

Great Lakes Yield Enhancement Network (YEN) Participant Sampling Protocols

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

DO NOT THROW OUT THE BOX THAT SAMPLING ITEMS WERE SHIPPED IN, THIS IS NEEDED FOR SHIPPING YOUR GRAB SAMPLE!

1. Field and Test Area Selection

- A. **Field Size:** The field that you select for this project should be a minimum of 10 acres total
- B. **Test Area Size:** The YEN test area within that field must 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
- C. **Marking Off the 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.
- D. **Sample Areas:** Select 10 locations at random within the test area 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. See example image below for randomized flag placement
- E. **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

- A. **Stage and Time of Sampling:** A soil sample should be taken at green up or when the ground has thawed, prior to any spring fertilizer application.
- B. **Number of Samples:** A single combined sample from the 1.5 to 3 ac test area is required. To do this, collect a minimum of twenty 6" cores from your test area to produce a single sample.
- C. **Where to Sample:** It is important to sample field variation (soil types, light/dark/high/low spots) separately. Sample between the rows
- D. **Labelling Samples:** Clearly include your YEN ID#, date of sampling, growth stage of crop, if applicable



- E. **Storing Samples:** Store collected samples at room temperature and ship to the lab within one day for immediate analysis. Freeze any samples that will not be analyzed immediately as soon as possible
- F. **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 increase 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.
- G. **Where to Send the Sample:** Samples are to be sent to Honeyland Ag in using the pre-labelled sample bag provided by dropping the sample bag in the mail. In the US samples are to be sent to A&L labs using the pre-labelled sample bags by dropping the sample bag at any UPS shipping location.

3. Tissue Sampling

- A. **Stage of Sampling:** You will be taking 2 tissue samples during the season: one at the onset of stem elongation – one node visible (GS31) and one once the collar of the flag leaf is visible (GS39)
- B. **How to Sample:** Sample the uppermost, fully emerged leaf blade from 20 different plants at each of the flagged locations for a total of 200 leaves (20 leaves x 10 flags). Use scissors to cut the leaves from the plant and place in a brown paper bag
- C. **Number of samples:** 2 samples per 1.5-to-3-acre test area
- D. **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
- E. **Labelling your bags:** Clearly include your YEN ID#, date of sampling, growth stage of crop
- F. **Where to send sample:** In Ontario samples are to be sent to Honeyland Ag using the pre-labelled sample bag provided by drop the sample in the mail. In the United States samples are sent to A&L Labs using the pre-labelled sample bag provided. Simply drop the sample off at any UPS shipping location.



4. Grab Sample Collection:



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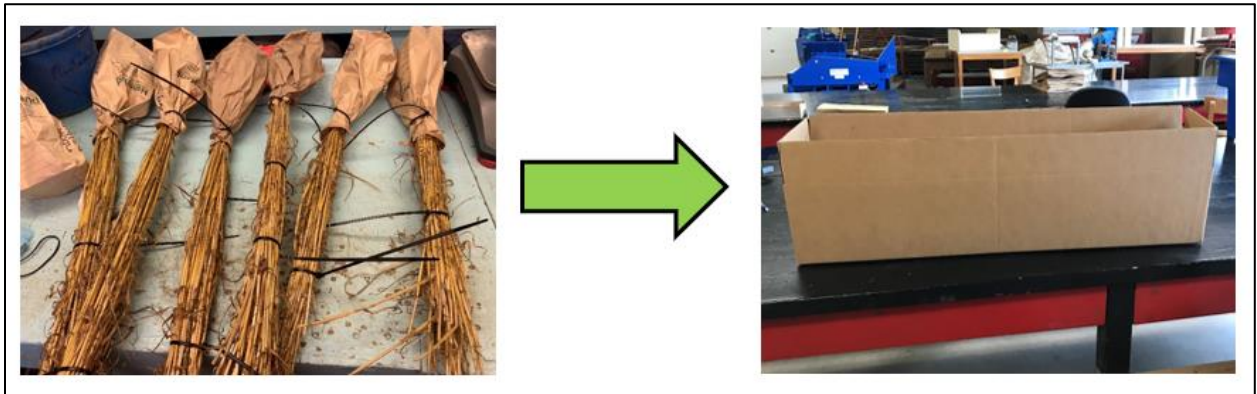


