Iris Yellow Spot Virus on Onions in Hawaii

Team Iris Yellow Spot Virus
R. Shimabuku, R. Mau, M. Kawate, S. Fukuda, J. Sugano, J. Hu, W. Borth, M. Chou, Daisuke Inoyama, Steven Ogata and Tom Matsuda
May 2012
IYSV Team Members

- Virologist: Drs. John Hu and Wayne Borth
- Entomologist: Dr. Ronald Mau & Ming Yi Chou
- IR4 Specialist: Dr. Mike Kawate
- Agents: Robin Shimabuku, Steve Fukuda & Jari Sugano
- HDOA Pesticide Specialist: Diasuke Inoyama, Steven Ogata and Tom Matsuda
Special mahalo to:

- Katsu Kobashigawa
- Lisa Salazar
Agenda

- Overview of:
  - IYSV virus
  - Insect vector
  - BMP’s
- Field symptoms of IYSV
- Spray coverage demonstrations

**HDOA credits**
What is Iris Yellow Spot Virus?

- IYSV is a Tospovirus
- Related to tomato spot wilt virus
- Typically spread by thrips

Photo credit: R. Shimabuku
Why is this important?

- Affects photosynthetic growth
- Lowers crop yields
- Lowers crop quality
Insect vector

- Transmitted only by the insect vector
  - Onion thrips (*Thrips tabaci*)
- Not mechanically transmitted
- Not seed borne
Iris Yellow Spot Symptoms

Photo credit: R. Shimabuku
IYSV Distribution

- Detected on Maui bulb onions on July 2010
- Found on bulb & green onions in Ewa, Oahu, November 2011
- Confirmed on green onions in Waianae, April 2012
- All confirmed by Hu and Borth - UH CTAHR
Onion thrips biology and control

Eggs are laid in leaf axils

Larvae feed in leaf axils

Adults feed on leaves

Pupal stages are found in the soil

Figure 17
Onion thrips biology and control

- Transmitted by 2\textsuperscript{nd} instar larvae and adult stages
- Larvae acquires the virus from infected plants
- Severity dependent on feeding, timing, crop host

Photo credit: Cornell & Columbia University
Onion thrips behavior & control

- Eggs are laid within axils
- Immatures feed within leaf axils
- Adults feed in leaf axils and on exposed leaves
- Sprays must penetrate leaf axils for best control
Host Plants

- Bulb onion (*Allium cepa*)
- Garlic (*Allium sativum*).
- Leek (*Allium ampeloprasum var porrum*)
- Chives (*Allium schoenoprasum*)
- Iris (*Iris spp.*)
- Lisianthus (*Eustoma grandiflorum*).
Best Management Program for IYSV in Hawaii
Clean start with virus free plants

- Avoid using infected planting material (transplants or sets) when planting new areas.
- Remove infected plants, culls and volunteer onions
Crop management practices

- Ensure proper crop nutrition, adequate water to minimize plant stress
Field scouting for symptoms

- Conduct routine scouting of greenhouse, seedling area and commercial fields
- Once infected = always infected

Photo credit: Colorado State University
Weed management

- **Common Weed Hosts:**
  - Jimsonweed (*Datura stramonium*),
  - Redroot pigweed (*Amaranthus retrofexus*)
  - Common pigweed (*Portulaca oleracea*)
Crop rotation

- Eliminate “green bridge”
  - Vegetative phase of the crop
  - Primary IYSV reservoir
- Plan ahead (100-120 day crop)
- Consider economics

Diagram:
- Bulb vegetable
- Leafy greens
- Herb
Host free periods

- Reduces host plant inoculum and insect vectors
- Consider economics
- Consider area wide
- Plan ahead
  - (100-120 day crop)
Find Alternative Fields

- Locate alternative production fields
- ‘Out run’ pest and diseases
- Long term strategy
Evaluate cultural management techniques

- Consider evaluating
  - Varietal selections (resistant lines)
  - Overhead irrigation
  - Compost
  - Mulch
  - Reflective mulches
Insecticidal Field Screening

- Important for resistance management
- Evaluation of insecticidal rates and frequency
- Registration of new products

