

The Impact of CBB Infestation in Kona, Hawaii
A Market Perception

Greenwell Farms, Inc.

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INTRODUCTION

In August 2010, the coffee berry borer (*Hypothenemus hampei*), hereafter referred to as CBB, was found in South Kona, Island of Hawai'i, and its identity was confirmed by Dr. Natalia J. Vandenberg (Systematic Entomology Laboratory, USDA-ARS). Since then, the population of CBB has flourished in Kona spreading from South Kona to North Kona. The Hawaii coffee industry has benefited from the attention received from the College of Tropical Agriculture and Human Resources (CTAHR), the Hawaii Department of Agriculture, and many industry supporting agencies in a collective effort to contain and eventually control this major threat. So far, however, the CBB population continues to expand unchecked in Kona.

The following is a summary of a presentation given to the Hawaii Coffee Association at their Annual Convention on Kauai by Greenwell Farms, Inc. (GFI) on July 20, 2013. GFI presented their experience over the past three coffee seasons with CBB, its impact on the quality of coffee produced by GFI and the general reaction by its customers in markets around the world. The Company told those in attendance that it is compelled to share what it believes is a pivotal moment in the long history of Kona Coffee¹:

- CBB infestation is growing at alarming rates.
- The cherry market in Kona has NOT valued cherry based on QUALITY which, in turn, has created disincentives for coffee farmers to adequately mitigate CBB.
- Specialty Markets around the World for Kona Coffee have been greatly impaired.
- The Kona Brand is NOW in jeopardy.

Who is Greenwell Farms?

The Greenwell Family has resided in Kona since the mid 1800's and, for four generations, has been involved in agricultural pursuits. Henry Nicolas Greenwell was one of the first exporters of Kona Coffee. In 1873, he was awarded a "Recognition Diploma" for his Kona Coffee at the World's Fair in Vienna, Austria.

The current generation of coffee farming began in the early 1980's when Norman Greenwell, his son Thomas, and son-in-law, Steve Hicks began growing coffee on a section of land once part of the W. H. Greenwell Ranch. During the 1980's and early 1990's the family developed a large farm, built several coffee processing facilities, and found markets for their coffee. They became involved in the establishment of important industry organizations helping to create the Kona Coffee Council, the Hawaii Coffee Growers Association, and the Hawaii Coffee Association serving in leadership roles in all three organizations.

¹ This paper reflects the presentation given to the 2013 HCA Annual Convention by Greenwell Farms, Inc. As such the ideas expressed herein are comments and opinions by Greenwell Farms, Inc. and are not the official position of the Hawaii Coffee Association.

In 1992, Norman Greenwell passed away, and Tom Greenwell took the helm of Greenwell Farms. Today, Greenwell Farms is a multi-faceted company:

- Farming – The Company farms 75 acres of its own property, and manages 65 acres of coffee for other land owners in Kona.
- Coffee Purchasing – Over the past 15 years, GFI has been purchasing coffee from between 300 and 400 farmers in North and South Kona.
- Coffee Processing – GFI provides custom dry milling, roasting and packaging for a number of other coffee companies on the Big Island.
- Marketing – Through the years, GFI has developed markets for its green bean in Europe, across North America, and around the Pacific Rim.
- Agricultural Tourism and Retailing – Since the mid 1990's, GFI has provided tours of its operations and offered at retail a full coffee product line on the farm and via ecommerce.

Each of these business segments has been built on a simple philosophy:

1. Quality comes BEFORE quantity.
2. Limit commitments to the ones that can be kept – Pay when payments are due, deliver when promised.
3. Keep things simple.

Staying focused on this philosophy has allowed the Company to survive many storms over the past three decades: The nematode epidemic of the late 1980's and early 1990's fundamentally changed how farms are developed in Kona. The aftermath of the Kona Kai scandal in the late 1990's devastated the market for green bean across the USA for several years. Since 2000, new processors moving into the Kona Market have created an intensely competitive market for sources of Kona coffee.

The CBB epidemic is by far the biggest challenge that Greenwell Farms has faced. Based on the Company's experience over the past three seasons, GFI believes that the industry must take drastic measures in the immediate future or risk severely damaging the Kona Coffee brand.

