BILLET PLANTING RESEARCH

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Research continued to develop methods to maximize the chances of success with billet (stalk section) planting. During 2018, results were obtained from field experiments conducted at the Sugar Research Station at St. Gabriel evaluating the potential for seed-treatment chemicals to improve stand establishment and yield in billet plantings. Planting method tests comparing two billet planters and whole stalk hand planting and comparing tolerance to billet planting among varieties also were conducted at the Sugar Research Station.

Seed Treatment Chemicals

Chemical seed (billet) treatments continued to be evaluated in field experiments to determine whether they can increase yields obtained from billet plantings in Louisiana. Results were obtained from on-going and newly established experiments comparing different varieties, treatments, and application methods.

Second ratoon results were obtained in a field experiment comparing HoCP 96-540 non-treated billets and whole stalks to billets dip treated with different seed treatment chemicals singly or in combinations. The treatments were non-treated billets, non-treated whole stalks, Platinum 75 SG insecticide (thiamethoxam 75%) at 5.67 oz (weight)/acre, Uniform fungicide (azoxystrobin 28.2% and mefenoxam 10.9%) at 6.5 oz/acre, Quilt Xcel fungicide (azoxystrobin 13.5% and propiconazole 11.7%) at 20 oz/acre, Quadris fungicide (azoxystrobin 22.9%) at 11.5 oz/acre, Platinum + Uniform, Platinum + Quilt Xcel, Platinum + Quadris, Xanthion biofungicide (*Bacillus amyloliquefaciens* strain MBI 600) at 1.2 oz/acre (component A) and 6 oz/acre (component B), and the disinfectant Pinesol at 60 ml/gal (1.6%). The concentrations of the insecticide and fungicides in the dip solutions were selected to approximate commercial label rates, and the fungicides were adjusted to have similar concentrations of active ingredients for one fungicide, azoxystrobin.

Differences were detected in plant cane among treatments for cane tonnage and total sugar yields (Table 1). Five treatments, including Platinum (insecticide), Xanthion and the three insecticide/fungicide treatments, Platinum + Uniform, Platinum + Quilt Xcel, and Platinum + Quadris, had equivalent cane tonnage yields to the whole stalk planting. All of those treatments with the exception of Xanthion had higher tonnage and total sugar yield than non-treated billets. In first ratoon, cane tonnage was still lower for non-treated billets compared to whole stalks, while the fungicide and insecticide treatments were similar to whole stalks, except for Quadris alone (Table 1). Similar results were obtained for total sugar per acre, except Uniform alone and Pinesol also produced a lower yield than whole stalks. In second ratoon, the highest cane tonnage and total sugar yields were obtained from the whole stalk, Platinum dip, and Platinum + Quadris dip treatments (Table 1). All three treatments produced higher yields than non-treated billets.

Table 1. Cane tonnage and total sugar yields for HoCP 96-540 billets planted with and without dip treatment with different combinations of seed-treatment chemicals and non-treated whole stalks in 2016 plant cane, 2017 first ratoon, and 2018 second ratoon in a field experiment at the Sugar Research Station.

	Plant cane		First ratoon		Second ratoon	
Treatment	Tons cane/A[1]	Sugar/A (lbs.)[1]	Tons cane/A[1]	Sugar/A (lbs.)[1]	Tons cane/A[1]	Sugar/A (lbs.)[1]
Non-treated billets	30.7 d	6,640 c	31.3 b	6,881 b	34.3 c	7,032 c
Non-treated whole stalks	47.0 a	10,497 a	44.0 a	9,582 a	49.7 ab	10,638 ab
Platinum dip	43.6 abc	9,603 ab	38.3 ab	8,498 ab	54.7 a	11,086 a
Uniform dip	32.1 d	7,063 c	34.9 ab	7,532 b	40.0 abc	8,397 abc
Quilt Xcel dip	35.4 bcd	7,898 bc	38.2 ab	8,249 ab	38.0 bc	8,007 abc
Quadris dip	34.7 cd	7,580 bc	34.2 b	7,791 b	37.0 c	7,227 c
Platinum + Uniform	43.1 abc	9,370 ab	35.9 ab	7,860 ab	37.7 bc	7,762 bc
Platinum + Quilt Xcel	45.1 ab	9,583 ab	39.3 ab	8,432 ab	41.7 abc	8,516 abc
Platinum + Quadris	43.7 abc	9,666 ab	39.7 ab	8,441 ab	53.3 ab	11,084 a
Xanthion	36.9 abcd	7,960 bc	38.0 ab	8,079 ab	42.0 abc	8,499 abc
Pinesol	32.5 d	7,040 c	36.1 ab	7,776 b	48.6 abc	10,099 abc

[1]Mean values within a column followed by the same letter were not significantly different (P>0.05). A = acre.

