

CASE STUDY: BROADACRE WHEAT

The Phelps family at Rowena near Burren Junction caught our attention when their certified organic wheat crop won the North West Wheat competition. Robert Phelps explained that the land titles on the property allow him to grow both conventional and organic crops in different locations. He also explained that it is possible to have an area of organics without converting the whole farm.

The total farm area is 12,000 acres, with 1800 acres under cropping. The annual average rainfall is 500 mm. The certified cropping area is 800 acres, some of which is under long fallow and some under pasture and 300 acres under organic wheat. The property also runs 60 to 70 breeding cows, which are managed organically but cannot be sold on the organic market because they run with non-organic sheep.

The cropping soil is grey vertisol or grey deep-cracking clay. This soil is self-mulching and much more resilient to ploughing than other cropping soils such as red soil. This characteristic is significant for weed control.

Figure 38: Robert Phelps inspects his organic wheat



Rotations

The organic paddock rotation has been wheat/wheat/wheat/wheat/long-fallow/wheat. However Robert plans to move away from such a monoculture and include pasture phase or a legume in the rotation. He is considering organic soybeans as a crop or chick peas or faba bean as green manure. The chick pea or faba bean may not be suitable for harvest because of likely problems with pest and disease.

A summer crop in the rotation competes with summer weeds and makes good use of soil moisture. This opportunity cropping means that you look carefully at the seasonal conditions and then decide what to do.

Ideally Robert would have four or five years of pasture (including legumes) to build up soil nitrogen and organic matter. Robert is considering using native grasses in the pasture phase, for example Mitchell grass which is difficult to establish may be sown into a wheat paddock. However, in order to do this he would need to clear more land so that he could still have an economic area for crop production.

The long fallow is used to conserve moisture. Weeds are ploughed in. However, weeds become a problem in the fallow if the season is wet and the soil is too moist to plough. In this case the weeds get away and they use up the moisture traditionally conserved in the fallow.

The fallow is not a bare fallow, stubble is retained and weeds are used as stock fodder or as a green manure crop

Weeds

Weeds are the biggest problem for the organic wheat, in particular thistle and *Phalaris paradoxa* (annual phalaris). Wild oats are not a major problem, but if they do appear they are pulled out by hand.

Robert's policy to weeds is **zero tolerance**. He takes the following measures to ensure there is no seed bank in the soil:

Prevention. The first management stage is to prevent weeds from invading the area. Paddock hygiene is of highest importance. Machinery is cleaned before it is moved onto the organic area (and also other cropping areas).



Figure 39: Machinery must be cleaned before entering the paddock

Figure 40: Machinery cleaned for use



Chipping. If they do invade, they are removed as soon as practical and before setting seed. Hand weeding is used to prepare the seedbed. Local people are employed, and this was at a cost of **\$50.00 per ha** in 2008. It is interesting to compare this hand weeding with the chemical cost of the same operation: \$50 per ha for grasses and another \$10 per ha for broadleaved, a total cost of **\$60 per ha for chemical control**.

Sacrificial ploughing. If Robert finds an invasion of annual phalaris in his crop he ploughs that patch and sacrifices some crop rather than let the weed go to seed.

Competition. A green manure winter crop controls the winter weeds by competing with them, and if they do establish they are ploughed in (before they can set seed).

In the future Robert intends to use rotations that include crops to compete with the weeds as a control measure.

Disease

Seed wheat. Robert uses his own seed so that he can be sure of the quality. The certifier permits the use of diatomaceous earth or carbon dioxide gas to protect the seed between seasons. The diatomaceous earth is not suitable for wheat for human consumption but is useful for seed wheat.

Resistant varieties. Make use of tolerant and resistant varieties.

- Crown rot. Robert selects the wheat variety, Suneca, because it is resistant to crown rot
- Yellow leaf spot. These plants haven't succumbed to yellow leaf spot, to date. There is occasional indication of an infected leaf but plants have not been set back. However, if it becomes possible to select for tolerance to yellow leaf spot, Robert will do so

Cultivation. Robert finds that cultivating the soil destroys the spores of fungal pathogens and so this contributes to the health of the crop.

Stubble management.

The organic cattle graze on the stubble and then it is disc harrowed. The cattle normally run with the sheep and so they are put into a quarantine paddock for the time recommended by the certifier before they are turned into the stubble.

Market

Robert sells the organic wheat directly to a flour mill. The wheat is collected from the paddock and carried in certified trucks and delivered to the mill. This operation requires organisation and good timing to make sure the trucks are available and arrive from the mill, some considerable distance away.

Unless you have a storage system that excludes oxygen it is difficult to store organic wheat on the farm because of pests (weevils) that damage the grain. Some growers have sealed silos that can be treated with carbon dioxide gas, but this is an additional cost. For this reason it is essential to have the market and the transport organised before you sow the crop.

Conclusion

If you are interested in establishing a successful broadacre enterprise such as this, be aware of:

- the structure of your soil and its resilience to cultivation
- establishing your market contacts
- organising rapid transport from the farm so that you don't need to store grain on the farm (except for seed, which your certifier can allow you to protect)
- soil fertility; the need for legumes in the rotation and the possibilities of using allowable additives such as rock phosphate
- labour available for in-crop weed control
- suitable rotations including the number of hectares available for cultivation and the area you can leave under pasture
- the importance of paddock hygiene.

CASE STUDY: BROADACRE WHEAT, A SUMMARY OF EXPERIENCE

Ray and Judi Unger are biodynamic growers. They have 1400 ha at Peak Hill near Dubbo and Parkes in western NSW. The rainfall is variable and the soils, red ironstone clay loam to grey clay, can be difficult to work. They are poorly drained, heavy, acid soils.

Ray has sheep, wheat and poll Hereford cattle and has farmed organically since 1994. Before that he farmed conventionally.

Ray's experience in his district has resulted in this advice for organic farmers:

- Plan** how you will use each paddock four to five years ahead. The plan is likely to include
- a long fallow the year before cropping. I am aware that this is not recommended by NSW DPI but I haven't ever had a problem with wind or water erosion on these soils. I plough on the contour and that contains any run-off and the rough surface of the ploughed soil isn't carried by wind.
 - stock (sheep and cattle) to eat weeds
 - cultivations. Be wary of cultivating too often, cultivations affect soil structure and cost fuel and time