INTRODUCTION AND BACKGROUND

Many small-scale producers are very interested in reducing inputs and farming in less chemically-intensive ways, making them predisposed to adopt integrated pest management (IPM). The latter approach seeks to reduce pest populations by relying mainly on cultural practices and biological controls, with pesticides being used only as a last resort. Historically, however, development of IPM programs has focused on large-scale conventional agriculture, leaving small-scale and organic producers underserved. The Western Small-Farm Working Group (which includes California, Idaho, New Mexico, Oregon, Utah and Washington) was formed with funding from USDA-NIFA to try to redress this balance by addressing the IPM-related needs of the small-scale producers in member states. Our members have been surveying their clientele for information on their pest management problems, and then developing on-farm pilot projects to help producers adopt suitable IPM practices. We report here on the characteristics of small-scale producers in New Mexico, their IPM-related needs, and how this information will be used to develop an IPM pilot project.

METHODS

A four-page questionnaire was developed that addressed the characteristics of both producers (age, ethnicity, experience, etc.), and of their farms (size, location, crops, livestock, main markets), as well as their insect, weed, and disease problems, current pest management practices, fertility management practices, information needs and resources, as well as their current farming challenges. The questionnaire was sent to 1,416 producers on the mailing lists of the New Mexico Cooperative Extension Service and the NM Organic Farming Conference, as well as being translated into Spanish and distributed by hand to an additional 30 small-scale growers in the south of the state. A total of 12.8% of the target population responded, of which 24 were non-commercial home gardeners, giving a total of 161 returns from farmers who derived at least part of their income from farming. In terms of their pest problems, producers were asked to rank which of the three categories (insects, weeds or diseases) they considered to be the most (and least) important on their farms, and to list their three worst problems within each category. To determine the most problematic species overall, those listed as No. 1 were allocated 3 points, those ranked No. 2 were given 2 points, and those ranked third, 1 point. The total scores across all respondents were then summed within each category.

RESULTS

1. Farm characteristics
   
   **Size:** Most of our respondents (85.8%) farmed less than 100 acres (63.3% farmed 10 acres or less, with 34% farming 1-5 acres and 12.3% farming less than 1 acre).
   
   **Crops:** Most farms were diversified, with a mixture of crops and/or livestock. 100 growers reported producing vegetables, 75 tree fruit, 74 alfalfa or other forage crops, 28 berries, 21 nut crops, 9 cut flowers and 9 herbs.
   
   **Livestock:** A diverse range of livestock is produced, with 31 respondents raising chickens (average flock size = 34), 27 raising cattle, 17: horses, 16: goats, 10: sheep, 7: turkeys and 4: pigs.
   
   **Production system:** Only 26.7% of our respondents considered themselves wholly conventional producers. 17.6% of respondents had at least some certified organic land, while the majority (47.2%) considered all or part of their production to be 'uncertified organic'. 35.4% reported using some kind of season extension technique (hoop houses, low tunnels, etc.).
   
   **Farm income:** 61.8% reported average annual gross farm sales of less than $10,000, with 79.2% reporting other sources of income; for 60.7% of respondents, farming represented 10% or less of their total income.
   
   **Main markets:** Farmers’ markets and other local outlets (retail stores, farm stands, etc.) were important markets for our respondents (45% and 43% respectively).

2. Farmer characteristics
   
   **Age:** 30% of respondents were aged 65 or older (Fig. 1) – exactly the same as the U.S. national average.

   **Gender:** 61.3% of respondents were male, 38.7% female (a slightly higher proportion of females than the national average).

   **Experience:** The majority of our respondents were experienced farmers (74% had farmed for >10 years, and 37% for >25 years. Only 7% had been farming for 5 years or less.

   **Ethnicity:** 74.5% of respondents reported being white (non-Hispanic), 19.1% Hispanic and 3.8% American Indian. There is a disparity between these data and those presented in the 2010 U.S. Census by race and ethnicity. In ranking the three as least important, the respective percentages were: diseases: 69.7%, weeds: 23.9% and pests: 7.5%. Some farmers mentioned that in the current drought, weeds provided food for their livestock and were therefore of value.

3. Principal pest problems
   
   **Pest categories:** Insects and weeds were considered to be the most important category of pests by similar numbers of respondents (46.5% and 43.5%, respectively). Only 9.9% of producers considered diseases to be the most important category. In ranking the three as least important, the respective percentages were: diseases: 69.7%, weeds: 23.9% and pests: 7.5%. Some farmers mentioned that in the current drought, weeds provided food for their livestock and were therefore of value.

   **Pest species:** In ranking their most important pest species, most respondents were able to list 3 insects and 3 weeds, but few listed even a single disease; many were unsure of the identity of diseases and gave only a general term such as ‘tomato fungus’ or ‘wilt’. The list of problematic weeds was the most diverse, with many species being listed just once by a single respondent. There were a few cases of probable mis-identifications (e.g. two producers listed Japanese beetle, which is not currently present in NM). The scores for the most important species are as follows:

   - **Insects:**
     - Squash bug (Anasa tristis): 104
     - Grasshoppers (unspecified): 96
     - Aphids (unspecified): 79
   - **Weeds:**
     - Bindweed (Convolvulus arvensis): 177
     - Pigweed (Amaranthus retroflexus): 48
     - Grasses (unspecified): 33
     - Kochia (K. scoparia): 32
   - **Diseases:**
     - Curly top virus: 71
     - Powdery mildew: 64

4. Current pest management practices
   
   Most of our respondents were well-informed about pest management practices. 64% of respondents felt that they understood what is meant by IPM, and of those, 72% said that they were currently following IPM practices. Of those that don’t practice IPM, the most common reasons for not doing so were that their farms were too small (although the largest of these was 400 acres), or that their pest problems were not that severe. 94% of all respondents reported regularly monitoring their crops for pest damage, with 90% checking for beneficial insects at the same time. However, only 35% used insect monitoring traps and only 30% kept records of their results. Just over 75% used crop rotation to reduce insect, weed or disease problems, while 65% reported growing ‘insectary’ plants to attract beneficial insects. 64% used insect- or disease-resistant crop varieties, and 49% reported using some kind of physical controls for pest problems (e.g. floating row covers or moving).

CONCLUSION: NEW MEXICO IPM PILOT PROJECT

Based on these results, our IPM pilot project for small-scale growers will focus on mixed fruit and vegetable production, with an emphasis on using monitoring to improve treatment decisions for pests such as codling moth, and cultural controls for weeds such as bindweed. The overall aim is to help develop best-practice guidelines for developing and implementing IPM on small-scale farms.

Figure 1: Age of NM farmers responding to our IPM survey

No. of Farmers

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