AGENDA

1. Ethics Reminder – Dr. Rick Langley, Chairman, N.C. Pesticide Board
   MANDATORY ETHICS INQUIRY - North Carolina General Statute 138A-15(e) mandates that the Board Chair shall remind all Board Members, of their duty to avoid conflicts of interest and appearances of conflict under this Chapter, and that the chair also inquire as to whether there is any known conflict of interest or appearance of conflict with respect to any agenda item coming before the Board at this time. It is the duty of each Member who is aware of such personal conflict of interest or of an appearance of a conflict, to notify the Chair of the same, and to refrain from inappropriate participation on that agenda item.

2. Consider Board Minutes from the May 10, 2022, meeting

3. Pesticide Environmental Trust Fund, Final Report
   Tick Safety for Outdoor Workers
   - Dr. Marcia E. Herman-Giddens, Tick Borne Infections Council of North Carolina

   Protocol for UAV Inspection of Potential Pesticide Drift Crop Damage
   - Dr. Gary Roberson, NCSU

4. UAVs and Mosquito Management – Considerations for application of the NC Aerial Pesticide Regulations
   - Michael Doyle, DHHS

5. Consider Settlement Agreements
   N.C. Department of Agriculture and Consumer Services, Structural Pest Control and Pesticides Division, v.
   IR20-086 Colton Wyatt
   IR20-087 Christopher D. Gammons
   IR21-012 Doyle Retherford
   IR21-036 Austin P. Locklear

6. Formal Hearings
   N.C. Department of Agriculture and Consumer Services, Structural Pest Control and Pesticides Division, v.
   IR2019-083 Joel Lineberger
AGENDA
ITEM
#2
NORTH CAROLINA PESTICIDE BOARD MINUTES
May 10, 2022

Dr. Langley called the meeting to order with all members present.

First Agenda Item: Dr. Langley read the Mandatory Ethics Inquiry. Ms. Pitt stated that she would recuse herself from discussion and voting on settlement number IR2021-005B, Roger E. Johnsonbaugh.

Second Agenda Item: Considered the Board Minutes from January 25, 2022.

Ms. Pitt MOVED to approve the minutes as prepared, SECONDED by Dr. Kirkman. MOTION CARRIED.

Third Agenda Item: Consider Final Adoption of Rules 02 NCAC 09L.0530 Prohibited Acts, and 02 NCAC 09L. 1112 Prohibited Acts, to include FIFRA 14 (a) and (b) violations as additional grounds for denial, suspension or revocation of pesticide licenses and certifications issued under the NC Pesticide Law of 1971.

Ms. Pitt MOVED to approve, SECONDED by Dr. Hudak-Wise. MOTION CARRIED.

Fourth Agenda Item: Pesticide Environmental Trust Fund (PETF) final report.
Dr. Robin Tutor-Marcom, NC Agromedicine Institute presented the Board with the final report for the WPS Respiratory Protection Support program. After a brief discussion, Dr. Langley, thanked her presentation.

At this time, the Division introduced several new Team members: Pesticide Inspectors Jordan McCurry and Courtney Eudy; and Pesticide Registration Administrative Specialist, Amal Gamra.

**A BREAK WAS TAKEN AT THIS TIME**

Fifth Agenda Item: Consideration of the proposed Settlement Agreements, presented by Assistant Attorney General Chris McLennan.

The Board heard and voted on the settlements in sets, with the exception for Mr. Johnsonbaugh.

Roger E. Johnsonbaugh (IR21-005(B), a licensed aerial pesticide applicator for Helicopter Applicators in Gettysburg, Penn., agreed to pay $1,200 after an application of pesticides to forest land west of Walstonburg drifted onto a nearby soybean crop, causing damage to the plants.

Dr. Hudak-Wise MOVED for approval, SECONDED by Dr. Cardoza. MOTION CARRIED. Ms. Pitt recused herself from discussion and voting on this settlement.

Mark A. Smith (IR20-024), a licensed pesticide dealer for Nutrien Ag Solutions in Norwood, agreed to pay $1,500 for selling and repackaging a pesticide into inappropriate storage containers on a farm in Monroe.
Jeff Benfield (IR20-035), a licensed private pesticide applicator for Benfield Nursery in Newland, agreed to pay $500 for applying a pesticide to Christmas trees although the pesticide label states it should not be used in nurseries or on plants grown for commercial sale.

