

Part one of a three-part series

Pasture cropping as a means to managing land

By COLIN SEIS

Pasture cropping is a land management technique of sowing crops into living, perennial (usually native) pastures and having these crops grow symbiotically with existing pastures.

This idea was initiated more than 15 years ago. Since then, Colin Seis has spent much time perfecting this technique. It is now possible to grow many different types of winter- and summer-growing crops without destroying the perennial pasture base.

Crops that can be sown are as diverse as winter-growing wheat, oats, lupins, canola, etc, or they can be summer-growing such as sorghum, cowpeas, lab-lab beans, etc.

The pasture cropping technique takes advantage of the natural dormancy of perennial plants by zero-tilling an annual crop into the dormant perennial plants.

Although most crops to date have been sown into perennial Australian natives, this system will work equally well with introduced grasses, provided the basic pasture-cropping principle of sowing into dormant grass is applied.

Pasture cropping is combining cropping and grazing into one land management system where each one benefits the other. The potential for profit and environmental health in doing so are enormous.

SUCCESS ON 'WINONA'

To illustrate this, below are details of a 20-hectare crop of Echinidna oats sown and harvested in 2003 on my property, 'Winona'. Although this crop yielded 4.3 tonnes/ha (31 bags/acre), the total area of 100ha of Echinidna oats averaged 3.4 tonnes/ha (25 bags/acre).

This profit does not include the value of the extra grazing. On Winona, it is between \$50-\$60/ha because the pasture is grazed up to the point of sowing.

When using traditional cropping practices where ground preparation and weed control methods are used for periods of up to four to six months before the crop is sown, no quality grazing can be achieved.

OTHER BENEFITS

Conventional cropping methods require all vegetation be killed before the crop is sown and while it is growing. From a farm economic point of view, the potential for good profit is excellent through pasture cropping as input and labour costs are so low. Other benefits are more difficult to quantify. These are the vast improvement in perennial plant numbers and diversity of pasture following the crop. There is no need to re-sow pastures, which can cost \$100-\$150/ha.

Even more difficult to calculate are environmental benefits of leaving a grassland intact by maintaining 100% ground cover 100% of the time. There is growing evidence, anecdotal and scientific, to support improvement in soil health, improved water-use efficiency and general improvement in ecosystem function.

History has shown us many new, or different techniques, are scoffed at when an idea is first presented. Pasture cropping was no different, with criticism coming from many fields, in particular from traditional agronomy experts.

Now many farmers and graziers from all over Australia have adopted pasture cropping, with serious interest being expressed in the United States.

CSIRO TRIAL

The CSIRO has also taken pasture cropping seriously, investing in a three-year trial project conducted by Dr Sarah Bruce on Winona. The project looked at many things pasture cropping can achieve.

Water-use efficiency and improved soil health are just two positive outcomes.

A field experiment was conducted to determine the effect of pasture cropping on biomass production, total cover, soil water and soil potentially available nitrogen, compared to more conventional cropping and grazing enterprises.

The experiment showed soil water content for the 0-60 centimetre profile was reduced in the pasture-crop treatment compared to the conventional crop or pasture treatment. Nitrogen availability was also reduced and less variable in the pasture-crop treatment.

COSTS/HA	
Spraying	\$5.00
Herbicide	\$14.00
Sowing	\$7.19
Fertiliser	\$35.00
Harvest	\$28.00
TOTAL	\$89.19
Yield	4.3 tonnes/ha
Value	\$150/tonne
Total	\$645/ha (\$150 x 4.3)
PROFIT	\$555.81/ha



Independent studies at Winona on pasture cropping by the Department of Land and Water have found pasture cropping to be 27% more profitable than conventional agriculture, coupled with great environment benefits that will improve the soil and regenerate out landscapes.



Essentially, the oats added substantial biomass and litter to the pasture-crop system in spring without greatly altering the biomass of the following pasture phase. The increased total biomass in the pasture-crop system caused a reduction in both soil water and nitrogen availability.

This may reduce the risk of waterlogging and loss of nitrogen through denitrification or nitrate leaching. Higher ground cover in the pasture-crop system may also reduce the risk of soil erosion (Bruce *et al.* 'Pasture-cropping: Effect on Biomass, Total Cover, Soil Water and Nitrogen').

CONCLUSION

Although pasture cropping has been practised using chemicals to control weeds and conventional fertilisers to manage soil chemistry, many crops are being sown without these inputs.

The pasture cropping technique can be used to grow organic crops. Without using a plough or destroying existing perennial pasture.

Benefits of pasture cropping are enormous, way beyond short-term crop yields. It contributes to developing crucial top-soil, water management, stabilising the many forms of soil erosion, controlling weeds, as well as many other benefits.

It gives farmers and graziers a tool to effectively manage

their properties while individually contributing to a healthier environment. ■

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Look out for Parts 2 and 3 of this series in the coming two issues of *Australian Organic Journal*. We will cover methods of pasture cropping as well as provide case studies of organic farms already using this technique.

Note: Because of the huge interest in pasture cropping, Colin Seis has been helping landholders in many parts of Australia, advising them on workshops and best methods for their particular area, rainfall and pasture type. His consultancy advice is available to anyone interested.