

Comparison of Kura Clover-Grass and White Clover-Grass Mixtures
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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.

The objective of this trial is to compare the yield and composition of mixtures based on one of four grasses sown with either kura clover or white clover (Table 1). The test is being conducted at Emo, Thunder Bay, New Liskeard, and Winchester. Harvesting commenced in 1998 at the latter 3 sites, but did not begin until 1999 at Emo due to slow establishment. Seeding rates were determined by relative seed size between the clovers and the competitive ability of the grasses. The main plots were species of grass and the subplots were species of clover.

Table 1. Grass-legume mixtures compared.

A) Grass Component	B) Legume Component	Seeding Rate (kg/ha)
Kay Orchardgrass	Endura Kura Clover	4 grass /10 clover
Kay Orchardgrass	Osceola White Clover	9 / 2
Baylor Bromegrass	Endura Kura Clover	6 / 10
Baylor Bromegrass	Osceola White Clover	10 / 2
Venture Reed Canary	Endura Kura Clover	6 / 10
Venture Reed Canary	Osceola White Clover	8 / 2
Orchard/Brome/Reed Mix	Endura Kura Clover	2 / 4 / 4 / 10
Orchard/Brome/Reed Mix	Osceola White Clover	2 / 4 / 4 / 2

Results:

First Harvest Year: In the first harvest year, white clover mixtures produced greater total dry matter yields than kura clover mixtures at Thunder Bay and Kemptville (1998 harvests) and at Emo (1999 harvest) (Table 2). These results are not surprising since white clover is known to establish easily while kura clover has often been slow to establish. First year yields at New Liskeard showed the opposite trend, with kura clover mixtures being superior. This reflects the excellent establishment of kura clover obtained at New Liskeard. Clover content of the mixtures was greater for white clover than kura clover at Kemptville (1998) and Emo (1999) (Table 3). The opposite trend was shown at Thunder Bay and at New Liskeard (Table 3). Ground cover data in 1998 (not shown) showed no differences between the two clover mixtures, but absolute ground cover ranged from 80% to 100% across locations.

Yield differences among the four grass mixtures were generally small, with brome mixtures being somewhat lower yielding at Thunder Bay and reed canarygrass mixtures being lower yielding at Winchester (Table 2). Reed canarygrass did not establish well at Winchester relative

to other grasses, as shown by the high legume content of the reed canarygrass mixture relative to other mixtures (Table 3). Brome established very poorly at New Liskeard, but this did not lower the mixture yield since the clover component filled in the plots.

Table 2. Total seasonal forage yield (kg/ha) in the first and second production years.

Year and Treatment	New Liskeard	Thunder Bay	Winchester	Emo (1999)
First Production Year				
<u>A) Grass Mixture</u>				
Orchard	8,154	3,398a	12,268a	3,747
Brome	8,370	1,862b	11,606a	3,819
Reed Canary	9,141	2,115b	10,001b	3,649
Mixture	8,776	2,313b	12,068a	3,858
<u>B) Legume Mixture</u>				
Kura Clover	9,606a	2,202b	10,749b	2,852b
White Clover	7,615b	2,642a	12,222a	4,684a
<u>Grand Mean</u>	8,610	2,422	11,486	3,768
<u>Significance¹</u>				
(A)	ns	**	*	ns
(B)	***	**	*	***
(AxB)	*	ns	ns	ns
CV ² (%)	8.5	16.0	10.4	42.0
Second Production Year				
<u>A) Grass Mixture</u>				
Orchard	8,616	3,589	1,127b	
Brome	8,596	3,771	2,471a	
Reed Canary	8,413	3,169	2,389a	
Mixture	9,680	3,493	1,934a	
<u>B) Legume Mixture</u>				
Kura Clover	11,535a	4,387a	2,428a	
White Clover	6,118b	2,624b	1,533b	
<u>Grand Mean</u>	8,826	3,506	1,980	
<u>Significance¹</u>				
(A)	ns	ns	*	
(B)	***	***	***	
(AxB)	ns	ns	ns	
CV ² (%)	17.2	12.3	24.4	

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) or (B) separated by different letters are significantly different.

Table 3. Legume content (%) of mixtures in the first and second production years.

Year and Treatment	New Liskeard	Thunder Bay	Winchester	Emo
First Production Year				
<u>A) Grass Mixture</u>				
Orchard	45b	21	20b	35
Brome	70a	22	29b	35
Reed Canary	48b	19	73a	34
Mixture	43b	22	27b	30
<u>B) Legume Mixture</u>				
Kura	62a	34a	29b	28b
White	41b	8b	45a	39a
<u>Grand Mean</u>	52	21	37	33
<u>Significance¹</u>				
(A)	***	ns	***	ns
(B)	***	***	***	***
(AxB)	ns	ns	ns	*
CV ² (%)	15.3	38.0	26.0	10.1
Second Production Year				
<u>A) Grass Mixture</u>				
Orchard	37b	29	46a	
Brome	47a	35	25c	
Reed Canary	39b	32	35b	
Mixture	37b	33	33b	
<u>B) Legume Mixture</u>				
Kura	69a	56a	69a	
White	11b	8b	0b	
<u>Grand Mean</u>	40	32	35	
<u>Significance¹</u>				
(A)	*	ns	**	
(B)	***	***	***	
(AxB)	ns	ns	***	
CV ² (%)	17.8	27.7	23.0	

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) or (B) separated by different letters are significantly different.

Second Harvest Year: Total yields in the second harvest year showed significantly higher yields from kura clover-grass mixtures than from white clover-grass mixtures at all three sites (Table 2). The kura mixtures were from 60 to 90% higher in yield, depending on the location. At Winchester, white clover was completely winterkilled (Table 3) leaving only nitrogen deficient

grass stands while the kura thrived. At New Liskeard, both white clover and kura clover survived the winter, but the white clover showed very poor vigour during an extremely dry spring while the kura clover filled in the grass stands (Table 3). At Thunder Bay, kura clover mixtures formed a much higher percentage of the stand as compared to white clover mixtures (Table 3), and also had a higher ground cover (not shown). Yield differences among grass species occurred only at Winchester, where orchardgrass mixtures were significantly lower in yield as a result of winterkill (Table 2).

Summary and Interpretation

Kura clover mixtures were lower yielding than white clover mixtures in the first production year at three of four sites. This result would be expected since kura clover has a reputation of being slow to establish. In the second production year, kura mixtures were higher yielding at all sites, indicating greater persistence with kura clover mixtures. This apparently resulted from increased winterhardiness (Winchester site), and from a combination of winterhardiness and drought tolerance (New Liskeard and Thunder Bay). The kura content of the stands was significantly higher than white clover at all sites in the second production year. This was a concern at Winchester where orchardgrass winterkilled and the stand was pure kura clover. This would pose a serious bloat risk to grazing livestock. To avoid this problem, a very persistent and competitive companion grass is required for kura clover.

Harvesting will continue at all sites for at least 2 more years assuming survival is adequate. This study is being funded in part by the Ontario Forage Council and by Speare Seeds.