Mitchell Bottomley (IR20-069), a licensed private pesticide applicator, agreed to pay $700 because an employee applying an herbicide to corn allowed the herbicide to drift onto adjacent property, which damaged apple trees and grass.

Christopher R. Wiggins (IR20-76), a private pesticide applicator, agreed to pay $1,200 after two employees applied pesticides that came in contact with field workers. The application was found to be in violation of several pesticide laws/regulations, including the provision that requires training in the state’s Worker Protection Standard.

Christine Ruiz (IR20-091), of J&R Landscaping based in Lancaster, S.C., agreed to pay $800 for applying a pesticide in Dallas without a license. When a state inspector observed a company employee making the application in September 2020, the company had already been issued a Notice of Non-Compliance in August of 2016.

Ms. Cardoza MOVED for approval, SECONDED by Mr. Johnson. MOTION CARRIED.

Drew Griffin (IR20-093(A)), the holder of a pesticide dealer license for TriEast Ag Group of Greenville, agreed to pay $800 for the improper sale of soil fumigants to four customers who were not certified in the soil fumigation category.

Harold E. Apple, Jr. (IR20-093(B)), a licensed private pesticide applicator in Gibsonville, agreed to pay $600 for applying soil fumigants when his certification in the soil fumigation category had expired. He has since recertified.

Jerry R. Robinson (IR20-095), a licensed private pesticide applicator, agreed to pay $600 after drift from his herbicide application to a strawberry field damaged trees in a nearby residential yard in Whiteville. North Carolina law states that no person shall apply pesticides under such conditions that drift from pesticide particles or vapors results in adverse effects.

Tommie L. Wiggins (IR20-096), of Wiggins Pro Tractor Cuts in Cary, agreed to pay $1,800 after he applied herbicides to a pasture without a license and the pesticide drifted onto nearby grapevines.

Charles Boyd (IR20-098), the holder of a pesticide applicator license for W.N.C. Landscaping and Nursery in Waynesville, agreed to pay $800 for applying pesticides with an expired license.

Ms. Pitt MOVED for approval, SECONDED by Dr. Kirkman. MOTION CARRIED.

Jodon C. Jamison (IR20-106), the holder of a commercial pesticide applicator license for Crow Creek Golf Course in Calabash, agreed to pay $800 for contaminating a pond at the course with pesticides.
Michael J. Mourdry (IR21-003), the holder of a commercial pesticide applicator license for Lakewinds Golf Course in Rougemont, agreed to pay $1,200 for applying pesticides with an expired license.

Simplot Agribusiness (IR21-010), parent company of the Simplot Turf & Horticulture location in Charlotte, agreed to pay $800 for applying pesticides without a required license.

Kenneth R. Poorman, III (IR21-019), agreed to pay $500 after a pesticide application to a pasture in Pinetown drifted onto people on a residential deck on the adjacent property.

Jamie Beasley (IR21-022), a licensed private pesticide applicator, agreed to pay $600 after a pesticide application to his corn field drifted to a pepper field on a nearby property.

Dr. Kirkman MOVED for approval, SECONDED by Dr. Hudak-Wise. MOTION CARRIED.

Landon S. Dail (IR21-027), a licensed private pesticide applicator, agreed to pay $500 after his pesticide application to an agricultural field drifted into a nearby residential yard in Tarboro.

Don A. Smith (IR21-028), a licensed commercial pesticide applicator for Ultimate Property Maintenance/Third Day Market in Jefferson, agreed to pay $2,800 for not following the state Worker Protection Standard that outlines recordkeeping for pesticide applications, worker training and provision of personal protective equipment. Smith was also found to have used pesticides not approved for use in the business’s greenhouse.

Kyle G. Easley (IR21-039), of Easley Does It Lawncapes in Greenville, agreed to pay $1,200 for applying pesticides without a license.

Jerry A. Dowless, Jr. (IR21-041), the holder of a private pesticide applicator license, agreed to pay $800 for failing to follow the state Worker Protection Standard in relation to his peach orchard near East Arcadia and for applying pesticides with an expired applicator certificate.

Andrew M. Bland (IR21-043), a licensed commercial pesticide applicator for Harvey’s Fertilizer and Gas Co. in Cove City, agreed to pay $800 after a pesticide application to his corn and soybean fields drifted to a nearby pasture.

