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Nutrient Removal in Creeping Red Fescue Seed Crops

*“ I wonder if
we might be
further ahead leaving the
straw and nutrients
on our land
to improve the soil.”
Reuben Loewen,
Prespatou, BC*



Closeup of probe sampling fescue straw at Hadland's Seed Farm during survey.

Introduction

Have you ever wondered how many nutrients a creeping red fescue seed crop removes from your soil? A number of years ago the Peace Region Forage Seed Association conducted a survey on the nutritional value of grass seed straw and fall re-growth for livestock feeds. The majority of the survey was conducted over a four year period from 2000 to 2004. Samples of creeping red fescue straw were taken once the straw had been baled off the field.

Samples of fescue re-growth were collected in the late fall. Feed samples were analyzed for a number of feed quality characteristics which included % nitrogen, phosphorous and potassium. A total of 72 creeping red fescue straw samples and 19 samples of fall re-growth were analyzed over the four year period. In addition, 5 samples of creeping red fescue seed were submitted for analysis in 2004.

Table 1 summarizes some of the data

Table 1. Average nutrient contents of creeping red fescue seed, straw and re-growth samples collected from 2000-2004.

Plant Parts	# of samples	Nitrogen	Phosphorus		Potassium		Sulphur
		%	%	% P ₂ O ₅	%	% K ₂ O	%
Seed	6	2.35	0.39	0.90	0.59	0.94	0.22
Straw	72	1.10	0.12	0.28	1.64	2.62	NA*
Regrowth	19	1.87	0.18	0.41	1.80	2.88	NA*

*Samples were not analyzed for sulphur. Oregon data indicates grass seed straw contains 0.25% sulphur. Grass hay contains 0.25% sulphur which was used to calculate the amount of sulphur in re-growth

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Discussion of results

Using the data from **Table 1** we can estimate the nutrient removal by a 500lb/ac creeping red fescue seed crop that produces 1 ton/ac of straw and 1/2 ton/ac of re-growth (**Table 2**). The amounts of nutrients removed from the soil will vary depending on crop yield.

The decision to retain straw and/or fall re-growth on the field will reduce the amounts of nutrients removed from the field. Nutrients such as nitrogen, phosphorous and sulphur in straw and re-growth which remain on the field will not be readily available to the crop the following year.



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More discussion of results

Table 2. Estimated average fertilizer equivalent of nutrients (lbs/ac) in red fescue seed crop

Assume 500 lbs/ac of seed, 1 ton/ac of straw and ½ ton/ac of re-growth.

	N	P ₂ O ₅	K ₂ O	S
Seed	11.8	4.5	4.7	1.1
Straw	22.0	5.5	52.5	5.0
Regrowth	18.7	4.1	28.8	2.5
TOTALS	52.5	14.1	86.0	8.6

The data in **Table 2** can be used to calculate the value of nutrients removed when seed and straw is removed from a creeping red fescue seed crop. A large amount of nutrients are taken from the field if straw is baled and removed. There is a trend for some creeping red fescue growers to leave straw on the field as newer combines do a reasonable job of chopping and spreading straw.

Nitrogen must be supplied to a first year stand of fescue unless the fescue crop was established on fallow or on stubble where there is nitrogen carryover from the previous annual crop. Generally, soil nitrogen levels will be very low after the first seed crop is harvested.

The amount of **phosphorous** (P) used by a fescue seed crop is low. The amount of P in the soil available for crop production is related to previous phosphate fertilizer applications. Growers with fescue in annual cropping rotations may have sufficient amounts available in the soil since they apply phosphate each year when seeding annual crops. There may be sufficient P available to meet the needs of the fescue crop. Phosphorus in grass residue left on the soil surface takes a considerable amount of time before it becomes available for crop use. Applying P prior to grass seed establishment or an annual broadcast application will supply phosphorous to the fescue crop.

Potassium removed in the seed of a fescue crop is minimal but the amounts found in the straw and fall re-growth is very high. Fortunately potassium is readily leached from grass seed residue left on the soil surface and is readily available for plant growth. Most Peace Region soils have adequate to high amounts of available potassium. Oregon recommendations are that when soil potassium levels in the top 6 inches are greater than 150 ppm (300 lbs/ac) applications of potash fertilizer are not required (Hart et al., 2005). In Alberta 250-300 lbs/ac of potassium is considered adequate for crop production.

Levels of **sulphur** in the seed of a fescue crop are low. Most of the sulphur is found in straw and the re-growth. The release of sulphur from straw and re-growth left on the soil surface is slow and would not be available to the crop the following year. Grey wooded soils are typically low in sulphur.

Summary

The amounts of nitrogen and potassium utilized by a creeping red fescue seed crop can be quite high. Nutrients in the seed that are actually removed from the field are relatively low. The majority of nutrients required to grow a fescue seed crop remain in the straw and fall re-growth. Straw and fall re-growth are high in potassium.

If the residue is left on the field, potassium is easily leached from the plant material, and readily available for following crops. Other nutrients such as nitrogen, phosphorous and sulphur found in residue on the soil surface require several years to be converted to forms available for plant growth. The information here can be used by producers to estimate the nutrients removed when growing creeping red fescue for seed. Farmers are advised to continue soil testing and apply recommended types and rates of nutrients.



References

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