Weethalle CWFS Site - Farming Systems Demonstration

R. B. Thompson, NSW Ag. District Agronomist, West Wyalong

Key Points

- In the past four (dry) years on this demonstration farm the fallow/wheat/oats/lucerne (Phase farming) and wheat/fallow rotations have proved the most financially rewarding, probably due to the moisture storing benefits of fallow.
- Urea seems both less risky and more reliable than the pulse or ley in increasing wheat yield.
- The extreme dryness has caused problems with weed control (chemicals not effective) and with growth of pulse crops and subclover leys.

Introduction

The Weethalle Farming Systems demonstration incorporates many aspects of the large farming systems trial at Condobolin. The principal purpose of the demonstration is to satisfy the questions of local farmers. Can you sustainably continuously crop this land? Will we get herbicide resistant weeds with continuous cropping? Which crop rotations are the most profitable? What is happening to nitrogen in the rotations? What impact does continuous cropping have on soil chemistry and soil water levels? After three years we have enough data to begin to make a few observations.

Method

The Farming Systems demonstration is located 17km north of Weethalle along the Kikiora Road on the property "Anona", belonging to the Rutledge family. The demonstration occupies an area of approximately 4.0 hectares. The demonstration consists of six farms employing different crop rotations. Each plot is 100m long x 20m wide. This is a demonstration - no treatments are replicated. Essentially the model is based on 900ha of crop land and l,200ha of lucerne pasture.

Like all models it has some weaknesses because of practical constraints. It cannot produce all the answers in the form that everyone wanted. It is up to those interested to manipulate the data to find their own answers. Some members wanted to have the entire model of 2,100ha under continuous cropping but it makes the economics too difficult because you introduce the capital costs of loan debt, interest, depreciation, extra labour, etc. Other members indicated that on their own farm; their paddocks were very variable and that continuous cropping of all paddocks was not feasible. The decision to maintain the model of l,200ha did not please everyone, but it was the only easy way to make simple comparisons.

The decision to base DSE value of the pasture and ley phase on Merino wethers also did not please those who wanted a self-replacing flock or heavy export lambs, but the variables of weaning percentages, extra handfeeding, additional labour, etc, makes it too difficult to cost out. By all means play with the data and put in some of your own numbers. After all the intention is for the members to manipulate the model to assist them in making more informed choices.

The demonstration site paddock was a clover paddock for 4 years or more. The

block was fallowed in August in 1998. In 1999 a 3.4t/ha Cunningham crop was harvested; and in 2000 the Rutledge family allowed us to fence off 6.0 hectares and we set up the demonstration.

Farm 1 is the traditional phase farming system. Lucerne is long fallowed in June then sown to 300ha wheat the following May. The next crop is 300ha milling oats and the block is sown out to lucerne.

Farm 2 has '900ha' devoted to continuous cropping, based on wheat-fallow rotation. Both phases are represented each year. The 450ha wheat has 100kg urea applied pre-plant each year. Following harvest the stubble is maintained on the fallow for 15 months (until April), then it is burnt and cultivated prior to sowing.

Farm 3 is continuous cropping, rotating '450ha' wheat with '450ha' of winter pulse. To date we have used lupins because they cost about the same as wheat to grow, lupins are easy to harvest and management of insect pests in lupins is rather easy compared to other pulse crops.

Farm 4 is continuous cereal cropping, alternating between wheat and milling oats. Due to land limitations and our weed management plan only one phase is represented each year. For the members unhappy with the use of oats - simply use the oat yield as hard wheat and adjust the budget.

Farm 5 is continuous cereal cropping, alternating between wheat and milling oats with 100kg Urea/ha applied pre-plant each year.

Farm 6 is continuous ley farming, where '450ha' of wheat rotates with '450ha' of subclover ley.

Results & Discussion

Financially, the Phase farming No 1) and the wheat-fallow (No 2) systems are the most rewarding. The long fallow component of both systems reduces climatic risk by underpinning higher wheat yields. While Phase farming is a traditional practice we often overlook the reasons behind the mix. I am prepared to speculate that this system was carefully developed over time on a trial and error basis by previous generations, rather than the embracing a random formula that has been mindlessly continued by subsequent generations. Sometimes we do not justly credit the generations that have gone before us.

