BILLET PLANTING RESEARCH

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Research continued to develop methods to maximize the chances of success with billet planting. During 2005, results were obtained from field experiments conducted at the St. Gabriel Research Station at St. Gabriel, LA. The research included second ratoon of experiments comparing dates and rates of billet planting of LCP 85-384 and a comparison in plantcane of billet and whole stalk planting of recently released and experimental varieties.

The collection and comparison of second ratoon results for the date and rate of billet planting experiment represents the completion of three, 3-year crop cycle experiments comparing the effects of these planting factors on billet planting performance of LCP 85-384. No significant differences were detected among original planting dates in second ratoon of the third experiment (Table 1). The results from all three crop cycle years of the third experiment are presented for comparison. Very early (beginning of August) and very late (October) planting dates were included in the first and third experiments, respectively. The lower cane tonnage yields detected for the October planting date in plantcane and first ratoon and lower plantcane sugar yield did not persist into second ratoon (Table 1). Yields from the early planting date were lower in plantcane only (results in 2003 Annual Report). No other consistent differences were detected among yields obtained for planting dates from mid-August to late September across the three experiments.

Table 1. Effect of planting date on three-year crop cycle yields of billet planted LCP 85-384.

	Tons cane per acre[1]			Sugar per acre (lbs.)[1]		
Planting date	Plantcane	1st ratoon	2nd ratoon	Plantcane	1st ratoon	2nd ratoon
Aug 18	36.9 A	32.2 A	26.0	7116 A	5888	4360
Aug 27	34.1 AB	28.1 AB	25.2	6534 AB	5466	4328
Sept 13	32.3 B	30.6 AB	25.1	6285 B	5569	4317
Oct 18	26.8 C	26.3 B	26.1	5072 C	4921	4294

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

Differences were detected among billet planting rates in second ratoon cane tonnage and sucrose per acre yields for the August but not September planting dates (Tables 2 and 3). The one billet planting rate produced the lowest yields, as in the first two crop cycle years and in two previous experiments. The 12 billet planting rate produced the highest sucrose per acre yield.

Yield components were compared for billet and whole stalk plantings of four commercial varieties, LCP 85-384, Ho 95-988, HoCP 96-540, and L 97-128, and three experimental varieties, L 99-226, L 99-233, and L 00-266 (Table 4). The plantings in this experiment endured severe drought conditions after planting. Plantcane yield assessed as cane tonnage and sugar per acre were lower for LCP 85-384, Ho 95-988, HoCP 96-540, L 99-226, and L 00-266. The millable stalk population also was lower for all of these varieties except HoCP 96-540. Yields for

Ho 95-988 showed the largest reductions, and sugar per ton was higher for whole stalk than billet planted Ho 95-988. Yields were similar for billet and whole stalk plantings of L 97-128 and L 99-233. This experiment was replanted during Fall, 2005 to obtain additional needed information about the ability of recently released and experimental varieties to tolerate billet planting.

Varieties have been demonstrated to vary in tolerance to billet planting. In addition, planting practices have been shown to be very important with billets. They are more sensitive than whole stalks to any planting problem, and billet planting is more expensive than whole stalk planting. However, certain conditions, particularly severe cane lodging, result in the need to plant billets. Research results from this and previous years indicate that practices to maximize the chance of success with billet planting include: providing a well prepared seed-bed, planting long (20-24 inch) billets with a low level of physical damage, planting at a high rate (three or more running billets in the planting furrow), covering with a uniform layer of no more than 3 inches of packed soil, and providing good drainage and careful weed control.

Table 2. Effect of rate of planting on three-year crop cycle cane tonnage yield of LCP 85-384 planted as billets at five rates on two dates.

	Plantcane[1]		1st ratoon[1]		2nd ratoon[1]	
Rate	Aug 15	Sept 16	Aug 15	Sept 16	Aug 15	Sept 16
1 billet	36.6 B	33.8 C	33.1 B	36.7	27.6 B	34.9
3 billets	41.2 AB	45.1 AB	38.0 AB	43.8	32.7 A	37.4
6 billets	45.4 A	43.6 B	42.3 A	39.0	30.9 A	35.7
9 billets	46.1 A	46.6 AB	41.5 A	36.6	32.6 A	35.0
12 billets	45.3 A	53.0 A	33.6 B	37.4	34.1 A	36.0

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

Table 3. Effect of rate of planting on three-year crop cycle pounds of sucrose per acre yield of LCP 85-384 planted as billets at five rates on two dates.

