EFFECT OF RESIDUE MANAGEMENT ON SUGARCANE YIELD GROWN ON COMMERCE SOIL

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In this study we investigated the effect of sugarcane residue (mulch cover) resulting from the combine harvester on sugarcane variety L97-128. Our focus was on sugarcane yield (biomass and sugar) and the decay of residue post harvest. Three residue management practices were implemented at the Sugar Research Station. The three treatments were; (i) burning the mulch after harvest, off-barring and cultivating in the spring; (ii) sweeping the mulch off the top of the row after harvest, off-barring and cultivating in the spring; and (iii) leaving the mulch on the field after harvest, off-barring and cultivating in the spring. The last treatment where the mulch is not removed may be best regarded as a no-till treatment which is a commonly used soil conservation measure. The sugarcane was planted on August 15, 2006 on Commerce loam soil. Sugarcane population, yield, and amount of mulch residue left on the soil surface were measured for each treatment. We summarize results for plant cane and first stubble (2007-2009).

Yield

The Commerce site consisted of six plots (two replications × three treatments). Each plot consisted of nine rows 440 ft length with levees between plots. Plant cane was harvested, using a combine harvester, on November 9, 2007. Based on six replications, the average yield for plant cane was 37.27 tons/acre and sugar yield of 8007 lb/acre. Following harvest, the residue on two plots was burned on November 16, 2007. In another two plots, the residue was removed from the top of the rows using a three-row sweeper on November 4, 2007. Using brushes with nylon bristles, a thin layer of surface soil was also removed along with the mulch and deposited in the adjacent furrows. In the remaining two plots, the residue was not removed.

The first stubble was harvested on November 3, 2008. This harvest was followed by sweeping two plots on November 11, 2008 and burning of another two plots on November 20, 2008 according to our treatments. The yields from the first stubble were 28.5, 26.2, and 28.4 tons/acre, for the burn, no-till, and sweep treatments, respectively. The respective sugar yield for the three treatments were 6235, 5693, 5938 lb per acre. We found no statistical differences obtained for the sugar yield among all the treatments from first stubble (see Table 1). Moreover, these yields were lower than that for plant cane of 2007.

Mulch Decay

The sugarcane residue was collected randomly within each plot, by measuring multiple 1 m^2 areas and collecting all surface mulch within each area. Sampling of residue was carried out several times following harvest of the plant cane as well as the first stubble. Sampling of residue was terminated several months following harvest and when it was decided that due to low residue amounts and surface non-uniformity, accurate residue measure was not feasible. The collected residue was dried at 55°C for 24-h and weighed. Results of the amount of mulch

remaining on the soil surface versus age of mulch following harvest are given in Figure 1 for plant cane. For the plant cane, the residue decreased from 3.085 tons/acre some 11 days after harvest to 0.977 tons/acre some 143 days after harvest. For the first stubble, the residue decreased from 2.836 tons/acre at harvest to 1.895, 123 days after harvest.

Table 1. Sugarcane yields of L97-128 for first stubble on Commerce soil [§.] Harvest was on November 3, 2008.

TREATMENT	Rep. Number	Number of Stalks (1000/ acre)	Cane Yield tons/acre	Sugar Yield lbs/ acre
Burn	1	34.8	29.6	6246
	2	35.9	27.3	6044
Average		35.4	28.5	6235
No – Till	1	36.4	26.4	5779
	2	35.0	26.0	5606
Average		35.7	26.2	5693
Sweep	1	36.6	27.8	5882
	2	36.6	29.0	6093
Average		36.6	28.4	5938
LSD 0.05		NS	NS	NS

§ Sugarcane was planted on August 15, 2006, and plant cane harvested November 9, 2007. Average yield for plant cane was 37.27 tons/acre and sugar yield of 8007 lb/acre.

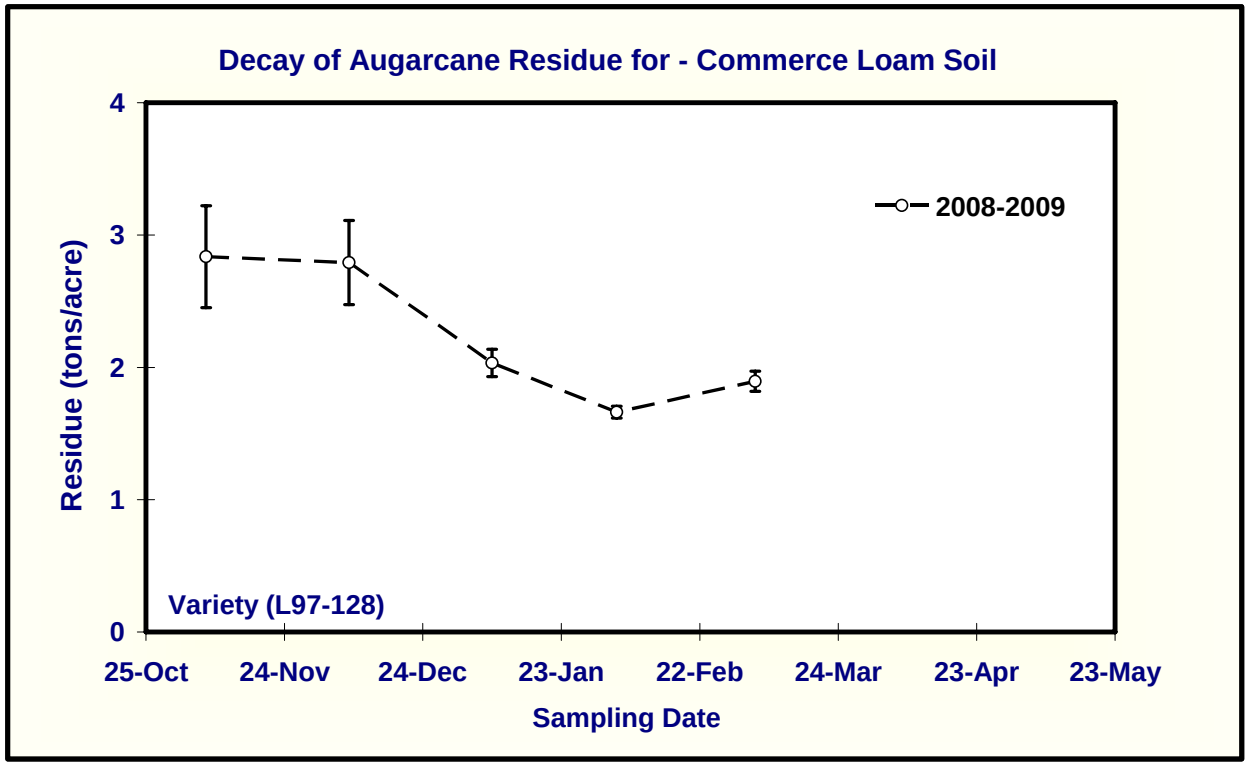

Figure 1. Field decay of sugarcane residue following harvest of L97-128 grown on Commerce loam soil for first stubble (2008-2009).