OPERATION UNDERSOW: IMPROVING PERENNIAL PASTURE ESTABLISHMENT UNDER A CEREAL CROP

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Summary. New technology based on alternate row sowing was tested and promoted to improve the success of establishing perennial pasture under cereal crop. Economic evaluation showed the technique to be a useful risk management strategy. Farmer adoption of alternate row sowing was measured to be 20%.

INTRODUCTION

The environmental and productivity benefits of phalaris (*Phalaris aquatica)* are well recognised (1). The promotion of perennial pastures, as a salinity control strategy through the Victorian Salinity Program has generated interest in perennial pastures in mixed farming areas traditionally growing annual pasture-crop rotations.

The establishment of pasture under cereals is common practice. The traditional method sees the crop sown at its appropriate depth with fertilizer and pasture dropped from a small seeds box at the rear of the combine and covered by heavy trailing harrows. This technique is notoriously unreliable for perennial pasture species (6) but is still widely used with the hope of achieving, in the same growing season, a cash crop and an established pasture for future grazing.

Traditional undersowing overlooks the requirements of the pasture and earlier studies showed improvements could be made by increasing crop row spacing (2, 5). Machinery modified to sow both crop and pasture at their correct depths with fertilizer in alternate rows showed considerable potential in preliminary trials.

The Operation Undersow project had three main objectives:

1) To test and develop the alternate row sowing technique.

2) To undertake an economic comparison of three techniques.

3) To maximise farmer adoption of alternate row sowing.

METHODS

1) *To test and develop the alternate row sowing technique:* Five field experiments to compare techniques were carried out from 1990 to 1993 across North-central Victoria on red-brown earths. A small 10 row combine with 18 cm row spacing and equipped with a Fiona small seeds box was used. There were three treatments common to all trials: *pasture sown alone, traditional undersowing and alternate row sowing*. The pasture sown alone was sown in 18 cm row spacings directly through the sowing points with fertiliser; no cover crop was sown. For traditional undersowing the cereal crop was sown on 18 cm row spacings while the pasture seed was dropped out of the small seeds box through hoses on the same spacings and covered. Alternate row sowing involved blocking every alternate cereal crop outlet and pasture hose so the crop was sown on 36 cm spacings, at double the conventional rate, while the pasture was sown in the row between the widely spaced crop rows. The boots sowing pasture were fitted with shorter points so that the pasture sowing depth was significantly shallower than the crop. With this method, both pasture seed and crop seed were sown with superphosphate at their recommended depths. Pasture plant density was assessed approximately four weeks after sowing with eight 0.25 square metre quadrats at random

along the plots. Grain yields were measured and pasture plant density was assessed the following autumn.

2) *To undertake an economic comparison of three techniques*: Comparisons were made of the net returns of establishing pasture with each of the three methods. Based on 100 ha the analysis was run over ten years using Net Present Values (discount rate 5%). Additional financial analysis examined the capital requirements and period required to pay back capital comparing cumulative net returns over 5 years.

Assumptions: assumptions were based on results and observations from the experimental program plus a sound understanding of contemporary farming practices in the region.

Crop yield 2.0 t/ha (traditional sowing) @ $113/t

Costs based on 95/96 gross margin estimates (3)

Merino Wethers (1 dse) producing 5.5 kg grossing $6/kg greasy

Stocking rates are based on the degree of establishment success with an estimated 2 dse/ha differential between methods. Analysis was also undertaken assuming no difference between stocking rate, for each method.

3) *To maximise farmer adoption of alternate row sowing*: An aggressive extension program was initiated at the outset of the project. Initially raising awareness of the short comings of traditional undersowing and promoting the benefits of alternate row sowing as they become evident during the experimental phase. This was done with numerous field days, seminars and group meetings held across the targeted area and promotional material was produced and distributed to raise awareness. A district farmer was employed to work with existing farmer groups to convert combines and oversee demonstration sowings. A maximum of $500 was granted to ten individual farmers to convert a combine to sow group demonstrations and alternate row sowing was recognised for [1]Land Protection Grant eligibility. A pasture seed rebate scheme[1] introduced through the Community Salinity Management Plans also promoted and encouraged alternate row sowing. Measurements and visual assessments were made by groups at different growth stages.