	Plantcane[1]		1st ratoon[1]		2nd ratoon[1]	
Rate	Aug 15	Sept 16	Aug 15	Sept 16	Aug 15	Sept 16
1 billet	7074 B	6421 C	7037 B	7782 AB	4767 C	5809
3 billets	8034 AB	8508 B	7790 AB	9332 A	5416 BC	6031
6 billets	8811 AB	8616 B	8554 A	8357 AB	5114 BC	5884
9 billets	9275 A	9133 AB	8243 AB	7492 B	5496 B	5551
12 billets	9172 AB	10854 A	7046 B	7952 AB	6057 A	6161

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

Table 4. Comparison of plantcane yield components for billet and whole stalk plantings of four commercial and three experimental varieties.

Variety	Treatment	Stalks/acre (x1000)[1]	Stalk wt. (lbs.)[1]	Sugar/ton (lbs.)[1]	Tons cane per acre[1]	Sugar/acre (lbs.)[1]
LCP85-384	Billet	32.8 B	1.75	202	28.4 B	5756 B
	Whole	50.0 A	1.61	206	40.2 A	8297 A
Ho95-988	Billet	18.7 B	1.98	189 B	18.6 B	3511 B
	Whole	36.2 A	1.94	205 A	35.2 A	7231 A
HoCP96-540	Billet	34.7	2.29	209	39.4 B	8241 B
	Whole	42.1	2.25	212	47.3 A	10018 A
L97-128	Billet	33.7	1.99	218	33.6	7298
	Whole	37.0	2.14	209	39.5	8256
L99-226	Billet	31.9 B	2.24	196	35.5 B	6973 B
	Whole	36.9 A	2.73	206	50.5 A	10401 A
L99-233	Billet	52.6	1.66	211	43.6	9212
	Whole	51.6	1.87	204	48.2	9844
L00-266	Billet	39.6 B	1.54	185	30.6 B	5652 B
	Whole	45.4 A	1.78	191	40.5 A	7761 A

[1]Values of different yield components within a variety followed by different letters were significantly different (P=0.05).

RESIDUE MANAGEMENT RESEARCH IN SUGARCANE IN 2005

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In cooperation with
St. Gabriel Research Station

The effect of residue size reduction and other treatments on soil respiration and productivity of LCP85-384 on a light-textured soil.

This study was initiated in 2004(plantcane harvest residue; 1st ratoon yield) and carried in place through 2005 (1st ratoon harvest residue; 2nd ratoon yield). There were eight methods to manage harvest residue: burn, sweep to middles, untreated, treated with 30 lb/a slow release N, soil incorporated, reduced particle size, reduced particle size + 30 lb/a slow release N , and reduced particle size and soil incorporated. Soil respiration data, based on four measurements taken in late winter to early spring, indicated residue reduced in particle size and soil incorporated resulted in a significantly higher decomposition rate compared to other treatments except those treated with slow release N (Fig 1). The soil incorporation of residue reduced in particle size consistently produced the highest respiration (decomposition) rates both years of the study. A higher rate of decomposition should reduce suggested negative effects on the developing crop that may occur from growing in a harvest residue blanket. This in turn should be expressed as increased productivity. Indeed, soil incorporated residue treatments did produce the highest sugar yields in 2005; significantly higher than the unincorporated counterparts (Fig. 2). The relationship between decomposition rate and productivity was not consistent, however, as respiration rate in the residue + incorporate treatment was low, but yield was high. Respiration rates may have increased at a later time after our measurements were completed. Regardless, the results of two years at this location indicated reducing residue particle size followed by soil incorporation consistently produced the highest yields. This method of residue management would dovetail well with efforts to reduce tillage in sugarcane production. No tillage or limited additional spring tillage would be required depending on the amount of field damage during harvest. This would be similar to the stale seedbed concept used for annual row crops in other areas of the state.

