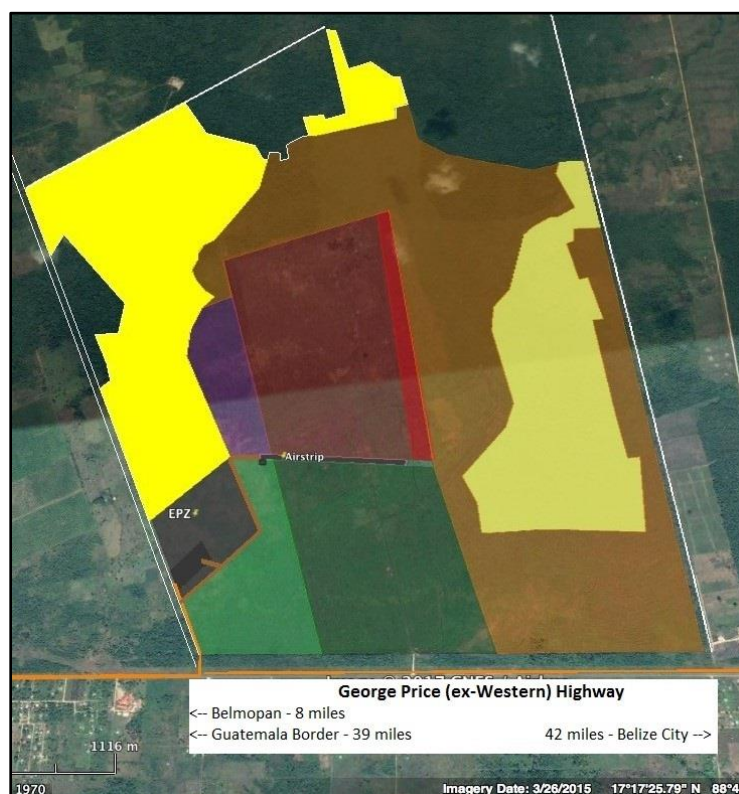
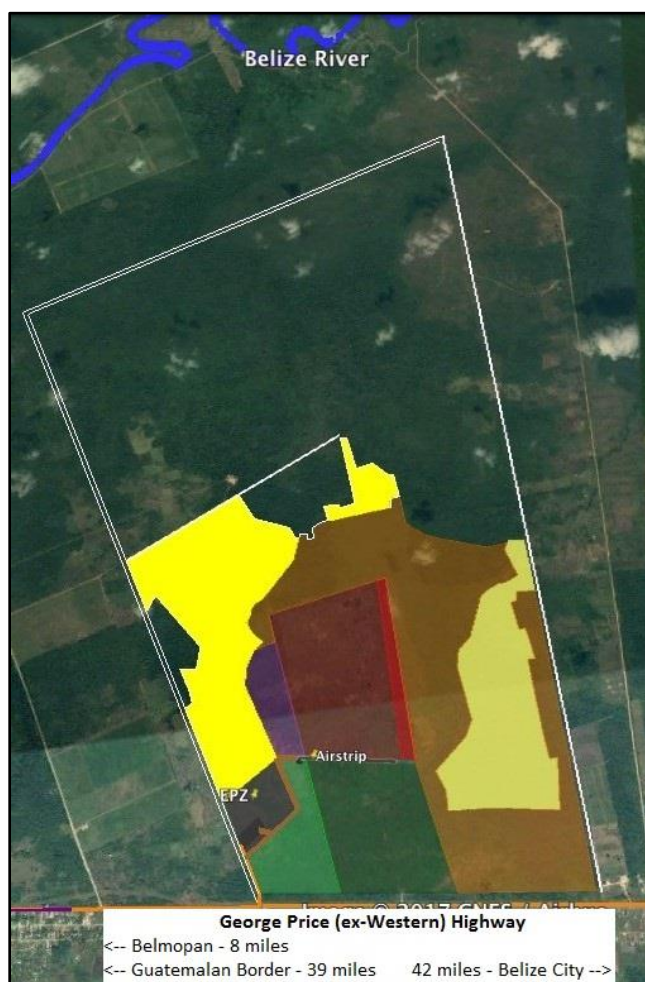


Belize Sustainable Agriculture, Ltd. Farming Report – November 27th, 2017

This is the **Tenth** Farming Report for BSA's 2017 Summer (Wet) season. Its main objectives are to inform readers about BSA's farming activities by season and crop; to provide data on climactic conditions, agricultural pests, and market conditions; as well as detailed data on BSA's farming methodologies.



