OUTCOMES OF THE WESTERN SMALL-FARM IPM WORKING GROUP: CONSTRAINTS AND PROSPECTS FOR IPM ON SMALL-SCALE U.S. FARMS

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INTRODUCTION

Historically, IPM research and extension in the USA has focused on large-scale agriculture, leaving small-scale producers under-served. The Western Small Farm-IPM Working Group was formed in 2010 with funding from USDA-NIFA to help address this imbalance. The overall aim of the group was to develop a regional network of effective small farm-IPM teams that could better serve the diverse small-scale producers in each of the six member states. The project plan included conducting initial needs assessment exercises to determine the IPM-related concerns of the small-scale farmers in each state, followed by the implementation of on-farm IPM pilot projects to gain a deeper understanding of, and insight into, the needs and constraints of these producers. Some of the key findings and recommendations from our work are presented here.

CONSTRAINTS ON THE ADOPTION OF IPM ON SMALL-SCALE FARMS

1. REACHING THE FARMERS

U.S. small-scale farms are characterized by diversity – not only in the crops or livestock produced, but also in the demographics and experience of the farmers. Many such growers come from 'non-traditional' backgrounds: they often have off-farm jobs, and may be unfamiliar with extension services and programs. For many, too, English is a second language.

Scenes from IPM pilot projects carried out by working-group members. Left to right: organic mixed fruit and vegetable farm in New Mexico, owner Lorenzo Candelaria, trap cropping and a mixed vegetable farm in Utah, and dragon-fruit farming and outreach in CA.

Working group conclusions:

- 'Hands-on', participatory activities are probably the most effective way of addressing these diverse audiences, although such approaches can be expensive.
- The formation of small-acreage producer organizations in each state would increase the ability of research and extension personnel to reach this clientele. Such organizations could also benefit beginning farmers by facilitating networking opportunities and helping to establish mentoring relationships with more experienced producers.

2. AVAILABILITY OF KEY INPUTS

All of the on-farm pilot projects were constrained by the lack of one or more potentially valuable inputs in pack sizes appropriate for small-scale growers. Such inputs included pheromone dispensers for mating disruption of key pests, certain pesticides (e.g. some herbicides), and organically-acceptable spray adjuvants such as pH buffers (below left).

Working group conclusion:

There is a need to work with input manufacturers to raise awareness of the aggregate market formed by the nation's small-scale producers, and to make their products available in pack sizes more appropriate for these customers.

SMALL-SCALE FARMS: AN UNDER-UTILIZED RESOURCE FOR EXOTIC PEST DETECTION?

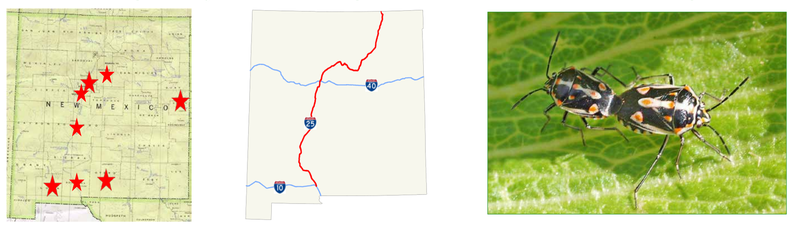
The working group's on-farm pilot projects involved regular interactions between participating farmers and IPM-trained personnel – particularly where such projects included regular pest monitoring. One outcome of these interactions was a surprising number of new pest and disease detections, many of which represented new state records (below).

New plant diseases or host associations (state records) found as a result of the Utah small-farm IPM pilot project (above, left to right): tobacco etch virus on pepper, watermelon mosaic virus in squash (on leaves and fruit), and bacterial canker in tomato.

New invasive pests (state records) found as a result of the New Mexico small-farm IPM pilot project (above, left to right): spotted wing drosophila, African fig fly, and the cereal aphid, *Sipha maydis*. The image on the far right shows leaf curling in dragon fruit, a symptom of Cactus virus X, whose presence was confirmed in California in 2013 by members of the working group.

These findings suggest that the nation's small-scale farms may provide a ready-made and under-utilized network of sites ideally suited to the detection of new invasive pests, for the following reasons:

- Many small-scale farms are located in or around urban centers, and hence close to the major highways and trade routes through which invasive pests may spread (see example, below).
- Small-scale farmers often grow a wide variety of different crops, including non-traditional species for local ethnic or specialty markets. Such crops may include the preferred hosts of new exotic pests.



Left: current distribution of the invasive stink bug *Bagrada hilaris* (far right) in New Mexico. Note close correspondence with NM interstate highways (center), suggesting dispersal via transportation networks. All three of the new invasive pests detected in the NM small-farm IPM pilot project (above) were found in the greater Albuquerque area, where I-25 and I-40 intersect.

OPPORTUNITIES AND FUTURE PROSECTS

1. FARMER INNOVATION

Small-scale farmers often show a high degree of innovation in developing pest management solutions appropriate to their needs and constraints. One working-group farmer in New Mexico, for example, rid his hoop-house of stinging harvester ants (*Pogonomyrmex barbatus*) by puncturing a small hole in a 5-gallon water container, placing the water-filled container over the nest entrance and allowing the water to percolate into the nest. After 2-3 weeks of such treatment, the ants moved away.

An example of innovation in pest-management problem-solving appropriate to small-scale production: bird damage to dragon fruit (left), and the solution: paint-filter bags as a pest exclusion technique. This method was developed by the California team during their small-farm IPM pilot project.

Working group conclusion:

There is a need to develop a mechanism (similar to the 'Farm Hack' website (http://farmhack.net)) to facilitate outward diffusion of such innovations to the wider small-farm audience.

2. IMPROVING THE PROVISION OF IPM-RELATED SERVICES TO U.S. SMALL-SCALE FARMERS

Given that IPM research and extension activities in many states are still focused mainly on large-scale agriculture (particularly where much of the research is funded by commodity groups), the IPM-related needs of the nation's small-scale farmers are likely to continue to go unrecognized and unmet unless concerted action is undertaken and/or an alternative paradigm is adopted to meet their needs.

Working group conclusion:

Funding sources targeted at IPM research for small-scale farmers, together with more innovative approaches to outreach and extension are needed. Since peer groups are an important source of IPM-related information for many small-scale farmers, extension activities based on Farmer-to-Farmer Networks and/or Farmer Field Schools might be more appropriate than traditional approaches such as workshops.

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