

Spatially Explicit Approaches for Measuring and Implementing Higher Level, Multi-Crop, Multi-Pest IPM

An Interim Report on a Western Region IPM Competitive Grants Project

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Background and Project Update

Evaluation of federally funded Integrated Pest Management (IPM) programs is mandated by the National IPM Roadmap. IPM programs are expected to result in effective pest control and measurable reductions in economic, health, and environmental risks to growers and public. IPM in the sensitive environments of the desert Southwest is vulnerable to the destabilizing impact of mobile multi-host pests, such as whiteflies (*Bemisia tabaci*), that are capable of attacking our nation's major source of winter vegetables, melons, and cotton. The year-round growing season and the chronic nature of pest incidence require control strategies that result in an areawide reduction of pest populations. As selective and other reduced-risk pest control technologies have become available, growers have rapidly adopted these tools across multiple crops, often as part of well-developed IPM programs for these crops. We have developed IPM guidelines for cross-commodity management of whiteflies that provide for sharing of important reduced-risk chemistries (e.g., IGRs and neonicotinoids) among major crops (cotton, vegetables and melons) to delay the development of resistance in pest populations and to maintain these important tools. Group adoption of these guidelines over large areas, often with multiple crops, will be required to ensure areawide reduction in whitefly populations and to provide effective resistance management for major reduced-risk technologies. The goals of this Western Region IPM project are (1) to quantitatively evaluate group adoption of Extension cross-commodity whitefly IPM guidelines by Arizona growers using newly developed spatially-explicit analysis methods; (2) through stakeholder dialog, to gain insight into the adoption of specific reduced-risk chemistries and other IPM behaviors in Arizona cropping systems; and (3) to develop a better, more responsive approach to IPM guidelines generation, evaluation, and education.

The methodology involved in this quantitative assessment (objective 1) requires access to reliable insecticide use data for multiple agricultural crops, linked to specific geographic locations. The first phase of this project has been focused primarily on the development of these data. We have established partnerships between University of Arizona (UA) Cooperative Extension, the Arizona Department of Agriculture (ADA) and USDA's Arizona office of the National Agricultural Statistics Service (AZ-NASS) that have been instrumental in developing the data. We have gained access to five years of pesticide use reporting (PUR) data that includes geo-references which, when combined with available GIS maps, can link pesticide applications to specific areas, facilitating the geo-spatial analysis of IPM practice adoption. We are in the process of developing the database that will be used for testing spatially derived hypotheses about IPM practice adoption. Ongoing dialog with growers and pest control advisors (PCAs) at Extensions meetings has provided some insights into barriers to IPM adoption (objective 2), but completion of this objective is ultimately dependent on the quantitative spatial analysis of the PUR data and follow-up interviews with PCAs and growers to be conducted in the next stage of the project. Ultimately, the improved understanding of potential adopter's IPM decisions will allow us to develop a better, more responsive approach to IPM guidelines generation, evaluation, and education (objective 3). We hope that the IPM evaluation methods developed through this research will provide a basis for similar approaches to measuring IPM adoption and risk reduction at a level of organization that spans multiple crops and pests over entire agroecosystems.