RFV vs. RFQ

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RURAL AGRI-INNOVATION NETWORK

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RFV and RFQ are two different indices that let us compare different forages quickly. The RFQ has been created to overcome the weakness that the RFV has, such as the fact that two forages with the same RFV do not always perform the same. RFQ has proven to be the easier and more reliable index when looking at feed value.

Thanks to our farmers co-operators for their assistance with this project.

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Relative Feed Value (RFV) vs. Relative Forage Quality (RFQ)

In 2007 a short rotation woody coppice plantation was established by the Canadian Forest Service to assess the potential of fast growing willow and poplar for bioenergy. A section of this plantation was fenced off in 2015. The idea of this project was to determine if willow and poplar regrowth would be an adequate food source for sheep to browse on. While suitable as short-term forage, the leaves and young stems may not have enough indigestible fibre for optimal rumen health. When the trees were analyzed, RFV and RFQ were taken into account. RFV and RFQ are two different indices that let us compare different forages quickly. RFV is a comparison to alfalfa, which is 100; other feeds may score higher or lower depending on their ADF and NDF contents, which are estimates of digestibility and dry matter intake. RFQ is a more robust calculation that factors in crude protein and fatty acid contents, as well as fibre.

The RFQ index is an improvement over RFV when someone is buying or selling forages as it can better predict the performance from the cattle that were fed that forage. The RFQ has been created to overcome the weakness that the RFV has, such as the fact that two forages with the same RFV do not always perform the same. RFQ has proven to be the easier and more reliable index when looking at feed values. When looking at the nutrient analysis the trees provide a very high value for both RFV and RFQ. The chart (below) shows the typical value for alfalfa on both RFV and RFQ, and when comparing it to the trees values it show much higher.

	Alfafla	120-130	110-139
	Sample ID	RFV	RFQ
Willow	CHARLIE	118.96	186.18
Willow	PSEUDO	140.37	180.82
Willow	HOTEL	147.49	167.36
Willow	INDIA	133.59	198.12
Willow	SV1	169.53	218.50
Willow	SX61	169.76	202.01
Willow	SX64	161.82	218.83
Poplar	2293-19	174.47	229.51
Poplar	DN-136	180.94	196.21
Poplar	NM-6	182.47	195.03
Poplar	NM-1	145.72	199.73
Poplar	DN-34	165.27	188.10
Poplar	BROOKS 1	181.56	214.67
Poplar	GREEN GIANT	177.24	209.12

REGEN FORESTRY

ONTARIO Sheep

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Sheep Preferences 2016

METHOD

Sheep were rotated through three paddocks planted with biomass-producing varieties of willow and poplar. The flock was monitored daily to determine how early and completely they browsed the new leaves and stems. The order and extent to which they ate each variety was noted, and ranked from most to least preferred. The ewes were given a mineral supplement to balance their tree based diet. The sheep were moved when forage became limited and flock behaviour changed, which was an average of 5.75 days.

Sheep Preference Ranking

W= Willow   P= Poplar

Charlie	Pseudo	Brooks #1	DN-34	Green Giant	SX61	SX64	DN-136	India	SV1	2293-19	Hotel	NM-1	NM-6
W	W	P	P	P	W	W	P	W	W	W	W	P	P

Delicious ——————————————————————————→ Yuck

RESULTS

When looking at the preferences, the varieties with similar genetics tend to be grouped together:

- Charlie and Pseudo = Salix alba
- India and SV1 = Salix dasyclados
- NM-1 and NM-6 = Populus nigra
- Brooks #1, Green Giant, DN-136, and DN-34 = Populus deltoides

In addition, the trees with Populus deltoides genetics were much slower to grow back after being browsed.