First ratoon yields were obtained in a field experiment comparing HoCP 96-540 non-treated billets and whole stalks to billets dip treated with seed treatment chemicals singly or in combinations. The treatments were non-treated billets, non-treated whole stalks, Platinum 75 SG insecticide (thiamethoxam 75%) at 5.67 oz (weight)/acre, Abound (Quadris) fungicide (azoxystrobin 22.9%) at 11.5 oz/acre, Quilt Xcel fungicide (azoxystrobin 13.5% and propiconazole 11.7%) at 20 oz/acre, Headline fungicide (pyraclostrobin 23.6%) 11.5 oz/acre, Priaxor fungicide (fluxapyroxad 14.33% and pyraclostrobin 28.58%), Platinum + Abound, Platinum + Quilt Xcel, Platinum + Headline, Platinum + Priaxor, and Pinesol at 60 ml/gal (1.6%).

Few differences were detected among treatments for cane tonnage and total sugar yields in first ratoon (Table 2). Only the whole stalk planting had higher cane and sugar yields than non-treated billets. Two treatments, the Platinum and Pinesol dips, had lower total sugar yield than non-treated billets.

The 2017 plant cane experiment compared HoCP 96-540 non-treated billets and whole stalks to billets either sprayed in-furrow or dip-treated with seed treatment chemicals singly or in combinations. The in-furrow treatment was applied with a CO_2 back-pack sprayer over the billets in the planting furrow before covering on a 36 inch band with a spray volume of 15 gallons per acre. The treatments were non-treated billets, non-treated whole stalks, Platinum 75 SG insecticide (thiamethoxam 75%) at 5.67 oz/acre (weight)/acre applied as an in-furrow spray and a dip; Quadris fungicide (azoxystrobin 22.9%) at 5.8 oz/acre as an in-furrow spray and a dip at 11.5 oz/acre; Quilt Xcel fungicide (azoxystrobin 13.5% and propiconazole 11.7%) applied at 10.2 oz/acre as an in-furrow spray and a dip at 20 oz/acre; Headline fungicide (pyraclostrobin 23.6%) as a dip 11.5 oz/acre; Priaxor fungicide (fluxapyroxad 14.33% and pyraclostrobin

28.58%) as a dip 11.5 oz/acre; Platinum + Quadris as an in-furrow spray at 5.67 oz/acre and 5.8 oz/acre, respectively, and a dip at 5.67 oz/acre and 11.5 oz/acre, respectively; Platinum + Quilt Xcel as an in-furrow spray at 5.67 oz/acre and 10.2 oz/acre, respectively, and a dip at 5.67 oz/acre and 20 oz/acre, respectively; Platinum + Headline; and Platinum + Priaxor.

Table 2. Comparison of 2017 plant cane and 2018 first ratoon cane tonnage and total sugar yields for HoCP 96-540 billets planted with and without dip treatment with different combinations of seed-treatment chemicals and non-treated whole stalks in a field experiment at the Sugar Research Station.

Variety and treatment	Tons cane/acre[1] Plant cane	Sugar/acre (lbs.)[1] Plant cane	Tons cane/acre[1] First ratoon	Sugar/acre (lbs.)[1] First ratoon
Non-treated billets	44.2 cd	9,879 cd	51.7 bc	10,053 b
Non-treated whole stalks	49.5 ab	11,155 abc	61.3 a	11,803 a
Platinum dip	45.2 bcd	10,386 abcd	41.7 d	7.586 d
Quadris dip	42.0 d	9,594 d	52.5 ab	10,467 ab
Quilt Xcel dip	43.2 cd	10,099 bcd	49.7 bcd	9,411 bc
Headline dip	46.5 abcd	10,743 abcd	54.7 ab	10.935 ab
Priaxor dip	47.2 abc	11,015 abc	50.0 bcd	9,696 bc
Platinum+Quadris	51.0 a	11,697 a	57.3 ab	10,973 ab
Platinum+Quilt Xcel	47.2 abc	10,766 abcd	51.7 bc	9,993 bc
Platinum+Priaxor	50.2 ab	11,456 a	52.0 bc	10,271 ab
Platinum+Headline	50.2 ab	11,378 ab	52.3 bc	9,987 bc
Pinesol	34.8 e	7,925 e	43.5 cd	8,305 cd

[1]Mean values within a column followed by the same letter were not significantly different (*P*>0.05).

