# Effect of Fall Harvesting Date on Stubble Turnip Yield and Quality

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Stubble turnips are grown as a fall and winter grazing crop for sheep. They are commonly used in the U.K. and New Zealand and to a lesser extent in Atlantic Canada and parts of the USA. Stubble turnips are used on a very limited basis in Ontario at present.

This study was designed to examine the effect of different fall harvesting dates on the moisture, yield, and quality of turnip tops and roots. Two varieties (Barkant - Emerald Seeds, Dobbinton, ON; Laurentian - Labonte Seeds, New Liskeard, ON) and a common # 1 seed lot (Bishops Seeds, Belleville, ON) were drilled in 18 cm rows at 2.5 kg/ha in replicated small plots on June 22, 1998. Harvest dates were November 5, November 18, and December 03, 1998. On each date, a subsection of each plot was harvested by hand in two parts, tops and roots. Dry matter content and yield were calculated for each plot and a subsample of tops and roots was ground and analysed for crude protein, acid detergent fibre (ADF) and neutral detergent fibre (NDF). Data presented are averages of the three varieties with the exception of Table 3.

**Results:**

The dry matter content of the turnip tops decreased over the three harvest dates while the root dry matter content stayed relatively constant (Table 1). As expected, the roots had a much lower DM content than the tops. Note that moisture content can be calculated as (100 - %DM). Previous experience has shown that perennial grass pastures grazed in fall have a DM content of 20 to 35% on average, although grasses that have been repeatedly frozen may have a DM content around 50%. Thus the dry matter content of turnip roots is much lower than what one would find in stockpiled perennial pastures.

**Table 1. Percent dry matter of turnip tops and roots on three harvest dates[1].**

| Portion | Nov. 05 | Nov. 18 | Dec. 03 |
|---|---|---|---|
| **Tops** | 31.7* | 28.0 | 23.8 |
| **Roots** | 10.7 | 9.3 | 9.5 |

**1. Each value reported is the average of three seed lots (Barkant, Laurentian, and common seed) and represents the average of 24 plots**

Top yield decreased with time in the fall while root yield did not (Table 2). This would be expected since tops continue to senesce as the fall progresses but the roots are relatively unaffected by fall weather. Due to the loss of top yield over the fall, the top:root ratio also declined (Table 3). The variety Barkant had more top yield than root yield on the first harvest date, but by the final harvest enough tops had died that the ratio was less than 1 (meaning more root yield than top yield (Table 3). The variety Laurentian is actually a sweet rutabaga which is intended for human consumption, thus it generally has a higher root yield than top yield. This ratio was less than one on the first harvest date but declined to only 0.26 by the final harvest (Table 3).

**Table 2. Dry matter yield (kg/ha) of turnip roots and tops at three harvest dates[1].**

| Portion | Nov.05 | Nov.18 | Dec.03 |
|---|---|---|---|
| **Yield Tops** | 2630* | 2006 | 1511 |
| **Yield Roots** | 3634 | 3384 | 3885 |
| **Yield Total** | 6264 | 5390 | 5396 |
| **Maximum Top Yield** | 4346 (Barkant) | 3137 (Barkant) | 2266 (Barkant) |
| **Maximum Root Yield** | 4733 (Laurentian) | 4591 (Laurentian) | 4965 (Laurentian) |

1. Each value reported is the average of three seed lots (Barkant, Laurentian, and common seed) and represents the average of 24 plots

**Table 3. Top:root ratio of two contrasting turnip varieties at three fall harvest dates[1].**

| Variety | Nov.05 | Nov.18 | Dec.03 |
|---|---|---|---|
| **Barkant** | 1.52 | 1.17 | 0.64 |
| **Laurentian** | 0.42 | 0.39 | 0.26 |

[1] Each value represents the average of 8 plots.

Top and root quality did not vary greatly over the three harvest dates and no particular pattern of change was evident (Table 4). Top crude protein was higher than root crude protein, but fibre levels were also higher in the tops. The turnip roots were notable for extremely low ADF and NDF levels (ie: very low fibre).

**Table 4. Feed quality of turnip tops and roots at three fall harvest dates[1].**

| Portion | Nov.05 | Nov.18 | Dec.03 |
|---|---|---|---|
| **Tops** | | | |
| Crude Protein | 13.9 | 14.6 | 15.0 |
| ADF | 18.5 | 20.6 | 20.9 |
| NDF | 34.9 | 34.3 | 31.2 |
| **Roots** | | | |
| Crude Protein | 11.0 | 12.0 | 11.0 |
| ADF | 13.9 | 15.3 | 14.5 |
| NDF | 19.6 | 21.5 | 20.9 |

1. Each value reported is the average of three seed lots (Barkant, Laurentian, and common seed) and represents the average of 24 plots

**Summary and Interpretation:**

Turnip tops declined in yield as the fall progressed but the roots did not change. Forage quality was also largely unchanged over the fall sampling period. Turnip roots were shown to have very low levels of dry matter and fibre.

Given the decline in top yield over time, it is recommended that the tops be grazed early in the fall before significant losses are incurred from freezing and subsequent leaf loss. Roots can be grazed later assuming the snow is not too deep. Top quality appears to be quite satisfactory for mature sheep. The composition of the turnip roots causes some concern due to their low dry matter and fibre content. The low dry matter levels (ie: high moisture) might limit dry matter intake, while rumen function could be impaired due to lack of fibre in the rumen. In field trials with grazing sheep, we have fed about 0.4 kg or dry hay per ewe per day when only turnips roots were left to graze. No animal health or condition problems were observed or measured when this practice was followed (see separate report for animal performance data). Overall, it appears that stubble turnip roots provide a "weatherproof" form of stockpiled feed which may fit into a system following stockpiled perennial forages.