Field 2: Subsoiled & Leveled	106 Ha	Mix Plow / Subsoil in progress	270 Ha
Field 2: Leveled / No Subsoil	13 Ha	Windrow / Work in Progress	173 Ha
Field 2N: Plowed / Some subsoil	23 Ha	Chained – No further work	109 Ha
Field 1: Leveled / No Subsoil	79 Ha	EPZ – Total Area	24 Ha
Field 1N: Plowed & Subsoiled	36 Ha	EPZ – Finished	2 Ha

BSA is only farming at the Cayo One Estate in the Summer 2017 season; it is situated some 8 miles east of Belmopan near the village of Cotton Tree in the Cayo District, and is ~39 miles east of the Belize-Guatemala border at Melchor de Mencos.

Weather Summary: November has been quite a dry month following October's historically heavy rains, thus continuing the recent pattern of weather volatility. There were two brief periods of heavy rains, aside from which the weather has been mostly sunny and bright. We consider that we will exit the historically active cyclone period on December 1st, and there is currently no cyclone activity forecast in the Atlantic for the next week.

Cayo One - Belmopan Precipitation Data (mm per month) – 2017 Season YTD Data through November 27 th													
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
2016/17	345	96	55	74	126	10	263	237	210	148	696	104	
2000-2016	129	139	65	49	32	124	271	256	236	230	260	232	2039

You can follow Belize's weather on: <http://www.hydromet.gov.bz/observations/radar/radar-images>

We also use the US NOAA Hurricane Center weather radar network which monitors the Caribbean basin, and recommend:
<http://www.nhc.noaa.gov/>
<https://www.wunderground.com/q/zmw:00000.1.WMGMM>

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Cayo One: ~ 201 Hectares (100% non-irrigated)

The exact acreage to be planted during the Summer 2017 season has now been determined, which is comprised of Fields 1 and 2. Most of Field 2 has been subsoiled, and, as the discussion and photographs during this season have demonstrated, we continue to be well pleased with the indications of the benefits of subsoiling.

Weather Analysis

After October's extremely wet total of 696 mm of rain (vs. 260 mm 17-year average), which was a 20+ year record for October rainfall in Cayo, November saw a return of erratic weather, with 104mm of rain recorded at the Cayo One Estate through November 27th. The rains came again mostly in two downpours, 40 mm between November 11th and 14th, and 50mm between November 18th and 19th.

The main moisture issues from October's extreme rain affecting the Cayo One crop have been threefold, all of which are discussed in greater detail in subsequent sections:

- 1) Slowing down the crop's drying during the R6 stage, which pushed the target date for commencement of harvest operations out to November 27th.
- 2) Wet soil conditions, which have made accessing Cayo One's fields for harvest operations more challenging and costly.
- 3) Fungus issues, which eventually broke through our strong preventative measures.

Temperatures continued to moderate in November, falling to an average (29° C / 85°F) and relative humidity fell somewhat from recent highs to an average of about 93%.

We are at the end of a very active Tropical Cyclone season, with no cyclone activity forecast for the next week. We therefore believe that our grain will be in silo, and indeed on its way to end customers, before we would be exposed to any possible new cyclones. Moreover, December cyclones are historically very rare. As we have repeated throughout the season, predicting Tropical Cyclone activity and landfalls is extremely difficult and we continue to rely on long term (100+ year) data that indicate that a tropical cyclone is not likely to impact Cayo One more than once a decade.

Land Preparation

There are two components to CSA's Land Preparation activities in 2017: Land Development and Farmland Preparation.

Land Development

A detailed discussion of CSA's Land Development activities was provided in the June 19th, 2017 Farming Report, which is available upon request.

As of November 27th, 2017 the status of BSA's fields is:

- Field 1 (79 Ha): was planted July 17th – 18th
Field 2 (122 Ha): was planted July 15th – 17th

We hope to have an informative and useful ability to compare the impact of subsoiling, as a small section of Field 2 (13 Ha) was not subsoiled, and Field 1 was not subsoiled. Evidence throughout the season, and especially after October's heavy rains, continues to show that Field 2 drains far faster and better than Field 1, and that subsoiling (and underground drainage!) is a necessity for all of Cayo One's fields.