Photo credit R. Shimabuku
Implement insecticide resistant management program

- Resistance occurs when a pest population is exposed to an insecticide group for an extended period of time.
- Thrips that are genetically immune to the insecticides breed and create a new population that are not killed.
- This is called genetic selection of resistant populations.
### Approved Insecticides Green Onions

Partial list of insecticides that can be applied to green onions for onion thrips. **Check all labels first before applying.**

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>Group</th>
<th>EPA Reg. No.</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admire Pro</td>
<td>4A</td>
<td>264-827</td>
<td>(both)</td>
</tr>
<tr>
<td>Prentox Malathion</td>
<td>1B</td>
<td>655-777</td>
<td>(both)</td>
</tr>
<tr>
<td>Mustang (RUP)</td>
<td>3</td>
<td>279-3126</td>
<td>(both)</td>
</tr>
<tr>
<td>Knack (IGR) (SUP)</td>
<td>7D</td>
<td>59639-95</td>
<td>(both)</td>
</tr>
<tr>
<td>Intrepid 2F</td>
<td>18</td>
<td>62719-442</td>
<td>(not bulb)</td>
</tr>
<tr>
<td>AzaMax</td>
<td>22</td>
<td>71908-1-81268</td>
<td>(both)</td>
</tr>
<tr>
<td>Entrust</td>
<td>5</td>
<td>62719-282</td>
<td>(both)</td>
</tr>
<tr>
<td>M-Pede Insec. Soap</td>
<td></td>
<td>10163-342</td>
<td>(both)</td>
</tr>
<tr>
<td>Lannate LV</td>
<td>1A</td>
<td>352-384</td>
<td>(both)</td>
</tr>
<tr>
<td>Dipel DF</td>
<td>11C</td>
<td>73049-39</td>
<td>(both)</td>
</tr>
</tbody>
</table>
Use Approved Insecticides in HI

http://pesticides.hawaii.edu/

Always read and follow the label directions (04/12)
Rotate Insecticides to Minimize Resistance:

- Crop protection chemicals such as insecticides should always be rotated.
- Never use the same insecticide for an extended period of time without rotating to a chemical in a different chemical class that pesticide.
Sample Insecticide Schedule for Typical Ag Pests

Recommended: Rotation between pesticide groups
Each color represents a different insecticidal class
A Possible Rotation for **GREEN** onion

- Based on insect lifecycle

**Sequential applications by Pesticide Group**

- Group 4A: Admire Pro
- Group 5: Radiant
- Group 2B: Malathion 57 EC
- Group 1A: Lannate
A Possible Rotation for BULB onions

- Based on insect lifecycle

Sequential applications by Pesticide Group

- Group 4A Admire Pro
- Group 5 Radiant
- Group 6 Agri-Mek 0.15 EC (SUP)
- Group 1A Lannate

Soil application

Approval for use in HI on BULB onions
May 1, 2012

**Not approved for use in GREEN onions

OR
Epi-Mek (SUP)
100-1154
Obtain Good Spray Coverage

- Achieving good spray coverage is important for IYSV management.
- Ideal spray coverage involves the uniform application of crop protection chemicals within the recommended label rate ranges and use of appropriate adjuvants (e.g., spreader/spreader-sticker)
- Management of IYSV requires optimal penetration throughout the plant canopy and into leaf sheaths
Maximum Application Limitation

- Be mindful of the maximum limits on crop protection chemicals

EXAMPLES ONLY:

- ADMIRE PRO (Soil application only)
  - Do not apply more than 14 ounces of Admire Pro/acre/crop season (soil application)

- Agri-Mek 0.15 EC (RUP) (Bulb only)
  - Do not apply more than 48 fl oz. (or 0.056 lbs a.i.) of Agrimek 0.15 or any product containing abamectin in a growing season \textit{per year}

- RADIANT SC
  - Do not apply more than 30 ounces of Radiant / acre / \textit{year}
Spreader or Spreader-Sticker

- Utilize a good spreader or spreader-sticker to obtain good spray coverage.
- Be careful of phyto-toxicity issues.
- Apply new material to a small area first.
- Assess spray coverage and phyto-toxicity issues before making large area applications.
The Label is the Law

- Only crop protection chemicals approved for use in Hawaii on green or bulb onions should be used to control onion thrips.
- Read and follow the label directions.
- Pay attention to key words such as preharvest intervals (PHI), re-entry intervals (REI), personal protective equipment (PPE), spray interval, maximum number of applications, etc.
Monitor for Damage = Damage

