Pest Management Alliance Grant
Final Report

March 30, 2015

Grant Agreement No: **12-PML-G002**

Project Name: **Expanding IPM Education to Southern Ca. Spanish-speaking Landscapers**

Principal Investigator: **Janet Hartin,** University of California Division of Agriculture and Natural Resources

Project Overview

Soil runoff and groundwater pollution are leading sources of water quality degradation in urban areas of Southern California and are largely due to overuse and improper use of pesticides and fertilizers. Approximately 75,000 Spanish-speaking landscapers and gardeners make decisions and/or apply pesticides and fertilizers annually in Southern California. Many lack adequate expertise in Integrated Pest Management (IPM) and safe use of pesticides in part due to inadequate training opportunities available in Spanish. Increasing educational services stressing pest prevention to this large clientele – which has quadrupled over 20 years - can significantly reduce overuse and misuse of pesticides in urban environments and improve the health and safety of the work environment for this segment of the profession.

Funding received for this contract led to a successful partnership consisting of University of California Division of Agriculture and Natural Sciences scientists, DPR scientists and staff, and external landscape industry leaders who developed and provided educational services to over 400 Spanish-speaking landscapers at 13 workshops throughout Southern California that included hands-on as well as classroom training.

Team members included Pat Matteson, Larry Wilhoit, Polo Moreno, Valerie Ruvalcaba and Mark Robertson (DPR); Darren Haver, Cheryl Wilen, Lisa Blecker, Mary Louise Flint and Janet Hartin (UC ANR); and, industry members Bill Baker, Toni Monzon, Robert Wade, Jaime Bayona, Chaz Perea, Anita Matlock, and Meredith Odom.

Specific curriculum and activities provided in the classroom and field training were based on the results of focus groups and individual interviews that assessed the specific needs of this large clientele. Focus groups and interviews included both foremen/women and crew and included questions on job duties, measures used to keep plants healthy, what kind of training is currently provided, and what kind of training would be most helpful. In addition, focus group participants were asked to respond to the usefulness of a number of UC ANR educational resources which were distributed. Those randomly selected for individual interviews were asked more specific questions regarding concerns about health and safety surrounding pesticide applications and how they determined what type and how much of specific pesticides and fertilizers to apply.

DPR's Polo Moreno worked closely with project presenters Jaime Bayona, Chaz Perea, and Lisa Blecker to ensure that Power Point presentations were translated accurately and were consistent in language usage and style. Mr. Moreno also translated workshop promotional materials and handouts. In addition, the high quality and extensive day-to-day project management provided by Bill Baker and Meredith Odom (William Baker & Associates) was particularly crucial for ensuring project success.

The project included a strong evaluation component consisting of pre and post workshop assessments and follow-up interviews several months after training was received. Results indicate a greater understanding of pesticide use and safety, irrigation scheduling and management, and fertilization application and management following training. Overall, respondents indicated that they had (or would) reduce pesticide usage by at least one-third and implement more preventive pest management strategies based on knowledge gained during the training.

Project Report

Objective 1: Manage administrative responsibilities and maintain clear communication among DPR alliance and team members during the course of the project which concluded March 31, 2015.

Deliverables: We had three full team meetings, seven UC team meetings with Wm Baker & Associates Spanish-instructors, and several conference calls between and among team members during this reporting period. Quarterly and annual reports were written by PI Janet Hartin and supplied to DPR along with corresponding invoices.

Objective 2: Recruit a minimum of 200 Spanish-speaking landscapers employed in Southern California to participate in focus groups and complete a pre-workshop/hands-on training subject matter assessment. A subset of 20 of the landscapers in attendance will also participate in individual interviews. (The original timeline of March 31, 2023 was extended to May 31, 2013 due to the later than expected final approval of the DPR contract, the winter holidays impacting its start date, and the fact that it was determined that 'smaller is better' pertaining to size of the focus groups and the overall project's success.)

Deliverables: Coordinated and hosted focus groups with 10-20 participants in each.

In all, 168 Spanish speaking landscapers participated in focus groups and 90 of these individuals participated in individual interviews representing eight private companies and four public entities. Although we did not meet our goal of recruiting 200 focus group participants, the consistency and similarly of the responses we received from those who did participate added to our overall confidence that their responses were very likely reflective of a larger pool of Spanish-speaking landscapers employed in Southern California.

Focus group protocol:

After much discussion and an extensive literature review of social science methodology for conducting effective focus groups, the following parameters were agreed upon:

- Focus groups would be kept to 15 or fewer members. Fewer is better to elicit open, frank dialogue. Ideally, focus groups will have 6-10 participants.
- Managers will be assigned to different focus groups than their employees.
- DPR team members should not attend focus groups. While DPR members are integral to the grant team, Toni Monzon, Jaime Bayona and Bill Baker were adament about this point of view after conducting initial focus groups. Due to the small size of the focus group, Toni, Jaime, and Bill strongly believe that anyone employed by a regulatory agency attending a focus group - regardless of the rationale for him/her being there – would inhibit open, honest dialogue significantly. After much thought and discussion, I, as Principal Investigator, agree that the cons outweighed the pros and to maintain the necessary open, transparent atmosphere required, no DPR or other regulatory personnel should attend the focus groups.

Following is the agreed upon dialogue used to introduce the members of the focus group to the reason for the meeting and desire for their input:

"Good morning and welcome. Thanks for taking the time to join our discussion about your training needs. My name is ____, and I will serve as the moderator for today's focus group discussion and will be taking notes. The purpose of today's discussion is to get information from you about the training needs of Spanish speaking landscapers so we can improve what is available to you in upcoming training sessions. There are no right or wrong answers to the questions I am about to ask. We expect that you will have differing points of view. Please feel free to share your point of view even if it differs from what others have said. If you want to follow up on something that someone has said, you want to agree, disagree, or give an example, feel free to do that. Don't feel like you have to respond to me all the time. Feel free to have a conversation with one another about these questions. I am here to ask questions, listen, and make sure everyone has a chance to share. I'm interested in hearing from each of you. So if you're talking a lot, I may ask you to give others a chance. And if you aren't saying much, I may call on you. We just want to make sure we hear from all of you. Feel free to get up and get refreshments any time you like. We will be taking notes to help us remember what is said. Even though you each have a name badge, no names will be included in any reports. Let's begin by having each person in the room tell us their name, your job title and how long you've been with the company. (Based on Krueger and Casey, 2000)

Questions asked of each Focus Group:

1. What are your main job duties?

2. How do you keep the plants at your job sites healthy?

3. Are there specific things you wish you had (tools, more time, training, etc.) that would help you take care of the plants even better?

4. Do you attend many educational events/workshops/etc or go to 'hands-on trainings'? If so, what kinds and how often? Would you like to attend more? Why or why not?

5. What do you think of these? (show different types of flyers, brochures, etc. These include a guide to using and applying fertilizers from Darren Haver's water quality project and various UC IPM materials which are all in Spanish) Are they useful?

6. What suggestions do you have for us to make sure the training we provide you later is useful? Hands-on? Indoor workshops? Some of each?

Interview questions (asked of 10-20% randomly selected focus group attendees).

1. Where are you originally from? (country and rural, city etc.)

2. What did you learn about pest control and soil fertility before coming to the United States? Did you come to the US to pursue a career in horticulture?

3. How do you in general keep plants on your worksites healthy?

4. Who applies fertilizers and pesticides in your company?

5. How do you determine when to apply fertilizers or pesticides?

6. How do you determine what type of product to use?

7. How do you determine how much to apply?

8. How do you determine how to apply it?

9. How do you determine what equipment to use?

10. Do you know how to calibrate the equipment?

11. How do you determine how often?

12. How do you adjust the irrigation when fertilizing or applying pesticides?

13. How watering and cultural practices affect pests and weeds?

14. Do you have concerns about your safety or the safety of your family?

15. How do you minimize risks?

16. What is wrong in the way you see other professionals applying pesticides and fertilizers?

17. What is wrong in the way you see other professionals managing water and performing cultural practices?

18. Does the public perception of the seriousness of the product applied affect the safety measures you take or the safety equipment you use?

19. What kind of training would be helpful to you?

20. What kind of training material would be helpful to you?

21. What subjects would be helpful to you?

Objective 3: Assess and categorize focus group and individual interview responses (June 30, 2013)

Deliverables: This objective was met. Major findings were that, overall, 96 percent of focus group respondents – whether licensed or not – played a role in identifying pest problems and problems dealing with the general health and well-being of landscapes they are responsible for. Niney-four percent indicated that having additional training to help them idenfity both biotic and abiotic problems would greatly assist them in performing their duties and less than 50 percent indicated that they regularly attended training workshops and all indicated they would like to have additional training. Over 96 percent of focus group participants indicated that they

welcomed additional training by our DPR Alliance team and most preferred at least some hands-on elements in the field.

The individual interviews proved extremely enlightening due to the greater detail and more private nature of the responses. Approximately 80 percent of those interviewed that indicated they regularly applied pesticides and/or fertilizers to landscape plants said they did so at least some of the time by 'ballparking' or 'guestimating' rates to apply rather than by actually reading labels and using calibration techniques. Many indicated that they had little actual say in what products to apply and wished that their viewpoints were more acknowledged by supervisors. Over 90 percent of interviewees indicated awareness of water quality as well as health implications of misuse of pesticides and were genuinely concerned about protecting their health and that of their families and in reducing water pollution. Many were grateful for higher governmental standards regarding pesticide use and safety in the United States than in their native countires of origin and attempted to minimize risks whenever possible. When asked "What kind of training would be helpful to you?" over 96 percent indicated that hands-on demonstrations of how to determine if fertilizers and pesticides should be applied and how to apply them correctly when indicated was most important followed by 94 percent indicating that colored pictures of common pests and their control would be useful. Over 92 percent indicated that subject matter information across a wide swath of horticulture topics (eg: plant ID, irrigation management, pest ID and control options, and identifying symptoms of non-pest (abiotic) problems was needed both in the field and via class-room training (powerpoints, etc.).