Ms. Pitt MOVED for approval, SECONDED by Dr. Cardoza. MOTION CARRIED.

Dennis Wilson (IR19-052), owner of Green Rite Lawn Care in Durham, agreed to pay $800 for applying herbicides without a commercial pesticide applicator’s license. When a state inspector observed a company employee making the application in June 2019, the company had already been issued two prior Notices of Non-Compliance in October 2017 and August 2018.

Chance W. Rosenberger (IR20-57), the owner and operator of Curb Appeal Landscaping in Charlotte, agreed to pay $800 for applying pesticides in Huntersville with an expired license. At the time of the violation in July 2020, the company had already been issued several Notices of Non-Compliance for non-renewal. Rosenberger has since renewed his license.
Jerry W. Edwards (IR21-001), a licensed private pesticide applicator, agreed to pay $1,400 for burning pesticide containers in Sparta. The improper disposal violated several N.C. pesticide laws/regulations related to storage and disposal and endangerment of people, plants, animals, food, water, and the environment.

James G. Hite, Jr. (IR20-099), of Greentech Land Care in Ayden, agreed to pay $800 for applying pesticides in Washington without a license.

Ms. Pitt MOVED for approval, SECONDED by Dr. Kirkman. MOTION CARRIED.

****

Dr. Langley asked the Board if there was any old or new business the Board would like to address.

With no other business, Dr. Langley asked for a motion to adjourn the meeting.

Dr. Hudak-Wise MOVED to adjourn, SECONDED by Ms. Pitt. MOTION CARRIED.
AGENDA

ITEM

#3
End of Year Report to the Pesticide Environmental Trust Fund

July 2022

Grant: Tick Safety for Outdoor Workers (TSOW)

Tick-borne Infections Council of North Carolina

Presentation by:
Marcia E. Herman-Giddens, Scientific Adviser
What is TIC-NC?
Tick-borne Infections Council of North Carolina, Inc

Mission

Tick-Borne Infections Council of North Carolina is a non-profit organization formed to improve the recognition, treatment, control, and understanding of tick-borne diseases in North Carolina.

_TIC-NC, Inc is a 501(c)3 organization._

[Website Link: www.tic-nc.org]
The grant partnership comprised:

1. The Chatham County Department of Public Health (CCDPH), Located in Pittsboro, NC.
   - Mission: “Building a healthy Chatham County through community partnerships and a commitment to equity.”

2. The Tick-borne Infections Council of North Carolina, Inc, is a 501 (c) (3)
   - All-volunteer non-profit started in 2005
   - Mission is “Improving the recognition, treatment, control, and understanding of tick-borne diseases in NC.” (tic-nc.org)
Team

Farmworker Coordinators, Piedmont Health
Concepcion de Cecilia Gama Rodriguez (Moncure, Chatham County)
Nereyda Damaso (Prospect Hill, Orange County)

TIC-NC Board Members:
Fran McCullough, President, Hillsborough
Kim Brownley, PhD, Vice-president and Treasurer, Mebane
Liz Crabill, Secretary, Chapel Hill
McGregor Bell, Director, Durham
Marcia E. Herman-Giddens, PA, DrPH, Scientific Advisor & Director, Pittsboro
Amy J. Stinnett, MPA, Director, Durham

High School Volunteer:
Hannah Wang, Chapel Hill

Translators & graphic design
-to be added

Chatham County Department of Public Health
Mike Zelek, Health Director
Anne Lowry, Environmental Health Director

6/21/2022
Initial objectives
Award: $3,000

- How we will accomplish our project to reduce the risk of acquiring a tickborne infection:
  - Identify organizations that work with migrant workers in local farms
  - Provide teaching to persons aiding the migrant workers about ticks and TBIs
  - Provide first aid kits to leaders in the field
  - Provide English/Spanish educational brochures
  - Provide repellants (?)
  - Teach team leaders how to report tick bites to the TickEncounter site run by the U of RI
Monthly timeline

- **Award $3,000**
- **Funds not transferred until mid-Oct**
- **Pouches assembled**
- **Efforts made to collect data Request denied**
- **500 pouches delivered**

- **July**
  - Funds on consent agenda Board of Commissioners, September 20th.

- **August**
  - Developing products & contact w farmworker servicers

- **September**
  - Creation of and ordering of products began

- **October**
  - Meetings with farmworker coordinators.

