



Legume pastures - the profit drivers of mixed farms in Central-Western NSW

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What boosts profits for any farm growing wheat is the ability to increase yields and/or protein content while keeping costs at a minimum. In the low-rainfall areas of Central-Western NSW, many producers are using mixed farming systems that involve a pasture ley. Farmers within these systems need to ensure that their pastures are going to be productive and provide the benefits of both adequate nutrition for livestock and the benefits of nitrogen fixation for their crops. With the current returns from livestock low, it is even more important that pastures provide a commercial benefit beyond the livestock system. Legume based pastures that fix nitrogen can provide both quality livestock feed and improved soil fertility for subsequent crops (Holford and Crocker, 1997). However, a sound understanding of how to best produce and manage this nitrogen supply in pasture and crop rotations in a low rainfall environment is lacking.

A Condobolin based project addresses this issue by looking at the management of pastures for improving the nitrogen benefits to subsequent crops. It looks at various management practices including choice of pasture species, their composition, phosphorus nutrition, soil pH, and the length of pasture phase. All these variables need to be understood in terms of their influence on the nitrogen cycle and productivity in this environment.

Methods

Trial work is being conducted at the Condobolin Agricultural Research and Advisory Station on a red-brown earth. The effects of different pasture compositions on the subsequent wheat yields and protein content are being measured over different lengths of pasture (2, 3, 4 and 5 years). Six pasture treatments are being investigated which include combinations of lucerne (LUC), ryegrass (RYE) and an annual legume mixture (ANN) containing barrel medic, subterranean clover and rose clover. Each pasture treatment is maintained for its planned length and the plots are then subsequently sown to Janz wheat for three years. Most importantly, the effects of the pasture-supplied nitrogen on wheat yield and quality are measured.

Results and discussion

The results have shown that lower amounts of nitrogen are being fixed in this environment compared with high rainfall areas. An average of 9 kg N/t leg. DM was fixed during 1995 to 1997 compared with the general rule of thumb, 25 kg N/t leg. DM (Peoples *et al.*, 1997). Despite this, the increases in soil nitrate obtained following a two and three-year pasture with a high proportion of legume has consistently resulted in significantly higher yields and often higher protein levels in the subsequent wheat crop. This can mean the difference between achieving ASW or Prime Hard wheat grade, which results in a significant monetary benefit. The results have demonstrated that the returns from increased yield and protein of the following wheat crop can provide at least \$150 and up to \$237/ha more for sowing legume pasture and keeping them clean compared with a ryegrass dominant pasture (Figure 1).

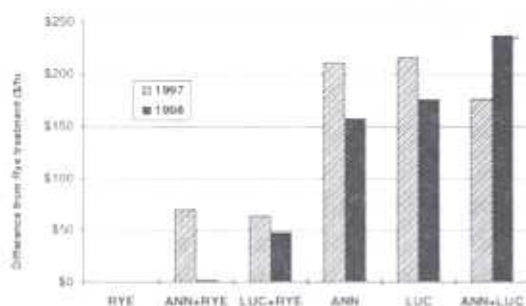


Figure 1. The gross gain from a wheat crop following a range of legume pastures (containing lucerne, LUC, annual legumes, ANN, and annual grasses, RYE) compared with an annual grass pasture (RYE).

from their pastures. Grazing management is one of the most effective techniques farmers have available to them for weed control.

Both lucerne and annual legume pasture species are valuable because good stands will build up the organic pool of nitrogen that is then mineralised and available to crops. The choice of legume species during the pasture is not as important as ensuring that pastures are kept relatively clean and weed-free to enable a large proportion of legumes to exist in the sward. By sowing a mixture of inoculated legume species that are suited to the region, growers can achieve a good stand of pasture that will survive and fix nitrogen.

Conclusion

By regularly establishing legume pastures and managing them to keep a high proportion of legumes in the pasture sward, farmers have the best chance of improving their whole-farm profitability.

Future results from this research project should help growers to understand the role of legumes within the farming system and provide information on how they can improve the productivity of both their pastures and their crops. Still, growers ultimately require information not only on the gain from the subsequent wheat crop but also from the livestock phase (Scott *et al.*, 1992).

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References

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The figure shows how important weed control is, and in particular the negative effects of annual grasses. Annual ryegrass, barley grass and wild oats all compete strongly with legume species during the pasture phase and are the major reason for low yields and protein levels in the following wheat crop. By using better management in the pasture phase and controlling these weeds, farmers have their best chance of obtaining good returns