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Seed Selection, Planting, and Crop Development

Seed Selection

Acreages planted so far are:

- Syngenta Impacto® – 197 Ha / 482 acres (Field 2 and most of Field 1) @ ~70,000 seeds/Ha or ~28,340 seeds/acre
- Pioneer® 4226 – 4 Ha / 10 acres (a small part of Field 1) @ ~70,000 seeds/Ha or ~28,340 seeds/acre

A detailed discussion of these two non-GMO hybrids is in the June 19th, 2017 Farming Report, which is available upon request.

Both plant varieties continue to develop well, but field surveys identified some noticeable differences in ear development. We have not performed a comparative kernel analysis between the two varieties.

Impacto® has shown very satisfactory plant growth and maintenance all the way through the ~130 days of this year's corn cycle. All Cayo One corn suffered from the high afternoon temperatures during the pollination phase, leading to the upper section of most ears not filling properly. Impacto® ears achieved an average 425 kernel count versus a goal of 550/575 in our September 26th field survey. We were also impressed during that survey with the 74,740/30,260 viable ears per Ha/Acre. Our first drying results show somewhat higher than expected stress cracking for Impacto® despite very gentle handling throughout the process. Impacto®, which is the first variety being harvested, did show some susceptibility to late season fungus, which is discussed below.

Pioneer® 4226 has fully caught up on its growth lag versus Impacto®, although we still conclude that it is somewhat more disease prone than Impacto®. 4226 had the same pollination issues as Impacto®, with the upper portion of the ears not pollinating properly. 4226 ears achieved an average 400 kernel count versus a goal of 500/525. 4226 is a variety known for lower kernel counts but substantially larger kernel sizes. Ear count was measured at 69,424/28,107 per Ha/Acre, versus a plant count of 65,920/26,690 viable ears. We will be harvesting Pioneer at the end of the harvest cycle, so we do not currently have any additional data available.

We have not been visited by the DuPont / Pioneer Technical Representative.

Planting Analytics

Planting Analytics were generally very encouraging, and the data obtained from our Seed Sense FieldView™ software has been very edifying. Singulation, spacing, and ride were all at >99%, and compaction very slight, averaging <2%. The information gleaned will help us further improve our planting next season, but we believe the combination of excellent (but improvable) planting techniques plus vigorous, high-quality seed, helped ensure the outstanding plant population seen on both Field 1 and Field 2.

A detailed report on Planting Analytics, with excerpts of computer printouts from our Seed Sense planting software, was provided in the July 17th Farming Report which is available upon request.

Crop Development

As of November 27th, we have just begun harvesting the Cayo One corn crop. The corn was into the end of the R6 stage (described in detail in the November 6th Report, which is available upon request) but still at 26% humidity on a sample taken on November 15th. However, that sample showed the first material signs of fungus on our crop,

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so we immediately began plans to accelerate harvest operations despite very wet ground conditions and the corn being well above the targeted 20-22% humidity range for ideal harvesting in Belize.

Weather conditions remained dry and balmy after rains on November 18th and 19th which allowed corn to dry down to 21% by the time harvesting was fully underway on November 27th. We began harvesting operations on Field 2, which, thanks to having been subsoiled, was sufficiently dry for tracked vehicles (combine and grain cart) to be able to operate without creating excessive ruts.

We will report in detail on crop harvest results during the week of December 18th, once harvest operations are completed and most of the crop has been shipped.

As we begin the 2017 Harvest we are excited to see the beginning of what will undoubtedly be Cayo One's best ever corn crop!

Field Survey Results

We repeat the data from a follow-up field survey which was performed on September 26th, 2017 in which the previously surveyed sixteen random, geo-mapped sections were re-surveyed for a “viable ear” count. Each section containing 16 segments that each measured approximately 1/1000th of an acre [17'6"]. In total we counted the ears on well over 7,000 corn plants.

September 26, 2017 Field Survey	Plant Count		Viable Ear Count		Kernels per Ear
	Ha	Acre	Ha	Acre	
Impacto®	69,640	28,200	74,737	30,258	425
Pioneer® 4226	65,920	26,690	69,424	28,107	401

- Both Impacto® and Pioneer® 4226 pollination were affected by early September's afternoon heat, leading to 20-25% kernel loss. This is partially offset by excellent results on viable ear formation.

