Fodder Tree Project

Poplar and Willow for Fodder

It is widely known in farming circles that poplar and willow are palatable to livestock, but the practice of feeding poplar and willow foliage varies greatly throughout the country. Some farmers consistently use this resource annually or during times of feed shortage, whereas others hardly use it at all.

In part this is due to a lack of readily available information for farmers and the fragmented nature of past research in this area, both serving to impede farmers' ability to use poplar and willow as an effective and ongoing fodder source.

Most of the East Coast of both the North and South Islands experiences regular and sometimes severe summer droughts, which significantly reduce livestock condition and productivity. The frequency and severity of droughts are expected to increase in many parts of New Zealand.

Many of the hundreds of thousands of willows and poplars on farms can be used to supply supplementary feed during droughts. It is readily available and is cheaper than buying in and transporting other supplements.

The Project

In drought-prone parts of the lower North Island, a project commenced recently to unite several groups involved in poplar and willow fodder research and management, and to disseminate key findings. This will enable farmers in the region and elsewhere in New Zealand, to effectively utilise and incorporate poplar and willow fodder into conventional livestock farming systems.

Findings from the project will assist farmers to sustainably use tree fodder to supplement pasture of low yield and poor quality, principally during drought, and as an alternative feed resource in other years.

The project aims to determine the effectiveness of using forage from trees already growing on the farm for other purposes, such as soil conservation, riparian management, shelter, timber or landscaping, for feeding livestock during droughts. It is also evaluating coppiced willows planted as special-purpose fodder banks in wet or waste areas of farms.

Central to the project are large grazing experiments involving sheep at Massey University's Riverside Farm. Ewe diets are supplemented with tree fodder during mating in late summer and early autumn, and the effects on lambing percentage, weaning weight and wool production determined. Cost/benefit analysis of the results of this research is being conducted and distributed to farmers.

Opportunity exists to develop guidelines for the management of trees for forage production, and for the feeding out of tree forage. This information will be based on the experiences of farmers who have used trees for forage, and on published information.

The project is funded mainly by MAF's Sustainable Farming Fund, with support from AGMARDT, Hawke's Bay Regional Council, Massey University, the Riverside Farm Research Trust, Greater Wellington Regional Council and the Willow and Poplar Research Collective.

More details about this project are provided at the MAF Sustainable Farming Fund website (http://www.maf.govt.nz/sff/), under the project title: Lower North Island Group for Drought Relief from Feeding Willow/Poplar (Contract Grant 01/208).

The Participants

This is a farmer-led, technology transfer project for three years, with regional council and technical support from a range of agencies.

- **Project Leader:** Peter Gawith farmer, Gladstone, Wairarapa
- **Contact Person:** Dave Cameron, Greater Wellington Regional Council, Masterton
- **Project Manager:** Dr Grant Douglas, AgResearch, Palmerston North
- Farmers in Wairarapa, Hawke's Bay, Rangitikei
- Hawke's Bay Regional Council, horizons.mw, Greater Wellington Regional Council
- AgResearch
- Baker & Associates
- Greenfields Communications (Deric Charlton)
- HortResearch
- Massey University

Project Results

Farmer case studies
During Spring 2001 farmers in Hawke's Bay, Rangitikei and Wairarapa were interviewed to obtain information on how poplars, willows and other plants could supply fodder for farm animals when they really needed it. The farmers provided a useful cross-section of current fodder tree use.

Benefits to Farm Animals
Although poplar and willow have been used as supplementary fodder for a long time, very little is known on the effect that this food source has on animal health and liveweight production. Some farmers suspect that stock condition and appearance are improved by the judicious use of poplar or willow fodder. Other farmers will use the fodder to maintain livestock weight during times of drought and view it as a short-term emergency feed.

More recently, trials undertaken by Massey University and the Greater Wellington Regional Council show that poplar and willow can improve ewe reproductive performance during times of drought, sometimes resulting in significant increases in lambing percentage.

Managing Fodder Trees
Currently most of the poplar and willow resource on farmland is generally planted for soil erosion control or riverbank protection, rather than for fodder production per se. Thus tree spacings and management regimes have generally not taken into account the role of fodder production, and farmers have until now, lacked any quantified means of estimating amounts of fodder available, how to manage the resource and safe but practical means of harvesting.

Estimation of Tree Fodder

- Dr Peter Kemp
  Institute of Natural Resources
  Massey University

Over summer 2002/3 a field technician was employed to assist with the cutting down of poplars and willows to measure the quantity of forage available to livestock present.

This work followed on from work last summer and the objective is to develop a method for estimating the forage available in poplars and willows. Trees were measured around Masterton, near Waipukerau and near Taihape.

The work was assisted by the cooperation of farmers in the three regions and the advice of Peter Cameron, Wellington Regional Council, and Neil Faulkner, Hawkes Bay Regional Council. Twenty trees were cut down and measured, including the removal of all edible forage (leaves plus fine stems of 5mm diameter or less).