Stand establishment and plant cane yield components were determined and compared. Differences were detected among treatments for initial fall shoot populations, spring shoot populations, and millable stalk populations (Table 3). Initial shoot populations during the fall were higher for the Headline dip and three of the four fungicide/insecticide combination dips compared to non-treated billets. All four fungicide/insecticide combination dips and whole stalks had higher spring shoot populations than non-treated billets. The Platinum + Quadris and Platinum + Quilt Xcel dips had similar populations to whole stalks. Only whole stalks and the Platinum + Quadris and Platinum + Quilt Xcel dips had more millable stalks than non-treated billets.

Differences were detected for some yield components among the treatments (Table 4). No differences were detected among treatments for stalk weight and commercially recoverable sugar. Two treatments, whole stalks and the Platinum + Quilt Xcel dip, had higher cane tonnage than non-treated billets, but only whole stalks had higher total sugar yield. The fungicide/insecticide combination dip treatments had large numerical increases in tons of cane and total sugar compared to non-treated billets, but due to variability among replicates, these increases were not significant. As has been typical in the seed treatment chemical experiments, the yield increases have resulted mostly from higher stalk populations, and these higher populations have been evident from primary shoot emergence after planting.

Table 3. Comparison of plant cane fall (primary) shoot, spring shoot, and millable stalk populations for HoCP 96-540 billets with and without treatment with different combinations of seed-treatment chemicals applied as an in-furrow spray or dip and whole stalks in a field experiment conducted at the Sugar Research Station during 2017.

Treatment	Fall shoots/acre[1]	Spring shoot population/acre[1]	Millable stalks per acre[1]
Non-treated billets	4,496 e	5,264 de	27,466 cd
Non-treated whole stalks	7,180 abcde	12,130 a	34,089 a
Platinum in-furrow spray	4,497 e	4,985 de	31,057 abc
Quadris in-furrow spray	4,566 e	3,834 e	29,384 bcd
Quilt Xcel in-furrow spray	5,403 bcde	5,786 de	30,150 abcd
Platinum+Quadris spray	6,030 bcde	6,379 de	28,233cd
Platinum+Quilt Xcel spray	5,228 cde	5,298 de	28,024 cd
Platinum dip	5,368 cde	5,438 de	27,607 cd
Quadris dip	5,194 cde	6,135 de	30,917 abc
Quilt Xcel dip	4,741 de	5,682 de	26,700 cd
Headline dip	7,424 abcd	6,728 cde	31,092 abc
Priaxor dip	5,821 bcde	6,239 de	25,584 d
Platinum+Quadris dip	9,202 a	10,352 ab	32,939 ab
Platinum+Quilt Xcel dip	8,226 ab	10,178 abc	33,671 ab
Platinum+Headline dip	7,598 abc	8,157 bcd	31,231 abc
Platinum+Priaxor dip	6,065 bcde	8,296 bcd	30,116 abcd

[1]Mean values within a column followed by the same letter were not significantly different (P>0.05).

A second plant cane experiment compared non-treated billets and whole stalks of HoCP 96-540 to billets treated with a group of FMC Corporation fungicides and insecticides applied singly and in combination as dip treatments and with experimental FMC 3RIVE 3D equipment that applies pesticides in-a-drill as foam. The treatments were: non-treated billets planted in an open furrow or in a double-drill, whole stalks in a double-drill, 3RIVE applied insecticide/biofungicide combination in a double-drill, 3RIVE applied fungicide/insecticide combination in a double-drill, insecticide/biofungicide dip, Topguard Terra fungicide (flutriafol 42%) 8 oz/acre dip, Ethos XB insecticide/fungicide (bifenthrin 15.67% and *Bacillus amyloliquefaciens* strain D747 5.0%) dip, and for comparison with previous experiments, a combination of Platinum 75 SG insecticide (thiamethoxam 75%) at 5.67 oz/acre and Quilt Xcel fungicide (azoxystrobin 13.5% and propiconazole 11.7%) at 20 oz/acre applied as a dip.

