FARM

beef+lamb new zealand

FACT SHEET

JANUARY 2020

PRODUCTION AND PERSISTENCE OF DRYLAND PASTURES

In dryland areas, pasture needs to grow but also last; persistence being critical to long term feed management.

Over a nine year period, Lincoln University's Dryland Pastures Research Team measured two main factors defining persistence, yield and botanical composition. The system investigated included traditional ryegrass/white clover, cocksfoot and sub clover, plus the legume, lucerne.

This fact sheet summarises some of their key findings to aid both growth and maintenance of feed supply.

KEY MESSAGE

Pasture persistence in dryland pastures is dependent on grazing management, pest pressure and the severity and extent of drought. Lucerne and cocksfoot were the most productive and persistent species.

YIELD RESULTS *(SEE FIGURE 1)*

- Total yields ranged from 5.7 tonnes/hectare (t/ha) to 18.5 t/ha annually; yield decreased over time in all pastures.
- Yield was higher for lucerne stands than grass-based pastures in all but one year; cocksfoot with sub clover was the most productive of the grass-based pastures.
- Lucerne's annual yield remained close to 13 t/ha in Years 8 and 9. Cocksfoot/sub clover pasture yields decreased from 13 to 8.7 t/ha over the nine years, with ryegrass/white clover pastures, decreasing from 10.5 to only 6.6 t/ha in the last two years.

SUB CLOVER YIELD RESULTS

- The total clover yield from sub clover pastures was over 3 t/ha during spring in five out of nine years.
- Spring white clover yield was only over 3 t/ha in one year.
- Sub clover offered the greatest potential for maximising spring growth before water stress slowed growth rates during the drier summer months.

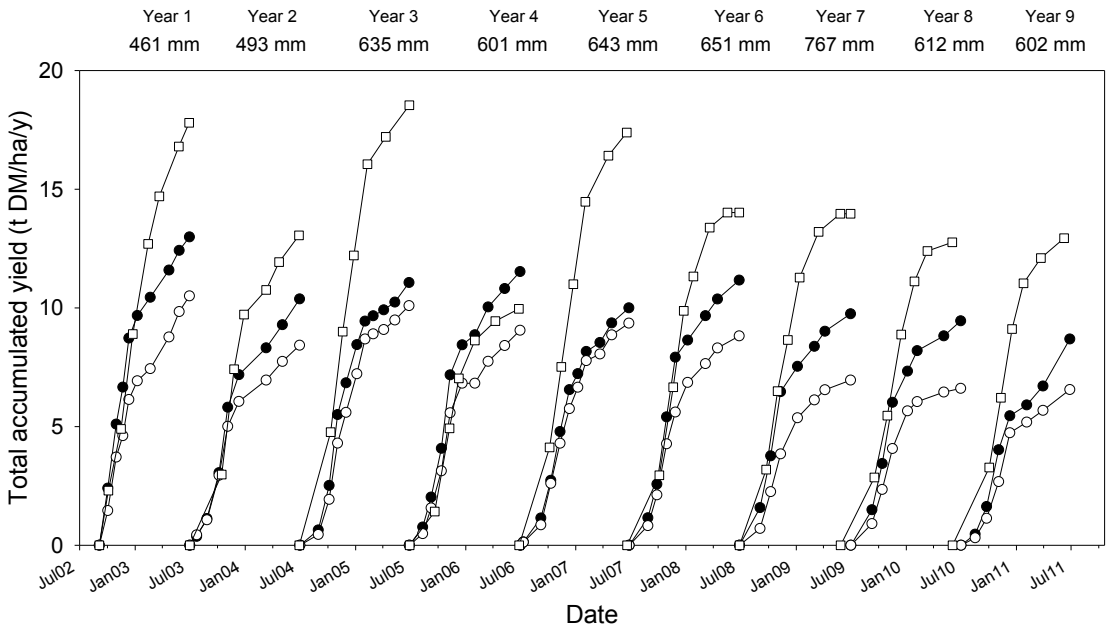

Figure 1: Total dry matter production (t DM/ha/y) of Lucerne (□), Cocksfoot/ Sub clover (●) and Ryegrass/White clover pastures (○) over nine years. Rainfall (mm) for each year is noted at the top of graph

BOTANICAL COMPOSITION RESULTS *(SEE FIGURE 2)*

- The trial area maintained 88% lucerne through to year 9. A winter spray was used on the lucerne to minimise weed invasion.
- Cocksfoot pastures maintained 83% of originally sown pasture components at year 5 and had above 60% over the whole nine years. The average rate of sown species loss was about 3.3% per year.
- The rate of loss in the perennial ryegrass and white clover was 10% per year and faster than cocksfoot pastures. By year 5, half the ryegrass/ white clover yield was annual and perennial weeds. By year 9 only 10% of the sown species were left in the ryegrass/white clover pastures.

