beef+lamb new zealand

RESEARCH AND DEVELOPMENT

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R&D BRIEF 125: ANNUAL LEGUMES ENHANCE ANIMAL PRODUCTION FROM SUMMER DRY PASTURES

This R&D Brief presents current knowledge on annual clovers for dryland pastures, derived mainly from the Max Clover project at Lincoln University. It refers to subterranean clover and touches on common adventive clovers such as suckling and the newly introduced annual balansa clover. Perennial legumes such as lucerne and white and Caucasian clovers will be covered in other R&D Briefs.

MAX CLOVER PROJECT

This Beef + Lamb New Zealand-funded project is being carried out by Lincoln University, with the aim to increase the profitability and flexibility of dryland farms through maximising clover in the sward. It involves -

- Developing grazing management guidelines for clovers so they provide high quality feed from August to October in summer dry areas.
- Matching clover species to the environment.

WHY CHOOSE ANNUAL LEGUMES?

Best in early spring

Annual legumes produce more in early spring than perennials. This is because annuals have lower optimum temperatures for germination and growth (10-15ºC) than perennial legumes (20-25ºC). Subterranean (sub) starts rapid growth at least a month earlier than lucerne and white and Caucasian clovers.

In favourable summer dry sites (shady hill faces, deep soils) the early spring production of annual clovers such as sub, followed by their strong fl ush in October/November, complements the start of rapid growth by perennials. In these sites a mix of annual and perennials gives a wide spread of legume production. Well-managed dryland pastures can get to 50% clover in the late spring when both annual and perennial clovers are growing rapidly as temperatures increase.

August pasture ideal for early lambing: 50% sub/50% grass

Fix nitrogen

Clover not only has high feed value itself but it also fixes nitrogen. This in turn increases the growth and feed value of the grasses. The result is greater animal production before the summer dry sets in (see R&D Brief 126 on legumes with cocksfoot).

Legumes fix about 25kg nitrogen/tonne(t) of legume dry matter (DM) grown. For example, 3t DM of sub clover grown over a year would fix at least 75kg nitrogen.

White clover can't survive drier sites

On drier sites (sunny hill faces, stony soils) most perennial legumes, with the exception of lucerne, are unproductive during dry summers and some may not survive summer drought (e.g. white clover). Annual clovers can survive from year to year as they set large amounts of seed before dying, ensuring a seedbank and rapid regeneration of seedlings with autumn rains.

On-farm example: Eleven-week old prime lambs (17kg CW average) off dryland hill pasture high in sub clover (about 40% of sward).

Enhanced stock production
Pastures with high legume content from August to November help lactating ewes milk well, ensuring rapid lamb growth. Grasses in the sward are also more palatable because of nitrogen fixation by clover. The end result is more lambs drafted by Christmas. Grazing animals, when given the choice, prefer a diet that is 70% clover and 30% grass.

Table: Legumes have impressive energy values (MJ ME/kg dry matter) and lose less energy value over time than grasses.

Clover	12
Lucerne pre-flower	12.2
Young grass leaf	11.5 (declines 0.03/day)
Grass stem	10
Dead grass	8
Pasture hay	7.3 – 8.4

ABOUT SUBTERRANEAN CLOVER

It is important to be able to identify what legumes you have, how much is there and where and when each thrives.

Biology of the plant
As sub is an annual, the seed germinates in autumn, flourishes and flowers in spring, and then dies off in summer. As plants mature in late spring/early summer seed burrs are buried in the soil.

Cultivars differ according to their flowering date, ability to handle dry or wet sites, leaf size and the degree of 'hardseededness' they set. Hard-seed helps protect against false strikes (where newly emerged seedlings die following autumn drought).

Production
Pure swards of sub clover produce four to ten tonnes DM/ha/year depending on rainfall. This production is similar to mixed grass/sub clover pastures at the same site.

However, clover content is likely to be only 20% of the total production in mixed pastures.

The Max Clover grazing experiment showed that superior clover content in sub/cocksfoot pastures gave greater liveweight gain/ha from August to October than white clover/ryegrass or white clover/cocksfoot pastures. For more see R&D Brief 126.