Stand establishment and plant cane yield components were determined and compared. Differences were detected among treatments for initial fall shoot populations, spring shoot populations, and millable stalk populations (Table 5). Initial shoot populations during the fall were higher for whole stalks and the Topguard Terra, FMC insecticide/biofungicide, and

Platinum+Quilt Xcel dips compared to the non-treated billet checks. The whole stalk, Topguard Terra dip, and Platinum+Quilt Xcel dip treatments had higher spring shoot populations than non-treated billets. The same treatments had more millable stalks than non-treated billets, and the Topguard Terra and Platinum+Quilt Xcel dip treatments had similar stalk populations to the whole stalk planting.

Differences were detected for some yield components among the treatments (Table 6). No differences were detected among treatments for stalk weight. Whole stalks had higher sugar per ton of cane than non-treated billets and all other treatments, except the Topguard Terra and the Ethos XB dips. The whole stalk, Topguard Terra dip, and Platinum+Quilt Xcel dip treatments had higher tons of cane and total sugar than non-treated billets. The Ethos XB treatment also had a higher total sugar yield than non-treated billets. The whole stalk planting had the highest total sugar yield, but the Topguard Terra and Platinum+Quilt Xcel treatments had similar tons of cane to whole stalks.

Table 4. Comparison of plant cane yield components for HoCP 96-540 billets with and without treatment with different combinations of seed-treatment chemicals applied as an in-furrow spray or dip and whole stalks in a field experiment at the Sugar Research Station during 2017.

Treatment	Stalk weight (lbs.)[1]	Sugar/ton cane (lbs.)[1]	Tons cane/acre[1]	Sugar/acre (lbs.)[1]
Non-treated billets	2.15 ab	213	30.6 cd	6,522 bc
Whole stalks	2.17 ab	215	42.8 a	9,197 a
Platinum in-furrow spray	2.18 ab	214	29.0 d	6,124 c
Quadris in-furrow spray	2.14 ab	209	33.7 bcd	7,218 abc
Quilt Xcel in-furrow spray	2.24 ab	207	32.8 bcd	6,881 bc
Platinum+Quadris spray	2.49 a	215	33.3 bcd	6,908 bc
Platinum+Quilt Xcel spray	2.23 ab	212	32.3 bcd	6,938 bc
Platinum dip	2.31 ab	212	30.7 cd	6.505 bc
Quadris dip	2.15 ab	213	34.0 abcd	7,221 abc
Quilt Xcel dip	2.01 b	214	30.8 cd	6,575 bc
Headline dip	2.30 ab	209	36.4 abcd	7,867 bc
Priaxor dip	2.14 ab	213	32.9 bcd	6,896 bc
Platinum+Quadris dip	2.46 a	208	37.7 abcd	8,058 abc
Platinum+Quilt Xcel dip	2.15 ab	209	40.7 ab	8,470 ab
Platinum+Headline dip	2.21 ab	211	38.1 abc	8,003 ab
Platinum+Priaxor dip	2.19 ab	215	35.1 abcd	7,405 abc

[1]Mean values within a column followed by the same letter were not significantly different (*P*>0.05). No letters are shown when all means were similar.

Table 5. Comparison of plant cane fall (primary) shoot, spring shoot, and millable stalk populations for FMC 3Rive billet seed treatment chemical experiment conducted at the Sugar Research Station during 2018.

Treatment	Fall shoots/acre[1]	Spring shoot population/acre[1]	Millable stalks per acre[1]
Non-treated billets Open-furrow	6,646 de	9,457 cd	19,450 d
Non-treated billets Double-drill	6,297 e	8,157 d	19,496 d
Whole stalks	13,036 a	32,207 a	36,436 a
3RIVE insecticide biofungicide combination	7,947 cd	9,179cd	19,682 d
3RIVE fungicide insecticide combination	6,321 e	8,970 cd	19,310 d
Topguard Terra dip	10,991 b	20,123 b	29,953 abc
FMC insecticide biofungicide combination dip	8,110 c	10,782 cd	22,610 cd
Ethos XB dip	7,622 cde	13,408 c	23,725 bcd
Platinum+Quilt Xcel dip	11,572 b	24,422b	32,579 ab

[1]Mean values within a column followed by the same letter were not significantly different (*P*>0.05).

