# Educating Spanish Speaking Pesticide Handlers: Agricultural and Landscape Workers

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## Abstract

The native language of many pesticide handlers and workers in Idaho's Treasure Valley is Spanish. These Spanish-speaking workers need opportunities for continuing education in pest management related to row crops, orchard production, and landscaping. In 2006, University of Idaho Extension Educators began providing an annual pesticide safety education program in Spanish. Programs have an annual attendance ranging from 28-40 students. Pre and post surveys have shown that, as a result of training, participant's knowledge increased in the areas of personal protective equipment, sprayer calibration, pesticide spills, insect scouting, long term effects of pesticide exposure, and employer responsibilities.

**Keywords**: Spanish pesticide handlers landscape workers agriculture

## Introduction

Spanish is the native language of many pesticide handlers, farm workers, and landscaping workers in southwestern Idaho. Pesticide safety training programs in Spanish were first offered in eastern Idaho by University of Idaho's Cooperative Extension System (UICES) in the late 1990's. The first UICES pesticide safety trainings conducted in Spanish in southwestern Idaho occurred in 2004. The need for a more comprehensive training program conducted in Spanish was magnified in the summer of 2005 when farm workers in Canyon County, Idaho experienced pesticide exposure due to a series of communication failures between the field crew, landowner, and custom spray applicator. Spanish-speaking pesticide handlers, farm workers, and landscape workers need continuing education opportunities to further increase their knowledge and understanding of pesticide safety as it relates to row crop, orchard production, and landscaping pest management.

A study conducted in Oregon (McCauley 2001) recognized that the migrant farmworker community is vulnerable to pesticide contamination and that measuring potential exposure can be difficult. Several factors contributed to their findings. All individuals in this study primarily spoke Spanish; only a small percentage spoke English as a second language. The general education level of these farmworkers averaged 5.4 years. The study also suggested that children of farmworkers are at higher risk of pesticide exposure due to specific conditions related to worker housing. These conditions included the home's close location to agriculture operations, lack of laundering facilities, and high numbers of agricultural workers per household. One conclusion of this study was that farmworkers were unaware of the dangers inherent in carrying pesticide residues home with them, primarily because of the language barrier.

Another study in North Carolina (Arcury 2002) examined the effectiveness of pesticide safety training among farmworkers. The study showed that when farm workers receive training they perceive they have greater control over their level of pesticide risk. The study concluded that for pesticide safety training to be effective, farmworkers

must believe they have some control in implementing their safety knowledge in the workplace.

The desired outcome of the UICES Spanish Safety Training Workshops is to educate Spanish-speaking farm workers about pesticide risks and demonstrate how they can implement preventative and protective steps in their workplace. The purpose of this paper is to demonstrate how UICES and the Idaho State Department of Agriculture (ISDA) developed and delivered Spanish language pesticide safety and Integrated Pest Management (IPM) education. This program may serve as a model for others wishing to provide similar training.

## Methodology

A University of Idaho "Critical Issues in Extension Grant" was awarded to a team of UI Extension Educators in 2006 for conducting a pesticide safety education program directed at Spanish-speaking pesticide handlers and workers in southwestern Idaho. The team selected a 2006 training site and prepared a full day educational workshop containing core curriculum such as: worker protection standards (WPS), personal protective equipment (PPE), pesticide labels, sprayer calibration, pesticide storage, pesticide disposal, and pesticide handling. The curriculum also contained specific topics selected to improve worker skills and awareness such as field scouting, insect identification and management, and West Nile Virus prevention. The workshop was conducted again in 2007 with minor changes to the curriculum. The 2008 workshop contained minor changes to specific topics as well as the addition of interactive breakout sessions. The workshop agendas are outlined in Table 1.

**Table 1.** 2006-2008 Workshop topics, time, and description

| Year | Subject | Time | Materials |
|---|---|---|---|
| **2006** | Pesticide Handlers Safety | 2.75 Hr | Lecture & EPA/WPS Handouts* |
| | Pesticide Safety in Orchards | 0.50 Hr | PowerPoint |
| | Spray Drift | 0.50 Hr | PowerPoint |
| | Chemigation | 0.50 Hr | PowerPoint |
| | Transport, Storage, Clean-up | 0.50 Hr | PowerPoint |
| | Potato Tuber worm | 0.75 Hr | PowerPoint |
| | Evaluation, Comments | 0.50 Hr | Survey & Interaction |
| **2007** | Pesticide Safety Training | 2.75 Hr | Lecture & EPA/WPS Handouts |
| | Pesticide Labels | 0.50 Hr | PowerPoint |
| | Pesticide Handling | 0.50 Hr | PowerPoint |
| | PPE Review | 0.50 Hr | Demonstration |
| | Transport, Storage, Clean-up | 0.50 Hr | PowerPoint |
| | West Nile Virus | 0.75 Hr | PowerPoint |
| | Evaluation, Comments | 0.50 Hr | Survey & Interaction |
| **2008** | Field Scouting | 0.75 Hr | PowerPoint |
| | Sprayer Calibration | 0.50 Hr | Interactive Exercise |
| | PPE Review | 0.50 Hr | Interactive Exercise |
| | Pesticide Exposure | 0.50 Hr | Interactive Exercise |
| | Transport, Storage, Clean-up | 0.75 Hr | PowerPoint |
| | Pesticide Safety Training | 2.75 Hr | Lecture & EPA/WPS Handouts |
| | Evaluation, Comments | 0.50 Hr | Survey & Interaction |