The CBB Epidemic

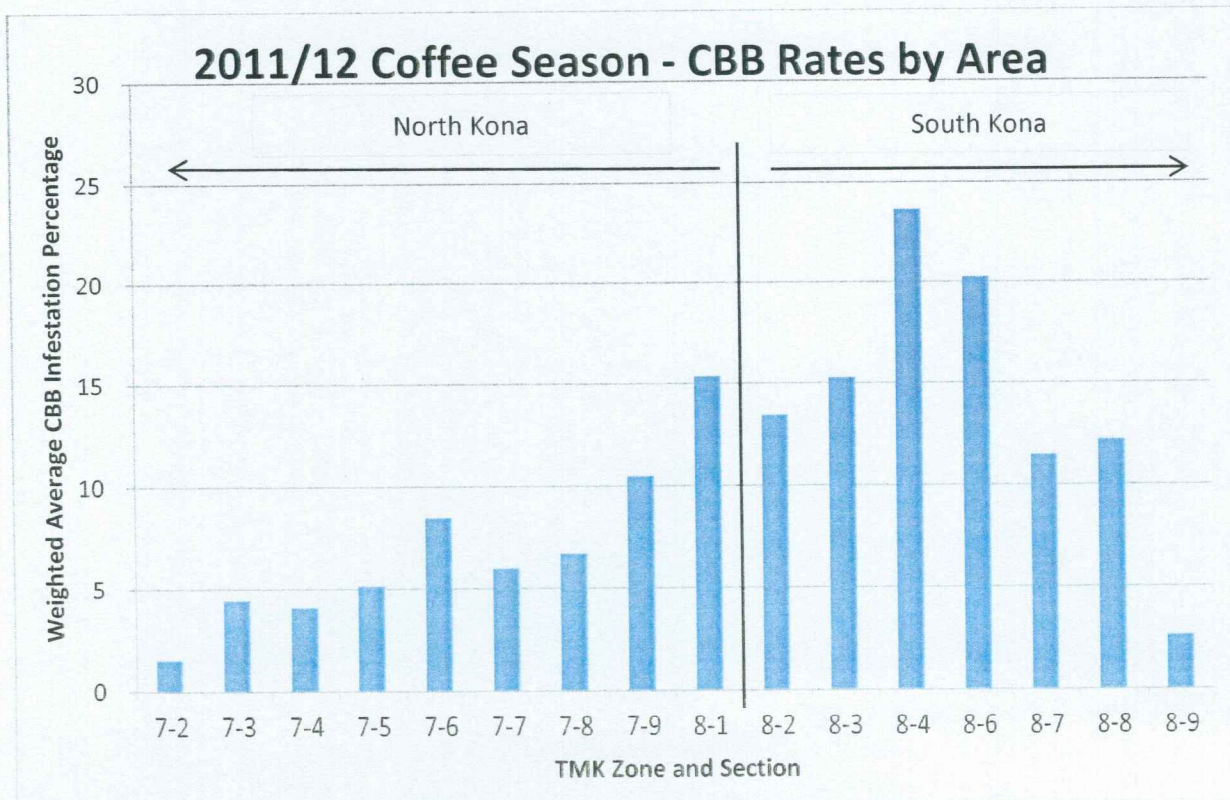
When the discovery of CBB in Kona was first announced in the fall of 2010, Greenwell Farms began periodic testing for CBB levels in coffee cherry deliveries. CBB infestation was found in a few deliveries during the year, but overall, the impact to GFI's production of green bean was minimal. Conversion of cherry to green appeared to be consistent with historical trends and the yields of higher grades were typical.

