

Nutritional Value and Integration of Hybrid Willow and Poplar as Fodder for Sheep

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Project summary

This project used a retired biomass experiment established in 2007 by the Canadian Forest Service. The site contains seven fast growing poplar hybrids and seven willow varieties. The project assessed the nutritional value of the tree leaves, as well as sheep preferences for different varieties. The trees were assessed daily for signs that the sheep had been eating them, and forage samples were taken in August of 2015 and 2016.

Results

According to the forage analysis, the trees provided adequate crude protein and more net energy than required for maintenance. Total digestible nutrients exceeded recommendations. Along with very high RFQ index values (167 to 230) and DMI estimates (4.01 to 5.13% body weight), the analysis indicates that the new regrowth from the trees is very digestible. No tree variety exceeded the maximum tolerable level of any micronutrient. Across both years, all trees contained more iron, manganese, and zinc than required by the sheep. The range of calcium, magnesium, sulphur, potassium, and copper content fell within or above the ewes' requirements. Phosphorus contents fell within or below the recommended range, and the trees did not provide adequate sodium. For a tree-based diet to meet the ewes' demands, a salt supplement is required.

Sheep preference did not change significantly over the two year study period. Overall the sheep seemed to cluster their preference of trees with similar genetics. This indicates that the flock could tell the difference between species, but

not varieties that share a parent species. The sheep showed a preference towards trees with higher calcium in 2015 and tended to avoid trees with higher copper levels.

In 2016, sheep selected for higher NDFD-48, which is the fraction of NDF that is digestible within 48 h in vitro. Some site-specific factors caused interesting observations. The soil had very high sulphur content (19 ppm), which tied up plant-available molybdenum. Because of this, the leaves did not contain enough molybdenum to meet sheep requirements.

The researchers were concerned that the molybdenum deficiency combined with adequate copper content in a highly digestible feed may create a potential risk for chronic copper poisoning in the flock. The flock veterinarian was consulted and, under their advice, the trial continued in 2016 with the addition of a trace mineral supplement (MasterFeeds GoalMaker). Even though the copper levels in the browse were higher in 2016 than 2015, the sheep no longer seemed to avoid copper. If they could detect the trace mineral imbalance in 2015 and consciously try to correct it, this could have important benefits to sheep welfare. However, more research is needed to understand if this is the case.

For farmers looking to use this method to feed their flock, trees could be used to fill the "summer slump" in pasture growth. Since the trees are very digestible, they are a suitable food source but not for very long, unless fibre is supplemented with hay or straw. With a mineral supplement to provide salt, trees can be a nutritionally viable feed for sheep. **OSN**