*Environmental Protection Agency (EPA) training materials for the Worker Protection Standard (WPS)

All workshop presentations, breakout sessions, and reference materials were delivered in Spanish. In addition, all attendees received a folder containing EPA /WPS information and a refrigerator magnet containing laundering instructions for pesticide-contaminated work clothing. At the conclusion of the workshop, attendees received an EPA Pesticide Handlers Certificate from ISDA.

Delivery methods in the 2006 and 2007 Workshops consisted of PowerPoint presentations and PPE demonstrations (Figure 1). The 2008 workshop also contained PowerPoint presentations, but included concurrent breakout sessions that incorporated class member participation.

During breakout sessions the class was divided into thirds and each group was assigned a station and an interaction topic. After 25 minutes of instruction and interaction, the group rotated to the next station. Breakout session topics included sprayer calibration, PPE, and pesticide contamination.

The sprayer calibration breakout consisted of math review, sprayer parts review, and sample mixing problems. Each group was given a calibration problem; group members assisted one another to complete the calculations needed to prepare an accurate solution. The PPE breakout required group members (with instructor supervision) to participate in selection and adjustment of PPE in order to meet label requirements as well as proper fit and adjustment to ensure protection performance. The third breakout topic included a discussion and demonstration of pesticide contamination and prevention. In this session, instructors interacted with group members by shaking hands, exchanging ball caps, cell phones, and other items secretly 'contaminated' with a fluorescent lotion. Instructors borrowed a walk-through tunnel exhibit (University of Idaho Germ City 2008) containing black lights designed to illuminate fluorescent materials. Upon entering the walk-through tunnel, group members could see where the lotion had contaminated their clothing, hands and face. This interaction gave them some appreciation of how easily pesticide contamination and dermal exposure can occur (Figures 2 & 3). After the exercise, instructors and group members discussed prevention methods to avoid pesticide contamination of workers clothing and skin and methods to protect family members from contamination.

The organizing team was concerned about adequately notifying the target audience about upcoming workshops. Advertising to the Spanish-speaking farmworker audience was accomplished through several methods including articles in county Extension newsletters, direct mail flyers, informational displays at agricultural shows, public service announcements on Spanish radio stations, and announcements on an Idaho Extension "pest alert" website. Participant feedback indicated that the most effective means of reaching the target audience was through flyers mailed to pesticide license holders. These license holders are the primary employers of many Spanish-speaking farmworkers. Workshop attendance fluctuated between 34 in 2006, to 40 in 2007, to 28 in 2008. According to the ISDA Specialist participating in this project, the average number of workshop attendees represents less than one percent of the potential

Spanish-speaking agricultural worker population in southwestern Idaho.

At the conclusion of the 2006 and 2007 workshops the participants were asked to evaluate the training and give suggestions for future topics. In 2008, in addition to the evaluation, the participants were given both a pre-class survey and test. Presenters were interested in assessing the level of education of participants as well as their pesticide safety knowledge. Questions on the survey addressed classroom training experience and language spoken. Seven questions on the pre-class test measured pesticide and agronomic knowledge. These pre-class test questions were posed using a six-point Likert scale (Boone 2007) that allowed the answers to be weighted according to how strongly the student agreed or disagreed. Four questions from the pre-class test were asked again at the end of the workshop to measure knowledge gain. Individual responses from all three workshops were kept anonymous and participants were not contacted later for program impact or follow up data. Sample size from the 2008 pre and post tests was not large enough for statistical analysis.

**Figure 1.** Instructor demonstrating the variety of PPE and their uses.

**Figure 2.** Instructor interacting with class members who handled fluorescent lotion-"contaminated" ball caps, gloves, and cell phones.


**Figure 3.** Class members prepare to enter walk-through tunnel after being "contaminated" with fluorescent lotion.

## Results

All three workshops were successful according to participant's evaluations. Class members expressed appreciation for the Spanish presentations and requested additional training. Examples of Workshop evaluation responses (2006-08) are shown below:

**What did you learn that you can use in your work?**

- How to take care of pesticides, how to recognize pests.
- Protect the chemicals, guard against drift, and calibration of equipment.
- Manage pesticides, personal protection, and proper application of pesticides.
- Spray drift and fumigation.
- Store pesticides in a safe place. How to protect us from pesticides. How to transport pesticides.
- Equipment. What to do in case of emergency. How to understand the labels.
- How to recycle pesticide containers.
- Learned that I have to protect myself. To ask my employer for necessary equipment, and how to manage chemicals.

