Cornell University
Cooperative Extension

Estimating Corn Grain and Corn Silage Yields

Dr. L. E. Chase
Department of Animal Science
Cornell University
lec7@cornell.edu

There are a number of situations where estimates of corn grain or corn silage yields are needed on dairy farms. These could include establishing a price for corn silage or obtaining information to file claims for crop losses. There are a number of methods that have been used to make these calculations. This document will provide a quick overview of these approaches.

!. Estimating Bushels of Corn Grain/Acre
   a. Count the number of kernel rows on 3-5 representative ears.
   b. Count the number of kernels/row.
   c. Determine the number of ears/acre.
   d. Multiply a*b*c = (total kernels/acre)
   e. Divide this value by 90,000 to determine bushels/acre.
   Example:
   - 16 kernel rows
   - 25 kernels/row
   - 25,000 ears/acre
   - 16*25* 25,000 = 10,000,000 kernels/acre
   - 10,000,000/90,000 = 111 bushels of corn grain per acre
   -
   Source: Dr. Greg Roth, Department of Crop and Soil Sciences, The Pennsylvania State University, (http://cornandsoybeans.psu.edu/pdfs/DROUGHT99.pdf)

A second method uses the expected bushels of corn grain per acre and the price per bushel of corn grain. The challenge with this approach is that this is a variable number depending on a lot of factors. A better way to use this method is to determine the actual expected bushels of corn grain per acre based on a lab analysis of starch content of the corn silage. The assumption is that all of the starch in corn silage is in the grain portion and not in the stalk, husk and leaves. These calculations require an analytical starch value, dry matter content (DM) and corn silage yield. The calculations are:

DM starch yield = Tons wet silage yield *% DM *% starch (DM basis)

Example:
- Yield = 20 tons/acre
- DM, % = 35%
- Starch, % = 30

= (20*2,000 lbs. /ton) * .35 * .3 = 4,200 lbs. starch

Grain yield = lbs. starch/ (% starch in corn grain)/% DM of shelled corn/56 lbs. per bushel

= (4,200/.72/.845/56 = 123 bushels of corn grain per acre

A simpler way to calculate this is: lbs. of starch * .0293 = 123 bushels/acre

Source: www.uwex.edu/ces/crops/uwforage/GrainYieldfromCornSilageII.pdf

2. Estimating Corn Silage Yield

This can be done by counting, weighing and sampling the number of corn stalks in 1/1,000[th] of an acre. Corn plants are chopped at a stubble height of 8 – 12 inches and weighed to "estimate" the tons of wet corn silage per acre. This should be done at 3-5 locations in the field. If the plants are chopped and dry matter determined, the tons of silage dry matter yield can be calculated. If the number of ears per stalk is counted, then the ears per acre can also be determined. The number of plants to count and weigh depends on the spacing of the rows. The weight of the plants divided by 2 will provide the estimated silage yield.

Row Spacing, inches	Length of row to sample
36	14 feet, 5 inches
30	17 feet, 10 inches
20	26 feet
15	34 feet, 10 inches

Example: The plants from 17 feet 5 inches with a 30" row spacing weigh 40 lbs. This gives an estimated yield of 20 tons per acre (40/2). If the plant dry matter was 35%, then the calculated dry matter yield per acre would be 7 (20*0.35).

There are also some thumb rule type calculations that can be used. These are:

One estimate of silage yield for corn plants without ears or poorly pollinated ears is 1 ton of dry matter (30%) for each foot of plant height. This does not include the tassel. Corn that is 4 foot high would yield about 4 tons of 30% dry matter corn silage.

Sources of Information:
http://anmp.umd.edu/files/NM-1.pdf
www.uvm.edu/pss/vtcrops/articles/Calculating_Forage_Yields.pdf
www.uwex.edu/ces/crops/uwforage/BuyingSellingCS.pdf