Pesticide Program Dialogue Committee

Resistance Management Work Group – Interim Report May 2021

Co-Chairs: Bill Chism, Alan Reynolds, and David Shaw

Work Group Goal:

Develop recommendations to EPA on how the agency can assist stakeholders in addressing the challenges of conventional pesticide resistance

This is a presentation of topics discussed by the workgroup and are not final recommendations

Charge Questions for Discussion – Breakout Groups

1. Are there current EPA policies that positively or negatively affect conventional pesticide resistance management? What policies could be re-worked to more positively address resistance management?
2. Are there current Industry programs that positively or negatively affect conventional pesticide resistance management? Would EPA have a role in those programs, and what might that be to positively influence industry?
3. Are there incentives (for registrants or pesticide users) that could be considered related to conventional pesticide regulation that might positively affect resistance management? Are there other ways in which the agency can work with stakeholders (e.g., growers, commodity groups, academics) to cooperatively address resistance management?
4. Are there elements from EPA's Bt PIP resistance management program that could be used in conventional pesticide resistance management?

Workgroup Roster – Breakout Groups

Group 1:
Jim Adaskaveg, University of California - Riverside
Chandra Aradhya, Bayer
Cameron Douglass, USDA/OPMP
David Ervin, Portland State University
Jim Kerns, North Carolina State University
Kenny Seebold, Valent USA
David Shaw (Organizer), Mississippi State University
Bill Chism (EPA)

Group 2:
Billy Crow, University of Florida
Jim Fredericks, National Pest Management Association
George Frisvold, University of Arizona
Tim Lust, National Sorghum Producers
Janet McAllister, CDC - Division of Vector-Borne Diseases
Caydee Savinelli (Organizer), Syngenta
Shannon Jewell, Kimberly Nesci (EPA)

Group 3:
Amy Asmus (Organizer), Asmus Farm Supply, Inc.
Matthew Houser, Indiana University
Craig Kleppe, BASF
Dominic LaJoie, National Potato Council/Ind. Grower
Lauren Lurkins, Illinois Farm Bureau
Houston Wilson, Kearney Agr. Res. Ext. Center
Nikhil Mallampalli (EPA)

Group 4:
Larry Dallas, Independent Grower
Katie Dentzman, University of Idaho
Steve Eskelsen, ADAMA
Patti Prasifka, Corteva
Gary Prescher, NCGA/Independent Grower
Jill Schroeder (Organizer), New Mexico State University
Alan Reynolds (EPA)

PPDC Program Support: Shannon Jewell, Carla Theriault

Breakout Group 1

Are there current EPA policies that positively or negatively affect conventional pesticide resistance management?

What policies could be re-worked to more positively address resistance management?

Breakout Group 1 – Topics of Discussion

- EPA establish a federal interagency workgroup on resistance management.
  - Many federal agencies have a role in resistance management.
  - Regulations can help or hinder resistance management.
  - Cross country movement of weed seeds, insects, pathogens.
- Yearly Resistance Management Meeting: Recommendation that stakeholders, both public and private, have a yearly meeting to coordinate and discuss resistance management plans across disciplines (insects, plant pathogens, and weeds).
- Establish a grant program to support community-based programs
- Reporting Incentives: EPA should develop incentives for researchers, users and suppliers to reward people who report suspected resistance or reveal of lack of performance patterns early.
  - Develop tools and centers (universities or IPM centers or other groups) for rapid identification of resistance.

Breakout Group 1 – Topics of Discussion

- Education: Updated training modules from OPP on resistance management.
  - Provide to states for applicator training.
  - Resistance management training for NRCS staff .
  - Mode of action training.
  - OPP should have a training requirement for resistance management as part of pesticide licensing.
  - Training should include retailers and distributors
- Label simplification on resistance management
- Conflicting impact of current policies.
  - Balance off-target movement and weed resistance. Off-target movement guidelines (e.g., buffers) have negative effects on weed management.
  - Endangered Species Act may have indirect effects on resistance management.
- Leverage reduced risk status for faster registration of pesticides for resistance management.
- Create incentive to develop tank mixes for resistance management.