Objective 4: Develop content for educational sessions based on the results of focus groups and interviews (October, 2013).

Deliverables:

Several 'hands-on' modules were developed by William Baker & Associates on the following horticulture practices:

Proper Plant Selection

- Macroclimate (Sunset zones more specific than USDA zones)
- Microclimate (shade, poor soil, current or future construction, etc.)
- Considering ultimate size (height/breadth) of plants before selecting specific plants
- Hydrozone-specific (eg: low, medium, and high ET zones)
- Ensure potted woody trees and shrubs are not root bound and are in good health

Proper Planting Techniques

- Soil testing for physical and chemical issues (pH, soil texture, bulk density, etc.)
- Protect roots and lower crown during planting
- Plant at same depth as in container and at least 2 x as wide

- Proper use of soil amendments (when to use, types to apply, how to apply; stress that compost and other soil amendments should not be added to planting holes for trees)
- Importance of irrigating/watering in thoroughly after planting

Early Maintenance

- Minor pruning: trees (central leader/crossed limbs/ suckers
- Irrigate according to plant water needs (keep root zone moist until established)
- Fertilize only as needed (discuss related water quality issues)
- Turf: seeding vs sodding, early care (steady irrigation based on species; recommended starter fertilizer; discuss difference between organic and inorganic N and slow and fast release sources and rationale for using slow release products particularly in sandy soils to reduce potential water pollution

Established Plant Maintenance

- Lengthen time between irrigations but water more deeply to encourage deep rooting; irrigate according to hydrozone and available ET information; discuss relationship of major fungal disease-causing organisms and wet rootzone)
- Prune trees (as needed; varies among species; never top; retain branch collar and no flush cutting)
- Turf: mowing height (1/3 'rule'); grasscycling; aeration; fertilization
- ID problems early and correctly
- Apply pesticides only as a last result and select least toxic products. (If pesticides are necessary, choose products that pose the least threat to the environment, nontarget organisms, and human health.)
- Use of mulch
- Fertilizers (slow vs. fast release and water quality consequences; organic vs inorganic, etc),
- Overall IPM (starting with early ID)

Power Points were also developed on identification and control of biotic and abiotic landscape problems due to the high priority of these topics indicated by focus group and interview participants. A special thanks to Alliance team-member Polo Moreno for his help editing these presentations. Power Points on the safe use and handling of pesticides previously developed by Lisa Blecker were also used. (Note: our DPR Alliance team is also appreciative to the UC ANR IPM group for sharing slides and another presentation developed for Spanish speaking landscapers based on the Green Gardener curriculum.)

- Subject matter assessment materials were drafted (included in Appendix B).

Objective 5: Provide classroom training and hands-on training to 400 Spanish speaking landscapers based on results of focus groups/individual interviews followed by post-workshop subject-matter assessments. 50 non-attendees will also be administered the post-workshop assessment (November 2013 - May 2014.)

"Hold 13 workshops/hands-on trainings at ten venues and three larger facilities for a minimum of 400 Spanish-speaking landscapers."

"Deliver Power Point and hands-on training at identified facilities and conduct post-workshop subject matter assessments in Southern CA"

Deliverables:
577 Spanish-speaking landscapers were training at 17 workshops/hands-on trainings. (Details including date, location, topics covered and attendance may be found on the Excel spreadsheet prepared by William Baker & Associates in Appendix C.)

Power Point presentations and hands-on follow up activities in the field focused on three prioritized areas of expressed need pertaining to protecting both worker health and safety and water pollution by the majority of focus group members and individuals who were individually interviewed:

- Safe and Effective Use of Pesticides Stressing IPM
- Irrigation Scheduling
- Fertilizer Management

Rationale for these modules: Our project prioritized these three areas due to the common over-application and/or misuse of pesticides and fertilizers leading to worker health and safety issues and waterways pollution. A module on irrigation that included irrigation scheduling according to evapotranspiration zones and soil types was included since irrigation is directly tied to the movement of pesticides and fertilizers.

The overuse of chemicals on sandy soils in which the precipitation rate (output rate) of water through an irrigation system exceeds the infiltration rate of the soil can lead to deep percolation and groundwater entry of polluting chemicals. In contrast, heavier clay soils and compacted soils of any texture are prone to water and chemical runoff leading to surface water pollution.

Improper cleaning and disposing of containers and mixing and loading chemicals without adequate protective outerwear and the proper equipment and/or where residues or run-off are likely pose a threat to human health and can lead to surface and ground water pollution. Following label directions regarding proper application rates and methods greatly reduces the probability of risk to human health and water pollution.

Pollution due to nitrates and phosphate containing fertilizers poses a major risk to the health of California waterways. Nitrate pollution can harm both animal and plant life and phosphorus

toxicity leads to algal blooms through eutrophication and can deplete oxygen levels below what is necessary to sustain fish and other species.

Hands-on activities included a wide range of topics listed below that were provided by Wm Baker & Associates for the 250 Spanish speaking landscape crew at the Laguna Woods site:

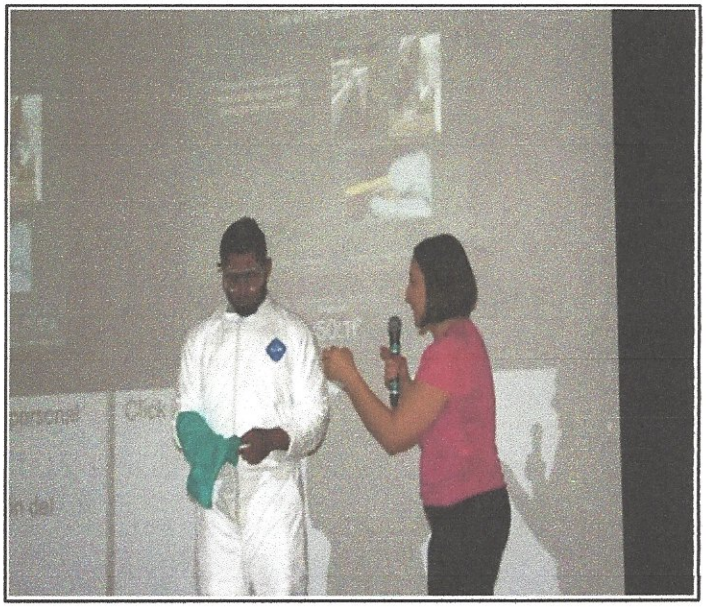
August 9, 2013 - met with supervisors and staff to determine potential shortcomings in their training. Addressed important elements regarding working with pesticides and fertilizers.

August 21, 2013 - talked to various crew members about their pesticide application methods and room for improvement..

September 27, 2013 - looked over mowing equipment with supervisors and crew members. Explained how mowing heights can effect water and fertility requirements. Discussed chemical storage.

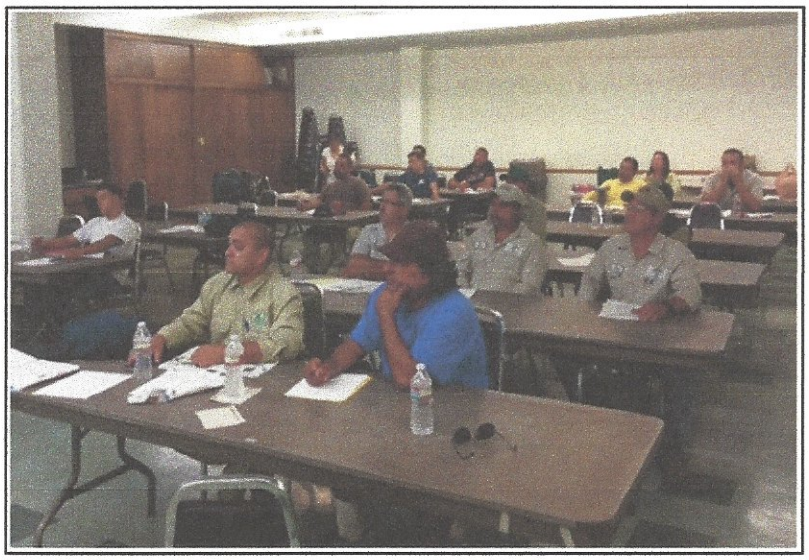
July 18, 2014 - met with supervisors and staff to discuss training progress to date and how it is being applied and what important issues need to be addressed on a regular basis in the field and in the classroom to add durability to the Alliance project. (Appendix E includes other specific suggestions from Alliance members Anita Matlock and Robert Wade to ensure that learning modules developed during the contract period continue to be used at the local and regional level and expand as opportunities allow statewide.)