Fertilizer Program

BSA has set a goal of a minimum average yield of 7 mt/Ha (112 bushels/acre) for its Summer 2017 corn crop.

However, CSA is fertilizing for a 9.4 mt/Ha (150 bushel/acre) yield, assuming a minimum fertilization rate of 110% of maintenance levels (the level at which the crop neither adds nor depletes to the soil's fertility).

We leveraged our access to low cost aerial applications throughout the season to increase the number of aerial fertilizer applications, and we made a final urea application to Fields 1 and 2 (total of 4 in each) on September 1st, following our corn's surprisingly rapid biological development.

Despite pollination issues due to afternoon heat in early September, we are pleased to see the high number of viable ears which formed. Our November 6th Survey indicates that our continued investment in (pre-planting) P and K is helping to ensure strong kernel development.

The following summary table provides an overview of our initial plant nutrition program.

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Fertilizer Application (lbs./acre)	N	P	K
Base	44	110	78
Liquid (fast uptake)	11	7	3
Urea	152	0	0
Foliar	0	0	0
Total	207	117	81
<i>150 Bushels/Acre Maintenance (lbs./acre):</i>	<i>188</i>	<i>66</i>	<i>42</i>
<i>Fertilizer Build / Draw (lbs./acre):</i>	<i>19</i>	<i>51</i>	<i>39</i>
<i>110% Fertilization requirement surplus:</i>	<i>0</i>	<i>44</i>	<i>34</i>

The June 19th, 2017 Farming Report has a detailed discussion of our fertilizer program; it is available upon request.

Adjusting for a 20-25% reduction in 2017 ear size due to pollination issues, we believe that 2017 Cayo One yields will demonstrate that we can reach or exceed, in years of reasonable weather, yields of 9+ mt/Ha (~150 Bu/Acre) on rainfed ground that is drained, subsoiled, and has sufficient organic matter. These yields would fully vindicate our major investment in crop nutrition.

Insects

Cayo One's crop is no longer exposed to insect pressure. However, we repeat that our own experience this year, and anecdotal reports throughout the region, confirm that insect pressure has been high throughout this season in Belize. This was further confirmed by the Syngenta Technical Representative who visited us in early November.

We consider that our aggressive insect management program has been effective thanks to a very proactive approach, which included the following applications:

- Initial our corn seed treatment (Syngenta's Fortenza®)
- Post planting insecticide application (DuPont Coragen®)
- Syngenta Karate®: (just registered in Belize; a suitable alternative to DuPont Coragen®)
- Syngenta Engeo® 247SC along with a phytotoxic oil as an additional suffocation agent.

Funguses and Bacteria

We began our fungus/bacteria management program using Syngenta's Amistar® in an initial prophylactic application on September 1st, during a simultaneous application with the insecticide Karate®. A second application took place on September 28th.

As previously expected, October's continued heavy rains did indeed increase the risk of aflatoxin and other funguses, which was aggravated by further rain in the first half of November. We have had growing reports from both Cayo and Orange Walk farmers of serious fungus/bacteria issues, especially where sufficient investment was made in preventative measures.

On November 15th we took further samples of our corn for testing, and saw the beginning of fungus, mostly in the smaller kernels on the upper part of the ear. While the measured fungus levels were within tolerances for Food Grade corn (<3% infection), fungus issues can develop rapidly, especially under wet conditions. Hence it was urgent to start harvesting, especially after a further 50mm of rain fell on November 18th – 19th. We set our harvest plans to begin at the earliest possible date, which was Monday, November 27th (with some preliminary equipment

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calibration and testing done on the 24th and 25th), as once corn is harvested and dried, fungus conditions typically do not develop further.

Based on an early look of our harvest operations on November 27th, we believe that with careful screening of our corn, during which most of the small kernels from the tip of the ear (which tend to be by far the most infected kernels) fall out of the crop (as they are too small/light to meet Food Grade standards) we will be able to maintain our corn within parameters generally required for Food Grade corn. We expect to undertake an aflatoxin test on samples of our corn in the coming days, which involves hand carrying samples to one of a number of neighboring countries as there is no laboratory in Belize currently able to carry out this test. We believe that the systemic properties of our fungicide applications should have provided the necessary protection from this particular disease, but we well it is essential to get an early confirmation of this.

