Arizona Vegetable IPM Team

IPM Implementation for Specialty Crops

• Produced on 134,000 acres at value of > $900 million annually.

• AZ ranks 2nd nationally Lettuces, Broccoli, Cauliflower, Spinach, & Melons

• AZ ranks 3rd, 4th and 5th, in Chile pepper, Dry onion and Watermelons

• Other important crops: Carrots, Celery, Cabbage, Potatoes and Specialty Ethnic Melons/Vegetables
Team Justification

- Diversity and intensity = demands for IPM

- Maintenance of existing IPM programs essential for vegetable production.

- “All IPM is local”

- IPM programs in AZ are research-based.

- Resources for IPM education are scarce.
Goal of the Vegetable IPM Team:

1) Science-based, multidisciplinary outreach program.

2) Delivery of relevant information and IPM technologies for desert vegetables.

3) Reduces reliance on broadly-toxic pesticides without sacrificing yield, quality and profitability, while minimizing dietary and environmental risks.
Vegetable IPM Team Approach

To synergize the UA’s outreach efforts in Vegetable IPM by strategically investing in an extension educator to assist Vegetable team members in delivering relevant IPM information in a timely and practical manner.

The extension educator, Mr. Marco Pena, was hired in late November 2009 at a 1.0 FTE (0.5 FTE funded by ADA SCRBG grant).

Vegetable IPM “Core” Team Members:

• John Palumbo  Entomology Specialist
• Mike Matheron  Plant Pathology Specialist
• Barry Tickes  Area Weed Specialist
• Kurt Nolte  Area Vegetable Specialist

*** Collectively > 80 yrs experience in IPM
**Expected Impact and Measurable Outcomes**

1. *Our primary expected outcome is to increase awareness and technical knowledge of IPM among target audiences.*
   * Increased delivery to stakeholders

2. *Another expected outcome is the increase use of IPM tactics.*
   * Measure changes in IPM-related behavior*
Activities, Outputs and Their Use

1. Stakeholder Engagement & Needs Assessment
2. Translational Science & On-Farm Demonstration
3. Educational Meetings, Updates & Events
4. Dissemination of Technical Resources
5. Troubleshooting and Field-Site Visits
AZ VEG IPM UPDATES
University of Arizona-Yuma

VEGETABLE

IMMEDIATELY

Wednesday April 6, 2011

Bagrada Bug Update

Bagrada bug pressure on desert cole crops appears to finally be letting up. Based on our trials here at YAC and reports from numerous PCAs in Cochella, Imperial, Blythe and Yuma, the adult numbers on new stands have been much lower in the past week. On older stands, the plants now appear to be growing "normally" and insecticide applications are providing longer residual (go to this link for early results of an efficacy trial). In other research trials, it appears that soil applied neonicotinoids are proving some relief against adults as well. Broccoli plants and cauliflower transplants that were treated with soil applications of imidacloprid (Admire, Alias, Nuprid, etc) or clothianidin (Bekas) at planting are significantly larger than untreated plants at 30 days after wet date. Although treated plants (at cotyledon or transplant stage) took some damage at stand establishment, it seems that once the plants produced fully expanded leaves the soil insecticides began to provide protection from Bagrada bugs. However, the ultimate impact of the Bagrada bug infestations may not be evident until harvest when we can assess maturity and quality of the crops that were heavily attacked early in stand establishment. Although bug numbers have declined, PCAs should still remain vigilant and scout fields thoroughly for the presence of adults, and signs of new feeding damage (tarry like feeding scars) on cotyledons and young terminal leaves. Research here at YAC on Bagrada adult activity has suggested that adults appear to be most active and abundant on plants in fields during the warmer parts of the day (9:00 AM to 4:00 PM), and least abundant on the plants early in the morning (4:00 AM to 8:00 AM) (see this link for preliminary findings). Thus, the highest probability of finding Bagrada bug adults on plants would be during mid-day. This may also be the best time to apply insecticides as well.

Melon Powdery Mildew

Mike Matheron, Extension Plant Pathologist

Melon growers need to keep in mind that powdery mildew can occur on all melons in the desert. If you have dealt with powdery mildew on spring melons, you will recall that powdery mildew starts off as very small colonies that may be few in number; however, they will continue to grow and produce ever larger quantities of spores, which in turn initiate mass infections to bring about a rapid increase in disease symptoms. In recent fungicide evaluation trials, several fungicides have provided excellent control of powdery mildew, including Microthiol Dispers (vegetable sulfur Quintec (quinoxynfen), Procure (flutriamidol), Rally (methylbutanil), and Endura (boscalid). Thoroughly read the label for each product before use for critical information concerning that particular chemistry. Effectively managing powdery mildew with fungicides is best achieved by initial application ideally before the first visible presence of the disease. Subsequent applications of fungicides throughout the life of the crop may be necessary. The fungus responsible for powdery mildew on melons has developed resistance to some fungicides in the past, so maintaining long-term effectiveness of fungicides currently available requires the use of resistance management strategies. One effective approach to alternate among products with different modes of action. The risk of powdery mildew on a particular melon planting will be affected by the genetic susceptibility of the melon cultivar to the disease as well as air temperatures during the growing season.