Workshop Photos (not inclusive)



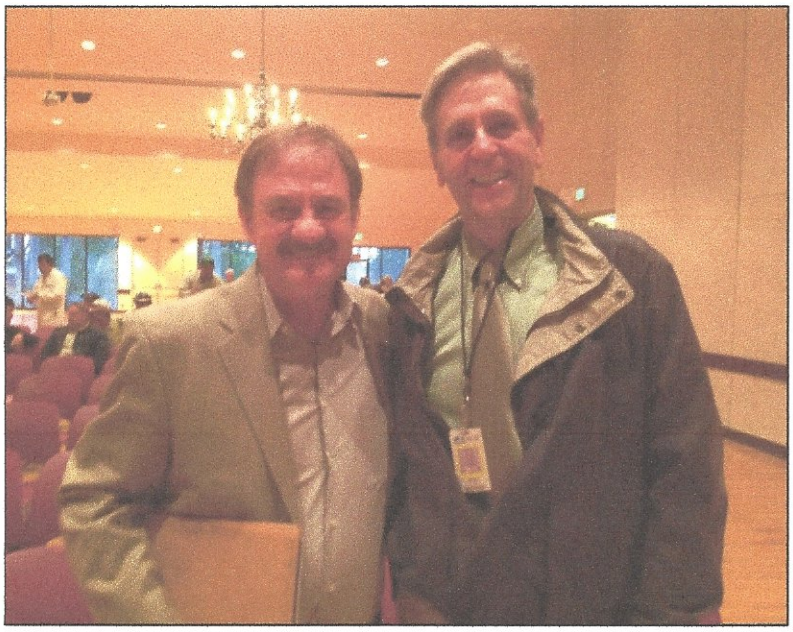
Laguna Woods Village

Lisa Blecker's Safety Demonstration (Laguna Woods Village)



CLCA Workshop (Los Angeles)

Mission Landscape Training



Alliance Team Member Bill Baker with Laguna Woods Village Landscape Manager Jerry Rathje

Laguna Woods Village

DPR Alliance Team Members Jaime Bayona, Mark Robertson, Pat Matteson, Janet Hartin, Bill Baker, Polo Moreno, and Larry Wilhoit following workshop at Laguna Woods Village

Objective 6:

"Have workshop participants complete a subject matter assessment just prior to workshops/training and just following workshop training and an additional 50 participants not attending the workshops/training complete the same assessment." (Nov. 2012 – Jan. 2015)

"Tabulate post-subject matter assessments and compare with pre-subject matter assessments." (Nov. 2013 – June 2014)

"Submit a summary of the results of workshop subject matter assessments compared with pre-subject matter assessments." (August 2014)

Deliverables:

Workshop attendees performed statistically better on all three tiers of subject matter covered (safe and effective use of pesticides, water management, and fertilizer management) post test than they did pre-test and better than non-attendees who completed the same test. (The non-participants performed no differently statistically than did pre-test trainees in both foremen/women and crew member categories, respectively, indicating that attendees were indeed a representative sample of Spanish-speaking landscapers.)

Figures 1a. and 1b and 2a and 2b (below) illustrate average (mean) improvements on post subject matter assessments vs. pre assessments by both foremen/women and crew members on what are considered the highest priority assessment questions. It is important to note that workshop attendees performed better on all post-workshop questions. (The subject matter assessment attendees and non attendees completed is in Appendix B.)

The questions referred to in the figures follow:

Pest Management/Pesticide Use and Safety

("Pesticide use" heading on figures 1a and 1b)

What do you do when you encounter a landscape pest (weed, insect, disease) negatively impacting a site you work at?

a. I apply a chemical pesticide as soon as possible
b. I identify the pest causing the problem and consider all alternatives before taking action
c. I talk to my supervisor who will decide what action to take
d. Other (none of the above)

("IPM definition" heading on figures 1a and 1b)

Which of the following best describes Integrated Pest Management (IPM)?

a. Controlling a pest using biological cultural, physical, and/or chemical measures regardless of environmental impacts
b. Controlling a pest using only non-chemical measures
c. Controlling a pest using a long-term, preventive approach combining biological, cultural, physical, and/or chemical options
d. Controlling a pest with chemicals first followed by cultural, biological, and/or physical options

("Calibration" heading on figures 1a and 1b)

When should pesticide equipment used to apply pesticides be calibrated?

a. Beginning of the season or when something changes that can affect the application (output rate, travel speed, nozzles, product, person making the application)
b. Only when a new person is hired that doesn't have prior experience or training with calibration procedures
c. Only when an experienced person takes over a new site he/she is not familiar with
d. On average once every three years for regularly maintained sites

Irrigation Management

("Reference ETo" heading on figures 1a and 1b)

1. Reference evapotranspiration (ETo) measures:
   a. Water use of a tree
   b. Water use of a cool-season turfgrass
   c. Water use of an entire landscape
   d. None of the above

("Highest water demand month" heading on figures 1a and 1b)

2. Which month has the highest water demand on average each year?
   a. June
   b. July
   c. August
   d. September

("Factors leading to water waste" heading on figures 1a and 1b)

3. Which of the following leads to water waste?
   a. Improper head spacing
   b. Improperly programmed 'Smart' controllers
   c. Improperly scheduled irrigations
   d. All of the above

Fertilization Management

("Preferred N-P-K for turf" heading on figures 2a and 2b)

Which is the preferred ratio of N-P-K for established turfgrass?

e. 1-1-1
f. 4-1-3
g. 2-5-5
h. 1-5-1

("Groundwater leaching" heading on figures 2a and 2b)

Which of the following is **not true** regarding slow-release fertilizers?

a. More potential groundwater leaching when applied to sandy soils than fast-release fertilizers

b. Less expensive than fast-release fertilizers
c. Require less precision to apply than fast-release fertilizers
d. Require fewer applications over the course of a year than fast-release fertilizers

("Application rate" heading on figures 2a and 2b)

How many bags of ammonium sulfate (20-0-0) would be needed to add one pound of actual nitrogen to a 10,000 ft sq area of groundcover if each bag contained 10 pounds of product?

a. 1
b. 3
c. 5
d. 10

("Fertilizer frequency" heading on figures 2a and 2b)

3. In most instances mature landscape trees should be fertilized:
   a. Once a month during the active growing season
   b. If deficiency symptoms appear
   c. Twice a month during the active growing season
   d. Once a week during the active growing season

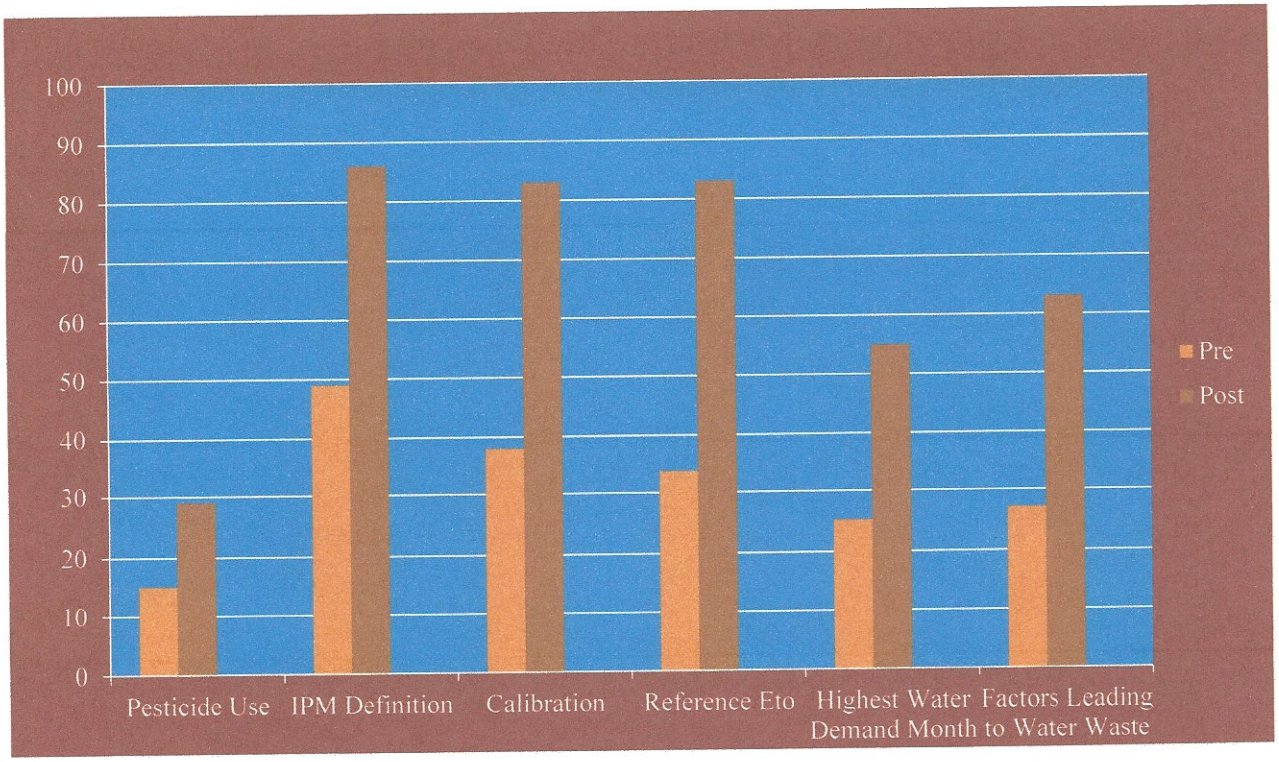


Figure 1a. Overall average (mean) foremen/women pre and post subject matter assessments (pesticide use and irrigation management)

