Ohio's Grain Famers and Water Quality Research

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Partnership for Ohio's Grain Farmers



What are Ohio's farmers doing?



Grain Farmer Checkoff Programs

- Ohio Check-off Funding collects
 - $-\frac{3}{4}$ of a cent per bushel on corn sales
 - $-\frac{1}{2}$ of a percent on revenue on wheat sales
 - $-\frac{1}{2}$ of a percent on revenue on soybean sales
- Funds are used for research, market development and promotion, or education
- Current Checkoff funded research primarily at The Ohio State University

Edge of Field Research

- On Field Ohio!
- Led by The Ohio State University and USDA
- Research program started in 2012, to better understand and mitigate the impact of nutrient runoff on water quality
- Evaluate the relationship between on-field conditions and nutrients leaving the fields
- Ohio Phosphorus Index score re-evaluation and future integration with the Tri-State Fertility Guidelines

Edge of Field Research



Edge of Field Research

- 29 fields monitored, 14 in WLEB
- Edge of field testing
- Evaluation of different practices
- On the ground results
- Phosphorus risk tool for farmers and crop consultants

Revising Ohio Fertilizer Recommendations

- Revising Nitrogen, Phosphorus and Potassium recommendations for corn, soybeans and wheat
- Project led by OSU Dr. Steve Culman
- Mostly on-farm strip trials
 - Diversity of soil types and management histories across state
 - All trials are replicated and randomized
- Public-private partners: Working directly with growers and also through OSU extension and private crop consultants
- Data include: Soil sampling, R1 tissue test, grain yields and nutrient concentrations, management survey
- New fertilizer recommendations to be released in summer 2018 (this is first revision since 1995)

Promoting 4R Nutrient Stewardship



4R Nutrient Stewardship Certification

- Audit process for fertilizer retailers
- Certifies that retailers are following 4R principles when working with farmers



- 4Rs = Right Source / Right Rate / Right Time / Right Place
- Led by Ohio AgriBusiness Association and The Nature Conservancy
- Initially focused in Western Lake Erie Basin, but now statewide

OHIO **47** Certified **Branch Facilities** 2,890,000 **Total Acres** 6,000 **Clients Serviced**

37 Certified **Branch Facilities** 1,900,000 **Total Acres** 3,580 **Clients Serviced**

WLEB

**Note: Ohio numbers include WLEB numbers

Precision Farming & Nutrient Mgmt

- Soil sampling / grid sampling
- Variable rate nutrient application
- Fertilizer incorporation
- GPS technology





Fertilizer Incorporation

- Current research is showing fertilizer placement can be very effective at reducing nutrient loss
- Requires specialized equipment
- Sediment management key



Photo Credit: Crops and Soils Magazine, May-June 2011

Best Management Practices

Cover Crops

- To increase organic material
 - Sorghum, cereal rye, oats, wheat, barley
- To increase soil nitrogen
 - Legumes, clover, alfalfa
- Capture excess nutrients
 - Oilseed, radish, turnips, buckwheat
- Natural herbicides
 - Mustard, oats, rye, sorghum
- Alleviate soil compaction
 - Radish, turnips

Buffer Strips

- Unplanted land between crops and waterbodies
- Filters nutrients before they enter water





Blanchard River Demonstration Farms

- Project led by Ohio Farm Bureau and USDA
- 3 demonstration farms in the Blanchard River watershed
 - Stateler Family Farms
 - Kurt Farms
 - Kellogg Farms
- Serve as models for other farmers
 - Research and evaluate innovative practices to reduce nutrient run-off
 - Results will be widely shared with other farmers, management agencies, and the public



Blanchard River Demonstration Farms

- Practices Being Evaluated
 - Variable Rate Nutrient Application
 - Cover Crops
 - Drainage Water Management
 - Wetland with Pollinator Habitat
 - Home Septic System Replacement
 - Two-stage ditch
 - Phosphorus Removal Beds
 - Filter Strips
 - Subsurface Nutrient Placement
 - Reduced Tillage



Phosphorus Application

Are farmers applying too much phosphorus?

- USDA research on Ohio fields showing that crops are removing more per acre than farmer is applying
 - Application = about 21 lbs P
 - Crop Removal = about 24 lbs
 - Total runoff = about 1 lb P (combined surface and tile)
- OSU research over entire state shows that soil test P levels trending down over past 25 years in 80% of 88 counties

Decline in Soil Test P



Surface Drainage / Tile Drainage

- Inconsistent data interpretation regarding impacts of surface drainage and tile drainage on watershed nutrient levels
- Erosion still matters
- Should not address issues associated with drain tile discharges at the expense of the progress that has been made reducing surface water runoff and the associated nutrient load

Many Remaining Questions

Questions:

- What is the true economic impact of BMP adoption?
- Can we verify BMP use by Ohio Farmers?
- What is the impact of legacy P in farmland?
- How does the impact of surface drainage and tile drainage differ?
- How much particulate/erosion runoff is becoming dissolved/bioavailable?
- What is the impact of N on algal blooms?
- What is the impact of fertilizer placement on run-off?

More research is needed on these questions and more!

Farmer Perspective on Water Quality

- Farmers want to be good environmental stewards
- Farmers are continually adapting farming practices to improve water quality
- Farmer decision-making should be based on the best science and research available
- Farmers are actively participating in research projects, and providing funding through their organizations
- There are still important research questions that need to be answered

Questions?







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