Emerging Agricultural Technologies Workgroup

Pesticide Program Dialogue Committee Meeting

May 12-13, 2021

PPDC Emerging Agricultural Technologies Workgroup: Roster, May 2021

- **Manojit "Mano" Basu**, CropLife America (Co-chair)
- **Ed Messina**, EPA/OPP (Co-chair)
- **Ruben Arroyo**, Riverside County Department of Agriculture and Measurements Standards
- **Dan Cederberg,** Teejet
- **Gilbert Del Rosario**, Corteva Agriscience
- **Adam Finch**, BASF
- **Josh Friell**, The Toro Company
- **Brad Fritz,** USDA, ARS
- **Rebecca "Becca" Haynie**, Syngenta
- **Ramon Leon**, North Carolina State University
- **Lauren Lurkins**, Illinois Farm Bureau
- **Daniel Markowski**, Vector Disease Control International
- **Dan Martin,** USDA, ARS
- **Jacob Moore**, ADAMA
- **Robby Personette**, Wisconsin Department of Agriculture
- **Damon Reabe**, National Agricultural Aviation Association
- **Karen Reardon**, RISE (Responsible Industry for a Sound Environment)
- **Margaret Reeves**, Pesticide Action Network
- **Brian Satorius**, Independent Grower
- **Scott Shearer**, Ohio State University
- **Bryan Sanders**, HSE-UAV
- **Christina Stucker-Gassi**, Northwest Center for Alternatives to Pesticides
- **Nick Tindall**, Association of Equipment Manufacturers
- **Anne Turnbough**, AMVAC Chemical
- **Greg Watson**, Bayer

CHARGE QUESTIONS

- How should EPA obtain a greater understanding of how the use of emerging agricultural technologies leads to reduced or increased risks that differ from those resulting from current methods?

- What changes to EPA's approach to pesticide labels, if any, are needed to accommodate emerging technologies?

Emerging Technology Workgroup - Cadence

- January 14, 2021
- February 11, 2021
- March 11, 2021
- April 8, 2021
- May 6, 2021

Presentations:

- February 11th: American Equipment Manufacturers presentation on Emerging Agricultural Technologies

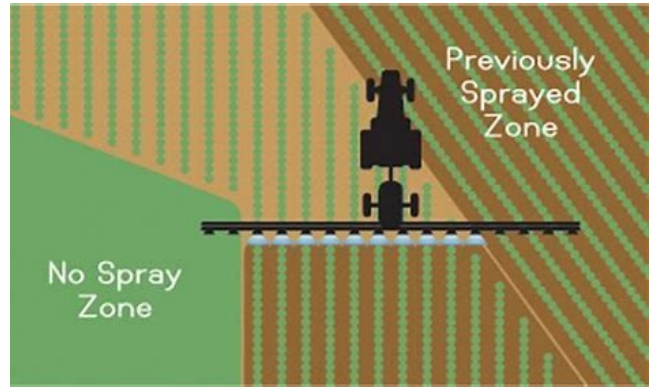
- April 8th: Jane Tang of Bayer presented on the December 2020 CERSA Workshop

These are available to view on the PPDC website on the

Emerging Agriculture Technologies Workgroup page.

Technologies

- GPS Guidance
  - Track machine’s position in the field
  - Enables other control technologies
- Boundary Mapping
  - Ensures application is taking place in the intended area
- Smart Guidance
  - Maintain consistent application speeds that help deliver consistent droplet size
- Targeted Spray Technology (Autonomous application)
  - Distinguish difference between weeds and crops
  - Potential to reduce application by up to 90%
  - Works with pre and post emergence applications
- Machine Mounted Weather Station
  - Mobile weather stations mounted directly on the sprayer
  - Allows for more accurate information to assist in mitigating spray drift



North Carolina State University, Center of Excellence for Regulatory Science in Agriculture (CERSA) Workshop

- CERSA is co-led by North Carolina State and Louisiana State University. It provides undergraduate, graduate and continuing education training in regulatory science, workshops and sponsored research for the advancement of regulatory science in agriculture.

- A December 2020 workshop established an open forum for dialog involving diverse stakeholders on science-based regulations of UAS and manned aerial applications in crop protection.

- Stakeholder consensus was achieved and provided direction for the further development of the technologies in the regulatory space.

  - CERSA Promotes the implementation of Remotely Piloted Aerial Application Systems in a complementary manner to conventional aerial and ground application equipment, recognizes need for public-domain regulatory models, droplet size efficacy research, and up-to-date drift modeling.

