

# Have your grain, and eat it too

*Dual-purpose winter wheats have the potential to be highly profitable for graziers in Australia's High Rainfall Zone. CSIRO is working with state departments and farming groups to see where grain and graze systems can be improved.*

Dual-purpose wheats are sown in February/March, grazed through mid-winter and harvested for grain in summer.

They effectively fill a winter feed gap and have a high nutritive value, often leading to very good liveweight gains.

Provided animals are removed at the right time, winter wheats can also recover to produce good yields of grain.

CSIRO researchers, working within the Murrumbidgee Grain & Graze project with NSW Department of Primary Industries, Charles Sturt University and the FarmLink Research farming systems group, are gathering trial data in order to find out how to improve the grain and graze system.

The Murrumbidgee project is part of Grain & Graze, a national collaborative research partnership between Meat & Livestock Australia, Australian Wool Innovation Limited, the Grains Research and Development Corporation and Land & Water Australia.

## Variability

One emerging puzzle with grain and graze systems is that liveweight gains can be very high, but are not consistent.

Recent research by Dr Hugh Dove in Canberra has shown that winter wheats often have low levels of magnesium and sodium and high levels of potassium, compared with animal requirements.

To test whether this was a problem in wheat grazing in Australia's High Rainfall Zone, recent trials compared liveweight gains for sheep grazed on



wheat, or on wheat with access to sodium or magnesium supplements.

Giving lambs access to either supplement while they were grazing winter wheat increased liveweight gain by about 25 per cent, though it has not been established whether the increase in weight gain was a response to magnesium or sodium.

While it is difficult to tell if these are separate responses or an interaction, Dr Dove believes that the ratio of potassium/sodium in the rumen may be the critical factor, with increased levels of sodium decreasing this ratio, increasing magnesium absorption and therefore liveweight gains.

The cost of one cent per animal per day, compared with the return in weight gain equal to 15 cents per animal per day, suggests that a salt: Causmag supplement for animals grazing winter wheat could be good insurance for graziers.

## Higher yields

CSIRO trials have also shown that grazed wheat yields can often be higher than ungrazed wheat, in one instance as much as 25 per cent higher.

Researchers believe that grazing reduces the canopy mass of the plants and therefore water consumption by the crop over the winter.

This conserves available soil moisture until flowering in spring, when the water can be used to produce more grain.

## A spring feed gap?

A possible hidden cost in dual-wheat systems is the feed gap that can occur between the removal of pasture from an area in late winter and the availability of the autumn-sown wheat for grazing in the next winter. This is a potential problem where stocking rates are high.

To fill the gap between pasture removal and wheat sowing, a CSIRO team has been looking at the use of spring-sown forage brassicas such as rape-turnip hybrids.

They found that grazing brassicas can result in very good liveweight gains in stock, however the brassica uses soil water that might otherwise have been available to the following wheat crop.

To study the extent to which water use by the brassica might affect later wheat yields, the CSIRO team turned to modelling of crop and animal performance in pasture-brassica-wheat systems.

## Modelling

The combined use of pasture, dual purpose wheats and forage crops can lead to large increases in productivity and profitability, especially in well-watered areas. It is, however, a highly complex system.

CSIRO research is using animal feeding trials and crop data in order to pinpoint the key variables in the system.

By using CSIRO computer models such as AusFarm to allow for the many interacting components of this multi-enterprise system, researchers are able to predict the long-term profitability of combined grain and grazing systems. To validate these predictions, they will need more long term trial data on animal response, crop performance and profitability.

The combined use of pasture, dual-purpose wheats and forage crops is a highly complex system with tremendous potential for Australia's High Rainfall Zone. Further collaborative research will make it more profitable and predictable.

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