In order to gauge the success of the project in relation to this objective three activities were considered.

1. Phone census of perennial pasture rebate scheme participants 1993.

2. Scrutiny of 21 case studies of North-central Victorian farmers (1).

3. Adaption of data from an independent survey investigating the state salinity program (4)

RESULTS AND DISCUSSION

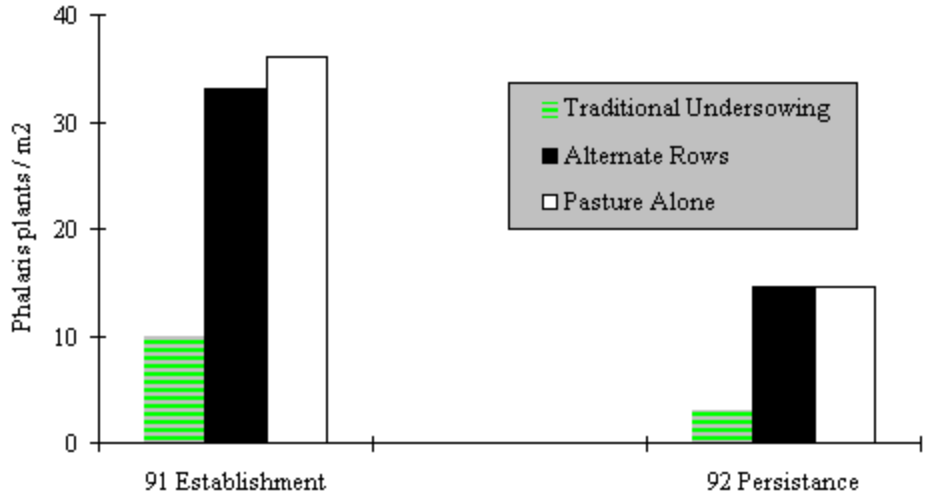

Figure 1. Typical results from experimental program. Phalaris under barley, Tandarra 1991/92.

1) Sowing in alternate rows significantly improved the establishment, survival and production of phalaris pasture compared with the traditional method of undersowing ($P<0.05$). Sowing perennial pasture on its own resulted in the most productive perennial pasture. The cereal crops sown in alternate rows yielded on average 16.5% less than the crops undersown in the traditional manner.

2) When assuming an increase in stocking rate, pasture alone shows the best returns. If all methods are stocked equally traditional undersowing is more profitable. Alternate row is intermediate.

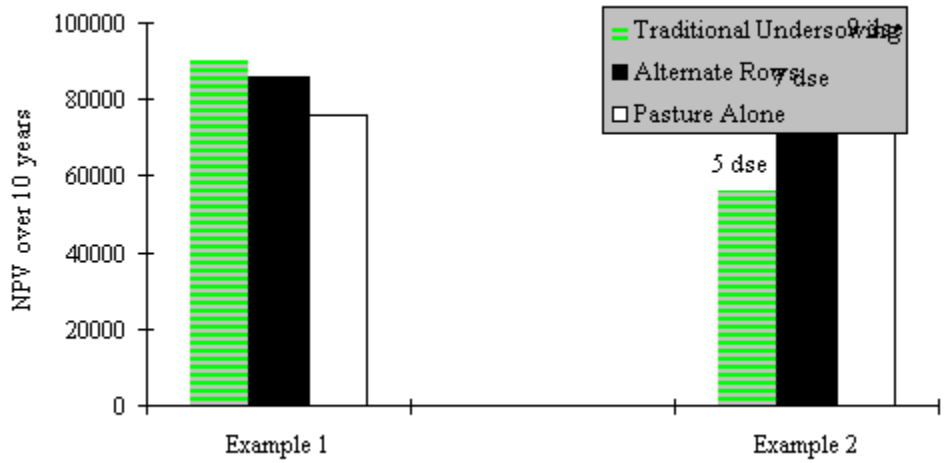

Figure 2. Net Present Value ($) over 10 yrs. Example 1 assumes the same stocking rate (8 dse/ha). Example 2 assumes a 2 dse/ha differential.

The capital required and the breakeven time period are critical questions for farmers and their bankers. The Cumulative Net Returns for each method over five years are shown in Figure 3.

