

Weed control, crop rotation and livestock management are important considerations for crop production in the Western Catchment.

Together with conservation farming practices they help increase yields, maintain or improve soil structure and fertility, and reduce the risk of crop disease.

Weeds

Conservation of fallow rainfall is essential for successful crop production in the Western Catchment. Weeds use soil moisture during the fallow period and compete with growing crops for moisture, nutrients and sunlight which causes reductions in grain yield. Weed seed contamination can result in price reduction for grain and the presence of certain weed seeds can result in grain being rejected.

The absence of cultivation during the fallow phase has important implications on weed spectrums and weed management. Weeds, including native invasive scrub, which are relatively tolerant of common fallow herbicides at standard rates, can obtain a competitive advantage. In the past, regular fallow cultivation generally kept these weeds and scrub under control, however, under chemical fallows they have become a major issue. Although spot spraying of invasive native scrub is possible, it is labour intensive and costly.

A recent weed control development is weed-sensing technology which can be used during the drier

months when the grasses dry off. This technology uses light emitting diodes (LEDs) on the spray-boom to sense the presence of green plants because they reflect the light. The sensor then triggers a fast-fire solenoid valve which sprays the plant with the chemical.

This can greatly reduce chemical use and therefore increase the cost effectiveness of chemical control of invasive native scrub.



Invasive native scrub re-infestation on cropping paddock in the Cobar district (Photo: Yohannes Alemseged)

Crop rotation

Alternate break crops such as pulses (e.g. faba beans, lupins, field peas, chickpeas) are generally grown in a rotation with cereal crops. The term 'break crop' refers to the particular impact of breaking a cereal disease cycle, such as crown rot or take-all. There are many other benefits involved in growing alternate crop types.

Benefits include:

Diversification of farm income and risk. Alternate crops can be profitable with a range of marketing options available depending on the crop type. However, alternate crops can be risky as they require additional management and the markets can be volatile.

Diversification of farm labour and machinery requirements. Many of the alternate crop types (e.g. faba beans) can be sown earlier to take full opportunity of an early autumn break. Field peas and chickpeas can be sown after the main wheat sowing time. Often these crops can be harvested before the wheat harvest begins (depending on varieties grown), with the exception of chickpeas, which usually mature after the wheat harvest has finished (depending on seasonal moisture availability).

Weed control. Alternating cereal and broadleaf crops allow for easier control of in-crop weeds. In addition, the use of herbicides from different groups, helps reduce or delay the development of herbicide resistance. Annual grass weeds, which increase during continuous cereal production, can be controlled using a cheaper herbicide in broadleaf crops, while the broadleaf weeds can be effectively controlled in cereal crops.

Disease break for cereals. Alternate crop types provide a break for cereal diseases because they do not host cereal diseases.

Chickpea (Photo: Ian Toole)



Increased flexibility for weed control. The use of alternate crop types allows a variety of herbicides to be used. This may allow specific weeds to be controlled which would otherwise be difficult and/or expensive in cereal crops.

Conservation of soil nitrogen levels. Pulse crops can maintain, if not actually increase, the level of soil nitrogen, which reduces reliance on and cost of fertilisers in the subsequent cereal crop.

Improved soil structure. The commonly grown alternate crop types are all tap-rooted plants, which are able to access moisture and nutrients from deep in the soil profile. This has the effect of 'opening' up the soil. The fibrous roots of subsequent cereal crops are then able to follow old root channels to better access moisture and nutrients.

Increased wheat yields and protein levels. Growing a rotation crop generally leads to increased yields in the following wheat crop. Increases in wheat protein are also common, particularly when grown after pulse crops.



Field pea (Photo: Ian Toole)

Livestock

The role of livestock on a farm depends on the production and income objectives of the farm manager. Livestock choice and management should be carefully planned to minimise topsoil damage.

Stock that are grazing stubbles should be regularly monitored to ensure over-grazing, which results in soil erosion, does not occur.

Stock can pulverise the dry topsoil of stubble paddocks, which increases the susceptibility of soil to losses from wind and water erosion.

Land managers should aim to maintain at least 50–60 per cent groundcover on stubble paddocks.

When stock are grazing on moist to wet soils, compaction can occur. Ideally, stock should be removed from wet stubble paddocks to avoid the structural damage that results from pugging. Structural damage from livestock can cause yield losses in subsequent crops (including pastures).

Factors controlling soil damage by livestock are:

- the water content of the soil
- surface cover
- livestock type
- livestock density
- soil type
- organic content of the soil.

References and further reading

The effects of cropping on the Western CMA red soils

The effects of cropping on the Western CMA grey soils

SOILpak for dryland farmers on the red soil of Central Western NSW

Northern Wheat-Belt SOILpak

Manual on-ground implementation of conservation farming

Dryland Cropping Guidelines for the Western Farming Systems Zone

Geared Up

For more information

Winter Crop Variety Sowing Guide – NSW Department of Primary Industries

Weed Control in Winter Crops – NSW Department of Primary Industries

www.western.cma.nsw.gov.au

or

www.dpi.nsw.gov.au



Livestock damage when soil is wet (photo: Ian Toole)

Acknowledgements

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