# BILLET PLANTING RESEARCH

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Research continued to develop methods to maximize the chances of success with billet (stalk section) planting. During 2010, results were obtained from two field experiments conducted at the Sugar Research Station at St. Gabriel comparing plant cane and second ratoon crop yields obtained from billet and whole stalk plantings of commercial and experimental varieties. In addition, the potential for Syngenta® seed-treatment chemicals to improve stand establishment and yield in billet plantings was evaluated.

Plant cane yields obtained from billet and whole stalk plantings were compared for seven varieties, HoCP 96-540, L 99-226, L 99-233, HoCP 00-950, L 01-283, L 01-299, and L 03-371. Second stubble yields from billet and whole stalk plantings were compared for eight varieties, Ho 95-988, HoCP 96-540, L 97-128, L 99-226, L 99-233, HoCP 00-950, L 01-283, and L 01-299. Differences between yields obtained from billet and whole stalk plantings are most evident in plant cane. Sugar per acre yield was lower for billet plantings of L 99-233, HoCP 00-950, and L 03-371. The only difference detected in second stubble was that the sugar yield of HoCP 00-950 was lower in the billet compared to the whole stalk planting. The results suggest that HoCP 00-950 does not tolerate billet planting well. Results from previous experiments suggested that the vigor of newly released varieties might result in billet planting tolerance. However, the plant cane results for the first test of L 03-371 and the HoCP 00-950 results suggest that this is not always the case for new varieties.

Chemical treatments from Syngenta® for use in a new planting system being developed for Brazil are under evaluation to determine whether they can increase yields obtained from billet plantings in Louisiana. Experiment treatments include a combination of three fungicides, an insecticide and nematicide combination, all pesticides combined, and non-treated billets. In an experiment with Ho 95-988 and HoCP 96-540, the combined chemical treatment increased tonnage and sugar per acre yields for HoCP 96-540 in both plant cane and first ratoon. In an experiment with HoCP 96-540, L 99-226, and L 99-233, initial shoot populations after planting and the spring shoot population were higher in the combined chemical treatment compared to non-treated billets for all three varieties, and the millable stalk population was higher for HoCP 96-540 with the fungicide treatment and for L 99-226 for the combined chemical treatment. Plant cane tonnage yield was higher in the combined chemical treatment compared to non-treated billets for all three varieties, and sugar yield was higher in the combined chemical treatment for HoCP 96-540 and L 99-226. Initial stand establishment and spring shoot population can be increased. The yield increase then comes from increased stalk population rather than increased stalk weight or sugar per ton. The results suggest that the maximum benefit comes from application of all of the pesticides combined. The results with the Syngenta® seed-treatment chemicals are promising and will be expanded.

Table 1. Comparison of yield components for billet and whole stalk plantings of seven varieties in plant cane during 2010.

| Variety | Treatment | Stalk wt. (lbs.) | Sugar/ton (lbs.) | Tons cane per acre | Sugar/acre (lbs.) |
|---|---|---|---|---|---|
| HoCP 96-540 | Billet | 2.3 | 219 | 35.5 | 7767 |
| | Whole | 2.6 | 221 | 38.0 | 8426 |
| L 99-226 | Billet | 2.9 | 224 | 34.5 | 7697 |
| | Whole | 3.2 | 228 | 45.3 | 10350 |
| L 99-233 | Billet | 1.8 | 218 | 35.3 | 7656 b |
| | Whole | 2.0 | 229 | 39.0 | 8937 a |
| HoCP 00-950 | Billet | 2.7 | 240 | 29.7 b | 7128 b |
| | Whole | 2.5 | 240 | 34.7 a | 8345 a |
| L 01-283 | Billet | 2.2 | 230 | 36.0 | 8265 |
| | Whole | 2.2 | 237 | 43.7 | 10369 |
| L 01-299 | Billet | 2.1 | 232 | 36.3 | 8429 |
| | Whole | 2.6 | 230 | 37.0 | 9463 |
| L 03-371 | Billet | 2.4 | 228 | 23.3 b | 5357 b |
| | Whole | 2.7 | 236 | 35.7 a | 8447 a |

[1]Values of different yield components for billet and whole stalk comparisons within a variety followed by different letters were significantly different (*P*=0.05).