International and US Regulation

Global Regulations - Asia

- Drone application is readily embraced and seen as beneficial for the aging and shrinking population of small holder rice farmers
- Regulators in Japan and Korea have swiftly transitioned to drones from well established RC helicopter guidance
- China leads drone innovation, and has the largest acreage treated worldwide by drones
- In 2020, the Philippines, Indonesia, and Thailand are the most recent Asian countries to permit spray applications via drones
- India permitted exemptional use of drones on locust and formed committees in 2020 to accelerate regulatory adoption

Global Regulations - Japan

Registration requirements of pesticides by drone application

Type of data requirement	**Label extension** of registered formulation from conventional application to UAV application	**New formulation** for UAV application
Bio-efficacy data	**Exempted** if pest/disease claim and critical GAP (Crop, Dose, PHI) is within the range of existing registration. If not, full data requirement	**Full data requirement** by UAV application
Crop residue data	**Exempted** if critical GAP is within the range of existing registration. If not, full data requirement	**Exempted** if critical GAP is within the range of existing registration
Crop safety data	**Full data requirement** by UAV application	**Full data requirement** by UAV application

Global Regulations - Canada

- PMRA is actively working with Remotely Piloted Aerial Application Systems (RPAAS) WG, providing input in studies and considerations to reach an approval
  - USDA is involved in RPAAS WG
  - Spray drift studies developed in 2020
- Canada has not yet approved pesticide application by UAV

What's Happening in the U.S - EPA

- Working with several stakeholders/working groups – both US and international on UAVs:
  - SFIREG/APPCO
  - RPAAS WG (led by Canada)
  - Organization of Economic Cooperation and Development (OECD) WG on drones
    - Completing literature review on drone applications – efficacy, drift, exposure, modeling
  - Center of Excellence for Regulatory Science in Agriculture (CERSA) Workshop on UAS and Manned Aerial Applications (Dec 2020)
    - Focused on:
      - Potential benefits and current and future anticipated uses of UAS
      - Spray drift models for existing application methods and UAS

EPA Risk Assessment

- EPA currently evaluates spray drift in ecological and drinking water risk assessments using two models:
  - AgDRIFT v 2.1.1 (2011) – for ground and manned aerial applications
  - AGDISP v 8.26 (2011) – used for adulticide applications
- Currently no approved model to evaluate drift from emerging technology like UAVs
- Priority for EPA is to understand the exposure considerations that this emerging technology presents and how it compares to existing application technology
- EPA continues to work towards a standard policy and risk assessment method to evaluate potential risk from emerging technology like UAV application

Deliverables Discussed at ET WG

- Deliverable 1 – List of Emerging Technologies
  - List of emerging technologies that can be used for or, in support of, or in place of pesticide application
  - Any regulatory oversight or risk assessment changes by EPA needed to facilitate their use
- Deliverable 2: Deep dive on Autonomous Application Platforms operated remotely and/or manually
  - How these technologies lead to reduced or increased risks that differ from those resulting from current methods
  - What changes to EPA's approach to pesticide labels, if any, are needed to accommodate these technologies

Deliverable 1: List of Technologies

Hardware

- UAVs/Drones
- Spray/Nozzles
- Ground Robots
- Equipment Improvements to Existing Application Equipment

Data and Analytics

- Maps
- Statistical Analysis
- Prescriptive Agriculture
- Artificial Intelligence

Deliverable 1: Technologies List

Equipment Improvements

- Autonomous Spray Systems Aboard Current Manned Aircraft and Ground Sprayers
- Spot Farming
- Boundary Mapping
- Smart Guidance
- Boom Height Control
- Rate Control
- Section Control
- Equipment Mounted Weather Stations

Ground Based Robots

- Land care robot
- Robot for mechanical weed control
- Tool-carrying robot
- Bug vacuum
- Autonomous Tractor
- Autonomous Ground Sprayer

Spray/Nozzle

- Nozzles the dramatically reduce or eliminate small droplets prone to drift
- Direct Injection
- Stacked (Tiered) Nozzles
- Targeted Spray Technology
- Pulse width Modulation

Future Work

Deliverable 1:

- Any regulatory oversight or risk assessment changes by EPA needed to facilitate their use including:
  - *Regulatory Framework from a risk standpoint and suggest measurable benchmarks that must be proven to realize risk assessment benefits, i.e. if a tech reduces drift by 80% this is fully accounted for in the risk assessment process and communicated in label language*

Deliverable 2:

- How these technologies lead to reduced or increased risks that differ from those resulting from current methods
  - *Continue engaging with industry, academics, CERSA, EPA and other stakeholders to develop understanding for a developing an outline of a risk framework*
- What changes to EPA's approach to pesticide labels, if any, are needed to accommodate these technologies
  - *Use the learnings to recommend pesticide label changes that may or may not be required to accommodate these technologies*