Insecticide Resistance Action Committee

The Role of IRAC in Insecticide Resistance Management

Daniel R. Vincent, Ph.D., DuPont
Caydee Savinelli, Ph.D., Syngenta
Graham Head, Ph.D., Monsanto

IRAC-US

IPM & IRM

IPM (Integrated Pest Management)

- Integrated, ecological approach to pest management.
- Use of diverse tools to manage pests in crops …
  - Defining acceptable pest levels
  - Employing preventive cultural practices
  - Monitoring pest levels
  - Mechanical controls
  - Biological controls
  - Chemical controls

IRM (Insecticide Resistance Management)

- Managing the pest gene pool to reduce selection pressure on various resistance mechanisms.
- Use of many chemistries and tools …
  - Growing early maturing or pest-resistant varieties of crops
  - Using chemistries at full-strength
  - Rotating the use chemistries of differing modes of action
  - Employing biological controls as possible
  - Protecting populations of natural enemies.

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9 Key Global Challenges...

21 July 2010

25 August 2010

In 35 days...

- Population: +7,531,709
- Arable Land: -392,703 ha

- **Population** increase
- **Arable land**: finite & disappearing
- Useable **water** reserves
- **Weather** changes (warming, extremes)
- Cultural Shifts ... **Labor**, etc.
- **Crop Uses** are Shifting (energy)
- Natural Disasters
- Economic Disasters
- Regulatory Pressures

Agriculture is Ecological Tension …

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Diversity

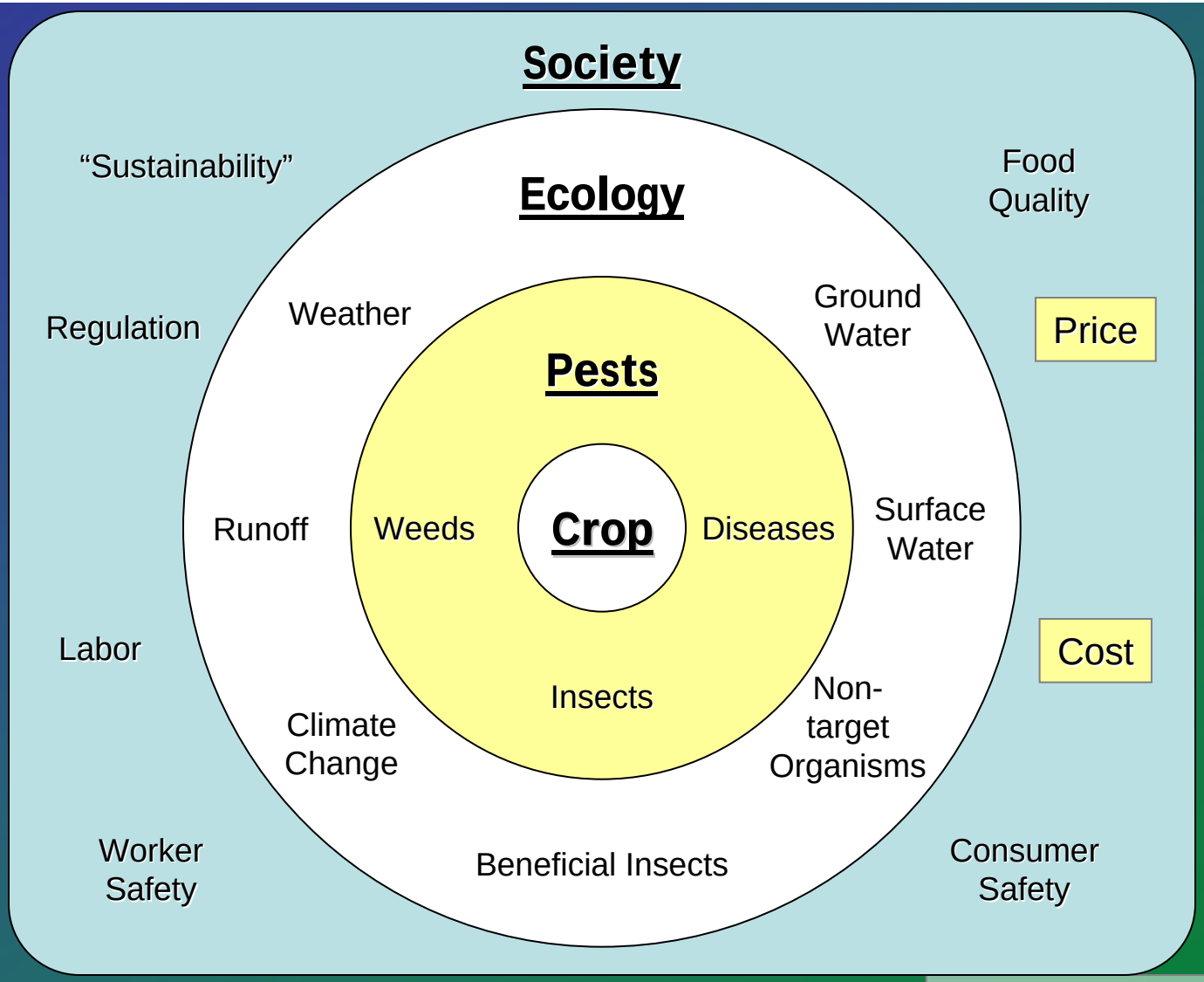
- Biodiversity is considered an indication of how balanced a system is.
- Usually stable.
- Few interventions, generally self-sustaining.
- Long-term.
- Adaptive, sometimes cataclysmically.