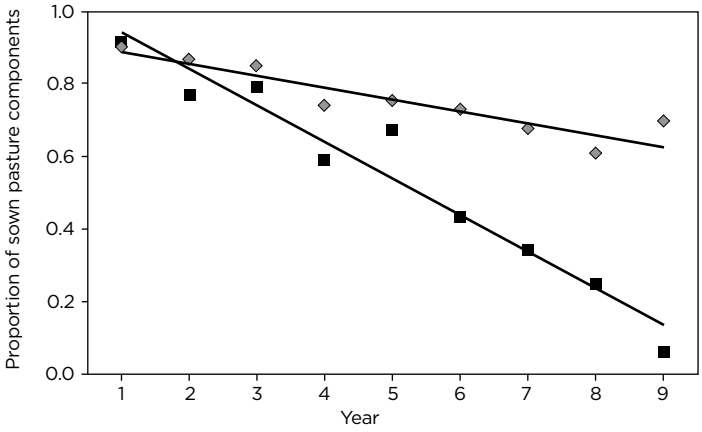

Figure 2: Decrease in the proportion of sown pasture components in dryland ryegrass/white clover (■) or cocksfoot-based pastures (◆) over 9 years.

TIMING OF FEED SUPPLY & DEMAND

- Loss of clover in all pastures directly correlated to a reduced rate of dry matter (DM) production in spring.
- A pasture with high clover content grew at over twice the rate in spring than one without. For every tonne of clover grown in spring pasture growth rate increased by 1.2 kg DM/ha/degree day up to a maximum of 6.8 kg DM/ha/degree day.
- About 90% of all sub clover dry matter was produced in the critical spring period.
- For total annual yield, grass-based pastures produced over 60% of annual yields in the spring; lucerne produced approximately 45% of its total annual yield in the same timeframe.

What are degree days and why are they important?
Degree days (or thermal time) is simply accumulated temperature. Using degree days means growth rates can be calculated in any environment from Kaitaia to Bluff. This approach removes the effects of seasonal temperature variations. Here, the base temperature is 0 °C. Therefore, a pasture which grows at 7 kg DM/ha per degree day will produce 35 kg DM/ha/day on a day with a mean air temperature of 5 °C (7x5). On a day with a mean temperature of 10 °C pastures would produce 70 kg DM/ha/day (7x10).

MANAGING DRYLAND PASTURES

- Traditionally, ryegrass and white clover supply useful feed in spring. However, low dry matter production and a lack of persistence in water stressed environments requires more frequent pasture renewal. This experiment shows renewal was required after 5 years.
- In a mix, sub clover complements cocksfoot, and provides clover dominant lactation feed. Sub clover sets seed in late spring to survive dry summers and regenerates from seed following autmn break rains. This pasture was still productive after 9 years
- White clover failed as a main companion clover in cocksfoot pastures after the first year. Its taproot dies and it is preferred by grass grubs.
- Lucerne is an efficient user of water in spring, and able to extract from depth in times of shortage. This meant dry matter production continued into summer months, which also allowed it to respond rapidly to summer rainfall.

FURTHER INFORMATION

Information about management of dryland pastures can be found on the Beef + Lamb New Zealand website, www.beeflambnz.com:

- Lucerne: Summary Papers for Establishing and Managing Lucerne booklet

For hard copies of these email resources@beeflambnz.com or phone 0800 BEEFLAMB (0800 233 352)

Beef + Lamb New Zealand offers a free text messaging service giving timely reminders, tips and information on the latest research in lucerne management, as well as observations from farmers. Sign up for free online at: beeflambnz.com/newsletter-signup or call 0800 233352, or view on Twitter: https://twitter.com/BLNZ_Lucerne

ACKNOWLEDGEMENTS

Beef + Lamb New Zealand would like to thank and acknowledge Professor Derrick Moot and Lincoln University for their assistance with this fact sheet. This project forms part of the investment made in the MaxClover research project.