Breakout Group 1 – Topics of Discussion

- Questions for PPDC on EPA policies that positively or negatively affect conventional pesticide resistance management.
  - Did we miss any policies or topics?
  - Any suggestions on incentives to raise awareness and actions on resistance management?

Breakout Group 2

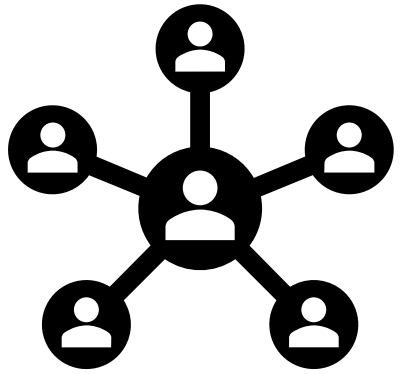
Are there current Industry programs that positively or negatively affect conventional pesticide resistance management?

Would EPA have a role in those programs, and what might that be to positively influence industry?

Summary of Industry Groups – Breakout Group 2

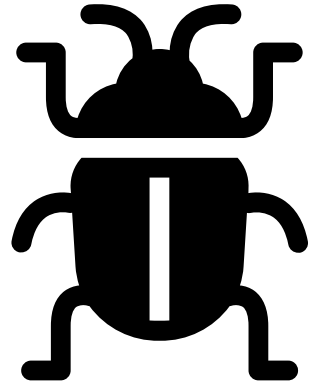
First area of discussion

- What is meant by “Industry”?
- Breakout Group 2 agreed on the following list.
  - Commodity Group
  - Community Based
  - Government
  - NGO
  - Professional Society
  - Registrant
  - Retailer



Programs- Pest Management and Resistance Management

- Breakout Group 2 agreed that programs goes beyond just resistance management programs.
  - Pest management programs use the same tools as resistance management programs.
  - Outcome is to manage pest while minimizing resistance.
  - Key for success is to have multiple tools.



EPA's Role in Programs – Breakout Group 2

EPA's Role in Programs

- Facilitate and promote education opportunities
- Fast track registrations for resistance management
- Participation in consortiums that are designing pest management and resistance management guidance
- Promotion of programs
- PSEP programs
- Work with other federal government agencies

Other Considerations to Address – Breakout Group 2

Breakout Group 2 will continue to discuss the following areas listed below

- Programs differ by what is being controlled.
  - i.e. Mosquitoes versus Weeds
- Behavior Considerations
- Economic Motivation
  - Long term versus short term
- Risk versus Reward
- Stakeholder Engagement and Commitment

Questions to PPDC – Breakout Group 2

- **With regard to industry types**
  - Are there other types of industries that need to be considered?
- **With regard to programs**
  - Are there other areas regarding EPA's role in pest management / resistance management programs that need to be considered?

With regard to other considerations

- Should Breakout Group 2 explore additional options?

Breakout Group 3

Are there incentives (for registrants or pesticide users) that could be considered related to conventional pesticide regulation that might positively affect resistance management?

Are there other ways in which the agency can work with stakeholders (e.g., growers, commodity groups, academics) to cooperatively address resistance management?

- **Note, all information shared on CQ3 slides are ideas in discussion at an exploratory stage in our task. They are not to be considered all inclusive or final in our recommendations or conclusions.**

Amy Asmus (Organizer), Asmus Farm Supply, Inc., Matthew Houser, Indiana University, Craig Kleppe, BASF, Dominic LaJoie, National Potato Council/Ind. Grower, Lauren Lurkins, Illinois Farm Bureau, Houston Wilson, Kearney Agr. Res. Ext. Center, and Nikhil Mallampalli (EPA)

Breakout Group 3 – Charge Question 3A Topics for Discussion

Are there incentives (for registrants or pesticide users) that could be considered related to conventional pesticide regulation that might positively affect resistance management?