- **CAN NOT** undo old damage
  - Protect new leaves
  - Evaluate effectiveness based on **NEW** leaves
  - Do **NOT** assess effectiveness based on older parts of the plant

Photo credit: UtahState University
Keep Good Records: RUP or not

- Good record keeping should be a common practice for all commercial agricultural operations.
- Keep good records of spray applications. Important information such as rates, frequency, treatment area, damage, etc. should be documented.
Impact of IYSV in Hawaii

- Results in reported crop losses from 20-100%
  - Reduction in crop yields
- Lowers crop quality
  - Reduction in grade A products
- Threatens Hawaii’s niche market varieties, i.e. Maui onion
Future areas of work

- Host suitability of green onions vs. bulb onions
- Screening & registration of new insecticides
  - Increased products
  - Better rotation program
- Varietal screening
Agriculture is Changing... Risk oriented business

- Ensure farm sustainability
  - Responsible farming
  - Business and risk management
  - Responsible pest management
  - Environmental stewardship
  - Farmer training programs
  - Access to resources & agencies
Increase viability and sustainability of commercial farms in Hawaii
Integrate more farmers into mainstream agriculture
Assist producers in adjusting to the changes in Hawaii agriculture

Our Goals

LIFE excels in:

Grass roots educational programs
Responsible and sustainable farming
Integrated pest management
Environmental stewardship
Pesticide, worker and food safety
Continuing farmer education programs
Agricultural resource & agency access
Teaming up to service growers better
Respond to a wider area of concerns
Mahalo to our agricultural partners: UH CTAHR (Risk Management Hawaii, Ag Incubator, Honey Bee, Aquaculture and Aquaponics, Sustainable and Organic Agriculture, Basil Swat Team, High Vaccinium, Hawaii Tea programs, etc.), Hawaii Department of Agriculture, USDA (FSA / NRCS), Hawaii Farm Bureau, County agencies, Oahu Resource and Conservation, Agricultural Foundation, agricultural chemical companies, health insurance companies, crop insurance companies, our many private and public partners, and Hawaii’s farmers and agricultural vendors.
Changing Role of Hawaii’s Farmers

- Crop producers
- Soil managers
- Pest managers
- Irrigation specialist
- Sales persons
- Marketers
- Accountants
- Food safety managers
- Business persons
- Payroll/health care providers
- Delivery drivers
- Etc
Keeping Hawaii’s Farms in Business

- Continuing education for Hawaii’s growers
  - Agricultural Educational Workshops
    - Address specific risk management issues
      - Crop production
      - Crop specific insurance
      - Record Keeping
      - Financial Measures
      - Business Planning
      - Marketing Plan
  - On Farm Field Days
  - Grower Inspired Field Days
  - Farm Doctor Program
  - Risk Management school
  - Bilingual Materials
Risk Management Resources for Hawaii Agriculture

Our Goals

Deliver risk management education to Hawaii’s producers
Educate Hawaii’s producers about crop insurance

Risk Management Workshops

- General Risk Management
- Crop Specific Insurance
- AGR-Lite
- Record Keeping
- Financial Measures
- Business Planning
- Marketing Planning
Minimizing the RISK on You

- Financial
- Production
- Market
- Legal
- Labor
- Natural Disaster
- Bad Weather
- Pests & Disease
- Down Market
# USDA Risk Management Products: Tools & Products

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Current Insurance Plans</th>
<th>Farm Service Agency (FSA) Natural Disaster Programs</th>
<th>Emergency Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AGR-Lite</td>
<td>Fruit (APH)</td>
<td>Dollar Amount</td>
</tr>
<tr>
<td>Banana</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Coffee</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mac Nuts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Papaya</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Other Fruits</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Other Tree Crops</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Nursery</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Vegetables</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cut flowers &amp; foliage</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Other Crops</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Livestock</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Farm/Ranch Land</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Notes:
* NAP is not available for crops where catastrophic (CAT) is available such as APH, Dollar or Tree base. If AGR-lite insurance is acquired NAP is no longer available.
* No RMA crop insurance or FSA NAP = No access to disaster programs.