

Michigan Supplemental Enhancement Activity

Water Quality Enhancement Activity – WQL04 – Plant tissue testing and analysis to improve nitrogen management

Enhancement Name

Use plant tissue tests to adjust nitrogen application rates

Land Use Applicability

This enhancement is applicable on cropland.

Benefits

The use of either plant tissue testing or leaf tissue testing is an adaptive nitrogen management technique used to adjust nitrogen application rates in-season (leaf tissue test) or for the following crop year (stalk test). Tests such as these help provide a thorough analysis of how nitrogen is being used by the current corn crop, giving a basis for adjustments to nitrogen rates. The end result is a more complete utilization of the nitrogen applied and less nitrogen remaining in the soil to be lost to the environment through nitrate leaching or soil emissions of nitrous oxide.

Criteria

1. The following testing and analysis information is specific to nitrogen management for corn:

- Corn stalk testing and analysis

Follow the procedure given in Purdue bulletin, “End-of-Season Corn Stalk Nitrate Test”, which is found in Section IV of the Michigan Field Office Technical Guide, G. Technical Tools, Nutrient Management, in the Nutrient Management References folder. Samples can be sent to the MSU Soil Testing Lab or any county Extension office.

According to MSU Extension Bulletin E2904, nitrate concentration between 450 and 2,000 ppm generally indicate good nitrogen use efficiency with optimum yields and limited residual soil nitrogen. Values below 450 ppm may indicate very efficient N use and optimum yields or a corn crop that ran short on N with some reduction in yield. Values above 2,000 ppm indicate more nitrogen was available than was necessary. Maintaining a database of stalk nitrate values from field to field and from year to year is a good way to fine-tune N management.

- Corn leaf tissue testing and analysis

For corn leaf tissue testing using the **chlorophyll meter method**, follow the procedure given in the Nebraska bulletin, “Using a Chlorophyll Meter to Improve N Management”. It is found in Section IV of the Michigan Field Office Technical

Guide, G. Technical Tools, Nutrient Management, in the Nutrient Management References folder.

For corn leaf tissue testing using collected **leaf tissue samples**, follow the procedure given in A&L Fact Sheet No. 34, “Plant Tissue Sampling of Row Crops”. It is found in Section IV of the Michigan Field Office Technical Guide, G. Technical Tools, Nutrient Management, in the Nutrient Management References folder. Contact the MSU Soil Testing Lab or any county Extension office for forms and information on submitting tissue samples.

A range for tissue N in corn between 2.90% and 3.50% is considered a sufficient concentration.

2. The following are plant tissue testing guidelines for other crops that require significant nitrogen inputs:

- For vegetable crops, follow the tissue sampling procedure given in the Minnesota Extension Bulletin 5886, “Nutrient Management for Commercial Fruit and Vegetable Crops in Minnesota”. It is found in Section IV of the Michigan Field Office Technical Guide, G. Technical Tools, Nutrient Management, in the Nutrient Management References folder.
- For potatoes, follow the guidance found in MSU Extension Bulletin E2779, “Nitrogen Management for Michigan Potatoes”. It is found in the Nutrient Management References folder in the Michigan Field Office Technical Guide, as referenced above.