BENEFITS AND COSTS OF LOWERING TOXICITY IN POTATO PEST CONTROL.

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Successful IPM programs for potato pests have been developed and implemented in the Midwestern USA, but these are largely predictive and reactive in nature and remain heavily dependent on pesticide use. The continuing threat of resistance, environmental and safety concerns, and the potential loss of pesticide tools through FQPA implementation clearly necessitates the development of alternative approaches to IPM, which are less reliant on pesticides. In Wisconsin, potato growers, researchers, and the World Wildlife Fund entered into a unique agreement in 1996, which set specific goals for reductions in pesticide use and increases in adoption of biointensive approaches to pest management. Reduced risk insect and disease control programs which integrate the basic components of successful potato IPM (crop scouting, pest prediction and thresholds) with low toxicity pesticides were developed and tested in large scale, replicated trials in commercial potatoes in 1999 and 2000. The efficacy and cost effectiveness of reduced-risk programs was compared with conventional programs by weekly assessment of pest and beneficial insect populations and disease development. Crop yield and grade were determined at harvest.

Reduced-risk insect management programs provided equivalent control of major pest species and significantly increased both predator and parasite populations compared to conventional programs. Biological control of aphid populations was achieved in some low-risk treatments in 1999. Yield and grade did not differ between programs and since reduced-risk insecticides were usually more expensive than conventional materials, reduced-risk programs were generally less cost effective. However, resistance induced control failures in conventional foliar programs in one field in 2000 increased input costs beyond those of the reduced-risk programs and illustrated the risk of continued use of conventional controls.

Reduced-risk fungicide programs based on substitution of the strobulerin fungicide azoxystrobin for conventional EBDC and chlorothalonil treatments, provided more effective disease control than conventional programs. Yields were increased by up to 20% in reduced-risk programs and although these were more expensive, the increased yield more than offset the input costs.

This research demonstrated that reduced-risk insect and disease control can be achieved in potato, which is equivalent to conventional but with greatly reduced overall toxicity. Costs of reduced-risk programs are higher than conventional programs but these costs may be offset by increased yields or avoidance of resistance-related control failures.

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