Table 6. Comparison of plant cane yield components for FMC 3Rive billet seed treatment chemical experiment conducted at the Sugar Research Station during 2018.

Treatment	Stalk weight (lbs.)[1]	Sugar/ton cane (lbs.)[1]	Tons cane/acre[1]	Sugar/acre (lbs.)[1]
Non-treated billets Open-furrow	2.57	197 bc	30.0 de	5.913 d
Non-treated billets Double-drill	2.49	203 bc	28.0 e	5,642 d
Whole stalks	2.44	223 a	54.3 a	12,058 a
3RIVE insecticide combination	2.40	190 c	33.5 de	6,453 cd
3RIVE fungicide insecticide combination	2.52	199 bc	28.5 e	5,664 d
Topguard Terra dip	2.27	205 abc	44.5 abc	9,096 b
FMC insecticide biofungicide combination dip	2.51	199 bc	34.7 cde	6,844 cd
Ethos XB dip	2.22	213 ab	38.5 bcd	8,205 bc
Platinum+Quilt Xcel dip	2.35	204 bc	46.5 ab	9,527 b

[1]Mean values within a column followed by the same letter were not significantly different (*P*>0.05).

The seed treatment chemicals continue to show potential to increase stands and stalk populations in billet plantings that result in increased cane tonnage and total sugar yield. The results continue to indicate that the most consistent benefit comes from dip application of combinations of insecticide and fungicides. A dip application of Pinesol has resulted in lower stands and yields in three experiments suggesting that it does not have a beneficial effect on planted billets, rather it is detrimental. As in previous experiments, an in-furrow spray application of chemicals alone or in combinations did not result in higher yields from billet planting. The results with the seed-treatment chemicals are promising, and the research will be continued. Developing an application method that will give similar beneficial results to a dip but be feasible in commercial planting systems is a high priority.

Planting Method Experiments

An experiment to compare two billet planting methods to hand whole stalk planting was harvested in second ratoon during 2018. Two varieties, HoCP 96-540 and HoCP 04-838, were included. Billets were planted with a conventional drum planter in which billets are metered under the drum into a single open furrow or with a double-drill planter in which billets are carried over the top and through two funnels into each of two narrow drills opened in the 70 inch row. Whole stalks were hand-planted at a rate of three stalks and a lap. The experiment was planted August 31, 2015. All planting method experiments have been conducted in cooperation with Dr. Paul White of the USDA-ARS Sugarcane Research Unit.

In plant cane, whole stalk planting of HoCP 96-540 had higher tons of cane than both billet planting methods, but total sugar per acre was comparable for double-drill billets (Table 7). The double-drill billets of HoCP 04-838 had higher cane tonnage and total sugar yields than open-furrow billets that were comparable to whole stalks. In first ratoon, tons of cane was still higher for double-drill billets and whole stalks of HoCP 04-838, while no differences were detected among methods for HoCP 96-540 (Table 7). In second ratoon, total sugar yield for whole stalk billets of HoCP 96-540 was again higher than for both billet planting methods, while cane tonnage and total sugar yields were again comparable for whole stalks and double-drill billets of HoCP 04-838 (Table 7). Cane tonnage was higher for double-drill compared to open-furrow billets.

Another experiment in plant cane compared the two billet planting methods, double-drill and open-furrow, to whole stalk planting for HoCP 96-540 and HoCP 09-804 during 2018. However, due to equipment break-down, only open-furrow billets were planted for HoCP 09-804. Planting rates for the billets were determined as number of billets and the weight of cane in the open furrow or for both drills combined. For HoCP 96-540, the planting rate assessed as number of billets in the furrow was slightly higher for double-drill billets, 7.8, compared to open-furrow billets, 6.8, with estimates of tons of cane planted per acre of 6.9 and 7.9, respectively. The estimates for running billets and tons of cane planted were 6.9 and 6.5, respectively, for HoCP 09-804.

Drought conditions following planting resulted in poor stand establish in the experiment, particularly for HoCP 96-540. There were differences among varieties and planting methods for shoot populations during the spring following planting (Table 8). Shoot populations for both billet planting methods were lower compared to whole stalks for both varieties. The population was lower for billets of HoCP 09-804, but the low populations of HoCP 96-540 for both billet planting methods would have been considered a stand failure in a commercial planting.

