



Great Lakes Yield Enhancement Network (YEN) In-Field Protocols

This guide will provide you with the information you need to complete your soil, tissue, whole plant and grain sampling.

1. Field and Test Area Selection

- I. **Field Size:** The field that is to be selected for this project should be a minimum of 10 acres total.
- II. **Size of test area:** The test area within the field needs to be a minimum of 1.5 acres and a maximum of 3 acres. The area should avoid headlands, compacted areas or areas with extreme variability.
- III. **Marking off test area:** The test area should be clearly marked off with 4 flags or posts that are at least 5 ft in height. These flags or posts will remain in the field until harvest.
- IV. **Selecting your 10 sampling areas:** Select 10 locations within the test area that are representative and mark them with a flag or post that is 5 ft in height. These flags or posts will remain in the field until harvest.
- V. **Sample collection:** All soil, tissue, grain and grab samples along with yield data will be collected from within this 1.5 to 3-acre designated area.



2. Soil Test Sampling





- I. **Stage/time of sampling:** A soil sample should be taken in the fall prior to any fertilizer (broadcast or with the planter) being applied.
- II. **Number of samples:** 1 sample from the 1.5 to 3 ac test areas is required. Collect a minimum of 20, 6" cores from this area to produce the composite sample.
- III. **Where to sample:** It is important to sample field variation (soil types, light/dark/high/low spots) separately. Sample between the rows and 6" in depth.
- IV. **How to store samples:** Store collected samples at room temperature and delivered to the lab within one day for immediate analysis. Freeze any samples that will not be analyzed immediately as soon as possible.
- V. **Labelling your samples:** Clearly include your YEN ID#, date of sampling, growth stage of crop, if applicable, and the sample number if there is more than 1 sample per field.
- VI. **Notes on collecting a representative sample:**
 - a. A sample from the test area must include enough cores, collected randomly from across the entire area. Too few cores increases the risk that a non-representative core could skew the result for the whole field. Non-random sampling increases the risk that a bias could be introduced into the sample. The most efficient way to achieve random sampling is to follow a zig-zag pattern around the test area. Collect a minimum of 20, 6" cores to produce the composite sample.
 - b. Often the most overlooked step in collecting a soil sample is the thorough mixing of soil cores before the sub-sample is collected. Sampled soil cores should be mixed in the bucket until no evidence of soil cores exist. Heavy clay soil cores sometimes need to be dried before they can be sufficiently mixed to allow for a suitable sub-sample. The sub-sample should be no more than 400 gm or about 1 cup of soil.

3. Tissue Sampling





- I. **Stage of sampling:** One sample at the onset of stem elongation – one node visible (GS31) and one sample once the collar of the flag leaf is visible (GS39).
- II. **How to sample:** Sample the uppermost leaf blade from 5 different plants at each of the designated flags for a total of 50 leaves (5 leaves x 10 flags). Use scissors to cut the leaves from the plant and place in a brown paper bag.
- III. **Number of samples:** 1 sample per 1.5 to 3 acre test area.
- IV. **Where to sample:** It is important to sample field variation (soil types, light/dark/high/low spots) separately. Sample average plants (look at height of the plant, stem thickness, leaf burn, etc). Leave a flag or note the GPS coordinates of the sample so you can revisit the same area for your tissue sampling at GS39.
- V. **Labelling your bags:** Clearly include your YEN ID#, date of sampling, growth stage of crop and the sample number if there is more than 1 sample per field.
- VI. **Where to send sample:** Samples will be sent to A&L lab (Michigan) and Honeyland Ag (Ontario)

4. Grab Sample Collection:

- I. **Stage/time of sampling:** Approximately 2-3 days prior to harvest at physiological maturity.
- II. **How to sample:** Collect a total of 100 shoots from within the test area by collecting 10 shoots from the 10 designated locations. The shoots should be cut at ground level using scissors or a hacksaw, and should include all infertile shoots intact, as well as fertile shoots.
- III. **Where to sample:** The one representative sample should comprise of 10 sub-samples from the 10 designated points within your yield area.
 - i. Grab ~10 neighbouring shoots and cut them at ground level using a hacksaw blade or scissors and place the whole shoots, ears-first into the sack.
 - ii. Repeat for the next 9 points in your field.
- IV. **How to store samples:** Place all 100 shoots side-by-side, ears first, in a brown paper bag and seal with a zip tie. Please be careful when handling the samples to ensure we do not destroy or break apart the sample.
- V. **Labelling your samples:** Clearly include your YEN ID# and date of sampling.





5. Grain Sample Collection:

- I. **How to sample the grain:** Take a 1.5 kg representative grain sample right after harvest. The sample should represent the grain being weighed, so it should be taken from two parts of each trailer load and it should not be cleaned, dried or otherwise changed before it is placed in a bag.
- II. **How much grain should be collected:** Each sample should consist of a minimum of 1.5 kg.
- III. **Labelling your grain sample:** Please Clearly include your YEN ID#, date of sampling, and the sample number if there is more than 1 sample per field.

6. Yield Verification:

- I. **How to verify yield:** Please measure out the exact length and width of the area to be harvested. This area must be in the range of 1.5 to 3 acres total. Weigh off the grain using a scale or weigh wagon. Determine the test weight and moisture and collect a 1.5 kg grain sample for further analysis.
- II. **What information to collect:** Complete the Yield Verification form and include the date, your YEN ID#, harvested plot length and harvested plot width, fresh weight at harvest, moisture content and test weight and return it with your grain sample. To determine moisture and test weight, collect a representative sample and use a tabletop moisture meter.
- III. **Verifying yield:** Please have your Yield Verification form signed by an independent verifier. This can be anyone not directly associated with your entry (i.e. not the farmer, agronomist or sponsor).

7. Photo Capture:





- I. **How to take photos:** Overhead digital photos should be taken from above the crop looking vertically down trying to cover as wide as an area as possible
- II. **When to take photos:** Overhead digital photos should be taken at GS 31 (stem elongation) and between GS60 (flowering) and GS87 (Hard dough).
- III. **Where to take photos:** Please take an image from 3 different locations in the field.



Contact Information

Ontario

Joanna Follings, cereals specialist at OMAFRA
Joanna.follings@ontario.ca or 519-400-7124

Michigan

Dennis Pennington, wheat systems specialist at Michigan State University
pennin34@msu.edu or 269-832-0497

General Enquiries

OntarioYEN@gfo.ca