Pre grazing   **Post Grazing**

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Sheep Preferences: 2015 vs. 2016

2015

1
SX61 (Willow)
SX64 (Willow)

2
SV1 (Willow)

3
Charlie (Willow)
Pseudo (Willow)

4
India (Willow)

5
2293-19 (Poplar)
DN-34 (Poplar)
DN-136 (Poplar)
Hotel (Willow)
NM-1 (Poplar)
NM-6 (Poplar)

2016

1
Charlie (Willow)
Pseudo (Willow)

2
Brooks #1 (Poplar)
DN-34 (Poplar)
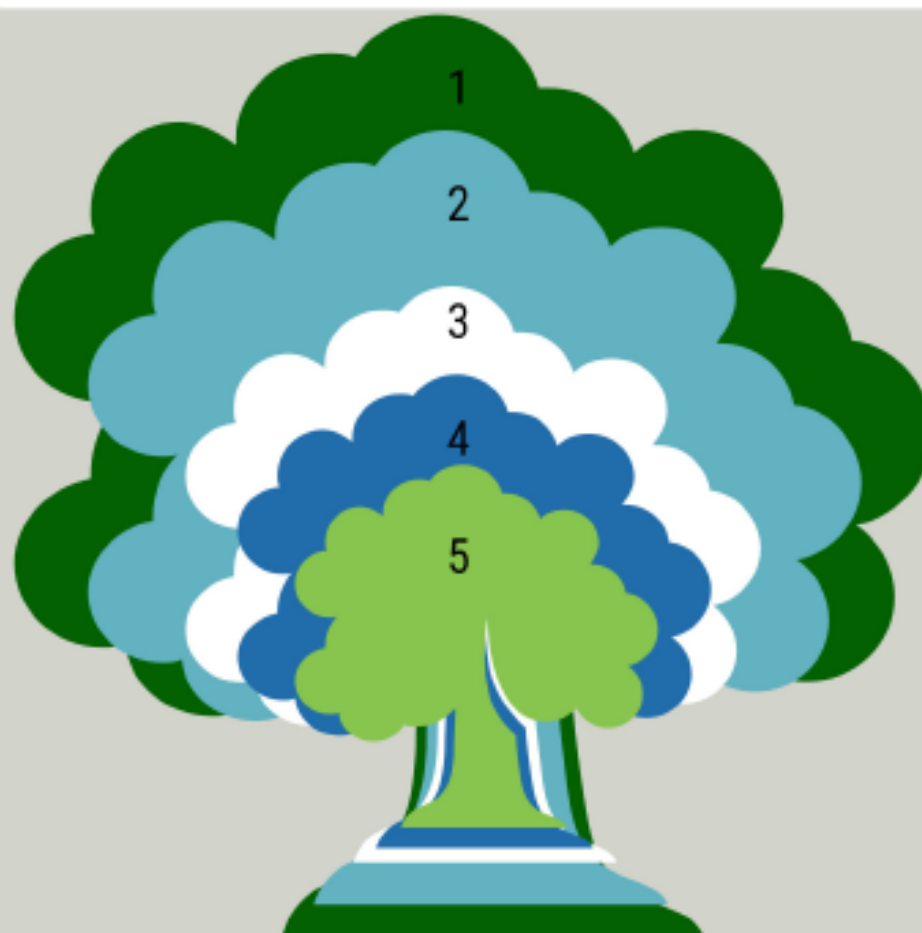Green Giant (Poplar)
SX61 (Willow)
SX64 (Willow)

3
DN-136 (Poplar)
India (Willow)
SV1 (Willow)

4
2293-19 (Poplar)

5
Hotel (Willow)
NM-1 (Poplar)
NM-6 (Poplar)

1
2
3
4
5

- Sheep clearly preferred willows over poplars

- Based on forage nutrient analysis, sheep seemed to prefer trees with higher calcium and avoid trees with higher copper contents

- A mineral supplement was provided to balance the diet

- Sheep no longer showed a clear preference of one tree genus over another; they instead preferred specific varieties consistently

- Based on forage analysis the sheep seemed to prefer trees with more NDFD (48hr).

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Nutritional Value of Trees: 2016

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RAIN has partnered with Ontario Sheep and Marketing Agency to investigate whether fast growing coppiced trees can be nutritionally and economically viable fodder source for sheep.