The following 2011/12 coffee season, was a different matter. Initial deliveries to GFI showed significant increases in the level of CBB infestation compared to the previous season. The Company felt that it was important to begin new strategies:

- **CBB Testing:** A comprehensive testing procedure was designed and initiated. Every bag in every delivery to GFI was sampled and tested.
- **New Pricing:** By early October, it became clear that the population of CBB in Kona had increased by alarming rates. On October 13, 2011, GFI called a meeting at their dry mill of all Kona Farmers to announce a new sliding scale pricing regime. The new testing procedures were explained to the farmers. Further, GFI would continue to pay the ongoing market price (at the time the street price was \$1.45 per pound) with adjustments for tested CBB rates.
 - a. Premium – 0% to 5% CBB - Market Price PLUS 10 cents per pound.
 - b. Standard – 6% to 10% CBB - Market price
 - c. Marginal – 11% to 20% CBB – Market Price MINUS 10 cents per pound
 - d. Poor – 21% to 30% CBB – Market Price MINUS 20 cents per pound.
 - e. Inferior – 31% CBB and over – Market Price MINUS 30 cents per pound.

At the time, GFI felt that this was a fair approach for farmers providing them incentives to control CBB, while at the same time, not overly penalizing them for then having CBB. It was hoped that the rest of the industry would follow suit with similar strategies. However, the day after the meeting with the farmers, the street price in Kona for cherry went to \$1.55 cash for all deliveries REGARDLESS of CBB levels.

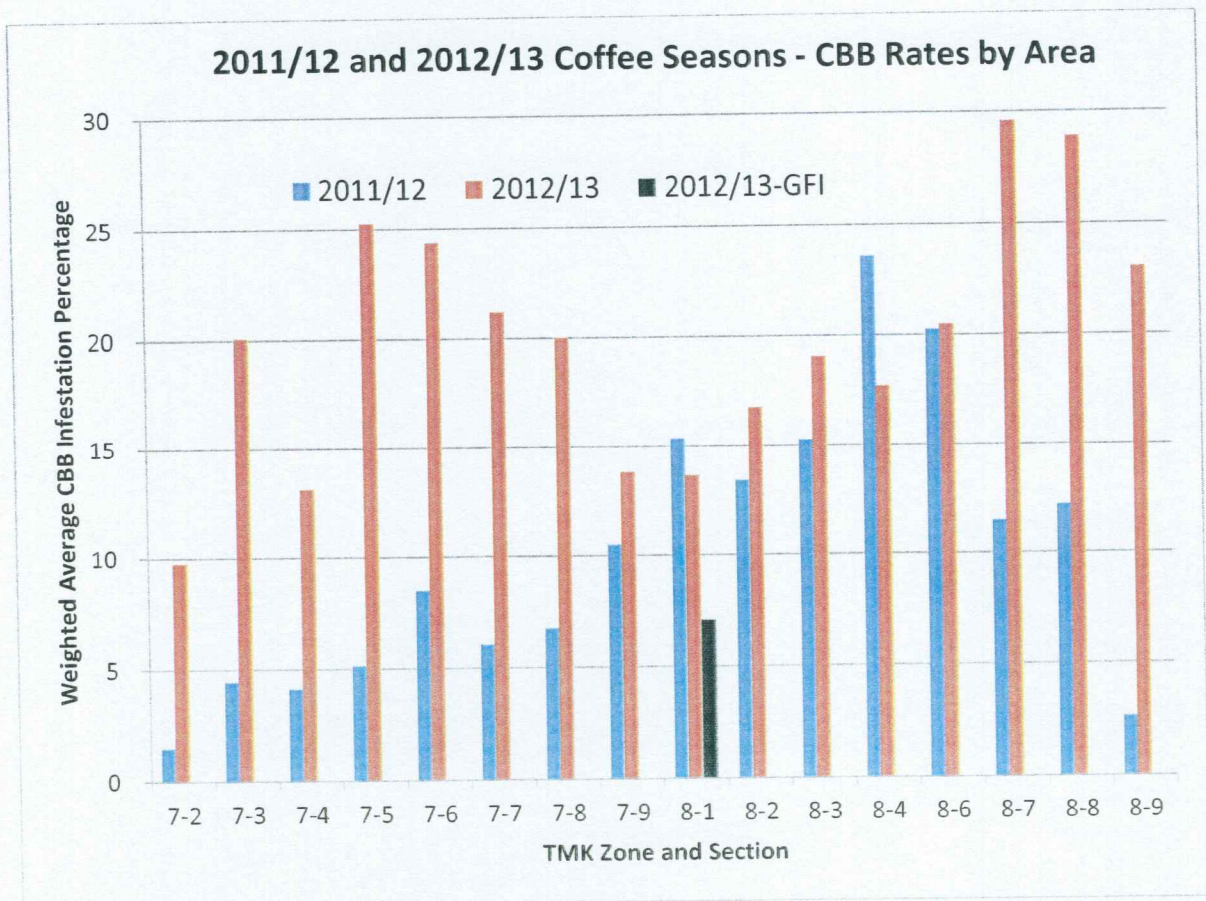
Between the time of the announced sliding scale pricing and the first of December, 40 percent of all farmers delivering coffee to GFI before the announcement stopped delivering coffee to GFI and sold their cherry to other mills. GFI continued rigorous testing of all cherry deliveries throughout the remainder of the 2011/12 season. The results of this testing are presented below:



This table presents the actual weighted averaged of CBB infestation in coffee delivered to Greenwell Farms from each of the Tax Map Key (TMK) zones of North and South Kona. The CBB infestation ranged from a low of 2% in zone 7-2 to 24% in zone 8-4. Overall, the weighted average infestation rate for all of Kona for the 2011/12 season was 10 percent.

Greenwell Farms began in earnest a CBB mitigation program on its own. The Company held workshops for the Kona community on the subject and offered traps and materials to all farmers. GFI had an overall CBB infestation rate of 10 percent on its own farms during the 2011/12 season.

The impact to Greenwell Farms from the loss of 40 percent of its farmers during the peak of the season during 2011/12 was financially devastating. Therefore, at the start of the 2012/13 coffee season, a decision was made by GFI to increase the maximum allowable CBB infestation to 50 percent. This was a risk, but the company felt that it had to stay relevant in the cherry market. Relaxing the cherry pricing regime helped and some farmers returned to GFI. Testing methods were refined and testing continued throughout the season. Below is a comparison of the results for both the 2011/12 and the 2012/13 seasons.



Overall, the CBB infestation from all areas of Kona nearly doubled from the previous year; from 10 percent in 2011/12 to 19 percent in 2012/13. The data suggests that the spread from South Kona to North Kona in a single year was dramatic.

Although the pricing regime at GFI was relaxed during 2012/13, farmers continued to migrate away from Greenwell Farms as the tested CBB percentage in their deliveries approached 50 percent (at that rate, GFI offered 70 cents per pound as a means to help the farmer harvest this infested coffee). The general experience of the past two seasons suggests that farmers in Kona will never initiate realistic CBB mitigation efforts until there is no longer a cherry market that will pay top dollar for CBB infested cherry. The average street price for cherry in Kona exceeded \$1.50 per pound for the entire year.

The good news for GFI was that its own CBB mitigation program was beginning to show success. The overall average CBB infestation of coffee harvested from its own farms was between 6 and 7 percent. The success of the GFI program this year was the result of sticking to a very simple three part program:

1. Keep orchards clear of all coffee cherry before and after each season. Pre-harvest and post-harvest stripping provides a very effective way of reducing CBB populations.
2. Populate orchards with enough CBB traps to provide an adequate monitoring of CBB activity.
3. Use the trap population data to set the time and frequency of fungal spraying in the orchard.

The success of the GFI CBB mitigation program on its own farms appears to point to the promise that the CBB issue in Kona may be solvable if the farmers can be motivated to adopt effect CBB control programs.

CBB Has Greatly Affected Green Bean Quality

Before CBB came to Kona, the coffee cherry market provided a reliable source of high quality coffee. Yields from purchased cherry would vary from year to year due to weather patterns and general coffee crop cycles. Over the long term, GFI could always count basic conversion formulas. These typically include:

- 4.25 lbs. of cherry was required for each pound of dried parchment.
- 1.22 lbs. of dried parchment was required for each pound of green (all grades).
- Generally, 58 to 60 percent of green bean produced would fall in the upper two grades for green bean.
- 96 to 97 percent of all green bean produce would grade as Kona Prime or Higher.

