

CANCELLED
Regional Library
Ministry of Agriculture & Fisheries
Invermay Agricultural Research Centre
Private Bag
Mosgiel
New Zealand

FODDER TREES
a summary of current research
in New Zealand

Edited by
L.A. Logan
Crop Research Division, DSIR
and
J.E. Radcliffe
Agricultural Research Division, MAF, Lincoln

REPORT No. 106
August 1985



CROP RESEARCH DIVISION DSIR
PRIVATE BAG CHRISTCHURCH
ISSN: 0110 3725



AGRONOMY

NORTHLAND

FODDER TREE RESEARCH AT KAIKOHE

J. Rumball and B. Cooper, Grasslands Division, DSIR, P O Box 194, Kaikohe.

A preliminary evaluation of tagasaste at Kaikohe

Background

Deer farmers in Northland urgently require high quality mid-summer feed for lactating hinds. Tagasaste occurs widely on roadside cuttings, though it is doubtful whether it is adapted to the poorly structured soils of the region.

Approach

Three seed lines were planted on basaltic soils in late spring 1983 as a hedgerow and at wider spacing (1.5 m). The objectives were to observe genotype variation in growth and the effects of pests and diseases.

Results

About 1 month after planting, a 4-day warm, wet period resulted in all plants dying from root fungus. Replanting occurred in January '84 and subsequent similar climatic conditions have had similar though not such drastic results. The best of the survivors has dimensions of 1.8 m wide by 2.9 m high after 1.5 growing seasons.

The basalt has a free draining topsoil but a rather dense subsoil which is presumably causing the problem.

Browse plants offered to unweaned autumn lambs

Background

At Kaikohe, autumn-born lambs have been found to carry considerably higher gut parasite burdens than spring-born lambs. Browse material offered to unweaned lambs could have two advantages: provision of a diet more attractive and fibrous than the low DM pasture generally available in May/June, with perhaps quicker gut development, and feed free from nematode larvae.

Approach

A simple trial will begin in April 1985 in which a range of browse material will be offered to a treatment group of unweaned lambs in a creep system. The plants include the evergreen or semi-evergreen perennials tagasaste, Irish whin (thornless gorse), argentine alder (*Alnus jorullensis*), Humbolt willow (*Salix humboldtiana*), and tarata

(*Pittosporum eugenioides*) and a few short lived species such as red clover and tick beans.

Feed preferences, utilisation and lamb growth and parasite burdens will be monitored.

A preliminary evaluation of black locust (*Robinia pseudacacia*) in association with pasture

Background

Some Northland soils of volcanic origin have low available-water retention and poor rewetting properties. Even with good fertiliser and management inputs it seems unlikely that significant improvements in productivity can be made with shallow rooted pasture species. An association of pasture with the deeper rooted, deciduous, legume tree, black locust, might be of some long-term soil benefit.

Approach

A small area of pasture on a mature basaltic soil was space planted with 300 mm high black locust in spring 1984 at 1.5 m spacings.

Results

After two growing seasons, plant height averaged 1.8 m. During a very warm wet period in the first summer, 40% of plants died, probably from *Phytophthora*. There is conspicuous variation in plant form - including height, number and angle of branches, size of thorns and leaf size. No data are yet available as to effects on pasture or soil properties.

Evaluation of honey locust in Northland

Approach

Several seed lines and some grafted plants (about 800 in total) were established on the DSIR Kaikohe Station and on some farms, 4-5 years ago. The objectives were to compare genotypes, site effects, and to record growth and flowering behaviour.

Results

Rabbits as well as livestock, relished young plants but after year two, sheep could be grazed under the plants. There was considerable variation among lines in branching behaviour and thorniness. The thornless types also tend to be erect types.

There is considerable size variation among sites and even within sites indicating considerable sensitivity to soil conditions. On one apparently uniform site, plant height varies from 0.75 m to 4 m. Maximum height after 5

FODDER TREES

growing seasons is 5.5 m.

Exposure to wind on one site (5 km from the sea) has severely affected all plants, in some years effectively removing all new growth for the year. On another sheltered site with a sandy shallow soil, growth rates have averaged about 0.1 m/year.

Flowering behaviour is erratic. The

first plants flowered in year three - about 5%. Numbers flowering in years four and five were about 19% and 11%. Many plants flowering in one year did not do so the next year. The ratio of apparent male plants to female plants has also been erratic. In years three, four and five female plants comprised 3%, 15% and 14% respectively of the total flowering. By year five the greatest number of pods produced by a tree was 75.

WAIKATO

FODDER TREE RESEARCH AT WHATAWHATA HILL COUNTRY RESEARCH STATION

Malcolm J. Macfarlane, MAF, Whatawhata Hill Country Research Station, Private Bag, Hamilton.

Background

Research so far (1983-85) has been confined to an initial look at tagasaste (*Chamaecytisus palmensis*) and Tree medic (*Medicago arborea*) to gain experience in establishment and management. This was with a view of beginning a field programme in the future, if warranted, and as resources permit.

Establishment

Three hundred seeds of tagasaste (200 from DSIR Pukekohe hedge and 100 from DSIR Lincoln trees) plus 50 seeds of tree medic (ex University of Perugia, Italy) were raised in a glasshouse during 1983/84. They were planted in rows into a deep, well drained ash soil, pH 5.4, on a north aspect and 15° slope. Row spacing was 1.5 m and within row spacing 30 cm. Prior to transplanting, seedlings were trimmed to 30 cm to induce branching.