There can be no doubt that the unusual climatic conditions in Belize (and Guatemala's nearby Peten province) during October and early November 2017 have caused fungus/bacteria issues to develop where even the most proactive farmers such as CSA are experiencing issues. However, we also believe that these challenges provide a further opportunity to demonstrate that CSA's commitment to scientific farming and willingness to make the necessary crop quality investments are why CSA is an ideal long term partner for regional end customers seeking superior quality grains.

Weeds

This year's weed control program combined proactive spraying of glyphosate during periods when fields were not cultivated, adequate field preparations, and post-planting application of Syngenta's Calaris®.

As we began harvest operations, we have seen some weed development. However, we are pleased to report that our weed levels did not impair either crop development or harvesting operations.

Harvest

We will report on Harvest results during the week of December 18th. Our entire team is focused on rapid and effective execution of the harvesting and delivery of our corn to our end customers. Our yield monitoring software is working effectively, and we look forward to the detailed data it will provide.

Early look data from our initial harvest activities in Field 2 confirm our expectation that, despite the pollination issues with this year's crop, overall yields from Cayo One, at least from (subsoiled) Field 2, will average between 7.0 and 7.5 mt/Ha (110 – 120 Bu/Acre).

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CSA exports test load of corn to Guatemala: – Nov 8, 2017
3rd party load of corn sent to Guatemala to test procedures



CSA Executive VP Abram Dyck with team: – Nov 8, 2017
Mistakes corrected on Test Load will avoid problems later!



Cayo One Day 132 Field 2 Impacto®: – Nov 25th, 2017
Corn fully dry as Yield Monitor calibration tests are run



Cayo One Day 132 Field 2 Impacto®: – Nov 25th, 2017
Very limited weeds and subsoiling make harvest easier



Cayo One Day 134 Field 2 Impacto®: – Nov 27th, 2017
Harvest fully underway – Humidity down to 20%



Cayo One Day 134 Field 2 Impacto®: – Nov 27th, 2017
Harvest Operations continue to 22:00 as good weather holds

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Cayo One Day 134 Field 2: – Nov 27th, 2017
Combine unloads directly into grain cart- next stop: dryer!



Temporary Storage Facility: – Nov 28th, 2017
Dry grain is stored until ready for cleaning and export



Cayo One Day 130: Extra equipment arrives – Nov 23rd, '17
Combine arrives but needs tracks: October rains mean soft fields



Cayo One Day 130: – Nov 23rd, 2017
Attaching tracks is no simple task!



Cayo One Day 130: Extra equipment arrives – Nov 23rd, '17
Cart to ferry corn from combine to trucks: it will need tracks!



Cayo One Day 130: – Nov 23rd, 2017
CSA Combine will need tracks too: get ready to take wheels off!

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Market Conditions and Conclusion

Corn

Global corn prices remain remarkably steady around recent lows, with Gulf Ports prices at ~\$149/mt for US #2 Feed Grade corn. This equates to ~\$190/mt FOB Puerto Quetzal (Guatemala) and \$250/mt CIF Melchor (Belize-Guatemala border crossing). The breakeven duty paid CIF Belize price would be ~\$355/mt, or BZD 32.00/cwt

Domestic Belize prices, however, continue to remain under pressure, as the 2017 harvest season is in full swing, and significant amounts of corn are downgraded to feed grade due to fungus/aflatoxin issues. Prices have fallen a bit further to the \$195-\$215/mt range (BZD 17.50-19.50/cwt) for Feed Grade corn. Again, this still compares favorably to the FOB Puerto Quetzal price, but would indicate that Belize either has an oversupply problem or that farmers have inadequate storage/financing to hold onto crops.

We continue to receive anecdotal reports that Belize farmers with storage have cleared out all of their old crop corn inventories and have sold or presold their 2017 production in a near desperate attempt to raise cash, after three very difficult years (2014-2016). Belize domestic corn price behavior in the coming six months will say much about local dealers' market control if prices drift back up as local supply moves entirely under dealer control. CSA has been able to confirm that there is abundant demand in Guatemala for Belize Feed Grade corn at prices equivalent to \$205-\$210/mt FOB Cayo District. Again, this compares with imported Feed Grade corn offered at \$190/mt FOB Puerto Quetzal.

Edible Beans

There has been little change in global prices for edible beans, with black beans remaining as low as \$700/mt FOB China, while Mexican CIF prices remain steady in a much higher \$1,150-\$1,200/mt range. US Dealer prices, with the 2017 crop in, have slipped to just below \$800/mt FOB. Belize has no activity ahead of new season plantings, which are expected to begin shortly.

