Measuring Corn Silage Yield

New guidance from the multi-agency partnership that oversees nutrient management planning in New York State allows for added nitrogen fertility for higher yielding corn fields if the farm: (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 factsheet 77 for the process describing adjustment of yield potential. 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 ft² 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 bunk. 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.

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 matter content was 36% so yield averaged 8.5 tons DM/acre \((20\times 9.45\times (0.36)/8)\) or 24 tons/acre \((8.5/0.35)\) at a standardized dry matter content of 35% DM.

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](http://nmsp.cals.cornell.edu/index.html).
- New York On-Farm Research Partnership: [nmsp.cals.cornell.edu/NYOnFarmResearchPartnership/](http://nmsp.cals.cornell.edu/NYOnFarmResearchPartnership/).

**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.

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**For more information**

Cornell University Cooperative Extension

http://nmsp.cals.cornell.edu

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