"Nature abhors a vacuum."

Monoculture

- Farming is a natural process done in an unnatural way.
- Often unstable.
- Many interventions usually required.
- Short-term (cropping cycle perspective).
- Crops "tuned" to soil, temperature, light, etc.

Agriculture is a Nest of Decisions



IRAC's Role

- Champion principles for reducing selective pressure on pest populations to sustain agriculture.
  1. Encourages the use of many tools to manage resistance development.
     - Diverse mechanisms (e.g., IPM)
     - Diverse modes of action in the use of insecticide products
  2. Works with manufacturers to adds voluntary language regarding resistance management to insecticide labels.
     - Window (block) approach to the use of pesticides
       - Where there is the possibility to rotate pesticides with differing modes of action
       - Added to the labels of many pesticides, including Diamides.

IRAC's Role …

3. Sponsors research aimed at monitoring and identifying resistance and resistance mechanisms. Some examples…
   - Monitoring studies
   - Formation and support of the Arthropod Pesticide Resistance Database (Michigan State Univ)
   - Identification of resistance mechanisms of *H. zea* in corn in US.
   - Cooperating with institutions on Public Health issues; e.g., malaria.
4. Engages a wide range of Stakeholders
   - Manufacturers
   - Agencies
   - Scientists
   - Industry and public groups (NAICC, CropLife, etc.)

Themes in This Meeting …

- EntoDiversity: Biological, Geographical, Disciplinary
  - This year's Conference theme celebrates how diverse the ESA has become and how diverse our relative contributions have become to science and society.

- Understanding and Capitalizing on Agricultural Biodiversity in IRM/IPM.
  - This IRAC-sponsored symposium is an attempt to bring together scientists from academia, institutes, government and business to discuss a great challenge.

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Today's Symposium, 1st half

1. *Spatial & Temporal Diversity of Polyphagous pests - Corn Earworm (Helicoverpa zea).*
   Patricia Pietrantonio (Tex A&M Univ)
2. *Natural Refugia – GM Crops.*
   Graham Head (Monsanto)
3. *Fall armyworm: management of a genetically-complicated migratory pest.*
   Rob Meagher (ARS USDA)
4. *Impact of Lygus lineolaris Management on Biodiversity in Cotton IPM.*
   Jeff Gore (Miss State Univ)
5. *Whitefly Management - Multicrop Systems.*
   Peter Ellsworth (Univ Ariz)
6. Break

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Today's Symposium, 2nd half

7. *How structure interacts with conservation of beneficial insect biodiversity broadly (predators, parasitoids and pollinators).*
   Doug Landis (Mich State Univ)
8. *Assessing ecosystem services provided by invertebrates in farmland- a 'bottom-up' approach.*
   Steve Wratten (Bio-Protection Research Center)
9. *Pollinator Services in Agricultural Landscape.*
   Claire Kremen (Univ Calif Berkeley)
10. *Pollinator Diversity in Urban Settings.*
    Gordon Frankie (Univ Calif Berkeley)
11. *Ecosystems and Agricultural Relationships.*
    John Finisdore (World Resources Institute)
12. Concluding Remarks