United States Department of Agriculture

NRCS Natural Resources Conservation Service

Indiana EQIP Job Sheet (590)
Enhanced Nutrient Management Systems with Plant Tissue Testing for Water Quality Monitoring

Indiana – July 2013 (ver. 1.1)

Enhanced Nutrient Management with Tissue Testing

WHAT IS ENHANCED NUTRIENT MANAGEMENT WITH TISSUE TESTING?

Enhanced nutrient management with tissue testing is an advanced management system that enables an adaptive approach to improve nutrient use efficiency, and to evaluate the water quality impacts of the system change via edge-of-field water quality monitoring.

PURPOSES

- Reduce nutrient losses.
- Improve water quality.
- Improve plant condition.
- Improve air quality.
- Improve soil quality.
- Improve nutrient use efficiency.
- Improve adaptive nutrient management.
- Facilitate edge-of-field water quality monitoring.

DATA COLLECTION REQUIREMENTS

Soil Tests will be collected annually on a minimum of 2.5-acre grids within the monitored drainage areas. Soil samples will be collected from at least 2 vertical depths within each grid to analyze potential stratification.

Tissue Testing will be completed according to the most-recent Purdue and/or other Land Grant University, or industry, if recognized by Purdue, methods and practice. Tissue testing will be completed annually for each appropriate crop. Tissue tests will be collected at each unique soil sample grid location (locations that have similar analyses, soil type, drainage, etc. can be grouped for tissue test purposes) during the optimum growth stages of the crop for each of the 3 tissue tests:

- **Hand-Held Chlorophyll Meter or Active Canopy Sensor** to inform side-dress Nitrogen applications to each corn crop during the monitoring period. The results will also be compared with other tissue test and soil test results to improve adaptive management after the monitoring period.
- **Plant Tissue Testing via Lab Analyses** will be collected at initial silking for corn and at initial flowering for soybeans for each appropriate crop during the monitoring period. Results will be compared with other tissue test and soil test results to inform adaptive management after the monitoring period.
- **End of Season Corn Stalk Nitrate Testing** will be compared with other tissue test and soil test results to inform adaptive management after the monitoring period.

ANNUAL NUTRIENT APPLICATIONS

Phosphorus rates will be applied using variable rate technology based on soil test results and Purdue or recognized industry recommendations during the baseline period for both drainage areas, and the same rates will continue for the duration of the monitoring period in the control site. In the treatment site during the treatment period, rates will not exceed crop removal or Purdue or industry recommendations, whichever is less.

Phosphorus timing, form and placement will be fall-applied broadcast, consistent with Purdue or industry recommendations during the baseline period in both drainage areas; phosphorus will be continue to be fall-applied broadcast in the control, but spring-injection applied with planting equipment in the treatment drainage areas during the treatment period.

Nitrogen rate, timing, form, and placement will be consistent in both drainage areas throughout the monitoring period. Split nitrogen applications will occur at planting and in-season following Purdue or industry recommendations and based on chlorophyll meter or active canopy sensor readings.

Lime and Potassium rate, timing, and form will be consistent in both drainage areas throughout the monitoring period and applied using variable rate technology based on soil test results.

OTHER AGRONOMIC MANAGEMENT

Tillage, planting, rotation, hybrid selection, cover crops (planting date, termination date, species, rate, etc.), buffer maintenance, tile drainage maintenance, and other agronomic activities will be consistent in both drainage areas throughout the monitoring period and will be implemented according to appropriate NRCS standards.

REQUIRED DOCUMENTATION

All documentation for monitoring will follow the IN NRCS FOTG Edge-of-Field Water Quality Monitoring Data Collection and Evaluation Conservation Activity (201) requirements.

A nutrient management plan will be developed and followed to describe the nutrient management details to be followed for both the control and treatment watersheds.

Annual documentation for the enhanced nutrient management with tissue testing will include:

- Soil test GPS locations.
- Soil test results (at each depth).
- Plant tissue collection GPS locations.
- Plant tissue analysis results.
- As-applied information for each nutrient, including (based on each soil sampling grid):
    - Rate.
    - Form.
    - Timing.
    - Method .

REFERENCES (as of July, 2013 – updated versions will be used as applicable)

Determining Nitrogen Fertilizer Sidedress Application Needs in Corn Using a Chlorophyll Meter (AY-317-W) http://www.agry.purdue.edu/ext/pubs/AY-317-W.pdf

Cornstalk Testing to Evaluate the Nitrogen Status of Mature Corn (AY-322-W) http://www.agry.purdue.edu/ext/pubs/AY-322-W.pdf

PU Corn & Soybean Field Guide – sampling guidelines for nutrient analysis (pg 210) and Plant analysis for nutrient levels in corn (pg 212) and soybeans (213).

A&L Labs – *Plant Tissue Sampling of Row Crops*

A&L Labs – *Plant Tissue Sufficiency Levels in Row Crops*

OSU C.O.R.N. Newsletter – *Benefits of Tissue Testing*