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## DON'T NEGLECT NUTRIENT APPLICATIONS FOR FORAGE CROPS

**Of all the crops grown on farmer's fields, forage crops tend to utilize and remove large amounts of nutrients.**

The majority of top growth for these crops is removed as part of harvesting. In most grain crops, only the harvested grain and associated nutrients are exported from a field, leaving and spreading the crop residues (chaff and straw) back to the soil surface. These residues contain crop nutrients that are recycled into the soil during normal decomposition processes. Table 1 provides a comparison of how barley used as a silage crop removes more nutrients, compared to a barley crop managed as a grain crop. Also included for comparison is a similarly yielding alfalfa hay crop.

**Table 1.** Nutrient Removal of a Barley Crop, Used for Silage or Grain, lb/bu

Crop	Removal of nutrients, lb/A			
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	S
<sup>1</sup> Barley grain, 85 bu/A	84	34	27	7.7
<sup>2</sup> Barley silage, 4.5 t/A (approx. 85 bu/A grain equivalent)	155	53	123	18
<sup>1</sup> Alfalfa Hay Crop, 4.5 t/A (DM)	230	54	220	24

<sup>1</sup>IPNI Nutrient Removal Calculator <http://ipni.info/calculator>; <sup>2</sup>Adapted from Nutrient Uptake and Removal by Field Crops: Western Canada. Canadian Fertilizer Institute. 2001. DM = Dry matter yield

**Replacement of nutrients removed in forage crops is important to the long-term nutrient status of soils.** As shown in Table 1, a barley silage crop removes almost twice as much N, P and S compared to a barley grain crop. Additionally there is almost five times as much K removed. Unfortunately many forage crops do not receive nutrient additions in balance compared to the volume of nutrients removed. Because of this the forage yields of long-term hay or silage stands tend to decrease over time, and if the forage stand is terminated and the field is rotated into a grain crop there is often a need to add higher than normal rates of nutrients using fertilizer or manure to achieve wanted and expected yields.

**I find that the hesitancy on the part of farmers and ranchers to balance nutrient removals with nutrient additions for forage crops is due to an undervaluing of the forage grown.** I was involved in a fertilizer research demonstration project on a ranch near Invermere, BC. The ranch manager complained to the local fertilizer retailer that he didn't think they got a sufficient increase in forage yields from applied fertilizer, and asked if there was a way to show that spending for fertilizer was economically beneficial. This was on a mixed stand of grass and alfalfa fields or pastures (50% grass and 50% alfalfa) that were normally grazed until mid July and then allowed to grow for hay cut in early September. I helped the retail agronomist to set out a simple fertilizer response trial, in order to accurately measure the effect on forage hay yields. The addition of fertilizer increased the yield to 4.5 t/A compared to 2.9 t/A where no fertilizer was applied. Using local costs for fertilizer and value of hay, the net return of the fertilizer applied was calculated as follows. The fertilizer cost was \$34.50/A, for 75 lb N, 60 lb P<sub>2</sub>O<sub>5</sub>, 100 K<sub>2</sub>O, 30 S, and 1 lb B. Hay yield was increased by 1.6 t/A and the value of hay was \$80/t. The value of the increased hay yield was 1.6 t x \$80/t for \$128/A. The net return was \$93.20/A, a return of \$2.7 for every dollar invested in fertilizer, an excellent amount of realized profit.

**In my opinion farmers and ranchers are often missing out on potential increases in forage yields and increased net returns by not optimally fertilizing their forage crops.** It is interesting to me that I was asked to attend a series of alfalfa production seminars in a ranching area of central BC, this past winter. I gave a presentation on alfalfa nutrition management. There is considerable interest in growing higher yielding and improved quality alfalfa for a growing export hay industry. Many ranchers and farmers who were previously hesitant to apply much fertilizer on their alfalfa crops are now motivated to grow higher yields. It wasn't that fertilizing forage crops wasn't economic previously, as shown in the example above, but with hay prices even higher for the export market, the increased motivation to apply more nutrients is there. I recommend all farmers and ranchers work with their local ag-retail agronomist and evaluate the return on investment of fertilizer applied to forage crops. The net returns are usually surprisingly positive.

– TLJ –

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Abbreviations: N = nitrogen.

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