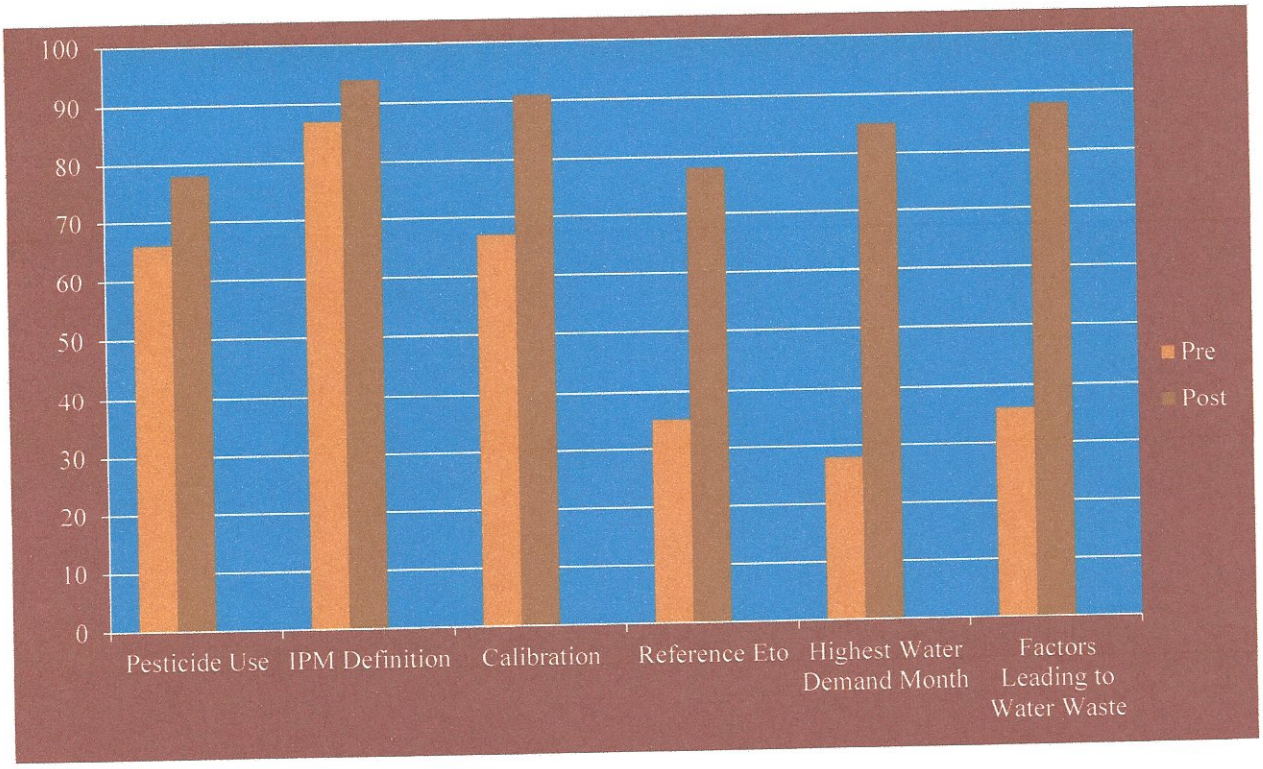


Figure 1b. Overall average (mean) crew men/women pre and post subject matter assessments (pesticide use and irrigation management)

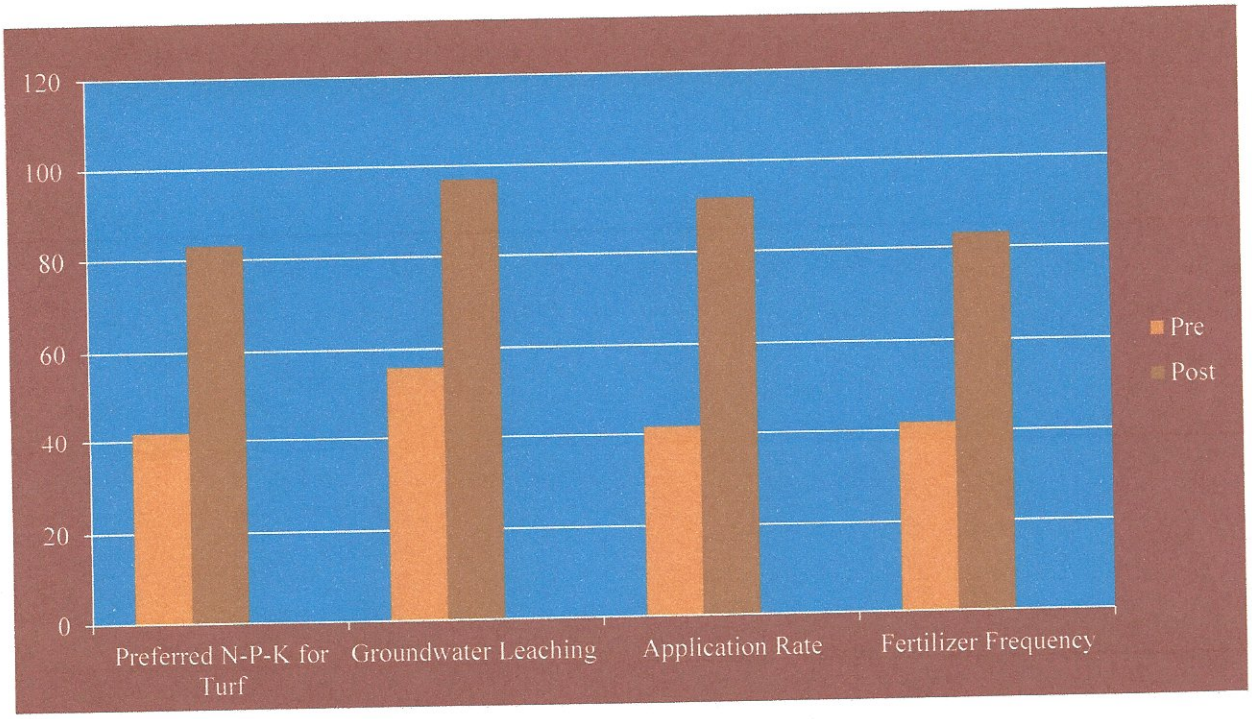


Figure 2a. Overall average (mean) foremen/women pre and post subject matter assessments (fertilization management)

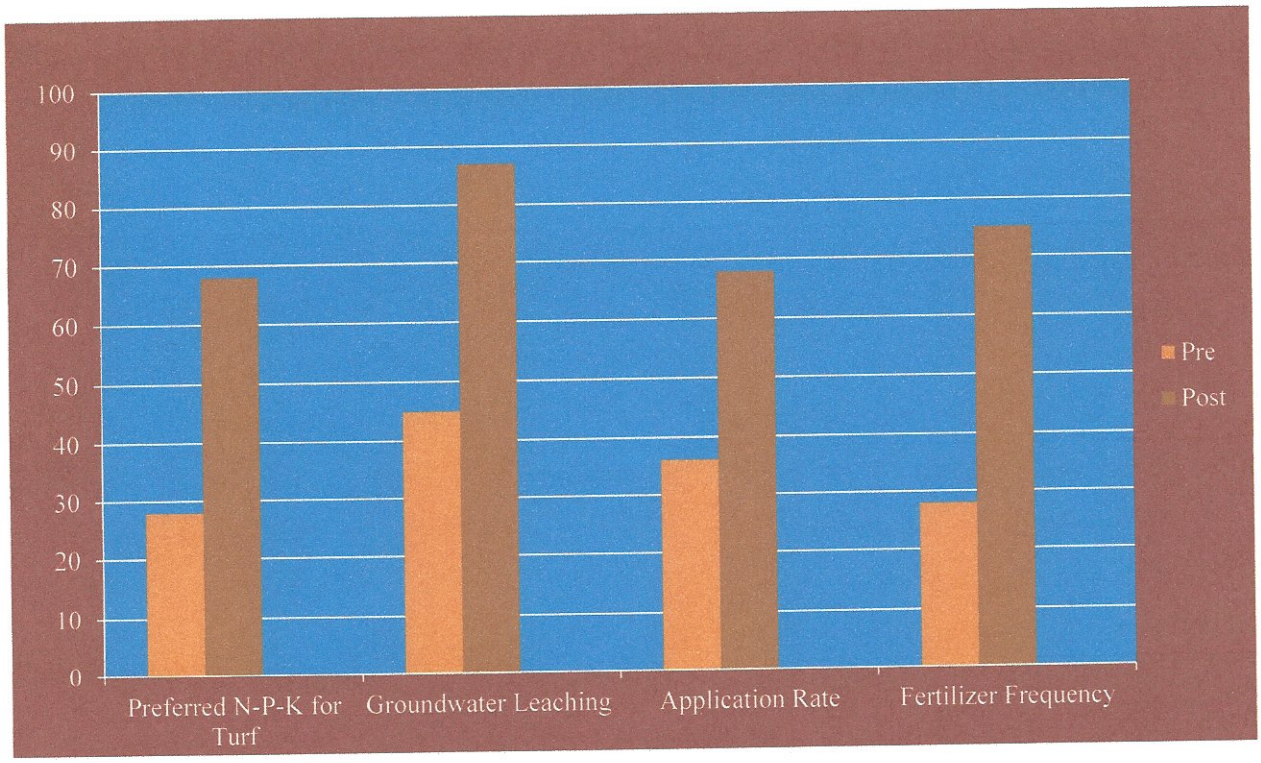


Figure 2b. Overall average (mean) crew men/women pre and post subject matter assessments (fertilization management)

"Determine the project's impact by measuring change in pesticide use three months after each workshop/hands-on training." (Feb. 2014 – Aug. 2014)

A random survey of approximately 243 project participants indicated that pesticide application was reduced by 1/3 or more due to our Alliance training.

"Discussion of problems (if any) that were encountered in the performance of the work, including changes in personnel."

No problems that were not solved occurred. The most time consuming issue was the fact that Toni Monzon (Bilingual Training Institute) requested to be released from the project after her focus work participation ended. She did a wonderful and thorough job conducting approximately ½ of the focus groups and individual interviews and her input is much appreciated. However, this protocol change required our project team to shift resources and funding for developing curriculum she was to have participated in largely to Wm Baker & Associates. Fortunately, Wm Baker & Associates employed several Spanish-speaking landscape professionals including Chaz Perea and Jaime Bayona who are licensed and experienced in classroom teaching and field training and were eager to participate to a larger degree in the project than originally planned. UC ANR IPM's Lisa Blecker provided excellent hands-on training that augmented her Power Point presentations on pesticide health and safety training at many of the sessions.

We had hoped to employ a bilingual student to assist in final project assessments and evaluation but the individual who had originally agreed to participate had a family emergency and had to move to Mexico temporarily and therefore the brunt of this work fell back to the project management team of Janet Hartin and Wm Baker & Associates. Due to these adjustments much more time than anticipated was spent by DPR partners as well as Janet's UC grant management team updating related budget sheets and invoices.

