Organic conversion strategies for stockless farming systems

Sally K Huxham, Debbie L Sparkes, Paul Wilson
Division of Agricultural Sciences, School of Biosciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK

ABSTRACT

The identification of appropriate stockless organic conversion strategies will help farmers and growers in their decision to convert to organic production. The current practice of a two-year red clover/ryegrass ley conversion relies on subsidies to be economically viable. This standard conversion and six alternatives were tested on a sandy loam soil entering organic conversion. A test crop of winter wheat will be grown across the entire experimental area in the first fully organic year (2001/2002). Strategies containing a legume ley phase returned the greatest amount of nitrogen to the soil. At the end of the second year, pre-cultivation, there were no differences in soil mineral nitrogen between strategies. Gross margins were greater from those strategies with cash cropping than those without, in spite of the generally depressed yields. Preliminary analysis suggests that growing red clover for seed in year 1 followed by a red clover ley in year 2 could be the most profitable option.

Keywords: organic farming; stockless; conversion; gross margin

INTRODUCTION

Many farms in the UK are exclusively arable and it would not be feasible for them to introduce a livestock enterprise in order to convert to organic production. Stockless organic systems are therefore the practical option for many arable farmers wishing to convert. The typical organic conversion in stockless systems is a two-year red clover/ryegrass green manure which is cut and mulched regularly (Lampkin, 1994). While this conversion strategy may be successful at supporting a subsequent crop rotation, it is dependent on set-aside and organic farming scheme subsidies to be economically viable (Lampkin & Measures, 2001).

MATERIALS AND METHODS

Alternatives to the red clover/ryegrass ley conversion were tested in a fully replicated field experiment on a sandy loam soil, previously in conventional cropping, which entered organic conversion in August 1999 (Table 1). Strategies 5 and 6 in Table 1 do not qualify for organic status under current legislation but are included to stretch the test bed. The plots received no inputs other than plant material derived from the plot itself and returned during mulching, combining or cultivating. Detailed measurements of soil and crops were collected from each conversion strategy, and gross margin data were calculated. In the third year (2001) wheat will be grown across the experimental area as a test crop.

Table 1. Conversion strategies (us = undersown with red clover, gm = green manure)

Strategy (S)	Year 1 crop	Year 2 crop	Year 3 crop
1	red clover/ryegrass (gm)	red clover/ryegrass (gm)	winter wheat
2	vetch (gm)	vetch/rye (gm)	winter wheat
3	red clover seed	red clover/ryegrass (gm)	winter wheat
4	spring wheat (us)	red clover (gm)	winter wheat
5	spring wheat	winter beans	winter wheat
6	spring oats	winter beans	winter wheat
7	spring wheat (us)	spring barley / spring pea	winter wheat

RESULTS

Nutrients

Strategies with a legume ley phase (S1-4) returned more nitrogen to the plots in plant material than those without ($P<0.01$). At the end of the first year, the vetch strategy contained 3-4.5 times more soil mineral nitrogen (SMN) than the other strategies ($P<0.01$). Before cultivation at the end of the second year there was no difference in SMN between strategies. Phosphorus levels in the soil declined in all strategies, while potassium and organic matter levels were not different from pre-conversion levels.

Yield

The first year cereal yields were low: wheat 0.5tha^{-1}, oats 1.5tha^{-1}, and the undersown wheat failed, probably due to poor establishment, low SMN levels and weed burden. The clover seed crop yield was good: 0.44tha^{-1}. In the second year field beans yielded 1.9-2.4tha^{-1}, the pea-barley intercrop yielded just under 3tha^{-1}.

Gross margins

The clover seed strategy (S3) generated the highest annual gross margin averaged over two years, due to a good yield and high seed value (seed aid was used in the calculation of gross margin for S3, rather than arable area payments). Annual average gross margins were greater from those strategies with a cash crop (S3,5,6,7) than those without, in both with and without subsidy scenarios.

CONCLUSIONS

Clover seed followed by clover, cut and mulched (S3), is a potentially profitable conversion strategy which returned a large amount of nitrogen to the soil. Despite low yields the more demanding strategies (S5-7), generated higher gross margins than the ley strategies (except S3), but contained more weeds and returned least nitrogen to the soil. Full agronomic and economic analysis can only be conducted following third year winter wheat yields and data.

REFERENCES

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