Observations

Tagasaste

(i) Establishment - transplants only established when rabbits were excluded from the trial area. Previously they had continued to defoliate all young plants. Continual releasing of transplants was required in the spring and summer, as competition (shading) by tall fescue and other resident species caused leaf fall and

subsequent plant death.

(ii) Root rot - mainly apparently healthy plants have died due to the collar rot *Phytophthora citricola*. This attacks even 2 year old trees causing rapid wilting, leaf fall and death. The fungus can readily be seen as a 'white collar' just beneath the soil surface on infected trees. Application of metalaxyl as 'Ridomil' has only been partially successful in controlling further plant death. Typically an area or group of trees become infected and the area enlarges, as trees on the edge die.

(iii) Spray damage - plants appear very susceptible to MCPB herbicide. A small drift from 500 m away in late autumn caused severe twisting of stems. All plants recovered, however.

(iv) Grazing management - recovery from grazing has been excellent. However sheep grazing of plants 1 m high has not been able to stop leaders forming. Topping has been necessary after grazing to avoid 'trees' forming. So far cattle have been unable to graze the top off plants, to avoid the necessity of hand topping.

Tree medic

(i) These plants have never looked good. They have only grown to 80 cm. No further work is planned.

Future Work

Proposed work with Stewart Ledgard, MAF, Soil & Plant Division, Ruakura Agricultural Research Station, will initially centre on nitrogen fixation studies in relation to grazing, and grazing plus topping treatments.

WANGANUI

TAGASASTE PILOT STUDY AT WANGANUI

Colin Bell, MAF, Batchelar Agriculture Centre, P O Box 1654, Palmerston North.

Preliminary work with tagasaste is underway at the MAF Wanganui Hill

Research Area.

Establishment

Seed was treated with concentrated sulphuric acid for 2 hr, rinsed with water and sown into seed flats and inoculated (mid March). Seed flats were placed in a controlled temperature

room at 15°C to germinate and then placed in a shadehouse. Seedlings were transplanted in the first week of May into PB5 planter bags and maintained in the shadehouse until late October.

On 25 October, 144 seedlings were transplanted at 4 m spacings onto a dry northerly hillside subdivided into 6 plots.

Management & measurements

The height, width and number of branches for all plants were recorded on 5 March 1985. Then three of the plots were then grazed with sheep and 3 plots had tagasaste plants trimmed to 20 cm.

The yield of leaf and stem material was recorded for the plants cut to 20 cm and measurements of grazed plants were made on 21.3.85 (Table 1).

Grazing reduced leaf material more than affecting height or width.

Plants will be observed and grazed in accordance with their growth response to the grazed and cut treatments, applied previously.

All plants suffered slight feeding damage from adult Fuller's Rose Weevil.

Table 1. Yield of leaf and stem

	All Plants measured 5.3.85	Grazed on 5.3.85 measured 21.3.85
Height (mm)		
mean	1062	787
sd	402	466
Width (mm)		
mean	261	213
sd	163	189
No. of Branches		
mean	13.6	10.6
sd	11.1	7.6
Cut on 5.3.85		
yield/plant (g)		
leaf mean	11.4	
sd	13.7	
Stem mean	22.3	
sd	26.1	

MANAWATU-Inland Hills

GROWTH, NUTRITIVE VALUE, AND PALATABILITY OF SHRUBBY FORAGE SPECIES GRAZED BY SHEEP AND GOATS IN HILL COUNTRY.

M.G. Lambert, Grasslands Division, DSIR, Private Bag, Palmerston North

Rows (5 or 10 m long) of shrubby species, planted at three spacings within rows, have been established at Ballantrae Hill Country Research Area, near Woodville. Plantings were made in spring 1983, autumn 1984 and spring 1984. Species are: broom (*Cytisus*

scoparius), wild gorse and short-spined gorse (*Vlex europaeus*), tagasaste (*Chamaecytisus palmensis*), tree medick (*Medicago arborea*), black locust (*Robinia pseudoacacia*), manuka (*Leptospermum scoparium*), tauhinu (*Cassinia leptophylla*), *Ceanothus griseus*, pampas grass (*Cortaderia selloana*) and toetoe (*Cortaderia fulvida*).

Growth rates, nutritive value, palatability of these shrubs to sheep and goats, and tolerance of grazing, will be assessed. No results have yet been obtained.

MANAWATU - Coastal Sands

TAGASASTE ESTABLISHMENT STUDIES

Erick Sorensen, MAF, C/- Flock House, Bulls.

Establishment on sandy dunes (Foxton dune soil type)

Container-grown plants 40-45 cm tall were transplanted on 2/8/83, into rows which were 1 m apart. Within rows plants were 0.5 m apart. There were 17 plants per row and 3 rows. Soil tests were pH 6.2, Ca 4, K 3, P 28, Mg 15, Na 7 and plants received 150 kg/ha of 15%

potassic super. By 2/12/83, the best plants had reached a height of about 60 cm and by 30/5/84 these had grown to 1.2 m. On 30/5/84 all plants were cut to 30 cm above ground, giving average yields of 1380 kg DM/ha, with a range of 1960 to 630 kg DM/ha among rows. By 21/12/84, the best plants had grown to 52 cm, a growth increment of only 20 cm. Plant survival averaged 86%.

Direct seeding into sandy soil (Himitangi No. 4 Sand)

Autumn seeding has the advantage of being able to utilise soil moisture which has often been depleted by