The table below is the model used to predict production from the cherry market from year to year.

Coffee Processing PRE CBB	
Description	Long Term Average
Cherry Purchased	1,000
Conversion Rate To Parchment	4.25
Dried Parchment	235
Conversion Rate to Green Bean	1.22
Green Bean	193
Overall Conversion All Green Bean	5.19

Green Bean Grades PRE CBB		
Grades	Percentage	Quantity In Lbs
Kona Extra Fancy	28%	54
Kona Fancy	30%	58
Kona No. 1	20%	39
Kona Prime	15%	29
Kona Pea Berry	4%	8
H3 and Off-Grade	3%	6
Total	100%	193
Total Prime and above		187
Overall Conversion Prime +		5.35

The consistency of these relationships allowed a marketing program that was predictable. Commitments could be made to green bean buyers with expectation that Hawaii Department of Agriculture confirmation in the form of grading certificates could be counted on. Through the years, buyers have come to depend upon third party certification of the Kona grades.

In addition to the CBB issue during 2011/12, the Hawaii Department of Agriculture was forced to limit the number of positions in Kona for the certification process to one position. Certification from HDOA began to take a longer period of time and by the middle of the 2011/12 season, it would sometimes take up 45 days to obtain certification. This was a very costly delay for the industry. In the summer of 2012, HB280 was passed making Certification of green bean coffee no longer mandatory. Since that time, no standards have been agreed upon for the self-certification process.

The dramatic increase in CBB populations in Kona has greatly affected the type of green bean that can be developed in Kona. Below is a comparison of the historic trend to the actual yields experienced by Greenwell Farms in 2012/13.

Coffee Processing PRE CBB	
Description	Long Term Average
Cherry Purchased	1,000
Conversion Rate To Parchment	4.25
Dried Parchment	235
Conversion Rate to Green Bean	1.22
Green Bean	193
Overall Conversion All Green Bean	5.19

Coffee Processing 2012/13	
	2012/13 Season
Cherry Purchased	1,000
Conversion Rate To Parchment	5.49
Dried Parchment	182
Conversion Rate to Green Bean	1.23
Green Bean	148
Overall Conversion All Green Bean	6.75

Green Bean Grades PRE CBB		
Grades	Percentage	Quantity In Lbs
Kona Extra Fancy	28%	54
Kona Fancy	30%	58
Kona No. 1	20%	39
Kona Prime	15%	29
Kona Pea Berry	4%	8
H3 and Off-Grade	3%	6
Total	100%	193
Total Prime and above		187
Overall Conversion Prime +		5.35

Green Bean Grades 2012/13		
Grades	Percentage	Quantity In Lbs
Kona Extra Fancy	0%	-
Kona Fancy	0%	-
Kona No. 1	4%	6
Kona Prime	69%	102
Kona Pea Berry	3%	4
H3 and Off-Grade	24%	36
Total	100%	148
Total Prime and above		113
Overall Conversion Prime +		8.89

Two basic changes have occurred in the conversion of cherry to green bean:

1. It now requires much more cherry to produce one pound of Kona Prime²: 8.89 pounds of cherry, versus 5.35 pounds before CBB came to Kona.
2. Higher grades are no longer possible. GFI produced no Extra Fancy or Fancy coffee that would meet Hawaii Department of Agriculture standards for those grades.

CBB Has Greatly Affected Green Bean Markets

The fact that 24 percent of GFI's production has fallen below Prime is a major financial burden on the Company. A portion of that coffee was sold into an "All Hawaiian" coffee program, but the majority of that production was thrown away since it can NOT be legally marketed as "Kona

² Hawaii Department of Agriculture administrative rules require that in order to sell green bean from Kona cherry as "Kona" coffee, it must be Kona Prime or higher.

Coffee". To offset this loss, GFI has been forced to raise its prices for certified green bean to unprecedented high levels.

Over the past several years, a growing interest in developing Kona Coffee programs has bolstered the general demand for Kona green bean. As CBB infestation has limited the supply, particularly the higher grades, the resulting supply/demand imbalance has driven general green bean pricing up. Fortunately for GFI, this has allowed the Company to sell its Kona Prime at very high prices to offset its current production losses.