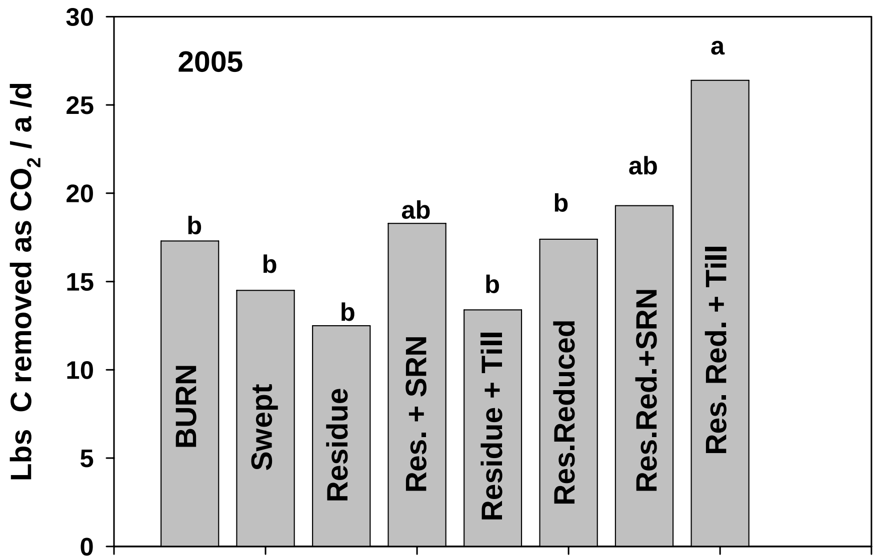

Fig. 1. The effect of harvest residue management input on carbon removed by soil (microbial) respiration. Average of 4 measurements, late winter-early spring.

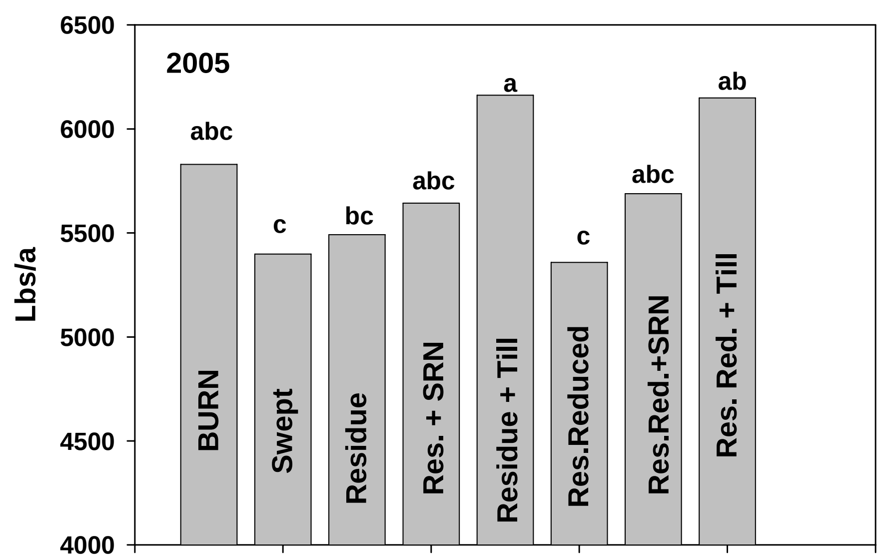

Fig. 2. The effect of harvest residue managment inputs on sugar yield of 2nd ratoon LCP85-384.

THE INFLUENCE OF FALLOW-PERIOD SOYBEANS ON SUGARCANE SEEDLING EMERGENCE AND PRODUCTIVITY

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Iberia Research Station

Summary:

Sugarcane growers often plant immediately following soybean harvest to accommodate the rapidly approaching mill openings. While the adverse effects on yield for plantings made directly into the decomposing residue of green manure soybeans have been documented, such is not the case for sugarcane planted behind soybeans grown for seed harvest. A study designed to evaluate the influence of fallow-period soybeans on sugarcane seedling emergence and productivity was planted in the fall of 2005. Three plantings, spaced one to two weeks apart, were made following soybean harvest and a conventional fallow period, each with and without fertilizer (N-P-K lb/acre rate = 15-45-45). Seedling emergence counts were made approximately one month after each planting. The table below shows considerable variability in seedling emergence among the treatments. Averaged over fertilizer treatments, fewer plants emerged when sugarcane followed soybean harvest at each planting date. It appears, however, that fertilization at planting can help to mitigate poor emergence. These observations are based on fall emergence and may not hold when growth resumes in the spring. Spring stand counts and fall yield measurements will be taken during the 2006 growing season.