The wheat-fallow system is of particular interest to a few members. The average local sole operator is sowing approximately 4,000 acres of crop to produce 2,500 tonnes of grain. Some operators have found it a stretch with the late breaks. The possibility of only having to sow 2,000 acres and still produce 2,500 tonnes of grain is very tantalising. The stored soil moisture in long fallow underpins and secures yield, reduces the risk of pinched grain, controls the various root diseases and minimise the need for a high risk broadleaf crop in the rotation. If the area to be sown is halved then only about half the funds are required, half the labour is required, all the crop is sown on time (late sown wheat crops usually have yield potentials reduced by 30%), all of the crop is sprayed on time (delayed weed control usually lowers wheat yield potential by 15%), all the crop is harvested on time (the last crop frequently has 5% more grain shelled out) and if you are only cropping half the area the machinery should last twice as long.

In the past the concept of maintaining 2,000 acres of fallow by cultivating for 15 months would be unpalatable. Fortunately many herbicides like glyphosate now cost equivalent to widelining, so we can now maintain stubble cover and still control weed

growth. Boomspraying is about twice as quick as widelining.

One interesting aspect from last year was the wheat on fallow yielded 2.13t/ha while the wheat on lupins yielded 1.15t/ha. The extra tonne of wheat in Farm 2 came from moisture stored back in 2001. Remember 2002 was so dry we did not sow the demonstration. The site was kept weed free but it required only one application of glyphosate early and a follow up 2,4-D amine application as it was too dry for weed growth.

The choice of using Mortlock milling oats was based on the premise that it yields about the same as wheat in the same situation, it minimises the incidence and risk of Take-all, and leaf diseases in the site, and that the milling price is usually equal to hard wheat. Now last year there was a bit of a blip on the market. Mortlock was worth $180.00 per tonne while the AH wheat price was $156.00 per tonne, so Farms 4 and 5 capitalised on that opportunity bonus.

Of interest was Farm 5. The Mortlock with 100kg Urea/ha pre-plant seemed to get caught in flag and yielded 0.5 tonne less than Mortlock without the urea. Neither the wheats on lupins or clover stubble, or the long fallow wheat with urea showed any signs of suppressed growth from nitrogen.

In general, the addition of nitrogen in Farm 5 in the past has been more profitable than Farms 3, 4 and 6 and consequently urea seems both less risky and more reliable than the pulse or ley in increasing wheat yield. So keep watching for future results. If adding 46kg/ha nitrogen on an annual basis begins to have a very negative yield response then we will have to debate and rethink things. We don't want to lose the answer to the original questions. Does urea acidify the soil more than a pulse or ley? Does a pulse or ley supply enough nitrogen for the next wheat crop?

The problem with both the pulse and ley options has been the slow growth due to the late breaks and dry winters. The productivity of the ley in 2000 was very profitable, which was a relatively average year. The pulse component has struggled each year with the dry winters. Last year it was so dry the simazine applied to the lupins was not available to the weeds, although we sprayed out the annual ryegrass; the wireweed was a real problem. The lupin yield we have obtained have been very similar to those in the Condobolin trial.

The clover ley was very rewarding in 2000 but it has suffered from the late breaks and dry winters in 2001 and 2003. Last year it was so dry the Treflan® failed to control the ryegrass and the wireweed. The ryegrass was sprayed out first as it was the larger problem. We then waited 3 weeks to spray the wireweed which proved to be a mistake, it set in dry and the bromoxynil at 2.1L/ha did not give us the desired kill on the wireweed and it really checked the clover growth. Sub clover in general grew poorly in 2003 in most paddocks of the district.

The issue of soil chemistry and soil water are not yet addressed. There has only been four harvests. We hope to have neutron probes installed this year. We will look at soil testing for acidity and nutrient decline in 2005.

Acknowledgments

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