Postemergence Grass Herbicides

Barry Tickel, Area Agriculture Agent

Postemergence grass herbicides have been available for the past 20 to 25 years. These include flumioxazin (Fusilade-1985), sicydisplayim(Prost 1986, Segment, Vantage and others), and clothodim(Select-1991, Select Max, Arrow, Envoy, Volunteer, and others). They only control grasses and are registered on numerous broadleaf vegetable and field crops as well as trees and vines. These herbicides are all classified as lipid biosynthesis inhibitors. They work by inhibiting the production of an enzyme (ACC Case) used to produce fatty acids which are needed in the formation of cell walls and other plant membranes. They are slow acting and have no soil activity. They are the same mode of action but are used safely on wheat and barley. These include ‘Clethodim’(clofop), ‘Pamena’(floxaprop) and Achiever(triloxynyl) which are commonly used control Canarian grass, wild oat and other grasses. These herbicides are all fairly broad spectrum and control most grasses although there are differences between them on some weed species. Clethodim will control sprangletop while sicydisplayim and flumioxazin will not. The same is true for annual bluegrass which is controlled only by flumioxazin when it is small. All of these are weak on sandbur. These herbicides have no soil activity and typically need to be applied 2 or 3 times to achieve season long weed control. They all require the use of a crop oil concentrate to help penetrate the leaf surface except for Select Max which requires either a non-ionic surfactant or crop oil. These herbicides are normally very safe to the crops that they are registered on. There have been only a few instances over the past 25 years where crop injury has occurred. One was to melons where above labeled rates of Select Max was applied in overlaps or at the ends of fields. This was only from Select Max. Another instance was several years ago on onions where liquid fertilizer (AN) was previously sprayed or the onions for weed control. The third instance was to some leafy vegetables, especially arugula, where the crop oil concentrate caused leaf burn. Although these herbicides once seemed fool proof, each year more failures are being reported. Last year, for instance, Prost and Select did not control Rabitfootgrass in a couple fields and Canarian grass was missed by Prost in others. The only documented case of herbicide resistance in this region has been the resistance of Canarian grass to sicydisplayim, flumioxazin and clethodim in the Imperial Valley. There are several potential causes for herbicide failures and resistance is only one of them and is rare in this region. Please let us know if you have failures so that we can help determine the cause. A video on this subject can be found on this link.

Updates from previous weeks visit the Arizona Crop Information Site
# Veg IPM Updates, 2010-11

http://ag.arizona.edu/crop/vegetables/advisories/archive.html

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<thead>
<tr>
<th>Insects</th>
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<td>Worms</td>
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<td>Weed IPM</td>
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- 32 VegIPM Updates have been delivered to date.
- January 2010, listserve contained 172 email addresses.
- December 2010, the listserve contained 311 addresses.
- In addition:
  - La Paz Co. CES distributes to ~ 50 additional
  - Riverside Co., UCCE distributes to CA PCAs
  - Western Farm Press
  - Western Agri-Radio Network
# Lettuce Weed Control/ Low Deserts

Barry Tickes  
University of Arizona  
Revised 6-08

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>CA/AZ</th>
<th>Year first registered or expected</th>
<th>Grasses</th>
<th>Mustards</th>
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<th>Sunflower</th>
<th>Nightshade</th>
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<td>Y</td>
<td>●</td>
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- ● Good Control  
- ○ No Control  
- □ Partial Control
How Herbicides Work

Field day Conducted by Students in PLS300 Applied Weed Science Class

University of Arizona
Yuma Agriculture Center
6425 W. 8th Street
Monday, April 26th
9 AM - 12 Noon

10 Students in the Applied Weed Science class will describe and demonstrate how 8 herbicide modes of action work.

3 CEUs Granted
This page contains a collection of educational videos from current research work in vegetable crops by University of Arizona Researchers. The purpose is to inform interested parties of new trends, recommendations and developments in the field. Another goal is to demonstrate the U of A Experiment Station’s involvement as contributions to Vegetable Integrated Pest Management. We hope that the information provided here is helpful for those involved in the industry.

Insect Management
Weed Science
Plant Pathology

Insect Management Videos:

Systemic Insecticide Evaluation

Describes how a systemic insecticides experiment was conducted by Dr. John Palumbo and his technicians at the U of A Yuma Agriculture Center.

Effective Management of Melon Powdery Mildew in the Desert Part II

University of Arizona Plant Pathologist Mike Mathison's presentation on the 21st Annual Fall Desert Crops Workshop.

Grower Field Days / Demos
• Herbicide Mode of Action
• Herbicide Injury
• New Herbicide Registrations

On-farm Research Projects
• Herbicide Residual on broccoli
• CYSDV Incidence on melons
• Diamide Uptake in lettuce

Industry /PCA Educational Meetings
• Southwest Ag Summit
• Desert Ag Conference
• Preseason Vegetable Meeting
• Fall Desert Crops Workshop

Pest Crop Loss Workshops
• Lettuce Workshop - YAC
• Melon Workshop - YAC
• Melon Workshop – MAC
Lettuce Insect, Disease and Weed Losses Workshops

Changes in Insecticide Usage (2004-2009)

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<tr>
<th>Year</th>
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<td>180000</td>
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- OP/Carbamates
- Spinosyns
- Abamectins
- Methoxyfenozide
- Indoxacarb
- Diamides
Leafy Vegetables are intensively scouted!

<table>
<thead>
<tr>
<th></th>
<th>Scouted acres (%)</th>
<th>Field visits/wk</th>
<th>Scouting costs ($/ac)</th>
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<tr>
<td>2009</td>
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Source: UA LIL Workshops, 2004-2009
Fall Lettuce – Key Pest Status, 2004-2009

Source: UA LIL Workshops, 2004-2009
Do the Stakeholders Benefit?
ARIZONA
VEGETABLES