Table 2. Comparison of yield components for billet and whole stalk plantings for eight varieties in 2008 plant cane, 2009 first ratoon and 2010 second ratoon.

| | | Plant cane | | First ratoon | | Second ratoon | |
|---|---|---|---|---|---|---|---|
| | | Cane/A | Sugar/A | Cane/A | Sugar/A | Cane/A | Sugar/A |
| Variety | Planting | (tons)[y] | (lbs.)[y] | (tons)[y] | (lbs.)[y] | (tons)[y] | (lbs.)[y] |
| Ho95-988 | Billet | 24.8 b | 5624 b | 32.0 | 5826 | 22.7 | 4241 |
| | Whole | 33.5 a | 7465 a | 33.5 | 6196 | 24.5 | 4407 |
| HoCP96-540 | Billet | 28.4 | 6460 | 31.2 | 5932 | 30.0 | 4717 |
| | Whole | 38.3 | 8047 | 36.0 | 6523 | 31.0 | 5152 |
| L97-128 | Billet | 25.2 b | 5271 b | 28.2 | 5421 | 26.0 | 4604 |
| | Whole | 33.9 a | 7482 a | 33.5 | 6460 | 30.3 | 5713 |
| L99-226 | Billet | 25.9 b | 5376 b | 31.8 | 5901 | 32.0 | 6417 |
| | Whole | 41.0 a | 8817 a | 36.8 | 7040 | 34.0 | 6199 |
| L99-233 | Billet | 24.3 b | 5333 b | 31.8 | 5914 | 31.5 | 5176 |
| | Whole | 32.2 a | 7192 a | 31.0 | 6072 | 36.7 | 6222 |
| HoCP00-950 | Billet | 27.6 | 6221 | 34.0 | 6481 | 24.5 | 4651 b |
| | Whole | 33.8 | 7719 | 39.0 | 7539 | 29.7 | 5933 a |
| L01-283 | Billet | 36.2 | 7816 | 41.5 | 7754 | 33.5 | 6343 |
| | Whole | 36.2 | 7689 | 41.5 | 7893 | 32.0 | 5869 |
| L01-299 | Billet | 36.7 | 7509 | 43.8 | 7880 | 37.0 | 6937 |
| | Whole | 38.2 | 7706 | 49.2 | 9448 | 41.3 | 7401 |

[y]Values of different yield components for billet and whole stalk comparisons within a variety followed by different letters were significantly different (*P*=0.05).

Table 3. Effect of Syngenta chemical treatments on yield components for two varieties, Ho 95-988 and HoCP 96-540 in plant cane and first ratoon.

| Variety and treatment | Plant cane | | First ratoon | |
|---|---|---|---|---|
| | Tons cane/A$^y$ | Sugar/A (lbs.)$^y$ | Tons cane/A$^y$ | Sugar/A (lbs.)$^y$ |
| Ho 95-988 | | | | |
| Non-treated billets | 48.2 | 9399 | 57.5 | 13113 |
| Insecticide + nematicide | 54.2 | 10684 | 56.5 | 12715 |
| Fungicide combination | 57.0 | 11459 | 59.7 | 13401 |
| All chemicals combined | 54.2 | 10787 | 57.4 | 13120 |
| HoCP 96-540 | | | | |
| Non-treated billets | 41.8 c | 7877 c | 43.3 b | 9267 ab |
| Insecticide + nematicide | 51.8 b | 9936 b | 46.7 ab | 10147 ab |
| Fungicide combination | 53.5 b | 9564 bc | 37.0 b | 7970 b |
| All chemicals combined | 63.0 a | 12205 a | 60.9 a | 12514 a |

$^y$Values for comparisons within a variety and column followed by different letters were significantly different (*P*=0.05).