Comparison of Fall Seedling Emergence for Sugarcane Planted After a Conventional Fallow Period and Soybeans			
Planting date	Fallow treatment	Fertilizer	Seedlings/acre
9/12/05	Conventional	Yes	38,358
		No	45,013
9/12/05	Soybeans	Yes	40,293
		No	28,920
9/20/05	Conventional	Yes	34,605
		No	36,058
9/20/05	Soybeans	Yes	30,008
		No	24,925
10/3/05	Conventional	Yes	17,545
		No	17,908
10/3/05	Soybeans	Yes	13,068
		No	11,980

DEVELOPMENT OF PRECISION FARMING SENSORS FOR SUGARCANE

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Currently, no sensors exist to determine yield or density variances in sugarcane. Part of my work has been to develop sensors and systems that will help record yield and density variances in fields.

Work has been proceeding on a sensor to monitor sugarcane yield. A sensor was mounted on a combine harvester to monitor the amount of material in the conveyer. This sensor comprised of several optical eyes (that count the duty cycle of material on the conveyor slates) and an electrical box to record data with gps (global positioning system). The system was designed to easily fit on an existing harvester and only need three threaded nuts welded to the underside of the conveyor for placement. Results from the system (Figs. 1 & 2) indicate that the system may have potential to indicate variances in the field, although more work is needed to test this theory.

Work is also continuing on a multi-purpose sensor that can count the number of three foot skips in a field (fig. 3), plant stand indicator (fig. 4), or stalks. This system is being developed to operate on a multi-row cultivator. The system should allow farmers to obtain variance data of the sugarcane crops early in the season, before harvest. This data may be useful for pre-harvest management decisions.

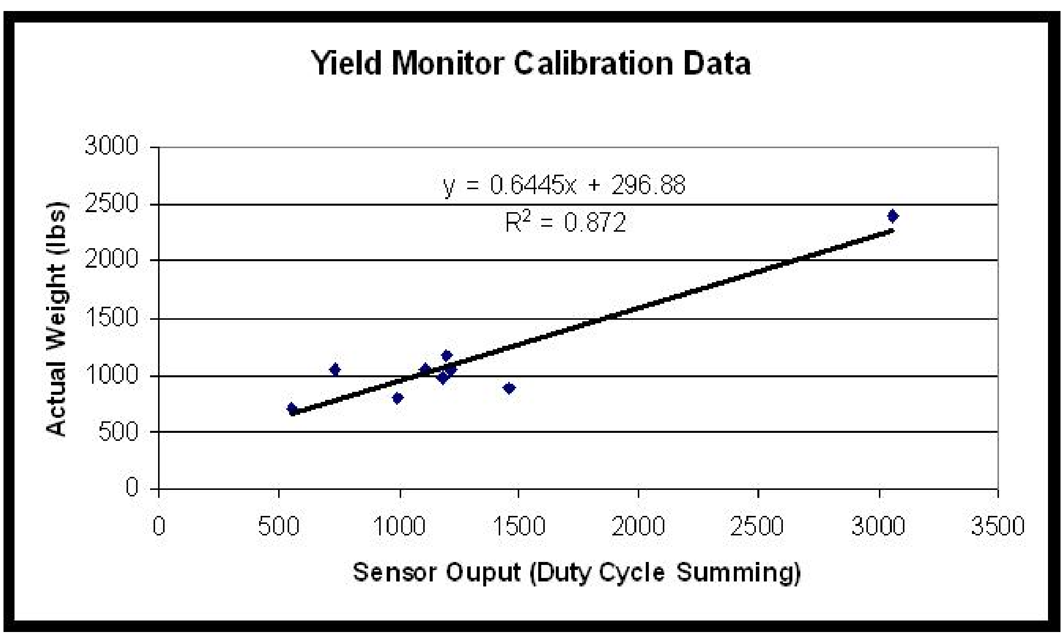

Figure 1: Calibration curve for optical yield monitor (more testing is needed to fill in points).