The good news is that GFI was able to clear its inventory during this past season and generate revenues adequate to cover its costs and obligations.

The bad news is that the prices needed to achieve financial stability in this new market climate are NOT sustainable for most Kona coffee programs. In general, customers in all green bean markets served by GFI are beginning to push back against the prevailing green bean pricing. The experience for GFI has been less than positive:

- A long standing supporter of Kona and purveyor of 100% Kona products in Europe has, for the first time in over 15 years, elected to pass on Kona from this year's crop.
- Buyers in the Japanese markets do not understand why upper grades are no longer available and that the pricing for Kona Prime exceeds prior year levels for Extra Fancy. Many are looking for other programs.
- Buyers from all across the USA are waiting for Kona to solve these problems before coming back into the market in any significant way.
- There is a tremendous amount of confusion amongst green bean buyers. Kona Coffee from other producers in Kona is being offered using grades such as "Kona Prime-Extra Fancy" or 100% Kona with no grade assigned at all.

The most challenging situation now is that there is no real way of predicting:

- How much Kona coffee (that is coffee from Kona that will actually grade out as Kona Prime or Higher) will be available this next season?, and
- At what cost will Kona Green be available?

The uncertainty about Kona coffee may be one of the most significant factors that will drive long term sustainable Kona coffee programs away.

Looking to the Future

Greenwell Farms is convinced that, overall, the Kona Coffee Brand is in real jeopardy of losing its appeal in world specialty markets. A solid reputation takes a very long time to build, and a very short time to lose. The presence of CBB in Kona is a primary factor in the confusion currently in the markets for Kona Coffee. In response, the efforts of the HCA, PBARC, the CBB Task Force, and others have resulted in the procurement of a great deal of public money to "combat CBB". These are significant and vital developments for the Hawaii Coffee industry.

However, regardless of programs to stop CBB, Kona Coffee can NOT stabilize until basic issues are resolved in Kona, and in general, the entire Hawaii Coffee Industry:

1. Only Farmers can Control CBB: Unless each individual farmer has real economic incentive to begin CBB mitigation in earnest, the farming community as a whole will NOT really combat CBB. Over the past two coffee seasons, the Kona Cherry market has ignored quality as criteria for setting the cherry price. Put simply, if a bag of cherry that is 80 percent infested with CBB is worth the same amount as a bag of clean cherry, then why fool around with spraying, traps and stripping?
2. The Industry Needs to Define Certification Process: The passing of HB280 in the summer of 2012, freed up the bottlenecks created by the constraints in budgets for the Quality Assurance Branch of the HDOA. In the year since the law was changed, no consensus has been reached by the industry and the HDOA regarding the self-certification process. Guidelines and adequate auditing of self-certification records need to be adopted and maintained to minimize the current confusion in the green bean markets. **If the industry can adhere to standards, market forces will exert appropriate pressures on market participants.**
3. Eliminate or Limit the Roasting Loop-hole: When mandatory certification was being debated amongst the industry organizations, smaller vertically integrated farms argued that the requirement for certification was an onerous expense that penalized that category of producer. A consensus was achieved that allowed any coffee produced and roasted within the origin on its label would not need to be certified. This part of the certification rules was never intended for large mills and wholesalers to distribute their brands. However, a significant quantity of Kona coffee produced from coffee procured in the general cherry market is now being sold using this loop-hole.

Until CBB came to Kona, the Kona Cherry market never really had a “quality” issue beyond under ripened and over ripened conditions. That has changed. If coffee cherry is eventually valued based on quality, the resulting “chaos” in the farming community in Kona will be significant; that is, at least until the majority of the farming community accepts comprehensive CBB mitigation as a required cultural practice of growing coffee in Kona.

Until these kinds of basic issues are resolved, however, the “chaos” caused by CBB infestation is being transferred out to the customers of Kona Coffee. Only time will tell how long those customers can be tolerate higher prices for lower quality coffee before turning to other specialty coffee origins.