"Plans to maintain project durability after funding ends." Due to the success of this project team members Anita Matlock (Sustainable Landscaping Regional Manager, Rain Bird) and Bob Wade (owner of Wade Landscape and former statewide CLCA President) assumed leadership roles to help ensure that training materials and assessments developed during this project would prove durable into the future at a local, regional, and – hopefully – statewide level. Appendix E contains their report.

"What worked well and is there room for improvement." One of the reasons for the project's overall success was the inherent close working relationship DPR maintained from start to finish with UC and industry partners. Mandating that the Alliance team include DPR staff and that the entire team meet face to face regularly helped ensure that tasks, timeline adjustments, and budget issues were dealt with in a timely and efficient manner. More importantly, it invited active dialogue among a team of professionals with a wide variety of backgrounds, perspectives, and frames of reference. The project was better for it! As Principal Investigator, I now know that I erred in underbudgeting for clerical assistance within my own UC ANR office since I am not an expert on spreadsheets or invoices and I spent more time than I realized I would need to on these duties. Without question, the project provided a valuable and highly valued service to Southern California Spanish-speaking landscapers and the model employed (a mixed team of professionals, use of focus groups and interviews, classroom and hands-on field training, project evaluation) is highly adaptable throughout the Southwest. Thank you for this opportunity to reach out to this important and growing clientele!

Appendices

Appendix A: Updated Timeline

Appendix B: Pre and Post Workshop Subject Matter Assessment

Appendix C: Excel list of Training Dates and Venues

Appendix D: Sample Materials Developed/Used in Project

Appendix E: Expansion Potential of Project

Appendix A: Updated Timeline

UPDATED TIMELINE

DPR Grant Agreement No: 12-PML-G002

Project Name: Expanding IPM Education to Southern Ca. Spanish-speaking Landscapers

Principal Investigator: Janet Hartin jshartin@ucdavis.edu 951.313.2023

Objective	Tasks, Milestones, or Deliverables	Beginning Date	Ending Date
Conduct Grant administration (Task 1.4)	Give a summary presentation at a PMAC meeting	Nov. 2014	Nov.2014
Recruit 200 Spanish-speaking landscapers to participate in focus groups (Tasks 2.1)	Coordinate and host 10-20 focus groups consisting of 10--20 Spanish-speaking landscapers per group	Nov. 2012	**Jul. 2013**
Recruit 200 Spanish-speaking landscapers to participate in focus groups (Tasks 2.3)	Select a random subset of 20 landscapers attending the workshops/hands-on training to participate in individual interviews.	Nov. 2012	**Jul. 2013**
Recruit 200 Spanish-speaking landscapers to participate in focus groups (Tasks 2.1, 2.2, 2.3)	Develop focus group guidelines, interview questionnaires, and subject matter assessment questions and skills tests.	Nov. 2012	**2013**
Recruit 200 Spanish-speaking landscapers to participate in focus groups (Tasks 2.2)	**Have workshop participants complete a subject matter assessment just prior to workshops/training and an additional 50 participants not attending the workshops/training complete the same assessment.**	Nov 2012	**Jan. 2014**
Assess and categorize responses from focus groups (Task 3.1)	Evaluate focus group responses/interviews and report results including common themes.	Apr. 2013	**Jul.2013**
Assess and categorize responses from focus groups (Task 3.1)	Submit reports on focus group outcomes, interview results, and assessment reports.	Aug. 2013	Aug. 2013
Develop content for training (Task 4.1)	Prepare PowerPoint presentations, other materials, and hands-on activities.	Jul. 2013	Oct. 2013
Provide training to 400 Spanish-speaking landscapers (Task 5.1)	Hold 13 workshops/hands-on trainings at ten venues and three larger facilities for a minimum of 400 Spanish-speaking landscapers.	Nov.2013	May. 2014
Provide training to 400 Spanish-speaking landscapers (Task 5.2)	Deliver PowerPoint and hands-on training at identified facilities and conduct post-workshop subject matter assessments in Southern CA.	Nov. 2013	May. 2014
Evaluate pre- and post-subject matter assessments (Task 6.1)	Tabulate post-subject matter assessments and compare with pre-subject matter assessments.	Nov. 2013	Jun.2014
Evaluate pre- and post-subject matter assessments (Task 6.1)	Submit a summary of the results of workshop subject matter assessments compared with pre-subject matter assessments.	Aug. 2014	Aug. 2014
Determine change in pesticide use by program participants (Task 7.1)	Determine the project's impact by measuring change in pesticide use three months after each workshop/hands-on training.	Feb. 2014	Aug.2014

Appendix B: Pre and Post Workshop Subject Matter Assessment

SUBJECT MATTER ASSESSMENT

Please answer the following questions to the best of your ability. Supplying this information will assist us measure the success and impact of this educational program and improve future endeavors.

Background Information

1. Which best describes your current position at work
    a. I am a landscape crew foreman/forewoman with decision-making responsibilities
    b. I am a member of a landscape crew with few or no decision-making responsibilities
    c. Other (please describe)_____

2. Please check all of the following that apply to you
    a. I schedule irrigations and set clocks/timers
        i. Regularly
        ii. Sometimes
        iii. Never

    b. I apply pesticides
        i. Regularly
        ii. Sometimes
        iii. Never

    c. I apply fertilizers
        i. Regularly
        ii. Sometimes
        iii. Never

3. How many years of experience do you have in the landscape profession?
    a. More than 15
    b. 10-14
    c. 5-9
    d. 0-4

Pest Management/Pesticide Use and Safety

1. What do you do when you encounter a landscape pest (weed, insect, disease) negatively impacting a site you work at?
   a. I apply a chemical pesticide as soon as possible
   b. I identify the pest causing the problem and consider all alternatives before taking action
   c. I talk to my supervisor who will decide what action to
   d. Other (none of the above)

2. Which of the following best describes Integrated Pest Management (IPM)?
   a. Controlling a pest using biological cultural, physical, and/or chemical measures regardless of environmental impacts
   b. Controlling a pest using only non-chemical measures
   c. Controlling a pest using a long-term, preventive approach combining biological, cultural, physical, and/or chemical options
   d. Controlling a pest with chemicals first followed by cultural, biological, and/or physical options

3. When should pesticide equipment used to apply pesticides be calibrated?
   a. Beginning of the season or when something changes that can affect the application (output rate, travel speed, nozzles, product, person making the application)
   b. Only when a new person is hired that doesn't have prior experience or training with calibration procedures
   c. Only when an experienced person takes over a new site he/she is not familiar with
   d. On average once every three years for regularly maintained sites

4. Which of the following practices will **not** help reduce the offsite movement of pesticides and avoid their negative impact on the environment?
   a. Applying granular forms of pesticides when baits are available
   b. Reading and following label directions
   c. Avoiding applying pesticides that drift under windy conditions
   d. Using alternative insecticides such as *Bacillus thuringiensis*, insecticidal soaps, horticultural oils, and other less toxic products rather than organophosphates

5. When is a California Dept. of Pesticide Regulation applicator license or certificate required?
   a. When a pesticide is applied on private property only
   b. When a pesticide is applied on public property only

c. When a pesticide is applied for hire
d. When a pesticide new to the market is applied

6. In California, records of all pesticides applied to commercial landscapes must be kept for:

a. 1 year
b. 2 years
c, 3 years
e. 4 years

7. Which of the following is **not true**:
   a. A locked cabinet or container is required for pesticide storage
   b. A monthly pesticide use report is required only during months when pesticides are applied
   c. A pesticide with a 'warning' label is less toxic than a pesticide labeled 'danger'
   d. Wearing goggles is always required when applying any pesticides

Irrigation Management

1. Reference evapotranspiration (ETo) measures:
   a. Water use of a tree
   b. Water use of a cool-season turfgrass
   c. Water use of an entire landscape
   d. None of the above

2. Most established landscapes are:
   a. Overwatered
   b. Underwatered
   c. Equally overwatered and underwatered
   d. Watered just about right

3. Which of the following will **not** reduce water use in landscapes
   a. Growing warm season grass instead of cool season grass
   b. Growing cool season grass instead of warm season grass
   c. Conducting regular 'can' tests
   d. Hydrozoning

4. Which soil type (texture) requires the most frequent irrigation?
   a. Sandy loam
   b. Clay loam
   c. Sandy

d. Loam

5. Which month has the highest water demand on average each year?
   a. June
   b. July
   c. August
   d. September

6. Which plant type should generally be watered most often once established?
   a. Turfgrass
   b. Trees
   c. Shrubs
   d. They all should be watered on the same schedule

7. Which of the following leads to water waste?
   a. Improper head spacing
   b. Improperly programmed 'Smart' controllers
   c. Improperly scheduled irrigations
   d. All of the above

Fertilization Management

8. Which is the preferred ratio of N-P-K for established turfgrass?
   a. 1-1-1
   b. 4-1
   c. 2-5-5
   d. 1-5-1

2. Which of the following is **not true** regarding slow-release fertilizers?
   a. More potential groundwater leaching when applied to sandy soils than fast-release fertilizers
   b. Less expensive than fast-release fertilizers
   c. Require less precision to apply than fast-release fertilizers
   d. Require fewer applications over the course of a year than fast-release fertilizers

3. Which of the following is least important to have analyzed during a soil test?
   a. pH

b. Nitrogen
c. Phosphorus
d. Percent organic matter

4. How many bags of ammonium sulfate (20-0-0) would be needed to add one pound of actual nitrogen to a 10,000 ft sq area of groundcover if each bag contained 10 pounds of product?
    a. 1
    b. 3
    c. 5
    d. 10

5. How deep should you take soil samples to submit for nutrient analysis:
    a. In the active root zone of the plant
    b. In the top three inches of soil regardless of where the roots are
    c. A few inches below the main root zone
    d. Between three and six inches deep regardless of where the roots are