Thanks to our farmers co-operators for their assistance with this project.

In 2007 a short rotation woody coppice plantation was established by the Canadian Forest Service to assess the potential of fast growing willow and poplar for bioenergy. A section of this plantation was fenced off in 2015. The idea of this project was to determine if willow and poplar regrowth would be an adequate food source for sheep to browse on. The trial was designed to see if there were any preferences among the sheep between tree type or variety. The sheep were monitored over a one month period, and samples of re-growth were taken to determine the nutrient content. The sheep were provided with mineral supplement; MasterFeeds GoalMaker.

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The chart (below) compares what the sheep need and what the trees provide. Iron, copper, manganese and zinc have a MTL (maximum tolerable level) to prevent toxicity. It was noted that the trees did not contain the maximum level, making them safe to eat. When looking at what the sheep do need, some of the trees contained more potassium, iron, manganese and zinc than required. Calcium, magnesium, sulphur and copper were all either within or above the recommended amount. Phosphorus was either below or within the levels, and only sodium was not present in high enough amounts for the sheep's diet.

Ewe maintenance requirement in diet that is 100% forages, based on DM content

		CP (%)	Ca (%)	P (%)	Na (%)	Mg (%)	K (%)	S (%)	Fe (ppm)	Cu (ppm)	Mn (ppm)	Zn (ppm)
		9.4	0.2-0.82	0.16-0.38	0.09-0.18	0.12-0.18	0.5-0.8	0.14-0.26	30 to 50	11 to 7	20 to 40	20 to 33
								MTL:	500	25	1000	750
Species	Variety	CP (%)*	Ca (%)	P (%)	Na (%)	Mg (%)	K (%)	S (%)	Fe (ppm)	Cu (ppm)	Mn (ppm)	Zn (ppm)
Willow	Charlie	9.76	1.03	0.14	0.01	0.29	1.34	0.62	71.04	9.76	73.94	77.24
Willow	Pseudo	8.07	1.06	0.14	0.01	0.17	0.57	0.15	113.95	8.07	108.3	192.89
Willow	Hotel	8.97	1.48	0.09	0.01	0.37	0.57	0.28	60.05	8.97	159.14	183.49
Willow	India	16.6	1.27	0.16	0.01	0.37	0.88	0.66	165.46	16.6	566.55	319.53
Willow	SV1	11.56	1.67	0.25	0.01	0.24	1.11	0.59	140.75	11.56	426.31	244.51
Willow	SX61	12.7	1.48	0.18	0.01	0.16	1.69	0.43	79.8	12.7	169.74	261.88
Willow	SX64	11.26	1.34	0.21	0.01	0.16	1.67	0.44	109.2	11.26	258.5	213.7
Poplar	2293-19	18.35	1.22	0.18	0.01	0.3	1.34	0.61	53.6	18.35	79.95	175.39
Poplar	DN-136	17.13	1.19	0.17	0.01	0.33	2.18	0.95	91.45	17.13	104.19	189.04
Poplar	NM-06	12.8	0.87	0.14	0.01	0.22	1.38	0.44	61.46	12.8	79.16	162.51
Poplar	NM-01	14.88	0.7	0.16	0.01	0.18	1.87	0.23	66.35	14.88	114.44	152.14
Poplar	DN-34	7.86	1.32	0.12	0.01	0.24	0.48	0.14	129.1	7.86	66.8	202.31
Poplar	Brooks	15.84	1.12	0.21	0.01	0.39	2.15	0.9	138.49	15.84	58.25	242.14
Poplar	Green Giant	12.14	1.29	0.22	0.01	0.39	1.98	1.18	206.66	12.14	130.66	235.61

In conclusion, it seemed that the trees are a good source of nutrients and can supply an adequate amount, other than sodium. The best way to deal with lack of sodium is to supplement them with a salt lick. The best way to use trees as forage would be for dry ewes during the "summer slump" in pasture growth. While suitable as short-term forage, the leaves and young stems may not have enough indigestible fibre for optimal rumen health.