



**Insecticide Resistance Action Committee**  
[www.irc-online.org](http://www.irc-online.org)

# **Insect Resistance Management: Science, Scope, and Solutions**

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**3/5/2010 Member Symposia, 57<sup>th</sup> ESA Annual Meeting, December 13-16, 2009 Indianapolis,  
Indiana**



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# **IRAC - United States**

## **Our Role in Insect Resistance Management**

**Philip W. Robinson**

**United Phosphorus, Inc.**

### □ IRAC - US

- Created in 1984
  - ✦ Specialized Technical Group
  - ✦ Industry Association
    - ◇ Crop Life



- Sponsor of Numerous ESA Symposia

## **□ IRAC - US Committee**

### **➤ Chairman**

**✦ Graham Head, Monsanto**

### **➤ Secretary/Treasurer**

**✦ Caydee Savinelli, Syngenta**



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# IRAC - US Member Companies

- AMVAC Chemical Corp.
- Arysta LifeScience NA LLC
- BASF Ag Products
- Bayer CropScience
- Cheminova, Inc.
- Chemtura Corp.
- Dow AgroSciences LLC
- DuPont Crop Protection
- FMC Corp.
- Mitsui / Landis International
- Monsanto Company
- Nichino America, Inc.
- Nisso America, Inc.
- Syngenta Crop Protection, Inc.
- United Phosphorus, Inc.
- Valent USA Corp.
- Interested in Joining IRAC?
  - Crop Protection
  - Plant Biotech
  - Public Health

- Reduces product value/utility**
- Reduces crop quality & quantity**
- Impact on insecticides/acaricides**
  - **Increases amount used**
  - **Increases use frequency**

- ❑ **Knowledgeable experts estimate**
  - **More than 500 resistant species of insects**
  - **Resistance impacts**
    - ✦ **all major agricultural and ornamental crops**
- ❑ **Resistance exists**
  - **Host Plant**
  - **Crop Rotations**
  - **Insecticidal soaps**
  - **Biologicals**
  - **Pheromones**
  - **Synthetic chemical**

### □ Synthetic chemical Resistance

#### ➤ Although present

#### ◇ Product stewardship allows

» viable use to continue



### □ New products

#### ➤ Not easily done

##### ✦ Discovery & registration

◇ ~\$50-200 million

◇ ~8-15 years development

#### ➤ Need long product life cycle

### □ Resistance management

#### ➤ Important product stewardship component

## □ The Role of Industry

### ➤ Product Expertise

- ✦ Development
- ✦ Registration
- ✦ Formulation
- ✦ Product Stewardship
- ✦ Marketing

- ❑ **Coordinate industry response to insecticide resistance**
  - **Prevent or delay**
    - ✦ **insect and mite resistance**
  - **Coordinate Resources**
    - ✦ **Monitoring**
    - ✦ **Methodologies**

## Facilitate communication & education about resistance

- Within industry
- Consultants
- Universities
- Government agencies
- Growers

- ❑ **Promote development of**
  - **Resistance management strategies within IPM**
- ❑ **Maintain efficacy**
  - **To support sustainable**
    - ✦ **Agricultural practices**
    - ✦ **Public health**

## ❑ Mode of Action (MoA) Documents

➤ IRAC International classification scheme lists the MoA, Name & Registrant

✦ Currently 28 classification groups

◇ Separate group for unknown MoA

◇ Most recently added groups

» Neonicotinoid (Group 4A)

» Diamide (Group 28)

## ❑ All insecticides & acaricides

➤ Allocated a specific group or sub-group

## IRAC Mode of Action Classification

*Issued, July 2009*

*Version 6.3*

Prepared by: IRAC Mode of Action Working Group

[www.IRAC-online.org/documents/MoA](http://www.IRAC-online.org/documents/MoA)

IRAC Mode of Action Classification v 6.3, July 2009 <sup>1</sup>

Main Group and  
Primary Site of Action

Chemical Sub-group  
or exemplifying  
Active Ingredient

Active Ingredients





## ☐ Mode of Action for Specific Groups or Subgroups, for example...

### ➤ Neonicotinoid Subcommittee

#### ✦ IRM Guidelines for neonicotinoids

- ◇ General Crop Management Practices

- ◇ Specific practices, for example...

