ECONOMIC ANALYSIS OF BIOIPM PROGRAMS IN WISCONSIN POTATOES

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The WWF/WPVGA Collaboration was formed in 1996 to establish a working relationship between the two organizations to promote the development and adoption of biointensive IPM practices, to enhance habitat quality, to refine measurement systems for IPM adoption, to look for marketplace incentives for ecologically produced potatoes, and to identify policies and programs to support environmental goals. The University of Wisconsin, which had always provided pertinent research, education, and information to the project, officially became a part of the three-legged stool in 1998 to form the WWF/WPVGA/UW Collaboration as it is known today.

Raising consumer demand for biologically based IPM produced products has been a goal of the collaboration from its inception. Collaboration measurement methods provide a solid foundation in the development of an eco-label for biointensive IPM grown potatoes. Using the potato IPM team at the University of Wisconsin, ecological standards were written for potatoes. These standards contain both an IPM portion and a pesticide toxicity section. Potatoes grown in 2001 which fit these standards were able to be sold under the "Healthy Grown" brand which is supported by the World Wildlife Fund.

To determine the economic feasibility of growing potatoes under these stringent environmental standards, an economic analysis of the costs of the pesticide programs versus conventional systems was completed. In 2000, the Collaboration received a grant from the American Farmland Trust and Environmental Protection Agency to work with growers to implement biologically based production systems. Growers who chose to receive one-on-one educational opportunities enrolled in this project to determine where they fell along the bioIPM continuum. Through this effort, with the help of Esther Day (American Farmland Trust, DeKalb, IL), we have developed an economic spreadsheet that calculates toxicity values and chemical costs for growers' pest management programs. This allowed for a comparison of the cost of bioIPM pesticide programs.

During the season, we collected information from 15 growers who were enrolled in the project. These growers provided their pesticide records for a specific field for analysis. We determined the average prices of specific potato pesticides used during the 2000 growing season, and then analyzed the cost of the pesticide programs compared to the toxicity of that compound (which represents the environmental risk of a pesticide) (Lynch, *et al*., 2000; Benbrook *et al., in press*).

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Due to the presence of the late blight fungus, fungicides were the most used pesticides in Wisconsin during 2000. Fungicides, which were applied as many as 15 times in the fields, accounted for over 77% of the total toxicity units per acre on average for the 15 fields. Insecticides accounted for 16% of the total average toxicity units while herbicides accounted for only 7% of the total. However, if we look at the costs of the chemicals, fungicides accounted for only 55% of the total pesticide cost, while insecticides and herbicides accounted for 27 and 18%, respectively.

To differentiate the length of the growing season, fields were split into short (less than 90 days from emergence to vinekill) versus long (more than 90 days from emergence to vinekill) season. Short season fields had an average of 1402 toxicity units per season and their pesticide costs averaged $147 total. Long season fields averaged 1710 toxicity units per season with a pesticide cost on average of $202 for the season. Costs versus toxicity of the herbicides, insecticides, and fungicides can be seen in Table 1.

Table 1: Average pesticide cost versus toxicity units per acre for short and long season potato crops during the 2000 growing season. This was done as a case study on 15 fields.

	Short Season Fields*	Long Season Fields*
Insecticide		
Cost	$41	$59
Toxicity	211	260
Herbicide		
Cost	$31	$30
Toxicity	77	119
Fungicide		
Cost	$75	$113
Toxicity	1114	1331
Total Pesticide		
Cost	$147	$202
Toxicity	1402	1710

*Short season fields (5 total) were fields with less than 90 days from emergence to vinekill, long season fields (10 total) were fields with more than 90 days from emergence to vinekill.

The overall economic costs of bioIPM programs are unclear as the cost of each program varies greatly among growers and trends in chemical costs and toxicity values are not evident. With the small sample size (15 fields) clear trends were not seen. However, as a case study, we are able to look at the fields on a field-by-field basis to draw conclusion. Growers were able to view where their field fell compared to other fields within the case study. This then allowed them to determine if changes in their pest management programs may be warranted.

Many factors can contribute to pesticide use, including pest pressures, weather conditions, efficacy, soil type, labor, etc. so further analysis is needed. Future work will be designed to incorporate these and other factors into the into a whole farm economic model which will also incorporate yield to distinguish the economics of the system.

References:

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