Target audience for incentives:

- **Registrants:**
  - Have strong economic internal incentives to protect their asset from resistance development
  - Should not need external incentives
- **Pesticide users (retailers, consultants, applicators, producers, landowners, municipalities, etc.):**
  - Have efficacy incentives to implement practices
  - Have yield protection incentives to implement practices
  - Most consider overall production goals which force priority choices
  - Some users may need additional incentives to overcome hurdles to implementation of practices.
    - How do you segment users to address hurdles
    - How to you structure incentives not to penalize the good actors while encouraging the bad actors?

Breakout Group 3 – Charge Question 3A Topics for Discussion

Identified hurdles to adoption:

- **Grower does not implement BMP's until in their area or field**
  - Mobility of pests and ability to overwinter (where applicable)
  - Ability to recognize resistance in first years of establishment.
- **Economic Thresholds – Cost of RM BMP's**
- **Issues effecting efficacy**
  - Environmental difficulties
  - Product performance/application error
  - Grower follow through of planned practices
- **Social factors**
  - What is acceptable
  - Availability of people and/or time to carry out practice
- **Conflicting messages from trusted advisers**
  - Priorities of partners
  - Science vs sales
  - Maximizing yield vs Optimizing production
- **Use of label language may/does not reach all audiences**

Are there incentives (for registrants or pesticide users) that could be considered related to conventional pesticide regulation that might positively affect resistance management?

Breakout Group 3 – Charge Question 3A Topics for Discussion

Are there incentives (for registrants or pesticide users) that could be considered related to conventional pesticide regulation that might positively affect resistance management?

What is needed:

- **Education**
  - How can the "right" people be reached?
  - How can education be incentivized (as opposed to just delivered)?
  - Which stakeholders can/should provide the scientific information for education?
- **Incentives to address hurdles to adoption**
  - Note: incentives are not always monetary payments or economic. Let's be creative with what we consider an incentive.
- **Realization that EPA cannot do this alone**
  - IPM including non-chemical practices must be included in education and RM plans
  - A community of stakeholders would more completely influence pesticide users (leads us to the second half of our charge question)

Breakout Group 3 – Charge Question 3B Topics for Discussion

Are there other ways in which the agency can work with stakeholders (e.g., growers, commodity groups, academics) to cooperatively address resistance management?

A discussion of carrots/sticks/carrot sticks:

- **Education**
  - BMP's and how to implement them effectively
  - Long term economics of good pest control
  - How do we reach the decision maker?
  - Private/commercial applicator training include yearly RM education
  - Link education with information gathering
- **Points programs for participation in RM practices**
- **Incentivize stakeholder community involvement**
- **Role of industry Marketing Programs**
- **Make mandatory enforceable part of the label**
- **Pest commissioners to control uncontrolled pests**
- **Mandatory reporting and mapping of target resistance issues**
  - Accessible to all stakeholders who are involved in resistance management plans
  - Suspected resistance vs proven resistance

Questions to PPDC - Breakout Group 3

- Is our conclusion that registrants have internal incentives to steward their products for Resistance Management and should not need external incentives, correct?
- Have we identified most hurdles to adoption of RM practices? Are there any major hurdles we are missing?
- Are there other categories needed to address resistance management?
- In our discussion of carrots/sticks/carrot sticks, are there other types of incentives we should explore?
- Do you have any other considerations you would like us to consider as we move forward with our charge?

Breakout Group 4

Are there elements from EPA's Bt PIP resistance management program that could be used in conventional pesticide resistance management?

Basic elements of Bt PIPs resistance management:

- Mitigation
  - Refuges, IPM Stewardship, Acreage Limitations
- Resistance monitoring/scouting
- Remedial action (if resistance develops)
- Grower education
- Registrant requirements (terms of registration)
  - Refuge compliance, grower contracts
- EPA oversight
  - Annual reporting, regular meetings with registrants

Breakout Group 4 – Topics of Discussion

- Mitigation
  - PIP-specific mitigation measures including refuges, acreage limitations, and crop destruct requirements are not likely to be adaptable to conventional pesticides.
  - The group discussed the possibility of IPM stewardship measures at length.
  - General question: Should IPM stewardship measures be taken proactively to prevent resistance, or should they be implemented (reactively) to cases of resistance in the field?
  - Challenge: Who is responsible for implementing?
    - EPA has authority over the registration and label.
    - There may not be a direct line from the registrant to the end user (distribution network)
  - Challenge: Can a Federally-mandated program include the flexibility needed to implement the most effective practices locally and for the target pest(s)?