Tangoio willow trees were measured in all three regions, and the data added to the predictive equation developed last year. The new data confirmed the sound relationship between dbh (diameter and breast height) forage per tree for Tangoio.

Veronese, Weraiti, Otahu poplars were measured near Masterton and Kawa poplar near Taihape. Veronese appears to produce more forage than the other cultivars measured.

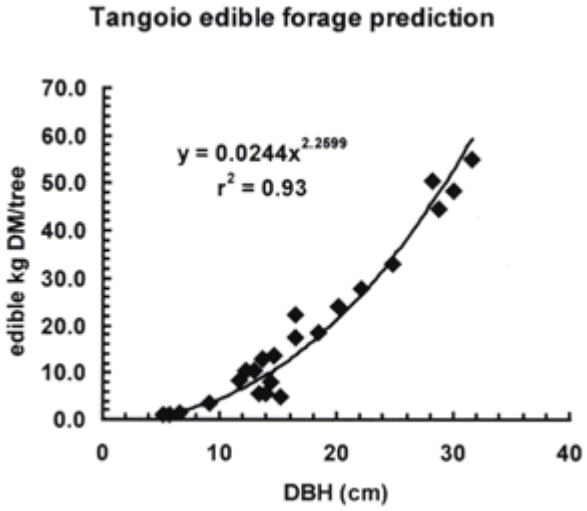
The relationship between dbh and forage per tree for poplar cultivars has greater variation than the relationship for Tangoio, but the predictive equations for both now are sufficiently sound to be used by farmers and advisers.

Future work will examine forage produced from trees that have been previously harvested, as to date only intact trees have been measured.

Tangoio edible forage prediction

Predicted edible forage in Tangoio willows using trunk circumference or diameter at breast height

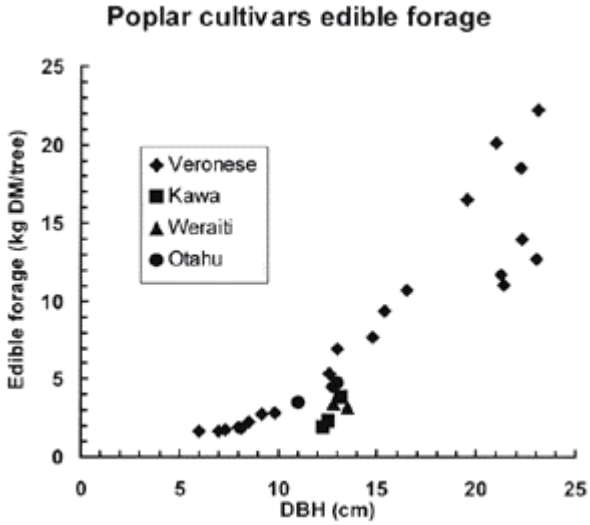
circumference (cm)	dbh (cm)	tree forage kg DM/tree
16	5	0.9
19	6	1.4
22	7	2.0
25	8	2.7
28	9	3.5
31	10	4.4
35	11	5.5
38	12	6.7
41	13	8.0
44	14	9.5
47	15	11.1
50	16	12.8
53	17	14.7
57	18	16.8
60	19	18.9
63	20	21.3
66	21	23.7
69	22	26.4
72	23	29.2
75	24	32.1
79	25	35.2
82	26	38.5
85	27	41.9
88	28	45.5
91	29	49.2
94	30	53.2



Poplar cultivars edible forage

Predicted edible forage (leaves and < 5 mm stem) in Veronese poplar trees using tree trunk circumference and diameter at breast height.

circumference (cm)	dbh (cm)	forage (kg DM/tree)
19	6	1.3
22	7	1.7
25	8	2.2
28	9	2.8
31	10	3.4
35	11	4.1
38	12	4.9
41	13	5.8
44	14	6.7
47	15	7.6
50	16	8.7
53	17	9.7
57	18	10.9
60	19	12.1
63	20	13.4
66	21	14.8
69	22	16.2
72	23	17.7



Farmer Case Studies

Overview

During Spring 2001 farmers in **Hawke's Bay**, **Rangitikei** and **Wairarapa** were interviewed to obtain information on how poplars, willows and other plants can supply fodder for farm animals when they really need it.

The farmers provided a useful cross-section of current fodder tree use. We thank these farmers for their generous co-operation. Of these farmers we found that:

- Two have used tree fodder for more than 20 years
- Seven have used tree fodder for at least 10 years
- One has established and used a coppice block for six years, and has a second block establishing
- Two others have recently planted their own coppice blocks
- Two don't use tree fodder by cutting, but value leaf fall from poplars during drought
- Using poplars and willows as a drought feedbank was the main use in Wairarapa, Hawke's Bay and coastal Rangitikei
- Safety during tree pruning was of general concern - one farmer had stopped pruning old trees because of this
- Cost-benefit concerns were raised by some farmers, but those relying on tree fodder during drought considered this use of great benefit
- Tree foliage quality aspects were seen as being the main benefit in Rangitikei

The Farmers