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- A. **Stage and Time of Sampling:** Physiological maturity when the peduncle has changed from green to yellow.
- B. **How to Sample:** The sample should contain 100 shoots in total. To do this, collect 10 shoots from the 10 flagged locations. The shoots should be cut at ground level using scissors or a hacksaw, and should include all infertile shoots intact, as well as fertile shoots
- C. **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
- D. **How to Store Samples:** Place all 100 shoots side-by-side, ears first, in a brown paper bag and seal with a zip tie. Use 3 additional zip ties to bundle the stems together as best you can (see image below). Please be careful when handling the samples to ensure we do not destroy or break apart the sample
- E. **Labelling Your Samples:** Clearly include your YEN ID# and date of sampling



- F. **Shipping the Grab Sample:** Place the bundled wheat plants in the provided 40" box (as seen above). In Ontario, use the shipping label (to be emailed in June) attach it to the box and drop off at your local depot or call to arrange a sample pickup. In the US use the provided shipping label, attach it to the box and drop off at your local FedEx shipping location.

5. **Head Counts:**

- A. **When to Sample:** any time between flowering and physiological maturity. Could be done when collecting your grab sample
- B. **What to Bring:** yard stick, pen, and paper
- C. **Where to Sample:** at each of the 10 flags marked in your test area
- D. **Sampling Steps:**
 - I. Go to each of the 10 flags in your test area with the yard stick included in your YEN package
 - II. Randomly place the yard stick between the rows and count the number of heads along both sides of the stick for a total of 20 counts (10 flags x 2 counts on either side of the yard stick)





- III. Record the row spacing
- IV. Record these numbers with a pen and paper to enter into CropTrak or record them directly into CropTrak using the app on your device
- E. **Important Notes:** Do not include any heads that will not be combined (i.e., below the canopy)

6. Grain Sample Collection:

- A. **How to Collect the Sample:** At harvest time, collect a 1.5 kg representative grain sample from the harvested test area. 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 the Ziploc bag provided
- B. **Labelling Your Grain Sample:** Please ensure your label includes your YEN ID# and date of sampling
- C. **Where to Send Sample:** In Ontario samples are to be sent to SGS labs using the pre-labelled box via Canada post. Simply drop the Ziploc bag into the box and drop the labelled box off at your local Canada Post. In the US samples are to be sent to MSU Mason Research Farm using the pre-labelled box via Fedex. Simply drop the Ziploc bag into the box and drop the labelled box off at your local FedEx shipping location.
- D.



7. Yield Verification:

- A. **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
- B. **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
- C. **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)
- D. **Reporting Yield:** Submit a picture or a scanned copy via email to joanna.follings@ontario.ca (Ontario) and pennin34@msu.edu (U.S.). Retain the original copy for your records

8. Photo Capture:

- A. **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.
- B. **When to take photos:** Overhead digital photos should be taken at GS 31 (stem elongation) and at and grab sample collection.
- C. **Where to take photos:** Please take an image from 3 different locations in the field.





Contact Information

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Great Lakes YEN Participant Activity Timeline

Kickoff Meeting (Virtual - Zoom)



Field and Test Area Selection



CropTrak – Add a Field and Add an Agronomist (optional)

NOTE: ALL survey data (background, planting, crop inputs, growth stage reporting) **must be entered throughout the season with completion at harvest time.** Not doing so will result in an **incomplete report** for your field!



Soil Sampling – Green up



Tissue Sampling – GS 31 + 39/Feekes 6 + 9



Grab Sample Collection and Heads/m² Count – Physiological maturity



Harvest Verification Form and Grain Sample Collection

All CropTrak data MUST be entered by this time or there is the risk of receiving an **INCOMPLETE** report!



Winners Announcement Meeting (Virtual - Zoom)



Wrap-Up Meeting and Report Discussion (In-Person)



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