Table 4. Effect of Syngenta chemical treatments on Fall and Spring stand establishment and millable stalks produced in plant cane by three varieties, HoCP 96-540, L 99-226, and L 99-233, during 2009/2010.

| Variety and treatment | Fall shoots/acre (x 1000)$^y$ | Spring shoots/acre (x 1000)$^y$ | Millable stalks/acre (x 1000)$^y$ |
|---|---|---|---|
| HoCP 96-540 | | | |
| Non-treated billets | 16.8 | 23.3 | 38.0 bc |
| Fungicide | 15.4 | 20.5 | 44.3 a |
| Insecticide/nematicide | 15.3 | 24.8 | 34.7 c |
| All combined | 15.0 | 22.5 | 40.9 ab |
| L 99-226 | | | |
| Non-treated | 15.3 b | 16.6 c | 31.3 d |
| Fungicide | 21.1 a | 26.1 b | 39.7 b |
| Insecticide/nematicide | 15.6 b | 20.2 bc | 35.9 c |
| All combined | 24.8 a | 39.4 a | 44.9 a |
| L 99-233 | | | |
| Non-treated | 16.9 b | 29.2 b | 55.6 |
| Fungicide | 19.2 ab | 32.2 ab | 56.6 |
| Insecticide/nematicide | 18.2 b | 34.6 ab | 57.2 |
| All combined | 22.6 a | 41.6 a | 59.3 |

$^y$Values for comparisons within a variety and column followed by different letters were significantly different (*P*=0.05).

Table 5. Effects of Syngenta chemical treatments on yield components for three varieties, HoCP 96-540, L 99-226 and L 99-233, in plant cane during 2010.

| Variety and treatment | Stalk weight (lbs.) | Sugar/ton cane (lbs.) | Tons cane/acre[y] | Sugar/acre (lbs.)[y] |
|---|---|---|---|---|
| HoCP 96-540 | | | | |
| Non-treated billets | 2.6 | 204 | 39.3 b | 8000 b |
| Fungicide | 2.4 | 196 | 38.3 b | 7392 b |
| Insecticide/nematicide | 2.5 | 197 | 45.0 ab | 8783 ab |
| All combined | 2.6 | 204 | 52.3 a | 10678 a |
| L 99-226 | | | | |
| Non-treated | 3.4 | 209 | 35.7 b | 7528 b |
| Fungicide | 3.4 | 221 | 44.3 ab | 9825 ab |
| Insecticide/nematicide | 3.3 | 200 | 41.3 b | 8086 b |
| All combined | 3.1 | 208 | 53.3 a | 11041 a |
| L 99-233 | | | | |
| Non-treated | 2.03 b | 212 | 46.0 b | 9732 |
| Fungicide | 2.37 ab | 204 | 51.0 ab | 10336 |
| Insecticide/nematicide | 2.28 ab | 204 | 54.7 a | 11234 |
| All combined | 2.43 a | 195 | 56.0 a | 10862 |

[y]Values for comparisons within a variety and column followed by different letters were significantly different ($P$=0.05).

## LONG-TERM EFFECTS OF POST-HARVEST RESIDUE MANAGEMENT

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**Summary:**

A study to evaluate the long-term effects of post-harvest crop residue management on the yield of sugarcane, *Saccharum* spp. hybrids, grown on silty clay loam (Vertic Haplaquoll) was initiated in 1996 and continued for three production cycles, a total of 10 crops. The debilitating effects on ratoon crops of residue retention are well documented, but the cumulative effects across production cycles have not been quantified in Louisiana’s temperate, humid environment. Residue management treatments included: 1) pre-harvest burning (B); 2) post-harvest residue swept to the row furrows (S); and 3) full retention of the residue (R). Retaining the residue resulted in numerical reductions for yield, stalk population and theoretical recoverable sucrose (TRS), but only reductions in cane and sugar yield were statistically significant (Table 1). Burning, B, resulted in an annual sugar yield increase of 855 pounds per acre over R and 562 pounds per acre over S**.** This study clearly demonstrated the temporal nature of the influence on yield of residue retention, as yield reductions from non-removal of crop residue were confined to ratoon crops within a production cycle and the negative effects did not carry over to the plant-cane crops of subsequent cycles.

Table 1. Influence of residue management on mean[1] sugar and cane yield, sucrose content and stalk population as an average of 10 crops in three consecutive production cycles

| Residue management treatment | Sugar yield lb/acre | Cane yield tons/acre | TRS lb/ton | Population Stalks $ha^{-1}$ |
|---|---|---|---|---|
| Pre-harvest burned (B) | 7,760 a | 37.0 a | 210 a | 49,020 a |
| Swept (S) | 7,198 b | 34.9 b | 206 a | 47,883 a |
| Retained (R) | 6,905 b | 33.7 b | 205 a | 46,202 a |

[1] Means in a column followed by the same letter are not significantly different (α = .05)

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