6. Composts applied as soil amendments are best thought of as:
    a. Fertilizers
    b. Soil conditioners
    c. Weed control agents
    d. Both b and c

7. In most instances mature landscape trees should be fertilized:
    a. Once a month during the active growing season
    b. If deficiency symptoms appear
    c. Twice a month during the active growing season
    d. Once a week during the active growing season

Appendix C: Excel list of Training Dates and Venues

SPANISH-SPEAKING LANDSCAPERS TRAINING SITES

SERIES NO.	DATE OF CLASS	COMPANY	LOCATION	CONTACTS AT LOCATION	INSTRUCTOR	NUMBER OF STUDENTS IN GROUP	TOPIC
1	1/9/2014	**Environmental Concepts**	Vintage Hills Clubhouse, 32025 Meadows Parkway, Temecula, CA	Meredith Odom	Jaime Bayona 11:00 - 2:00	15	ETo and Smart Controllers
2	1/10/2014	**Morningside Community Association**	Morningside Country Club	Mel Milward	Jaime Bayona	9	Best Management Practices to Ward off Pests
3	1/28/2014	**North Ranch Country Club**	5052 Collingswood Place, Westlake Village, CA 91362, cell is 805-421-6833	Louise Valdez 805-497-4495 narcclouise@gmail.com	Jaime Bayona 12:00 to 2:00	25	Best Management Practices to Ward off Pests
4	1/30/2014	**Landscape Industry Show**	Los Angeles Convention Center	Janet Hartin	9:15 to 10:15 Chaz Perea;	35	Best Management Practices to Ward off Pests
	1/30/2014	**Landscape Industry Show**	Los Angeles Convention Center	Janet Hartin	10:15 to 11:00 Chaz Perea		Irrigation Practices to Ward off Pests
	1/30/2014	**Landscape Industry Show**	Los Angeles Convention Center	Janet Hartin	11:10 to 12:00 Lisa Blecker		Safe Use and Handling of Pesticides
5	3/18/2014	**Mission Landscape Main Office**	Delhi Center: 505 E Central Ave - Santa Ana, CA 92707; Tel: 800.545.9963; fax: 949.224.0044	Angela Belagardi 714-460-0107	1:00 - 3:00 PM PM Jaime Bayona	13	Best Management Practices to Ward off Pests
6	3/20/2014	**Environmental Concepts**	Vintage Hills Clubhouse 32025 Meadows Parkway, Temecula, CA	Meredith Odom	Jaime Bayona	20	Best Management Practices to Ward off Pests
7	3/21/2014	**Laguna Woods Village**	Laguna Woods, CA Clubhouse 5 24262 Punta Alta	Jerry Rathje, Kurt Rahn	Jaime Bayona 7:15 AM	80	Best Management Practices to Ward off Pests
8	3/27/2014	**Laguna Woods Village**	Laguna Woods Village Clubhouse 2 24112 Moulton Pkwy.	Jerry Rathje, Kurt Rahn	Jaime Bayona 9:00 AM	20	Best Management Practices to Ward off Pests
9	3/28/2014	**Laguna Woods Village**	Laguna Woods, CA Clubhouse 3 23822 Avenida Sevilla	Jerry Rathje, Kurt Rahn	Jaime Bayona 7:15 AM	80	Best Management Practices to Ward off Pests
10	4/22/2014	**Various companies**	San Marcos Community Center 3 Civic Center Drive	Cheryl Wilen	Jaime Bayona - Lea Corkidi 7:30 - 12:30	48	Best Management Practices to Ward off Pests/Irrigation

11	5/19/2014	**Various companies**	LA Arboretum 301 N Baldwin Ave, Arcadia, CA 91007 (The Palm Classroom)	Jill Berry Phone: 626.821.4624 Fax: 626.821.4642 Jill.Berry@arboretum.org<mailto:Jill.Berry@arboretum.org> www.arboretum.org	Lisa Blecker; Chaz Perea; Jaime Bayona 8:15-8:130: Check in and coffee 8:30-8:35: Introductions/Day Overview (???) 8:45-10:45: IPM Overview: Biotic and Abiotic Disorders (Chaz) 10:45-noon: Safe Use and Handling of Pesticides (Lisa) noon-1:00: Lunch 1:00-3:00: Irrigation Management 3:00-4:00: Calibration Video (Chaz)	25	Irrigation and Best Management Practices to Ward off Pests
12	5/22/2014	**Western Municipal Water District**	Western Municipal Water District of Riverside County 14205 Meridian Parkway Riverside, CA 92518 (951) 571-7100	Pam Pavela	Jaime Bayona - 2:30 to 5:30	30	Irrigation and Best Management Practices to Ward off Pests
13	5/27/2014	**City of Burbank**	Buena Vista Library 300 N Buena Vista St, Burbank, CA 91505	Ferris Kawar	Jaime Bayona 11:00 - 1:30	Unknown	Irrigation and Best Management Practices to Ward off Pests

Appendix D: Sample Materials Developed/Used in Project

California Environmental Protection Agency
Department of Pesticide Regulation

UC IPM
University of California
Agriculture and Natural Resources
Integrated Pest Management Program

UC Cooperative Extension
University of California
Agriculture and Natural Resources

¡CLASES GRATUITAS PARA JARDINEROS QUE HABLAN ESPAÑOL!

Inscríbase hoy, contacte a Meredith Odom en:

(951) 741-0443 modom@wbaconsulting.com

Si nos manda un e-mail, por favor incluya todos los nombres de los interesados en la clase y el lugar de la clase (San Marcos, L.A. Arboretum, o Western Municipal Water) en el espacio marcado "Subject" (asunto). En el texto del e-mail incluya el nombre y teléfono del la compañía o persona para la que trabaja.

Abril 22, 2014 (8am-11:30am) (SÓLO EN ESPAÑOL)

Manejo Integrado de Plagas (IPM) y Manejo de Riego para Conservar Agua y Mantener Limpios Nuestros Ríos y Canales

San Marcos Community Center, 3 Civic Center Drive, San Marcos, CA

Mayo 19, 2014 (8:30am-4pm) (SÓLO EN ESPAÑOL)

El Manejo de Riego, la Fertilización, y el Manejo Integrado de Plagas Nos Ayudan a Conservar Agua y a Mantener Limpios Nuestros Ríos y Canales

Los Angeles State and County Arboretum, 301 N Baldwin Ave, Arcadia, CA

Mayo 22, 2014 (2:30-5:30pm) (EN INGLÉS Y ESPAÑOL)

El Manejo de Riego y la Fertilización para Conservar Agua y Mantener Limpios Nuestros Ríos y Canales

Western Municipal Water District (WMWD), 14205 Meridian Parkway, Riverside, CA 92518

California Environmental Protection Agency
Department of Pesticide Regulation

University of California
Agriculture and Natural Resources

¡CLASE GRATUITA PARA JARDINEROS QUE HABLAN ESPAÑOL!

Mayo 27, 2014

11am – 1:30pm **(se proveerá almuerzo gratis)**

Buena Vista Library - 300 N Buena Vista St., Burbank, 91505

PRESENTADO POR EL DEPARTAMENTO DE REGLAMENTACIÓN DE PESTCIDAS Y EXTENSIÓN COOPERATIVA DE LA UNIVERSIDAD DE CALIFORNIA

"Manejo de Riego para Conservar Agua, Reducir Plagas y Disminuir la Contaminación por Residuos de Pesticidas Fuera del Lugar Donde Se Apliquen"

Instructor: Jaime Bayona

Este taller está abierto para todos los empleados de jardinería, tanto del sector público como el sector privado, que hablen español.

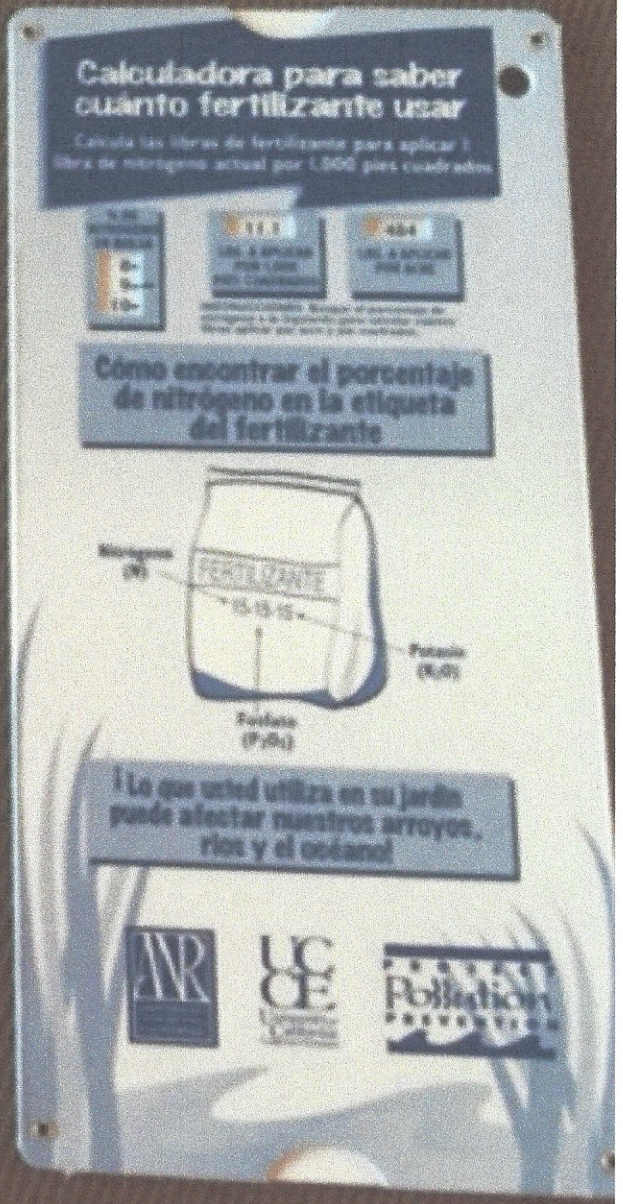
¿Tiene Preguntas? Llame al Burbank Recycle Center (818) 238-3900

