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# ***Nutrient Removal in Seed & Straw of Grass Seed Crops***

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Combining fescue and straw being baled in the background.

**Introduction**

Grass seed and straw samples were collected and analyzed for nutrient concentration from 2002 to 2004 by the Peace Region Forage Seed Association. The data is summarized below in Tables 1 and 2.

Samples were collected from:

- \* Creeping red fescue
- \* Timothy
- \* Smooth bromegrass
- \* Meadow bromegrass
- \* Tall fescue and,
- \* Perennial ryegrass

Table 1. Average nutrient concentration of forage seed straw.

| Crop                | # of samples | Nitrogen | Phosphorous |                                 | Potassium |                    | Sulfur <sup>1</sup> |
|---------------------|--------------|----------|-------------|---------------------------------|-----------|--------------------|---------------------|
|                     |              | %        | %           | % P <sub>2</sub> O <sub>5</sub> | %         | % K <sub>2</sub> O |                     |
| Creeping red fescue | 72           | 1.1      | 0.1         | 0.3                             | 1.6       | 2.0                | 0.3                 |
| Timothy             | 38           | 0.8      | 0.1         | 0.2                             | 1.0       | 1.2                | 0.3                 |
| Smooth bromegrass   | 14           | 0.9      | 0.1         | 0.2                             | 1.1       | 1.4                | 0.3                 |
| Meadow bromegrass   | 34           | 1.1      | 0.1         | 0.2                             | 1.7       | 2.0                | 0.3                 |
| Tall fescue         | 31           | 1.3      | 0.1         | 0.3                             | 2.1       | 2.5                | 0.3                 |
| Perennial ryegrass  | 2            | 1.1      | 0.1         | 0.3                             | 2.0       | 2.4                | 0.3                 |

**References**

Hart J.M., N.P. Anderson, A.G. Hulting, T.G. Chastain, M.E. Mellbye, W.C. Young III, and T.B. Silberstein. September 2012. Postharvest Residue Mgmt for Grass Seed Production in Western Oregon. OSU EM 9051.

Yoder, Calvin & Sandra Burton. Feb 2011. Seedhead factsheet #1: Nutrient Removal in Creeping Red Fescue Seed Crops.

Table 2. Average nutrient concentration of forage seed seeds.

| Crop                | # of samples | Nitrogen | Phosphorous |                                 | Potassium |                    | Sulfur <sup>1</sup> |
|---------------------|--------------|----------|-------------|---------------------------------|-----------|--------------------|---------------------|
|                     |              | %        | %           | % P <sub>2</sub> O <sub>5</sub> | %         | % K <sub>2</sub> O |                     |
| Creeping red fescue | 5            | 2.4      | 0.4         | 0.9                             | 0.6       | 0.7                | 0.2                 |
| Timothy             | 5            | 2.9      | 0.4         | 0.9                             | 0.6       | 0.7                | 0.2                 |
| Smooth bromegrass   | 5            | 2.4      | 0.3         | 0.8                             | 0.7       | 0.8                | 0.2                 |
| Meadow bromegrass   | 5            | 2.5      | 0.3         | 0.7                             | 0.6       | 0.7                | 0.2                 |
| Tall fescue         | 1            | 1.9      | 0.4         | 0.9                             | 0.7       | 0.8                | 0.2                 |
| Perennial ryegrass  | 1            | 1.6      | 0.4         | 0.8                             | 0.6       | 0.7                | 0.2                 |

<sup>1</sup> Sulfur was not analyzed in Peace samples. Data is from Oregon State University research.



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Table 3. Average nutrients removed from the soil in 1000 lbs of straw and 500 lbs of seed of commonly grown grass seed crops in the Peace River Region.

| Crop                | Nitrogen removal (lbs) |      | P <sub>2</sub> O <sub>5</sub> removal (lbs) |      | K <sub>2</sub> O removal (lbs) |      | Sulphur removal (lbs) |      |
|---------------------|------------------------|------|---|------|--------------------------------|------|-----------------------|------|
|                     | Straw                  | Seed | Straw                                       | Seed | Straw                          | Seed | Straw                 | Seed |
| Creeping red fescue | 22                     | 12   | 6   | 4    | 40                             | 4    | 5                     | 1    |
| Timothy             | 16                     | 15   | 4   | 5    | 23                             | 3    | 5                     | 1    |
| Smooth brome        | 17                     | 12   | 4   | 4    | 27                             | 4    | 5                     | 1    |
| Meadow brome        | 21                     | 12   | 5   | 3    | 40                             | 3    | 5                     | 1    |
| Tall fescue         | 27                     | 10   | 6   | 4    | 50                             | 4    | 5                     | 1    |
| Perennial ryegrass  | 23                     | 8    | 6   | 4    | 49                             | 4    | 5                     | 1    |

## Results and discussion

Looking at individual nutrients:

- \* Nitrogen removal with seed harvest is approximately 10 to 25 lb/500 lb seed. The total N range in seed and straw is 30 to 40 lb/1000 straw. Except for timothy, N removed in seed is about half the amount contained in straw. For timothy, the amount of N in seed and straw is about equal, 15 lb N.
- \* Phosphate (P<sub>2</sub>O<sub>5</sub>) removal is similar in seed and straw and generally low in all crops.
- \* Potash differs substantially from other nutrients as the amount of potash in straw is 5 to 10 times the amount in seed. Only 3 to 4 lb potash is contained in 500 lb grass seed compared to 40 to 50 lb potash in 1000 lb straw.
- \* Sulfur removal is low in all seed and straw.

If residue is left on the field:

- \* Potassium is readily leached from the straw. Leaching with as little as 1/4" of rain provides plant available K. Slow or soaking rainfall of ~1" will remove most of the K from straw. The potash removed is entirely plant available and remains in the surface inch or two of the soil.
- \* In contrast to potash, other nutrients in straw aren't made available to the next crop as quickly. For nitrogen, phosphorous and sulfur in straw to become available to subsequent crops, microbial decomposition is necessary.

Left photo: Straw bales after combining grass seed.

Right photo: Swathing fescue.



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