**What improvement and topics to you suggest?**

- The subject of West Nile virus in Spanish.
- Do more programming like this and let our bosses know how the programs help us.
- Keep doing them so we can be better in the field, thank you.
- How to get workers and employers to collaborate.
- More training.
- That you bring the chemicals you talk about.
- Continue this program because there are many workers who don't speak English.
- It was a very good program for people who apply pesticides because you gave very good instruction on how to manage them and you also gave suggestions on how to protect the flora and fauna.
- Thanks to the whole department for programs to Latinos and for having us learn the new regulations and how to protect us daily.
- The class was very complete with the information we needed. Thanks to all the educators for your time and effort.

The 2008 pre-class survey showed: 57% of the participants had previous classroom training on pesticide issues; 56% of the participants understood only Spanish.

Additional questions in the pre-class test (Table 2) revealed that 88% of the participants agreed they understood how to protect themselves from pesticides and understood the health hazards of pesticides. All class members agreed that they knew there was potential for cancer or other illnesses as a result of chronic pesticide exposure. All but one class member agreed that they knew employers had responsibilities to notify workers of pesticide applications and reentry times. Fewer class members (59%) agreed that they knew how to accurately mix pesticides. A higher percentage (72%) agreed that they knew how to store and dispose of pesticides. Finally, only 48% agreed that they knew how to scout fields to determine the necessity of spraying.

All class members agreed after the educational program that they now understood the information referred to in the questions. However, the question on field scouting had a wider variety of responses indicating that this topic may require more time and instruction.

**Table 2.** 2008 Workshop Pre-class test (27 pre-class responses).

| | **Pre-Test** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **No.** | **Question** | **1 Very strongly Disagree** | **2 Strongly Disagree** | **3 Disagree** | **4 Agree** | **5 Strongly Agree** | **6 Very Strongly Agree** | **Blank** |
| **3** | I understand how pesticides can enter the body and how I can protect myself | 3 | 0 | 0 | 9 | 3 | 10 | 2 |
| **4** | I understand the health hazards of pesticides | 2 | 0 | 1 | 11 | 3 | 9 | 1 |
| **5** | I understand that repeated exposure to pesticides can have long term health hazards | 0 | 0 | 0 | 12 | 2 | 12 | 1 |
| **6** | I understand my employer must inform me of sprayed fields and safe reentry | 1 | 0 | 0 | 11 | 4 | 10 | 1 |
| **7** | I understand how to mix pesticides accurately | 3 | 3 | 5 | 3 | 7 | 6 | 0 |
| **8** | I understand how to properly store and dispose of empty pesticide containers | 4 | 1 | 1 | 7 | 4 | 10 | 0 |
| **9** | I understand how to scout a field to determine if it really needs to be treated | 9 | 1 | 4 | 7 | 2 | 4 | 0 |

| | Post-Test | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| No. | Question | 1 Very strongly Disagree | 2 Strongly Disagree | 3 Disagree | 4 Agree | 5 Strongly Agree | 6 Very Strongly Agree | Blank |
| 3 | I understand how pesticides can enter the body and how I can protect myself | 0 | 0 | 0 | 3 | 7 | 18 | 0 |
| 5 | I understand that repeated exposure to pesticides can have long term health hazards | 0 | 0 | 0 | 2 | 5 | 21 | 0 |
| 6 | I understand my employer must inform me of sprayed fields and safe reentry | 0 | 0 | 0 | 2 | 5 | 21 | 0 |
| 9 | I understand how to scout a field to determine if it really needs to be treated | 0 | 0 | 0 | 9 | 7 | 10 | 2 |

## Conclusions

Spanish-speaking farm workers in southwestern Idaho need and desire pesticide safety and agronomic training to help them in their jobs. Workshop participants have expressed appreciation for the Spanish language presentations and have requested additional workshops be offered in the fall as well as the current spring training date. Class members also welcome instruction in related areas that would help them improve their employment skills such as pest identification and management, field scouting, sprayer calibration, and others. Through personal communications with various employers of Spanish-speaking workers, the ISDA Specialist and collaborator in this project has reported positive feedback on the value of the training.

From the 2008 survey, and from class interaction, it was apparent that the participants already had a good understanding of worker protection issues and basic pesticide safety. The workshop organizers hypothesize that the 2008 class members were composed largely of supervisors, with crew responsibilities, who had advanced experience and training. Workshop organizers plan to continue reaching these more knowledgeable individuals. However, we recognize the need to reach more Spanish-speaking pesticide workers and pesticide handlers who have less access to classroom training. In the future, we intend to include a question in the pre-class survey to determine if participants have

supervisory duties and whether they intend to use the workshop information and methods to educate their crews.

There is potentially a much larger Spanish-speaking audience to be reached with pesticide safety training. In order to do so, organizers intend to keep the workshop free of charge and are considering adding additional workshop dates and locations. Some factors that may be limiting the attendance of pesticide workers are:

- Employers unwilling to support large numbers of attendees
- Low reading skills among workers
- Inconvenient training locations
- Travel expense

Surveys indicate that as the Idaho nursery and landscape business expands, a potentially larger Spanish-speaking audience must be reached to adequately promote pesticide safety among workers in this industry.

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