

PT538

**Comparative benefit cost of IPM and
conventional pest management in potatoes**

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The Research Arm of the
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**COMPARATIVE BENEFIT COST OF IPM
AND
CONVENTIONAL PEST MANAGEMENT IN POTATOES**

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INTEGRATED PEST MANAGEMENT MAKES ECONOMIC SENSE

Pam Strange¹ & Julian Morison²

Crisping growers of South Australia, and other parts of Australia, have been progressive in their adoption of IPM philosophy and techniques. Chemical usage has changed from routine sprays as insurance covers in conventional management to usage only when there is a threat of economic loss.

Adoption of IPM has had a positive impact on crispering crops in South Australia. There has been no discernible loss in terms of yield or quality of potatoes harvested, but there have been savings through reduced insecticide use. A representative of the Smiths Snackfood Company believes that supply from South Australia has improved in quality and the growers have become more professional in their management in the past few years.

In this analysis of conventional pest management vs IPM, the benefits of IPM far out-weigh the costs to both the grower and to the wider community (Table 1, Fig. 1.).

INTEGRATED PEST MANAGEMENT

Since the 1992/93 season growers of the Crispering Group of South Australia have adopted IPM techniques in their management practices. They have been introduced to the concepts of beneficial insects, cultural management techniques as alternatives to chemicals, and hygiene and other practices, including weed control, that avoid pests. Beneficial insects, such as wasps, spiders, lacewings and lady bugs, can actually kill and reduce insect pest populations. Chemical sprays kill beneficiaries as well as pests and sprays in young crops are most devastating as the population of beneficiaries may be eliminated. If this happens, pest control becomes solely reliant on chemicals, chemical resistance is more likely to occur and the cost of pest control becomes much greater.

Chemical resistance in insects is a reality in all horticultural production and when it happens the effect is devastating. Reduced and strategic chemical use reduces the risk of resistance build-up. Crop monitoring, together with an increased awareness of IPM, has been an important part of the transition from conventional to IPM crop management. Crop monitoring provides accurate and up-to-date information on pest and disease incidence in the crop as well as additional information on growth and the environment for potential problems in the crop. Crop monitors have been employed by the Group.

The main pests of concern to these growers include thrips, potato tuber moth, aphids and the red legged earth mite.

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CHEMICAL USE UNDER IPM AND CONVENTIONAL PEST MANAGEMENT

The number of sprays in Atlantic crisping crops in the Adelaide Hills of South Australia has fallen from an average of 4.5 sprays per crop (range 0-7) prior to the 1992-93 season to an average of 0.5 sprays in 1993/94 (range 0-2), 1.4 sprays in 1994-95 (range 0-3) and 1.5 sprays in the 1995/96 crop (range 0-6). Growers openly admit that they are now using much less insecticide as a result of the IPM training. Before they would have put on a spray "Just in case" because "A drum was in the shed".

ECONOMIC ANALYSIS

There is only limited financial information available comparing IPM with traditional pest control. To date no local evaluation has been undertaken to assess the economic costs and benefits of IPM adoption. In this analysis a partial budgeting approach has been used, which involved developing gross margins for crisp potato production in the Adelaide Hills under conventional and IPM pest management.

Under IPM, most growers have reduced the number of sprays by 3 to 4 per crop. This translates to reduced production costs of \$200-\$300/hectare. Under average yield (40t/ha) and price (\$250/t) conditions, this will increase the gross margin by a significant 5-6.5%. Figure 1 indicates the net benefits of these changes. Under lower price and yield conditions, the percentage increase in gross margin would be even greater!

With a fall in insecticide usage (from 4.5 sprays to around 1-1.5 spray/crop) and an increase in labour (up to 2 hours monitoring per hectare per season), the financial impacts have fallen exclusively on production costs.

Even if IPM resulted in only one less spray per crop, the costs of monitoring would be more than offset by the reduction in insecticide application costs. It is unlikely that the extreme saving of 7 sprays would be reached (as shown in Fig. 1) as the average number of reduced sprays during the past three years is 3-4 in the Adelaide Hills.

ADDITIONAL BENEFITS

The implementation of IPM will involve "private" and "external" costs and benefits (Parigi and Malcolm 1996). Private costs and benefits are those directly felt by the grower, and most can be given dollar values, eg. reduced chemical usage, increased labour. External costs and benefits are those accruing to the grower's neighbours, the community and to the consumer, and are often more difficult to quantify, eg. reduced risk to human health and the environment.

Table 1 details some of the costs and benefits that may arise from the adoption of IPM for potatoes.

This analysis was funded by HRDC and the data was supplied by growers of the Crisping Group of South Australia as part of their HRDC funded projects

Table 1: Potential Costs and Benefits of IPM in Potatoes

Potential Costs	Comments
Increased use of some inputs	Increase in labour usage for crop monitoring. Weed control (chemical or mowing) may be increased or replace spraying costs.
Emergence of new pests	Pests which have been incidentally controlled previously may become more prevalent with a change in the spraying regime for the targeted pests. Regular crop monitoring will identify any new pests.
Greater uncertainty about cost and benefits of pest control	Growers initially had some concerns about their capacity to control pests under IPM, but many crops have been grown successfully with zero insecticide usage.
Potential Benefits	Comments
Reduction in the use of some inputs	In this analysis, reduced insecticide usage has been the principal reason for the benefits generated by IPM. Savings in tractor time, fuel, etc have been associated benefits.
Reduced consumer concern about chemical residues	As IPM becomes more widely adopted and public awareness of its adoption increases then the benefits of reduced consumer concern will be realised.
Reduced risk of chemical resistance in insects	No evidence to date from the Crisping Group to suggest this has occurred but resistance is a common problem in vegetable crops with high chemical input.
Better established populations of beneficial insects	High populations of beneficiaries will aid control of pests without the need for insecticides, reducing the level of chemical input further.
Aggregate income benefits to consumers and producers	If cost reductions from IPM are confined to a relatively small number of growers then those producers are likely to be the main beneficiaries. As the technology becomes more widely adopted, competitive forces will push down product prices and the benefits of the new technology will be shared by processors and consumers, as well as producers. The extent to which the benefits are shared will be determined by market structure, i.e. the extent of market power of each sector along the producer-to-consumer marketing chain.
Reduced risk to human health and safety and the environment	In as much as insecticides used in potato production do pose a risk to human health and the environment, then IPM does generate benefits as insecticide usage has been significantly reduced.

Reference

Parigi, P. and Malcolm, L.R 1996, 'On assessing some of the net effects of IPM' paper to the 40th Annual Australian Agricultural and Resource Economics Conference, Melbourne, 13-15 February.

Figure 1 Impact of IPM on Potato Gross Margins

