Cornell University
Cooperative Extension

Agronomy Fact Sheet Series **Fact Sheet 71**

Measuring Corn Silage Yield

New guidance developed in consultation with the multi-agency partnership involved in nutrient management planning in New York allows for added nitrogen fertility for higher yielding corn fields if the farmer: (1) documents individual field yield data for each of the years where yield potential (YP) is adjusted for increased yield and (2) works to manage corn stalk nitrate test (CSNT) results to be below 3,000 ppm. See Agronomy Factsheets 77 and 78 for more detail. In this factsheet, we focus on methods to determine corn silage yield.

Methods to Determine Corn Silage Yield

Various methods can be used to determine corn silage yield. Examples range from totaling the actual weight determined by running each truck or wagon over a scale, to use of calibrated data from a forage chopper yield monitor, to tallying of loads multiplied by an estimated average load weight, or by using a yield check in a specific area of each field to estimate yield of the entire field. These methods will be discussed briefly.

Yield Check

A representative area in a field can be used to estimate whole field yield. Given spatial variability in many fields, this method is less accurate than measuring all loads off a field.

If machine harvest is possible, harvest a chopper-width along the length of a field, determine net harvest weight, determine the dry matter (DM) content of a subsample (see below), adjust the yield for DM, and divide by the total area harvested. Ideally, three subareas are harvested and measured in this way per field.

When hand-harvest is the only option, the sample area should be at least 40 feet in length and include two or more rows of corn. A subset of a minimum of five plants from this area should be taken to determine the moisture content. There are 43,560 ft^2 in one acre. If harvest consists of two rows (30 inch row spacing) each 40 feet long, weighing 220 lbs, the fresh silage yield is estimated at 24 tons/acre ([220/2000]/[2*30/12*40/43560]). If the forage sample is 35% dry matter, the yield is 8.4 tons of dry matter per acre (24*0.35). For either approach, it is important to select representative areas within a field.

Total harvest weight from a field

As more farms install truck scales, this option is more viable than in the past. This method, when combined with subsampling to determine the moisture content of the silage at harvest, is the most accurate way to determine yield. The empty and full weight must be recorded for each load from every field harvested. This is most easily done when farm scales are installed at a convenient location, close to the bunks. Subsamples for moisture should be taken a few times over the course of a field harvest. Moisture samples can most easily be taken when silage is dropped off at the bunk (5-6 grab samples per load). Moisture can be determined using a Koster tester, a microwave, or an oven.

Figure 1: Subsampling for moisture at the bunk. Inset: Koster tester.

The sum of the net load weights per field can be tallied and multiplied by the percent dry matter in the samples from the field, and divided by the number of acres in the field, to determine an accurate per acre DM silage yield. For example: it took 20 trucks to harvest an 8 acre field. The average silage weight per

truckload was 9.45 tons (based on the 20 weights from this field). The average dry mater content was 36% so yield averaged 8.5 tons DM/acre (20*9.45*(0.36)/8) or 24 tons/acre (8.5/0.35) at a standardized dry matter content of 35% DM.

Figure 2: Using farm scales to track yield and crop inventory.

Tally of loads times average load weight

A tally of loads multiplied by an average load weight can result in reasonable estimates, if loads are similarly filled. It is recommended to determine the average truck weight *for each individual field* as moisture content from field to field can vary widely. To determine an average yield and moisture, include weights and moisture data from at least five loads throughout the harvest of the particular field.

Forage chopper yield monitor

Forage choppers can be a very efficient way of determining yield and dry matter at the same time. It is very important that yield monitors are calibrated properly.

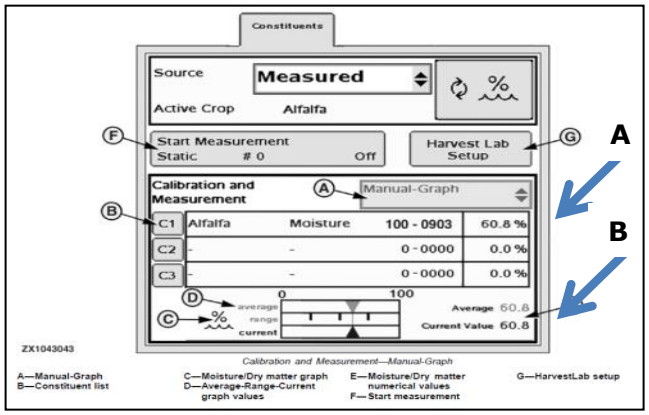

Figure 3: While in the constituents tab, "Avg. Moisture of calibration load" to be recorded is shown by Arrow A, and "Avg. Moisture of field" is shown by Arrow B. The place to find the moisture will differ depending on how the operator has the monitor configured.

When entering a new field, calibrate the monitor by weighing the first three loads and determine the right moisture content at the start of the field harvest as well.

Whole Farm Yield Monitoring

With the introduction of forage yield monitors, and development of calibration protocols, it is now feasible to collect corn silage yield data across all fields and over multiple years. Please contact the Nutrient Management Spear Program if willing to share the data: it can become part of a statewide dataset that will allow for adjustments in the Cornell University corn yield potential database. Email qmk2@cornell.edu if interested in being part of the New York State yield database project.

In Summary

Accurate yield records are essential to guide corn field management decisions. In addition, accurate yield records can help manage resources across the entire farm (whole farm nutrient management). Various methods can be used to determine corn silage yields and its moisture content at harvest. Keeping good records is essential.

Additional Resources

- Nutrient Management Spear Program Agronomy Fact Sheet Series: nmsp.cals.cornell.edu/index.html.
- New York On-Farm Research Partnership: nmsp.cals.cornell.edu/NYOnFarmResearchPartnership/.
- USDA-NRCS New York State 590 Standard: ftp://ftp-fc.sc.egov.usda.gov/NY/eFOTG/Section_4/Practice_Standards/nyps590.pdf.

Disclaimer

This fact sheet reflects the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this fact sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

For more information

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Nutrient Management Spear Program
http://nmsp.cals.cornell.edu

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