2011 MINIMUM TILLAGE CORN TRIAL

Reduced tillage practices have tremendous potential to reduce farmer expenses, maintain yields, and reduce potential negative environmental effects caused by cropping operations. Conventional tillage practices require heavy machinery to plow and groom the soil surface in preparation for the planter. The immediate advantage of reduced tillage is less fuel expense, less equipment and labor required. It's also clear that intensive tillage increases nutrient and soil losses to our surface waterways. By turning the soil and burying surface residue, more soil particles are likely to detach from the soil surface and run off from agricultural fields. Reducing the amount and intensity of tillage can help build soil structure and reduce soil erosion.

Many growers are interested in different minimum till methods and equipment, including 'no-till,' 'strip-till,' and 'zone-till.' No-till implements do not till the soil, but rather use a metal coulter to cut the

planter. No-till and strip-till plots had four 30” rows and were 12’ wide. Zone-till plots had six 30” rows and were 15’ wide. A 10-20-20 starter fertilizer was applied at 260 lbs per acre to the strip-till and no-till plots. A liquid 9-18-9 starter fertilizer was applied at 5 gallons to the acre in the zone-till plots. A pre-plant glyphosate herbicide, Roundup®, was applied at a rate of 2 quarts per acre to all plots.

Table 1. Agronomic information for the 2011 Minimum Tillage Corn Trial at Borderview Farm.

Location	Borderview Farm – Alburgh, VT
Soil type	Benson rocky silt loam
Previous crop	Winter rye
Plot size	10’ x 45’ (no-till and strip-till); 15’ x 45’ (zone-till)
Replicates	4
Seeding rate	34,000 seeds ac^{-1}
Row width	30”
Planting date	31-May 2011
Starter fertilizer	260 lbs ac^{-1} of 10-20-20 (no-till and strip-till), 5 gal ac^{-1} of 9-18-9 (zone-till)
Pre-plant herbicide	Roundup®, 2 qts ac^{-1}
Additional fertilizer	100 lbs available N ac^{-1} of ammonium sulfate (21-0-0), 8-July 2011
Harvest date	7-October 2011

consumed, the contents of the ration, feeding practices, the level of her production, and many other factors. Most labs calculate NE_L at an intake of three times maintenance. Starch can also have an effect on NE_L, where the greater the starch content, the higher the NE_L (measured in Mcal per pound of silage), up to a certain point. High grain corn silage can have average starch values exceeding 40%, although levels greater than 30% are not considered to affect energy content, and might in fact have a negative impact on digestion. Starch levels vary from field to field, depending on growing conditions and variety.

Non-fiber carbohydrate (NFC) and nonstructural carbohydrate (NSC) are also totaled and reported. NFC is comprised of starch, simple sugars, and soluble fiber, and is digested more quickly and efficiently than fiber. NFC provides energy for rumen microbes, once it is fermented by volatile fatty acids. NFC and NSC are sometimes referred to almost interchangeably, but pectin levels are included in NFC and omitted from NSC. In addition, NFC is calculated by difference [100 – (% NDF + % crude protein + % fat + % ash)], whereas NSC is determined through enzymatic methods. NSC should be in the 30-40% range, on a dry matter basis. NFC is generally between 35-40% in a high milk production ration, though levels as high as 42% are acceptable, due to the variability of particle size, frequency of feeding, dry matter intake, and other factors.

Yield data and stand characteristics were analyzed using mixed model analysis using the mixed procedure of SAS (SAS Institute, 1999). Replications within trials were treated as random effects, and hybrids were treated as fixed. Hybrid mean comparisons were made using the Least Significant Difference (LSD)

RESULTS

The 2011 growing season included many weather extremes in Vermont (Table 2). In April and May, excessive rainfall left soils saturated and, in many cases, delayed planting. June and July, in contrast, were hot and dry. July had 0.29 inches less precipitation than the 30-year average. In August, precipitation levels were extremely high (10.23 inches for the month, which is 6.38 inches above average). Tropical Storm Irene brought severe wind and record rainfall. While lodging damage was minimal at the site of the corn trial in Alburgh, VT, 2011, in general, it was by no means an ideal growing season. Weather data is based on National Weather Service data from a cooperative observer station in South Hero, VT, which is in close proximity to the trial. The historical average is based upon 30 years of data (1971-2000).

Table 2. Data from a weather station in close proximity to Alburgh, VT (South Hero, VT).

	June	July	August	September	October
Average temperature (°F) ±	67.1	74.4	70.4	63.8	51.5

Corn silage quality was not affected by tillage method in this trial. There was no significant difference in CP, ADF, NDF, starch, TDN, NE_L, NFC, or NSC. Trial averages were comparable to corn grown using conventional tillage practices.