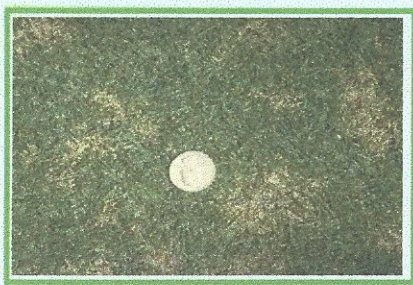
California Environmental Protection Agency
Department of Pesticide Regulation

UC IPM
University of California
Agriculture and Natural Resources
Integrated Pest Management Program

University of California
Agriculture and Natural Resources


Identifique esta maleza
UC IPM
UC CE
AGRICULTURAL WATER QUALITY RESEARCH & EDUCATION
IDENTIFICADOR DE MALEZAS
Tipos de herbicidas
https://ucanr.edu/weedpestnotes
www.ipm.ucanr.edu


Calculadora para saber cuánto fertilizante usar
Cómo encontrar el porcentaje de nitrógeno en la etiqueta del fertilizante
¡Lo que usted utiliza en su jardín puede afectar nuestros arroyos, ríos y el océano!
UCCE
Pollution Prevention



Mancha de dólar (*Dollar spot*)

Pastos que afecta: zacate bermuda, zacate azul anual, festuca, raigras, paspalum costero, y zacate zoysia.
Síntomas: manchas circulares pequeñas de 1 a 5 pulgadas; las manchas pueden juntarse y formar áreas más grandes de forma irregular; las hojas parecen remojadas y se ponen cafés, seguido muestran una banda rojiza atravesando la hoja; temprano en la mañana con el rocío se pueden ver hebritas blancas como de telarañas.
Condiciones que favorecen esta enfermedad: temperaturas moderadas (60º - 70 ºF); mucha humedad o estrés por agua; neblina; el fieltro, o sea la acumulación de la capa de desechos del zacate (en inglés = *thatch*); sobrevive en el suelo como unas costras duras de color oscuro.
Prevención: fertilice bien; reduzca el fieltro (la capa de desechos del zacate) con una cortadora vertical (*verticut*); riegue por un tiempo apropiado a una profundidad de 4 - 6 pulgadas pero no extienda el tiempo demasiado; mantenga el pasto bien aireado; una cubierta delgada de abono ayuda a suprimir esta enfermedad.

Anillos de Brujas (*Fairy ring*)

Pastos que afecta: todos los pastos para césped.
Síntomas: una banda de zacate verde oscuro va formando un círculo (4 pulgadas hasta 30 pies) o semicírculo en el zacate húmedo; los champiñones (ver la foto) pueden estar presentes o no; una área de zacate café que se está muriendo puede presentarse justo detrás de la banda verde oscura; un segundo anillo de zacate muriéndose puede aparecer dentro del círculo.
Condiciones que favorecen esta enfermedad: los suelos que tienen una capa gruesa de fieltro (desechos del zacate o *thatch* en inglés), o mucha materia orgánica con lignina sin descomponer.
Prevención: aplique nitrógeno adecuadamente; airee el suelo para que el agua penetre mejor, riegue los agujeros bastante por varios días; haga cortes verticales del zacate (*verticut*) si se acumula más de 1/2 pulgada de la capa de desechos del zacate; rastrille los champiñones para mejorar la apariencia del césped; para eliminar esta enfermedad, quite el césped y la zona de la raíz que contenga una masa blanca como algodón hasta una profundidad de 12 pulgadas, y a unos 2 pies más allá de la orilla exterior del anillo, rellene con suelo limpio y resiembre o ponga tepe nuevo.

Fusariosis (*Fusarium blight*)

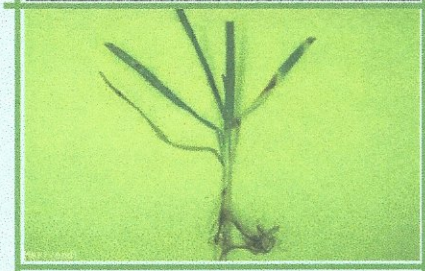
Pastos que afecta: zacate azul de Kentucky.
Síntomas: manchas circulares pequeñas de color verde gris que miden desde unas cuantas pulgadas hasta un pie de ancho; algunas plantas en el centro pueden sobrevivir, y hacen que se vea como un "ojo de rana"; la corona o el área de la base de tallos muertos muestra una podredumbre rojiza y es dura y resistente; el follaje muerto se ve blanqueado.
Condiciones que favorecen esta enfermedad: temperaturas de día de 85º - 95º F; áreas de estrés por sequía, con mucho sol; sobrevive en la capa de desechos del zacate (*thatch*), también en los restos de zacate.
Prevención: riegue por el tiempo apropiado; no aplique más de 1 libra de nitrógeno por cada 1000 pies cuadrados en cada aplicación ó no más de 6 libras por año; corte el zacate a la altura más alta que se recomiende; haga cortes verticales del zacate (*verticut*) si se acumula más de 1/2 pulgada de la capa de desechos del zacate (*thatch*).

Mancha gris de la hoja (*Gray Leaf Spot*)

Pastos que afecta: festuca, raigras, zacate kikuyo, zacate de San Agustín.
Síntomas: parches irregulares secos de césped con manchas blanqueadas y con orillas oscuras en las hojas; el zacate raigras toma la forma de un anzuelo.
Condiciones que favorecen esta enfermedad: temperaturas de día calurosas de 85º-95ºF; mucha humedad o mucha lluvia; demasiado riego y demasiado fertilizante del césped.
Prevención: evite el fertilizar en exceso; de igual manera, riegue por el tiempo apropiado; reduzca el sombreado; aumente la aireación.

Fusariosis Fría (*Pink Snow Mold*)

Pastos que afecta: azul anual, azul, festuca, raigras y zacate zoysia.
Síntomas: parches circulares de 1 a 2 pulgadas que pueden agrandarse hasta unas 12 pulgadas; las hojas primero se ven remojadas, después café rojizo y finalmente blanqueadas; en las hojas muertas a veces se pueden ver masas gelatinosas chiquitas de esporas; temprano en la manana se pueden ver como hebritas blancas o rosadas de hongos; esta enfermedad es más común en el norte y centro de California.
Condiciones que favorecen esta enfermedad: temperaturas frías (40º 65ºF) y condiciones húmedas frecuentes; aplicar demasiado nitrógeno en el otoño; un pH neutral o alcalino; este hongo sobrevive en desechos de zacate.
Prevención: reduzca la sombra y mejore la aireación y el drenado de agua; riegue por el tiempo apropiado; evite el exceso de nitrógeno, especialmente en el otoño; mantenga el pH del suelo entre 6.5 - 6.7.



Tizón de la hoja (*Leaf Spot*)

Pastos que afecta: zacate bermuda, azules, festuca, zacate kikuyo, raigras, zacate zoysia.
Síntomas: manchas circulares o alargadas de color café con el centro café y las orillas café oscuro o morado en las hojas, vainas y tallos; las coronas y raíces seguido tienen una podredurmbre café oscuro; las plantas con la corona infectada pueden morirse cuando el clima está caliente y ventoso, y dejan areas peladas en muchas partes del césped; las esporas de esta enfermead las transporta el viento.
Condiciones que favorecen esta enfermedad: las temperaturas tibias (70º - 90º F) para los zacates azul, raigras y festuca; las temperaturas frescas (60º - 70ºF) para el zacate bermuda y zoysia; mucha humedad; cortar del zacate muy raso; este problemas es más serio cuando hay mucho nitrógeno o también si hace falta nitrógeno.
Prevención: reduzca la sombra; mejore la aireación del suelo y el drenado de agua; evite que hayan partes secas y también demasiado fertilizante de nitrógeno; mantenga la altura del corte lo más alta que sea posible.

Quemazón por Pythium (*Pythium Blight*)

Pastos que afecta: los afecta a todos.
Sintomas: manchas circulares pequeñas de 2 a 6 pulgadas; las manchas pueden juntarse y formar áreas más grandes; las hojas renegridas se marchitan muy rápido, se ponen de color café rojizo, se aplastan y se pegan unas con otras, se ven grasosas; las raices pueden estar cafés; bajo condiciones húmedas se pueden ver masas algodonadas (micelio del hongo) del hongo.
Condiciones que favorecen esta enfermedad: partes bajas del jardín que siempre están mojadas; temperaturas calurosas (80º - 95ºF en el día, y de más de 68ºF en la noche); sobrevive en el suelo por largos períodos.
Prevencion: reduzca la sombra; mejore la aireación del suelo y el drenado de agua; riegue por el tiempo apropiado; no corte el pasto si está mojado; no ponga mucho nitrógeno cuando el clima está caliente y húmedo.

Quemazón por Rhizoctonia (*Rhizoctonia blight*)

Pastos que afecta: zacate azul, zacate azul anual, festuca, raigras.
Síntomas: primero aparecen unos parches o anillos cafés de forma irregular que se pueden agrandar hasta medir varios pies de diámetro; los centros pueden recuperarse y entonces se ven como anillos de zacate enfermo; las hojas y vainas del zacate quedan remojadas, se marchitan, se ponen de color café claro y mueren; cuando la infestación es leve las raíces no están infectadas y las plantas se pueden recuperar; este es un hongo que vive en el suelo, donde forma finas hebras en la tierra o en el césped.
Condiciones que favorecen esta enfermedad: mucho fieltro (thatch) o sea, la acumulación de la capa de desechos del zacate, y las altas temperaturas (80º a 95ºF); mucha humedad; la carpeta es muy tupida y suave debido al exceso de nitrógeno; es más común en áreas cálidas de tierra adentro.
Prevención: reduzca la sombra y mejore la aireación y drenado del suelo; riegue por un tiempo apropiado a una profundidad de 4 - 6 pulgadas; evite el exceso de nitrógeno; mantenga el fieltro (thatch), la capa de desechos del zacate a menos de 1/2 pulgada de grueso.