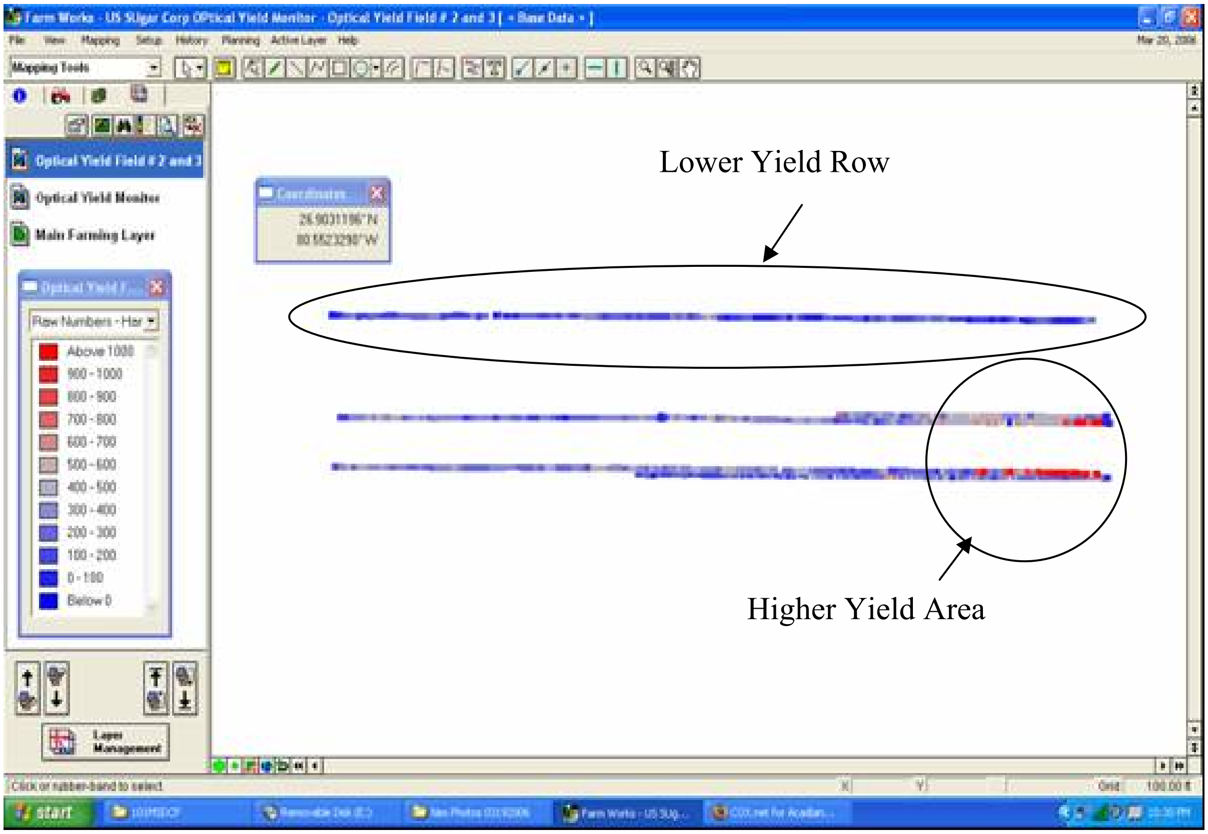

Figure 2: Variance in a field recorded with optical sensor (field length – ½ mile).

