The Seed Head
Fact sheet # 4

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Effects of Elk Damage to Creeping Red Fescue Fields in the Peace

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Introduction

There are over 200 "fine seed" producers in British Columbia utilizing more than 36,000 ha for grass seed production. Elk numbers in the B.C. Peace region appear to be on the increase as more animals are being seen grazing grass seed fields. These elk are using the grass seed fields in the region as winter and spring pasture. Grazing intensities vary from a few affected plants in a field to large areas of the field having severe grazing damage.

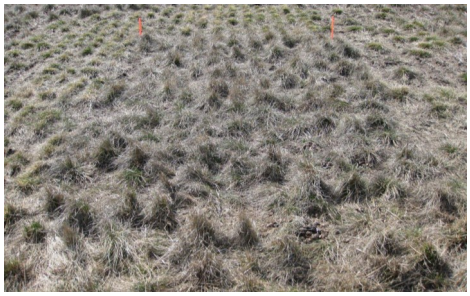
A literature review was carried out to determine the research that has been done on the effects of grazing forage seed crops (Seed Head #3). There was no published research showing potential yield losses when creeping red fescue is grazed by elk during the winter dormancy of the grass or in the spring when the grass breaks dormancy and begins to grow.

Grazing during the fall, winter or spring may be detrimental to forage seed yields which can affect tiller elongation and floral initiation in the spring. Severity of grazing on the plants may also affect seed production.

Research is needed to determine the losses in forage seed crops and to provide options to compensate fine seed producers for their losses. The first steps needed to provide an effective wildlife compensation program for fine seed producers in BC is to quantify the severity of the loss and the development of assessment methodologies that effectively and efficiently assess wildlife damages. The objective for this study was to determine the impact on forage seed yields when wildlife graze creeping red fescue seed fields in the winter and spring.

Photo on right:
Elk grazed study plot in Franklin Moller's field

Photo on far right:
Ungrazed study plot in Franklin Moller's field



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Results and discussion

In the fall of 2009 and 2010 the vegetative plants in the seed field were clipped to determine the amount of forage available for wildlife to graze. The creeping red fescue fields produced an average of 1239 lb/ac of topgrowth which is capable of sustaining on average 73 elk grazing days/acre (table 1) in 2009. In the fall of 2010 the production was 889 lb/ac which could sustain 52 elk grazing days/ acre. The clippings show that there is sufficient growth in the fall to maintain a significant herd of elk on the fescue fields.

Seed Yields

Predicting potential fields in the fall which the wildlife will use for winter and spring grazing is very difficult. In our trials we identified potential fields in the fall of 2009 and in the spring of 2010 we had to abandon two sites and identify replacement sites. The grazing intensity was rated as medium at these sites.

The four sites identified in the fall of 2010 were all abandoned when there was no wildlife damage to the creeping red fescue plants when the fields were inspected in the spring of 2011. The exceptional heavy snowfall during the winter of 2010 - 2011 was thought to be too deep for the wildlife to graze in the selected fields. A field on Franklin Moller's farm at Sexsmith, Alberta was selected for our sites since it had approximately 300 elk grazing on 300 acres of creeping red fescue fields for most of the winter. Three sites were selected in the fields where grazed and ungrazed plots were identified and marked. The grazing intensity on the plots was rated as medium.

In the 2010 harvest the ungrazed plots had a higher seed yield than the grazed plots (table 2). The yields of the ungrazed plots were numerically higher but not significantly different than the grazed plots. The mean difference was 27 lbs/ac higher yields for the ungrazed plots than the grazed plots.

In the 2011 harvest the differences between the ungrazed plots and the grazed plots (table 3) were much different. The grazed plots had higher seed yields than the ungrazed plots numerically but again the differences were not statistically significant. The numerical difference between the treatments was 48 lbs/ac more seed yield in the grazed sites than the ungrazed.

Table 1.Top growth and grazing potential of creeping red fescue seed fields

Year 1 - 2010 Sites	Top Growth Lb/ac	Elk Grazing Days* Per acre
Dan Peters (Site 1)	1150	68
Dan Peters (Site 2)	1174	69
Reuben Loewen	1393	82
Mean	1239	73
Year 2 - 2011 Sites		
Rick Gies	957	56
Dave Wuthrich	728	43
Reuben Loewen	1188	70
Gordon Hill	683	40
Mean	889	52

*assuming a cow elk consumes 8kg (17lbs) per day Source: Alberta Forage Manual - Aasen & Bjorge; 2010

Table 2. 2010 Clean Seed Yield

Site	Yield in lbs/ac Ungrazed	Grazed
RG	428	345
BOS	463	542
RL1	749	746
RL2	749	650
mean	597	571

Table 3. 2011 Clean Seed Yield

Site	Yield in lbs/ac* Ungrazed	Grazed
CA	714	725
ST	592	690
JS	646	681
mean	651	699

Dockage

Dockage is the amount of empty hulls, chaff and foreign material in the seed sample after threshing and is expressed as a percent. High dockage levels may indicate a high level of unfilled hulls which would affect clean seed yields.

In 2010 (table 4) the samples from the grazed plots had a higher dockage (29.9%) although the difference (4%) was not sufficient to be significant. In 2011 (table 5), there was no difference in the dockages (27.7% and 27.8%) between the grazed or the ungrazed seed plots.