Rhizoctonia de parches grandes(*Rhizoctonia large patch*)

Pastos que afecta: zacate bermuda, zacate kikuyo, zacate de San Agustín, zacate zoysia.
Síntomas: primero aparecen unos parches o anillos cafés de forma irregular que se pueden agrandar hasta medir varios pies de diámetro; los centros pueden recuperarse y entonces se ven como anillos de zacate enfermo; las hojas y vainas del zacate quedan remojadas, se marchitan, se ponen de color café claro y mueren; las plantas se arrancan fácilmente del suelo por las guías podridas, cuando la infestación es leve las raíces no están infectadas y las plantas se pueden recuperar; este es un hongo que vive en el suelo, donde forma finas hebras en la tierra o en el césped.
Condiciones que favorecen esta enfermedad: los suelos que tienen fieltro en exceso (una capa de desechos del zacate muy gruesa), también las temperaturas frescas (60º a 70º F) y las condiciones de suelo mojado.
Prevención: reduzca la sombra y mejore la aireación y drenado del suelo; riegue por un tiempo apropiado a una profundidad de 4 - 6 pulgadas; evite el exceso de nitrógeno en el otoño; mantenga el fieltro (thatch), la capa de desechos del zacate a menos de 1/2 pulgada de grueso.

Hilo Rojo (*Red thread*)

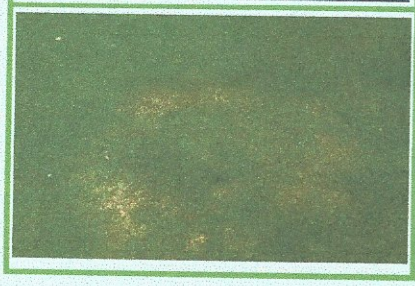
Pastos que afecta: zacate bentgrass, zacate bermuda, zacate azul, zacate festuca y raigras.
Síntomas: el hilo rojo puede matar el césped en parches de 2 a 8 pulgadas de ancho, o la enfermedad puede darse en áreas grandes sin matar completamente a las plantas del zacate; unas hebras rosas como telarañas hacen que se peguen las hojas unas con otras; cheque bien si hay unas costras gelatinosas de color rosa saliendo de las hojas de zacate, estas le confirmarán que el zacate tiene hilo rojo.
Condiciones que favorecen esta enfermedad: es muy común cuando hay condiciones de temperaturas frescas (70º a 75ºF) y las hojas de zacate se quedan mojadas por mucho tiempo; seguido se da en plantas de zacate que les falta nitrógeno cuando las temperaturas son frescas o tibias y hay demasiada humedad (demasiado riego o lluvia).
Prevención: el riego y la fertilización apropiados pueden reducir que se dé esta enfermedad; también ayuda a prevenirla un buen nivel de nitrógeno; prevenga el estrés por sequía checando la cantidad de riego que necesita su especie de césped; mantenga una buena circulación de aire; reduzca la sombra.

Roya (*Rust*)

Pastos que afecta: los afecta a todos.
Síntomas: parches irregulares de zacate enfermo cubierto con unas ampollas de color oxidado (éstas son las esporas del hongo)
Condiciones que favorecen esta enfermedad: el aire tibio (70º a 75ºF) y que las hojas se queden mojadas por mucho tiempo facilitan que se forme este hongo; si al césped le falta nitrógeno es más fácil que se le forme el hongo.
Prevención: mantenga un césped vigoroso siguiendo unas buenas condiciones de riego y fertilización recomendadas para su especie de césped; corte el zacate regularmente y si el césped está infectado quite los recortes para reducir el número de esporas del hongo.

Mancha Muerta de Primavera (*Spring dead spot*)

Pastos que afecta: bermuda, paspalum costero, zacate zoisia.
Síntomas: cuando el zacate empieza a crecer en la primavera, aparecen manchas circulares de zacate muerto de 6 a 12 pulgadas de ancho; las manchas pueden juntarse y formar áreas más grandes; por lo general esta enfermeded afecta céspedes que tienen más de dos años de haberse sembrado.
Condiciones que favorecen esta enfermedad: afecta al zacate durante el invierno, cuando está en descanso (dormancia); el problema es más serio cuando las temperaturas del suelo son menores a los 65ºF; la infección sobrevive como partes endurecidas de la hoja, así como en las raíces y guías (estolones) infectadas.
Prevención: quite el zacate muerto; fertilice en el verano para mantener el zacate vigoroso; no fertilice de más a finales del verano; riegue por el tiempo apropiado.



Fusariuim de Verano (*Summer patch*)

Pastos que afecta: zacates azules, festucas finos.
Síntomas: áreas circulares de hasta un pie de ancho, de color amarillo o café claro, éstas son plantas de zacate muerto o muriéndose; en el centro de estos círculos pueden haber plantas verdes que parecen estar sanas; las raíces, coronas y estolones del pasto están cubiertas de "hilos" (hifas) del hongo de un color café oscuro; cuando la enfermedad está muy avanzada los tallos se ven descoloridos y las vainas podridas.
Condiciones que favorecen esta enfermedad: temperaturas altas (más de 85ºF) desde finales de la primavera hasta fines de verano; la enfermedad es más seria cuando el césped se corta muy bajo o cuando hay demasiada humedad en el suelo.
Prevención: airear el suelo y aplicar nitrógeno de liberación lenta; mejore el drenaje; reduzca la compactación; riegue por el tiempo apropiado; al cortar el zacate no lo deje muy corto; controle el fieltro, la capa de desechos del zacate (*thatch* en inglés) ; reduzca el pH del suelo si está por arriba de 7.

ENFERMEDADES COMUNES DEL CÉSPED EN CALIFORNIA

Adaptado y traducido de: Pest Notes: Lawn Diseases: Prevention and Management UC ANR Publication 7497
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Appendix E: Expansion Potential of Project

Further Expanding IPM to Spanish-speaking Landscapers

Anita Matlock, Rain Bird

(Project Team Member)

Overview –

Thanks to a California Department of Pesticide Regulations (DPR) grant, we were able to develop content and implement training to more than 500 Spanish-speaking landscapers under the program name "Expanding IPM to Spanish-speaking Landscapers." It is now time to take this successful program and further expand IPM to more Spanish-speaking landscapers. To do this, three functions need to happen: 1) recruit participants; 2) provide the training and testing; and 3) provide the recognition for successfully completing the class. This could be handled by hiring an organization that is equipped to provide these services.

The recommendation would be to use as many existing programs as possible such as the Qualified Application Certification, Maintenance Gardener Pesticide Control Certification and the Annual IPM Innovation Awards program.

The Offering –

Starting with the current curriculum, it is recommended that the offering be as flexible as possible to meet the needs of the trainee. For instance, training could be held at a central location or on-site at a work location. Both venues worked well in the pilot study. (*give examples of the numbers at a place like Leisure World and the average at centralized events.) It is recommended that the content be developed into an option on-line training. That is, the course could be offered through the DPR website but administered by a third-party vendor. In addition, the content could be further expanded for more in-depth training. It is further recommended that videos be incorporated into the training especially for the on-line classes.

The Partnerships –

Because the information is relevant to many agencies and program, there is a benefit to working with the other agencies and programs to promote this training. Examples would include: Department of Health, Department of Water Resource and the water agencies, Healthy Schools Act, California Water Resources Control Board, etc.

Recruiting Participants –

There are a number of proven methods to attract participants. The first is to take a lesson from business and create "brand" for the training. For instance, it could have its own landing page on the DPR website with links from other department pages. In addition, the program could be promoted through various professional organizations such as California Landscape Contractor Association (CLCA), California Parks and Recreation Society (CPRS) and California Hispanic Association of Professional Agriculturists (CHAPA). Industry suppliers could be asked to help promote the training such as irrigation suppliers such as Ewing Irrigation, specialty suppliers such as Target as well as lawnmower repair shops. A non-traditional way to each the Hispanic landscaper is through local Hispanic-focused grocery stores located in the

community. DPR could promote this to the current licensed applications as a way to earn Continuing Educational Units (CEU) and to the Integrated Pest Management (IPM) workshops. Another way to promote is to have a table at landscape industry trade shows. Finally, to add credibility and brand recognition for the program, offer to train and get testimonials from key organizations such as Disneyland.

Recognizing Participants –

In order to get more participation from the companies and their employees, there should be some kind of recognition such as a certification for having taken the class. For the employer, having the company listed on a website can be beneficial as well as being permitted to use the program's logo in their marketing efforts. For the employees, providing an official wallet size card helps with their after-hours enterprises. It is recommended that the existing programs be utilized whenever possible such utilizing the Annual IPM Innovation Award program.

Outreach –

Once a program has been developed, it is important to market the program. At a basic level, the program needs to have a 'brand' created which links to a landing page at the DPR website. A campaign should be created to speak to the importance of this program and "market" to decision makers for landscape issues such as Home Owner Associations (HOAs) and their management organizations, Building Owners and Managers Associations (BOMA) that this certification is an important resource for their landscape efforts. It is recommended that the demonstration garden concept, such as the Pesticide-Free Park and Demo Garden at Guadalupe River Park in San Jose, be expanded to other cities.

Legislative Impact –

In order to gain further participation, requiring additional training as part of a licensing program goes a long way to ensure maximum participation

Conclusion –

With the success of the pilot program, it is now time to further expand IPM to more Spanish-speaking landscapers. To accomplish this, there needs to be a plan in place to recruit participants, provide the training and testing then recognize the participants.