  - » Colorado Potato Beetle

  - » Whitefly

## □ Mode of Action Specific labeling

➤ Appears on many product labels

✦ Example:

◇ Neonicotinoid Insecticide (4A)

<b>GROUP</b>	<b>4A</b>	<b>INSECTICIDE</b>
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✦ Active ingredient(s)

✦ Inert ingredients

- **Mode of Action Labeling also...**
  - **Specific Use Instructions**
    - ✦ **Pests controlled**
      - ◇ **Life stage, generation**
    - ✦ **Product use rates**
    - ✦ **Application frequency**
    - ✦ **Product rotation recommendations**
      - ◇ **Different mode of action**

### □ Online

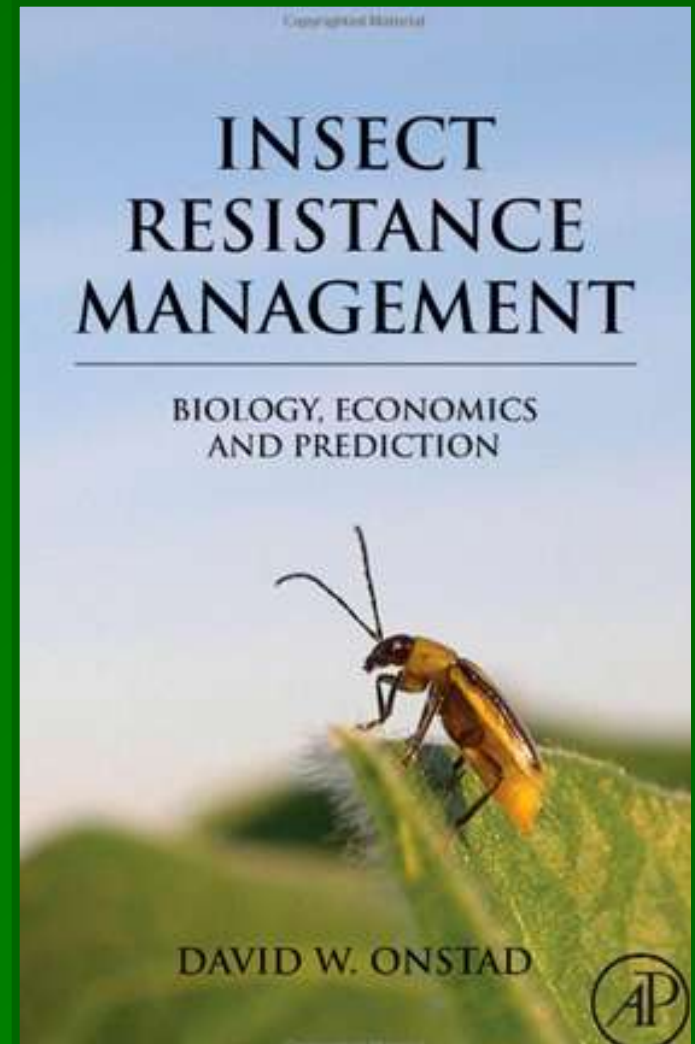
#### ➤ Insect Resistance Management

##### ✦ Course & Book

◇ D. Onstad

» University of Illinois

#### ➤ Additional resources available on the IRAC website.



### Arthropod Pesticide Resistance Database

➤ Michigan State University

✦ [www.pesticideresistance.org](http://www.pesticideresistance.org)

