2019 NAICC Efficacy Workshop: 
Product Application Techniques Appropriate For 
Trial Objectives

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RD4AG
Developing Tomorrow’s Agriculture
Since 1983
Yuma, Arizona and Fairfield Montana
RD4AG is a Field Company
- Specializing in small plot replicated field trials
- Founded in 1983
- Currently over 20 people on Staff,
  - Hundreds of years experience in agriculture
- Conducted around 3000 trials in North and South America
- Focused on being accurate and efficient
Projects are tremendously more complex
- Back “then” a 7 treatment trial for product performance was a bigger trial
- Today, 20 is not unusual

Application Technology and Methods
- Are exponentially more diverse
- Multiple application types in one trial
- Or several different methods in one treatment!
Our job is to evaluate the performance of the product or technology we are testing

**WE ARE NOT TESTING THE APPLICATION METHOD**

Except when we are testing the application method

The old axiom of getting the product to the pest is slightly modified to:

Get the Product to the Target in an Accurate manner
As the trials have gotten bigger and more complex so has the equipment needed, the organization to get things straight, and the clientele’s lack of tolerance for poor precision.
## Application Types

### Sprayers
- Backpack Sprayer
  - Have Backpack will Travel
- Tractor sprayer
- Airblast sprayer
- Hand gun / Bottle Sprayer
- Drop nozzle sprayer
- Hooded Sprayer
- CDA
- Band Sprayers

### Shanks and Planters
- In furrow
- Below the seed
- To the Side(s) of seed
- Sidedress

### Granules
- In Furrow
- Broadcast
- Tilled in
- Mulched or Rototilled in
- Salt and Pepper App

### Irrigation applications
- Drip
- Flood
- Furrow
- Sprinklers

### Transplant treatments
- Tray Drenches
- In Field Drenches
- Tray Sprays

### Seed Treatments
- Liquids
- Dusts or powders

### Treated Dry Fertilizer
- Liquids
- Dusts or powders

### Inoculum apps
- In furrow
- Via irrigation
- Sprayed on

### Commercial Applications
- Airplane application
- Helicopter applications
- Ground Rig
- Irrigation
SPRAYERS

- Where most of us began
  + R&D Sprayers Model T
  + Nozzle Selection
    - Fine droplets vs Coarse
    - Drops vs Straight boom
    - TeeJet Catalog 51A is still THE resource. Enter Teejet 51A in Google and voila!
TRACTOR SPRAYERS

- By my way of thinking is a KEY to success
  - More consistently able to get the Product to the Target when SPRAY is the Drug of Choice
  - More flexibility
  - Better coverage
  - Fewer errors
TECHNOLOGY AND SPRAYERS

- GPS and Computer Guided
- But Manual too
MORE SPRAYS

- Leaf-blower Sprayer
- Hand Gun or Bottle
- Spray Booth
- With a stack of parts and some ingenuity, anything is possible
MORE SPRAYERS

- Air Blast for Trees, etc.
- But More complicated means
  - More Training...
  - More Upkeep
  - More Efficiency
PLANTING TIME—SHANKS AND PLANTERS

- The Most Difficult for Randomized Apps
- In-Furrow
- Below the seed
- Next to the seed
- Side-dress
GRANULARS—FERTILIZER AND MORE

- Gandy Boxes
- Salt and Pepper
- Tilled or Mulched in
IRRIGATION APPLICATIONS

- Sprinkler
- Flood
RANDOMIZED IRRIGATION

- Spaghetti tubing is your friend
  - The specs have to match for flow
  - Use Flow Meters to verify Uniformity
  - Syringe or Pressure tank Injection
RCB DRIP IS NOT EASY

- Lots of Effort
  - We figure $1000 plus per trial
  - Setup can get Messy

- Verifying Pressure and Uniformity is a Challenge
  - Constant Maintenance and Checking is CRUCIAL!!!
RCB DRIP System installed over top of growers Drip System
RCB SPRINKLER
Drenches
  - Typical Tray holds 500 mls water

Sprays
  - Foliar or Drench

Challenge is keeping them straight and NOT cooking them
SEED, SOIL, FERTILIZER AND INOCULUM

- Equipment can be big or small
  - Specialized equipment makes things more efficient
  - Being organized to isolate
  - Keeping things clean
SEED TREATMENT

- Anything from a baggie
- To field Equipment
- The right supplies
  + Bags
  + Colorants
- 5 to 10 mls mix per pound of treated material
AND OF COURSE.... COMMERCIAL APPLICATIONS

- Not suited to small areas
- REALLY hard to get a grower or commercial applicator to SLOW down or be available when you need them
THANK YOU!