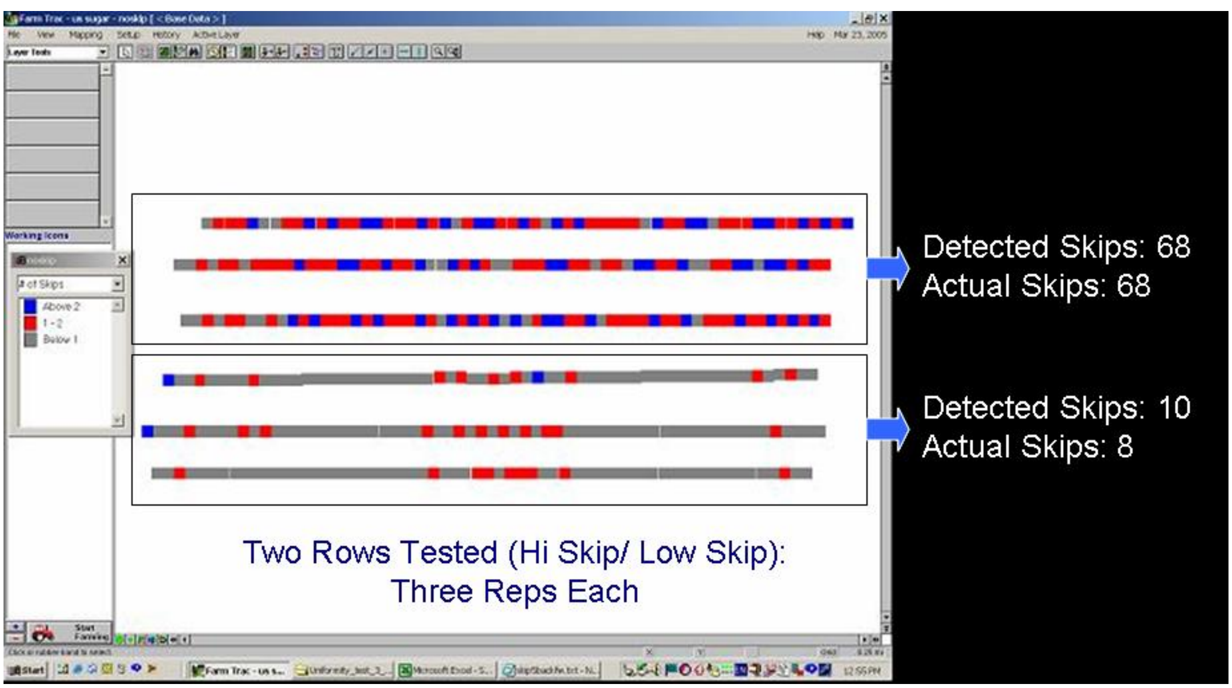

Figure 3: Three foot skip detection test on verification plot.

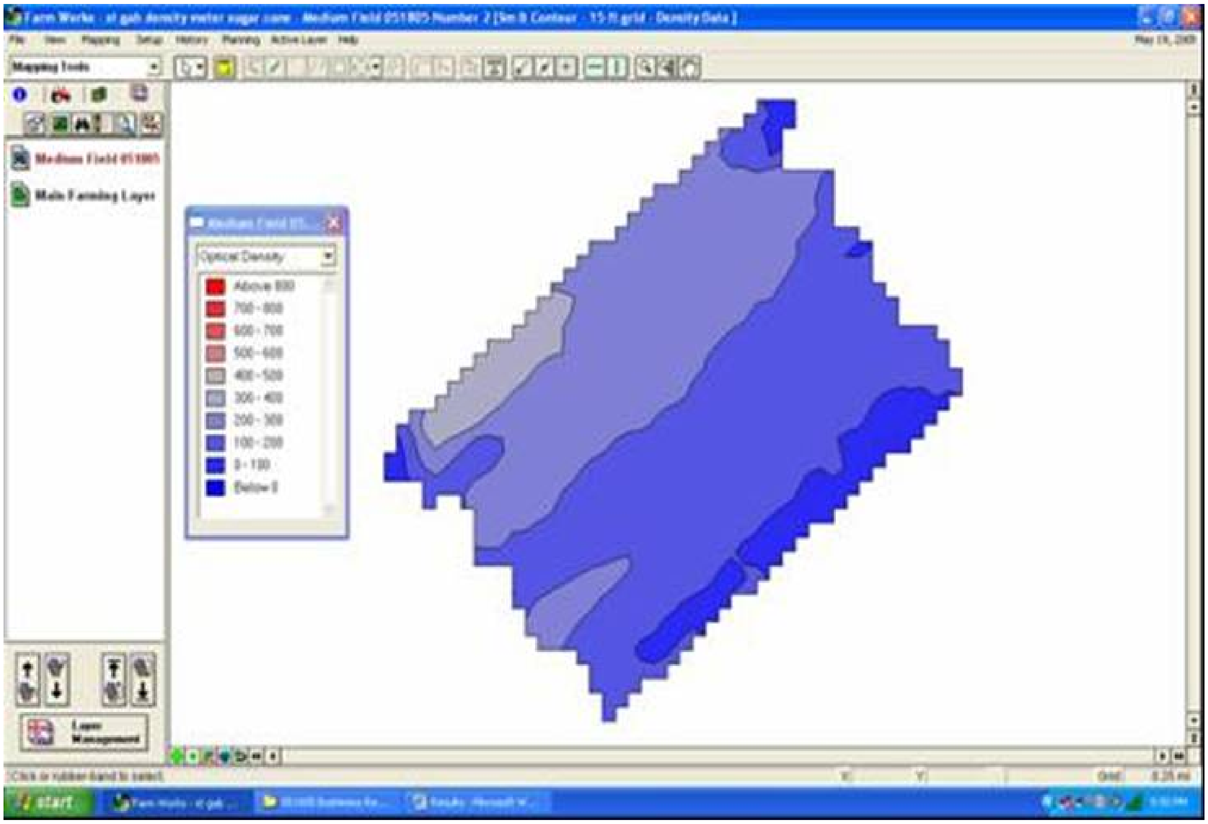

Figure 4: Mapping with a stand density indicator. Variances were the result of different varieties.