Soybeans

Global prices have moved up very modestly, with Gulf Ports traded around ~\$373/mt, which equates to ~\$413/mt FOB Puerto Quetzal and \$477/mt CIF Melchor border crossing. The breakeven duty paid CIF price (Belize delivery) would be ~\$675/mt, or ~BZD 61.00/cwt

Domestic Belize prices once again remain steady, as they have for an extended period of time, with Grade #1 soybean prices being quoted in the \$560-\$580/mt range (BZD 50-52.00/cwt), although there is little activity.

We are relieved that the 2017 Hurricane season is over and that Belize has been spared, unlike in 2016.

We are in the midst of harvesting Cayo One's best ever crop. The season has been replete with challenges, and we are still some distance from reaching the Estate's full potential. However, what we have seen this season, especially on Field 2 which was subsoiled, we believe Cayo One has excellent potential to produce high yielding crops !

Thanks! - Abram Dyck, John Peters, and the Farming Report Editorial Team

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Grower	Location	Field #	Ha/ Acres	Irr ?	Soil Type	Crop	Seed Variety (count/Ha) (count/acre)	Plant Date	Stand Date	Fertilizer Program (For full details of applications, refer to Lot Records)	Comments
BSA	Cayo One	1	75/ 185	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	July 17-18	July 20	Base 12-24-12 <u>330lbs/acre</u> 0-46-0 <u>85lbs/acre</u> 0-0-60 <u>68lbs/acre</u> 40-0-0-5.6 (S) <u>100lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u> 40-0-0-5.6 (S) <u>68lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u>	Near ideal seedbed and planting conditions. Stand emerged and established by July 20. Stand is Uniform and Vigorous at Day 11 – July 31 V-6 to V-7 and healthy although slight signs of water stress – Aug 14 Solid growth thanks to less rain and generous fertilizer: V-11 to V-12 at Aug 28. Continued solid growth and early R-1 at Sep 11. Promising Crop well into R5 at Oct 9. After surviving heavy rains, promising crop about to enter R6 at Nov 6 Harvesting operations underway November 27 th !
BSA	Cayo One	1a	4/ 10	N	Black	Corn (Yellow)	Pioneer 4226 70,000 28,340	July 18	July 20	Base 11.1-28.6-20.2 <u>385lbs/acre</u> 40-0-0-5.6 (S) <u>100lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u> 40-0-0-5.6 (S) <u>68lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u>	Western side of Field 1. Near ideal seedbed and planting conditions. Stand emerged and established by July 20. Stand is Uniform and Vigorous at Day 11 – July 31 V6 to V7 and healthy although slight signs of water stress – Aug 14 Solid growth thanks to less rain and generous fertilizer, but higher evidence of illnesses: V-11 to V-12 at Aug 28. Continued solid growth and

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											early R-1, with no worsening of illness patterns at Sep 11. Promising Crop well into R5 at Oct 9. After surviving heavy October rains, a good crop about to enter R6 at Nov 6. Harvesting operations underway November 27 th !
BSA	Cayo One	1N	34/83	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	TBD	TBD	Base	Decision made not to plant on August 15 th . Insufficient time to complete landworks.
BSA	Cayo One	2	122/301	N	Black	Corn (Yellow)	Syngenta Impacto 70,000 28,340	July 15-17	July 18	Base 11.1-28.6-20.2 <u>385lbs/acre</u> 40-0-0-5.6 (S) <u>100lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u> 40-0-0-5.6 (S) <u>68lbs/acre</u> 40-0-0-5.6 (S) <u>70lbs/acre</u>	Near ideal seedbed and planting conditions. Uniform emergence within 60-72 hours of planting Stand emerged and established by July 18. Stand is Uniform and Vigorous at Day 13 – July 31 V8 and healthy across the field with little to no signs of water stress – Aug 14 Impressive growth with healthy plants at V12 to V-14: August 28. Continued vigorous growth and mid R-1 at Sep 11. Promising Crop well into R5 at Oct 9. After surviving heavy October rains, a very promising crop about to enter R6 at Nov 6. Harvesting operations underway November 27 th !

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Lot Records for Fields 1 and 2 (Zoom in to see details)

A new Lot Record is (still!) in development