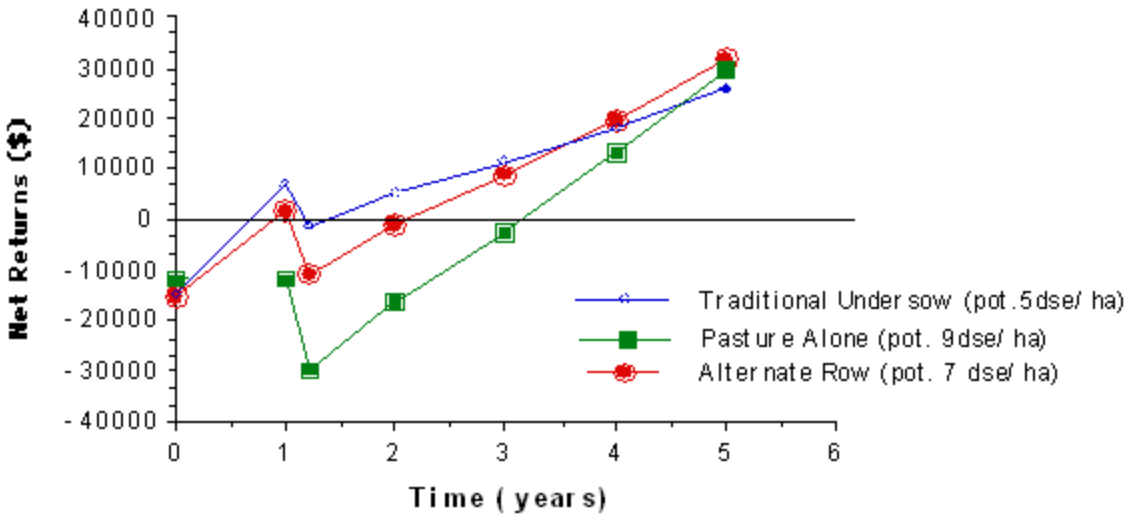

Figure 3. Cumulative net returns for each method over five years for 100 ha.

The risk of failure is greatest under traditional undersow followed by alternate row and pasture alone. Alternate row sowing is a compromise in both risk and returns. Stocking rates must be increased to realise improved pasture establishment benefits. This increases labour demands and stretches management skills.

3) The pasture seed rebate scheme phone census revealed that 21% of participants had used the alternate row sowing technique by 1993. A further 21% indicated an intention to use the technique in the future. Only one of the 34 farmers surveyed was unaware of the Operation Undersow project. The 21 case studies undertaken in 1995 confirmed the majority of pastures are still sown using the traditional undersowing techniques, however 20% were using alternate row sowing. A survey investigating the Victorian Salinity Program (4) confirmed that 19% of North-central Victorian farmers had adopted alternate row sowing.

CONCLUSION

Alternate row sowing significantly increased the likelihood of successfully establishing perennial pasture over traditional undersowing. It is a risk management strategy requiring minimal capital input and provides an economic compromise. Engaging a farmer in a pro-active extension campaign, coupled with financial incentives and group extension methods, has achieved a high rate of adoption of this new technology.

REFERENCES

1. Dettmann, P. 1995. Getting Phalaris to Work for You: Farmers Experience in North-central Victoria. Grassland Soc. of Vic., Bendigo. ISBN 7306 64139.

2. Hoen, K. and Oram, R.N. 1967. Aust. J. Exper. Agric. 8, 190-196.

3. Kennelly, A. 1995. North Central Gross Margins 1995-96. Agriculture Victoria.

4. Luke, R., Karunaratne, K. and Barr, N. Salinity Control in North-central Victoria. A Measure of Farmer's Beliefs and Behaviours. Agriculture Victoria. (in press).

5. Pendleton, J.W. and Dungan, G.H. 1953. Agron. J. 45, 442-444.

6. Reed, K.F.M., McGowan, A.A., White, D.H. and Bailey, P.J. 1987. In: Agriculture in Victoria. (Eds D. Connor and D. Smith) (AIAS: Melbourne) pp. 127-144.

[1] Land Protection Grant and Pasture seed rebate scheme provide State Government funded incentives to land managers to adopt practices promoted in the regional Salinity Management Plans.