits tested, grass seeding rate had little or no effect stand composition or forage yields. The species of grass mixed with kura clover did not have a major impact on total yields in the first two years, but the experience at New Liskeard indicated that bromegrass competed poorly with kura clover. At Kemptville, orchardgrass was completely winterkilled between the first and second production years. This left a pure legume stand that would be a high bloat risk if pastured. This suggests that kura clover should be mixed with a very persistent grass like reed canary, although this may result in lower yields in the first year after establishment. This test will be harvested for two more years to examine longer term effects of these mixtures.

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