Breakout Group 4 – Topics of Discussion

- Mitigation
  - The potential role of product labeling in stewardship:
    - Where do growers get information? Can the product label influence behavior? How can label language be modified for resistance management?
  - The role of growers:
    - Grower outreach -- Grower meetings (coordinated by registrants), extension educators, social media can all have roles in stewardship.
    - How do we 'make' good stewards?
      - Most growers do consider themselves to be good stewards.
  - Certification-type program to incentivize stewardship
    - E.g., Water quality programs that award points for growers complying with voluntary nutrient and soil loss management practices (STAR program in IL).

Breakout Group 4 – Topics of Discussion

- Resistance monitoring/scouting
  - For Bt PIPs, EPA has employed two monitoring strategies: pest sampling/bioassays from high pressure regions (proactive detection) and investigations of unexpected field damage (reactive detection).
  - The group has been deliberating which approach (or both) makes sense for conventionals.
  - Questions/challenges:
    - Who is responsible?
      - For Bt PIPs, industry group (ABSTC) conducts monitoring; is that feasible for other pesticides?
    - Resources :
      - What is the availability of personnel, materials, susceptible populations, etc. to detect and confirm resistance across all pesticides?
      - Who pays?
    - Damage investigations – can they be standardized, or will they vary by company?

Breakout Group 4

Overarching questions….

- Should resistance management be conducted for all chemistries?
  - Bt PIPs “public good” criteria (PPDC 1996) due to lack of human and environmental risks.
  - Focus of breakout group has leaned towards ag, but what about other pesticide uses (e.g., vector management)?
- Voluntary vs. mandatory?
  - Voluntary – registrant or grower adherence to a voluntary program may depend on socioeconomic factors.
  - Mandatory – who enforces? Overly complicated labels could lessen the likelihood of compliance.
  - Should EPA have the same level of resistance management oversight with conventional pesticides as they do for PIPs?

Resistance Management Workgroup – Next Steps

- Reconvene the full workgroup to consider the PPDC's input
  - Do we need to make any "course corrections" to the general direction of the discussion?
  - Additional topics and questions that should be considered

- Breakout group discussions to continue
  - Recommendations to be made to the full workgroup (~ early September)

- Full workgroup report and recommendations to PPDC (October)

Questions/Discussion Topics for PPDC

Breakout Group 1

- Questions on EPA policies that positively or negatively affect conventional pesticide resistance management.
  - Did we miss any policies or topics?
  - Any suggestions on incentives to raise awareness and actions on resistance management?

Breakout Group 2

- With regards to industry types
  - Are there other types of industries that need to be considered?
- With regards to programs
  - Are there other areas regarding EPA's role in pest management / resistance management programs that need to be considered?

With regards to other considerations

- Should Breakout Group 2 explore additional options?

Questions/Discussion Topics for PPDC

Breakout Group 3

- Is our conclusion that registrants have internal incentives to steward their products for Resistance Management and should not need external incentives, correct?
- Have we identified most hurdles to adoption of RM practices? Are there any major hurdles we are missing?
- Are there other categories needed to address resistance management?
- In our discussion of carrots/sticks/carrot sticks, are there other types of incentives we should explore?
- Do you have any other considerations you would like us to consider as we move forward with our charge?

Questions/Discussion Topics for PPDC

Breakout Group 4

- Should resistance management be conducted for all chemistries?
  - Bt PIPs “public good” criteria (PPDC 1996) due to lack of human and environmental risks.
  - Focus of breakout group has leaned towards ag, but what about other pesticide uses (e.g., vector management)?

- Voluntary vs. mandatory?
  - Voluntary – registrant or grower adherence to a voluntary program may depend on socioeconomic factors.
  - Mandatory – who enforces? Overly complicated labels could lessen the likelihood of compliance.
  - Should EPA have the same level of resistance management oversight with conventional pesticides as they do for PIPs?