- **November**

- **December**

- **January**

- **February**

- **March**

- **April**

- **May**

- **June**

Still working on new effort to collect data and delivery of more materials.
**Initial objectives**

- Identify organizations that work with migrant workers in local farms
- Provide teaching to persons aiding the migrant workers about ticks and TBIs
- Provide tick first aid kits to leaders in the field
- Provide English/Spanish educational brochures
- Provide repellants (?)
- Teach team leaders how to report tick bites to the TickEncounter site run by the University of Rhode Island

**Final accomplishments**

We learned the sites in the district including Orange and Chatham did not have team leaders. Instead, we supplied **500 complete kits and 250 partial kits** to the two farmworker coordinates who distributed them to individuals and family groups.

X No team leaders on site at all times.
Content of pouches:

- Instructions on proper tick removal
- ‘Tick card’ with information
- Alcohol wipes
- Sharp-pointed tweezers
- Small plastic bag to contain a removed tick so the person can show it to a health care provider if they become symptomatic
Pouches

Assembly

Contents
- Removal card
- Tweezers
- Alcohol wipes
- Ziplock bags

Number 500

Jan 4, 2022
We serviced 14 counties through Piedmont Health Farm Worker Coordinators.
Nereyda Damaso (Prospect Hill, Orange County)

Concepcion de Cecilia Gama Rodriguez (Moncure, Chatham County)
Moncure Community Health Center
Sampson County farmworkers: group of 25 men

*Fran McCullough*, President of TIC-NC
& *William Selvidge, MD*, a retired family medicine specialist in Prospect Hill, NC where many of his patients were farmworkers

Completed in June

- Newton Grove farmworkers
- 25 men from Mexico
- Requested repellant, tweezers, and other tick information
## Final expenditures

Award: $3,000  
Spent: $3,000

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>EFF DATE</th>
<th>PO/REF2</th>
<th>AMOUNT</th>
<th>P</th>
<th>VDR NAME/ITEM DESC</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>12/01/2021</td>
<td>20221660</td>
<td>118.83</td>
<td>Y</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>Amazon Alcohol Pads and zip lock bags</td>
</tr>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>5/17/2022</td>
<td>20222066</td>
<td>385.70</td>
<td>N</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>Amazon Tweezers</td>
</tr>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>12/01/2021</td>
<td>20221503</td>
<td>25.65</td>
<td>Y</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>Amazon Tweezers</td>
</tr>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>12/01/2021</td>
<td>20221503</td>
<td>532.15</td>
<td>Y</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>4IMPRINT INC - Purchase</td>
</tr>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>12/01/2021</td>
<td>20221504</td>
<td>286.41</td>
<td>Y</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>Amazon Tweezers</td>
</tr>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>12/01/2021</td>
<td>20221503</td>
<td>359.10</td>
<td>Y</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>Amazon Tweezers</td>
</tr>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>12/01/2021</td>
<td>20221503</td>
<td>591.00</td>
<td>Y</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>720 STICKER WAXLE - Purchase</td>
</tr>
<tr>
<td>PAG - TICK SAFETY GRANT</td>
<td>12/01/2021</td>
<td>20221503</td>
<td>75.00</td>
<td>Y</td>
<td>BANK OF AMERICA PCARD ONLY</td>
<td>Artwork for magnets PAYPAL HEADLUMP - Purchase</td>
</tr>
</tbody>
</table>
Acknowledgements

- Pesticide Environmental Trust Fund
- Chatham County Department of Public Health
- The Farmworker Coordinators
- The farmworkers

Moncure Community Health Center

Prospect Hill Community Health Center
Using Drone Imagery in Agriculture

Gary Roberson, PE PhD
Charles W Suggs Distinguished Professor
Alumni Distinguished Undergraduate Professor
Extension Specialist
Biological and Agricultural Engineering
### Step by Step Guide to Using Imagery in Agriculture

<table>
<thead>
<tr>
<th></th>
<th>Planning</th>
<th>Preparation</th>
<th>Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pilot</strong></td>
<td>What are the UAV data collection requirements?</td>
<td>How do you determine that you have the resources ready?</td>
<td>What UAV will you fly to survey the target fields?</td>
</tr>
<tr>
<td><strong>Payload</strong></td>
<td>What sensors will be used?</td>
<td>Procure How will you collect the image data?</td>
<td>Processing How will you turn the images into usable data?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide How will you make the data available to use?</td>
<td></td>
</tr>
</tbody>
</table>
Legal Requirements

- Federal Aviation Administration (FAA) License – Part 107
- NC UAS Operator Permit
- Register UAS with FAA

- Precision Agriculture Technology: How to Become a Commercial Unmanned Aerial Vehicle (UAV) Pilot
  - Extension Publication AG-839
  - Dr. Gary Roberson
Recreational vs Commercial

- The difference is Intent

- Is the UAV in the air strictly for the joy of flying or learning?