### University Extension and Researchers

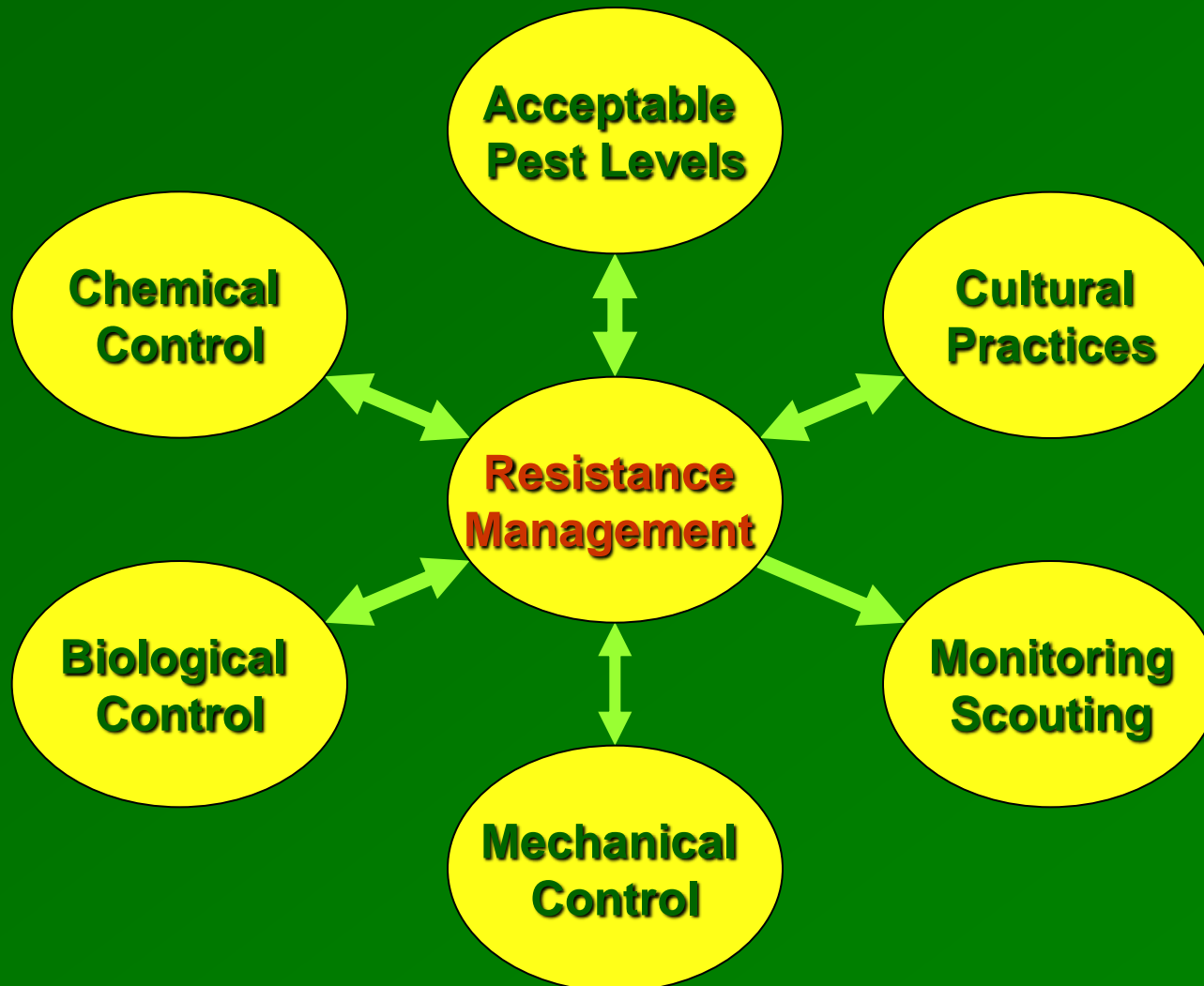
### Center for Integrated Pest Management

### Regional Integrated Pest Management Centers

### National Association of Independent Crop Consultants

➤ (NAICC)

- ❑ **IRAC-US provides financial resources for resistance management projects, for example...**
- ❑ **2008 Projects**
  - **Pyrethroid Resistance Management**
    - ✦ **Urgent need for Bollworm, *H. zea***
      - ◇ **B. Hopkins & P. Pietrantonio, Texas A&M**
  - **North American Mapping and Management**
    - ✦ **Zea Resistance**
      - ◇ **B. Hutchison, University of Minnesota**
      - ◇ **S. Fleisher, Penn State University**
      - ◇ **G. Payne, University of West Georgia**



## Follow Local Recommendations

## Products

### ➤ Use LABELED rates!

#### ✦ DO NOT

#### ◇ Rely on a single MOA

» Especially for season long control

» Multiple generation pests / crop season

### ➤ Use block rotations

#### ✦ Multiple or overlapping generations



## ❑ No simple solutions, but keep it simple

Rube Goldberg (rōob gōld'berg) n. a comically involved, complicated invention, laboriously contrived to perform a simple operation — *Webster's New World Dictionary*

### ➤ Complexity reduces implementation

❑ Pests don't honor property lines!

❑ Let the neighbors do it!

- ❑ **Industry motivated**
  - **product stewardship**
    - ✦ **protect product life cycle**
- ❑ **IRAC**
  - **Task force**
    - ✦ **Create RM guidelines**
    - ✦ **Educate & promote**
      - ◇ **Value of resistance management**
        - » **Crop, non-crop uses & public health.**
- ❑ **For success**
  - **Cooperation from all stakeholders!**



Thank you for attending the symposium