Table 7. Planting method comparison results for plant cane, first ratoon, and second ratoon yield components for HoCP 96-540 and HoCP 04-838 planted as billets with a conventional drum planter in an open furrow, billets planted in a double-drill, and hand-planted whole stalks in a field experiment conducted at the Sugar Research Station during 2018 (planted August 31, 2015).

	Tons cane/acre[1]	Sugar/acre (lbs.)[1]	Tons cane/acre[1]	Sugar/acre (lbs.)[1]	Tons cane/acre[1]	Sugar/acre (lbs.)[1]
Variety and treatment	Plant cane	Plant cane	First ratoon	First ratoon	Second ratoon	Second ratoon
HoCP 96-540						
Double-drill billets	38.8 b	6,950 ab	27.7 ab	5,099 a	28.1 bc	4,721 c
Drum planter/open-furrow billets	36.8 bc	6,753 b	24.1 abc	4,482 ab	26.3 c	4,677 c
Whole stalk hand-plant	42.0 a	7,366 a	27.8 a	5,161 a	31.9 abc	5,694 ab
HoCP 04-838						
Double-drill billets	36.3 c	6,896 ab	22.0 c	4,140 b	35.8 a	5,930 ab
Drum planter/open-furrow billets	33.4 d	6,096 c	20.6 d	3,956 b	27.9 bc	5,019 bc
Whole stalk hand-plant	36.1 c	6,711 b	23.6 bc	4,596 ab	33.2 ab	6,012 a

[1]Mean values within a column followed by the same letter were not significantly different (P>0.05).

Stalk weight was higher for HoCP 96-540 compared to HoCP 09-804, while commercially recoverable sugar was higher for HoCP 09-804, as expected, but neither yield component was affected by planting method (Table 9). Differences between planting methods were detected for tons of cane and total sugar yield for HoCP 96-540 but not HoCP 09-804. Billet planted HoCP 09-804 produced similar yields to whole stalk planting, while both billet planting methods produced lower yields compared to whole stalk planting of HoCP 96-540. Total sugar per acre yield was higher for double-drilled billets compared to open-furrow planted billets.

Considering the results altogether, double-drill planting of billets in a traditional row has the potential to produce higher yields than open furrow billet planting. Double-drill planting can preserve moisture in the row, and it may allow wider utilization of the row top. Stressful environmental conditions, especially drought after planting, have occurred in two of three seasons following planting, and all experiments have been planted in heavy clay soils, as well. Under these conditions, HoCP 04-838 and HoCP 09-804 have exhibited better tolerance of billet planting than HoCP 96-540.

Table 8. Comparison of spring shoot populations for HoCP 96-540 and HoCP 09-804 planted as billets with a conventional drum planter in an open furrow, billets planted in a double-drill, and hand-planted whole stalks in a field experiment conducted at the Sugar Research Station during 2018 (planted October 5-6, 2017).

Variety and treatment	Spring shoot population/acre[1]
HoCP 96-540	
Double-drill billets	2,211 c
Drum planter/open-furrow billets	761 c
Whole stalk hand-plant	9,389 ab
HoCP 09-804	
Drum planter/open-furrow billets	7,395 b
Whole stalk hand-plant	11,274 a

[1]Mean values within a column followed by the same letter were not significantly different (*P*>0.05).

Table 9. Planting method comparison results for plant cane yield components of HoCP 96-540 and HoCP 09-804 planted as billets with a conventional drum planter in an open furrow, billets planted in a double-drill, and hand-planted whole stalks in a field experiment conducted at the Sugar Research Station during 2018 (planted October 5-6, 2017).

Variety and treatment	Stalk weight (lbs.)[1]	Sugar/ton cane (lbs.)[1]	Tons cane/acre[1]	Sugar/acre (lbs.)[1]
HoCP 96-540				
Double-drill billets	2.5 abc	174 b	24.9 c	4,344 b
Drum planter/open-furrow billets	2.7 ab	166 b	18.3 c	3,051 c
Whole stalk hand-plant	2.9 a	173 b	48.5 a	8,391 a
HoCP 09-804				
Drum planter/open-furrow billets	2.3 bc	198 a	39.8 b	7,888 a
Whole stalk hand-plant	2.1 c	200 a	44.8 ab	8.957 a

[1]Mean values within a column followed by the same letter were not significantly different (*P*>0.05).