- Is the UAV in the air to create a work product, deliverable, or to gather information that can lead to a business decision?
Platform Options

- Satellite
- Manned aircraft
- Unmanned Aerial Vehicle
- Ground vehicle
- Hand held
Platforms

Fixed Wing
SenseFly eBee

Rotary Wing
DJI M600

Hybrid VTOL/Fixed Wing
BirdsEyeView FireFLY6
Rotary Wing UAV

- Pro
  - No Minimum Airspeed
  - Take-Off & Landing
  - Hover

- Con
  - Reduced Coverage and flight time
  - Difficult recovery in case of failure
  - Less wind resistance

DJI M600 Pro
Hovering flight time: 30-40 mins with NO payload
Sensors for UAV’s

Reflected (or emitted) light (energy) recorded as bands of color (data)

- **Visual**
  - Visual images, typically red green and blue color bands (RGB)

- **Multispectral**
  - 3 to 10 color bands
  - Relatively wide bands

- **Thermal**
  - Measure thermal radiation by infrared

- **LIDAR**
  - Light Detection and Ranging
  - Pulsed laser light capturing 3D surfaces

- **Hyperspectral**
  - Hundreds of color bands
  - Relatively narrow bands
RGB or visual image cameras are relatively low cost sensors capable of providing high resolution imagery.
Sensors

- Visual Color Camera
  - Red, Green, Blue (RGB)

- Other Color Bands
  - Red Edge
  - Near Infrared (NIR)
  - Thermal
Multispectral Sensor Data

Red

Red Edge

Green

Near Infrared

Visual/RGB
Using Sensors to Evaluate Crops

Figure 2. Spectral signatures of crops and soil (Kyllo, 2003).

Figure 3. Spectral signatures of healthy and stressed sugarbeets (Kyllo, 2003).

Mission Planning

• Mobile app operates the UAV while in flight

• Recommendation
  – Pix4D Capture
  – Drone Deploy
  – Platform OEM App
Mission Planning
Fly the Mission
Data Collection and Time of Day

Mid-day typically offers best data collection window.
Weather Conditions and UAV

Clear  Partly Cloudy  Filtered

Good  Bad  Good
Check the Results
Processing UAV Data

- Desktop Computer Software
  - Local installation
  - User controllable
  - High end computing power
  - Commercial and Open Source Options
    - Perpetual license
    - Annual subscription

- Cloud Software
  - Server installation
  - Requires high speed internet
  - Minimal customization
  - Select from fixed menu
  - License fee
Processing UAV Data

- Desktop Computer Software
  - Pix4D Fields
  - Pix4D Mapper
  - Agisoft
  - Drone to Map/ArcGIS
  - QGIS

- Cloud Software
  - Precision Analytics
    - Precision Hawk
  - Field Agent
    - Sentera
  - OpenDroneMap
    - OpenDroneMap.org
Images are Data!

- Anomalies
- Patterns
- Vegetation Indices
- Spatial Analysis
Normalized Difference Vegetative Index

- NDVI
  - Crop Stress
  - Crop Health
  - N Input
- Correlates To
  - "Greenness"
  - Chlorophyll
  - Leaf Area
Digital Surface Models
Potential Crop Damage

Czarnecki, J., D. Reynolds, and R. Moorhead, 13th International Conference on Precision Agriculture, July 31 – August 4, 2016 St. Louis, Missouri, USA

Biological and Agricultural Engineering
- What do you see?
- What do you see?
  - Planter Issue
  - Poor Stand
  - Low Population
  - High Population
  - Discoloration
- What do you see?
  - Planter Issue
  - Poor Stand
  - Low Population
  - High Population
  - Discoloration
Questions?

Gary Roberson
NC State University
Biological and Agricultural Engineering
gary_roberson@nscu.edu