If you can't stand on sub in spring with every step you take walking accorss the paddock, then you don't have enough sub clover. The clover content in a deficient paddock may be increased by reducing grazing intensity during spring flowering and seed set, or drilling or broadcasting more sub seed in autumn.

For detailed information on sub cultivars, sowing and management see R&D Brief 127.

ON-FARM SUCCESS STORIES WITH SUBTERRANEAN

David Grigg, Tempello, has focused on promoting sub clover on his Marlborough dryland hill country property.

The proportion of lambs sold prime off the ewe before Christmas is strongly linked to the amount of sub clover in the sward. In years when sub clover flourishes in spring, 80% of lambs have been sold prime before Christmas at 10-12 weeks of age.

"WHEN SUB-CLOVER IS GOOD, WE CALCULATE IT'S USUALLY WORTH ANOTHER 8KG OF LIVEWEIGHT PER LAMB AT WEANING."

As an example, one year with low sub (<20%) Tempello only weaned 27kg lambs on average but the following year, with better management and high sub (>50%), lambs weaned at 35kg liveweight."

Sub fits with the Tempello system as about 65% of the year's feed is grown over the ninety days from September to the end of November.

To see good sub production in spring, David is careful to look after it following germination in autumn.

"This means not grazing it until it has four trifoliate leaves. If grass begins to dominate late autumn, give it a quick graze but don't set-stock on it."

"Don't be tempted to feed it to ewes, even if it is the only green following a drought."

Supplements are sometimes fed in autumn so subdominant pastures can be nursed for spring lactation.

"This is the money-making season."

In June, blocks are grazed to 700kg DM/ha to reduce grass competition come spring. Blocks are then given two months to produce feed cover before set-stocking in late August.

Every five years or so, a block will only be lightly grazed in spring, and then left to flower. This helps build up the seed bank.

"WE'VE ALWAYS HAD SUB CLOVER HERE BUT WITH FENCING AND BETTER UNDERSTANDING OF HOW TO MANAGE IT, WE CAN GET UP TO 60% OF SUB CLOVER IN THE SWARD IN SPRING."

Sub clover on Tempello hill country in spring, with farm consultant Peter Anderson.

USING BALANSA CLOVER

Biology of the plant
Balansa flowers earlier than most sub clover cultivars, providing high quality feed in August/September. It is a top flowering annual clover in contrast to sub that buries its seed burr. Balansa seed production is therefore more vulnerable to grazing during spring.

Production
Bolta balansa clover was included in the Max Clover grazing experiment. Progress is being made in understanding this promising clover so that management strategies can be recommended for its use in dryland farming systems.

VOLUNTEER ANNUAL CLOVERS

The four most common volunteer annual clovers are cluster, striated, suckling and haresfoot. Their distribution may indicate sites where more productive annual legumes will thrive.

Biology
All four of these small leafed species are 'top flowering' with a similar growth form to balansa clover. However, they have developed strategies to produce seed even under intensive grazing.

They are less productive and have lower grazing preference than sub clover but they still fix nitrogen with each tonne of leafy herbage (about 25kg N/tonne through pink root nodules).

Striated clover
Striated clover is the most easily confused with sub clover. Its leaves have no leaf mark and are more hairy than sub and feel like velvet. The flowers are pink and the seed head is spiky and harsh to touch.

Cluster clover
Cluster clover is hairless and can be confused with white clover. However, cluster has no stolons and smaller leaves. Its flowers are pink and have no peduncle (flower stem) and form a small ball at the base of each leaf stem (petiole).

Suckling clover
Suckling clover has yellow flowers and the short stem from the middle leaflet is longer than the stems on the two side leaflets. Its leaflets are heart shaped but hairless.

Haresfoot clover
Haresfoot clover (trefoil) is grey green because of dense hairs covering the plant. Its leaves are narrow and the pink flower/seed head look like a hare's foot. In a good year, on sunny faces where it is dominant, the hills take on a pink hue.

MORE INFORMATION

For further information freephone Beef + Lamb New Zealand on 0800 BEEFLAMB (0800 233 352) or email enquiries@beeflambnz.com or visit www.beeflambnz.com

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