Table 4. 2010 Percent dockage and germination

	Percent dockage*		Percent germination*	
Site	Ungrazed	Grazed	Ungrazed	Grazed
RG	27.1	31.1	95.8	97.3
BOS	35.4	35.3	98.8	97.5
RL1	20.7	27.1	98.5	99.5
RL2	20.7	26.2	98.5	99.1
mean	26.0	29.9	97.9	98.4

Table 5. 2011 Percent dockage, percent germination and 1000 kernel weight

	Percent dockage*		Percent germination*		1000 kernel weights (gms)*	
Site	Ungrazed	Grazed	Ungrazed	Grazed	Ungrazed	Grazed
CA	28.3	27.9	95	95	1.1	1.2
ST	23.8	24.8	96.5	97.6	1.2	1.2
JS	31.2	30.4	94.1	97.4	1.1	1.1
mean	27.8	27.7	95.2	96.7	1.1	1.2

Germination

All samples were tested for germination to determine the percent of viable seeds that were produced. In both years (table 4 and 5) the grazed plots had a slight increase in germination but the differences were not significant. Neither treatment could be attributed to any difference in germination.

1000 kernel weight

Thousand kernel weights were only measured in 2011. The mean difference in 1000 kernel weights was only 0.1 gram higher in the grazed site. This difference was not significant which indicates that our measurements could not identify any treatment difference in seed weights.

Bedding and Trampling

In the spring of 2010 a bedding site with many elk beds and elk trampling was identified and sampled in the Osterwalder field. In 2011 a site was selected in the Franklin field at Sexsmith with the same type of damages. Clean seed yield, % dockage, % germination and 1000 kernel weights were measured (table 6). There was no significant difference between these bedding sites and paired sites which had no elk damage.

Elk trampling damage near a fescue plant and feces

Table 5. The affect of bedding and trampling on seed yield, dockage, germination and seed weight

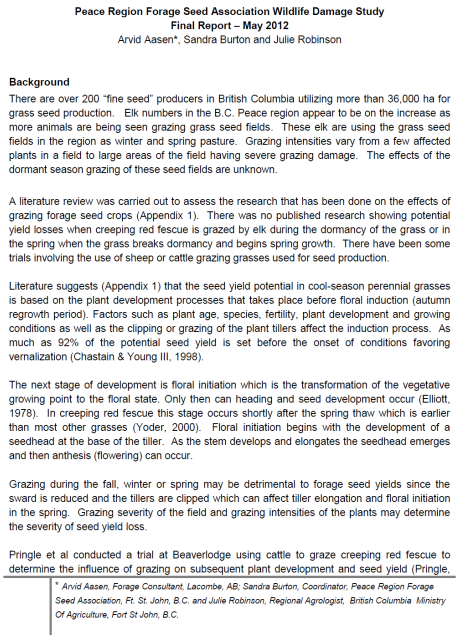
	Yield (lbs/ac)		Percent dockage*		Percent germination*		1000 kernel weights (gms)*	
Site	Control	Bedding	Control	Bedding	Control	Bedding	Control	Bedding
2010	414	402	34.8	34.4	97.3	94.0	n/a	n/a
2011	511	374	35.5	34.4	94.7	95.3	1.2	1.1

Conclusion

The wildlife damage study conducted in the Peace Region of British Columbia and Alberta was not able to show any statistical differences in seed yields between an ungrazed creeping red fescue field and an elk grazed field. The data collected was not able to allow us to conclude that winter or spring wildlife grazing did or did not adversely affect the seed yields, dockage, germination or seed weights of a creeping red fescue field.

It is the opinion of the participants of the study that the variability of the grazing and the variability in the fields was too high to enable us to conclude that wildlife grazing did or did not adversely affect the seed yields, dockage, germination or seed weights of a creeping red fescue field in the Peace region of British Columbia and Alberta. The severity of the grazing may not have been severe enough in these fields to adversely affect seed yields as well.

Wildlife Damage Study Contractors
L - R: Arvid Aasen, Julie Robinson and Sandra Burton



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Final Report – May 2012
Arvid Aasen*, Sandra Burton and Julie Robinson

Background

There are over 200 "fine seed" producers in British Columbia utilizing more than 36,000 ha for grass seed production. Elk numbers in the B.C. Peace region appear to be on the increase as more animals are being seen grazing grass seed fields. These elk are using the grass seed fields in the region as winter and spring pasture. Grazing intensities vary from a few affected plants in a field to large areas of the field having severe grazing damage. The effects of the dormant season grazing of these seed fields are unknown.

A literature review was carried out to assess the research that has been done on the effects of grazing forage seed crops (Appendix 1). There was no published research showing potential yield losses when creeping red fescue is grazed by elk during the dormancy of the grass or in the spring when the grass breaks dormancy and begins spring growth. There have been some trials involving the use of sheep or cattle grazing grasses used for seed production.

Literature suggests (Appendix 1) that the seed yield potential in cool-season perennial grasses is based on the plant development processes that takes place before floral induction (autumn regrowth period). Factors such as plant age, species, fertility, plant development and growing conditions as well as the clipping or grazing of the plant tillers affect the induction process. As much as 92% of the potential seed yield is set before the onset of conditions favoring vernalization (Chastain & Young III, 1998).

The next stage of development is floral initiation which is the transformation of the vegetative growing point to the floral state. Only then can heading and seed development occur (Elliott, 1978). In creeping red fescue this stage occurs shortly after the spring thaw which is earlier than most other grasses (Yoder, 2000). Floral initiation begins with the development of a seedhead at the base of the tiller. As the stem develops and elongates the seedhead emerges and then anthesis (flowering) can occur.

Grazing during the fall, winter or spring may be detrimental to forage seed yields since the sward is reduced and the tillers are clipped which can affect tiller elongation and floral initiation in the spring. Grazing severity of the field and grazing intensities of the plants may determine the severity of seed yield loss.

Pringle et al conducted a trial at Beaverlodge using cattle to graze creeping red fescue to determine the influence of grazing on subsequent plant development and seed yield (Pringle,

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This report:
Peace Region Forage Seed Association Wildlife Damage Study
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