The Belize Ag Report

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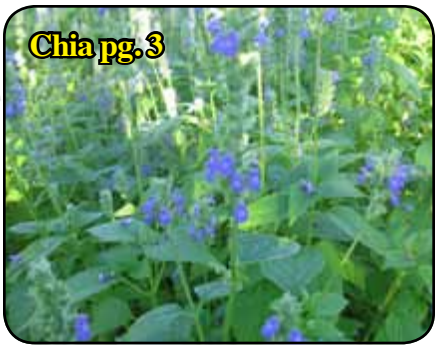

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Chia: The New Old Super Food of Belize

By Elizabeth Andrus-Reimer

Chia seeds, or *Salvia hispancia*, may be new to the ever growing list of marketable foods grown in Belize, but this super food has been around this region since the ancient Maya. Its common name "chia" is an ancient Nahuatl word for "oily". The southern Mexican state of Chiapas is said to be a combination of the word "chia" and "water " making an interesting combination considering that chia seeds soaked in water make a vital re-hydrating drink that is often served a variety of ways in the Mundo-Maya and now the rest of the world. Legend even has it that chia soaked in water was the only food that ceremonial-purified royal messengers were allowed to consume during their long treks between Mayan city-states.

When I asked Ronald Reimer, a chia farmer in Spanish Lookout, about this legend, he thinks it could be quite true. While he has never personally been on a complete chia and water fast, he makes a traditional drink by soaking chia in water between meals and he notices all cravings in between meals and stomach pains that he used to associate with gastritis are gone. Now he enjoys this super food over salads, in smoothies, over or in breads, and adds a handful to cereals and baked goods; they turn "normal" food into an energy-packed health food. Ronald also suspects that because of its gelatinous quality when it is wet, it could also be made into puddings as a safe replacement for tapioca and dairy desserts.

Ronald began growing chia in order to supply an export demand through Bel-Car Exports. While the first crop was a near failure with only six pounds per half an acre, he learned that chia grows best during the months from November to January. With his second experimental crop, Mr. Reimer was able to produce 40 pounds per acre and during the heavy rain in 2013, he said he had to fertilize his fields but the yield was 160 pounds per acres. When I asked him about the increase, he said that he learned something from each crop and there is nothing more beautiful than sitting in a field with the purple and white flowers while the butterflies and hummingbirds buzz around him.

As a chia farmer, Ronald hopes to see the Belizean market expand. Although he started to produce for export, he also sells wholesale to local consumers. Before him, chia seeds were imported in small quantities from Mexico and Guatemala and were expensive. Now, it can be found at local retailers, such as Reimer's Health Food in Spanish Lookout. As farmers like Ronald learn more about growing chia and the general population learns to consume it, it can be readily available and the prices can decrease.

When people ask me what chia is good for, I hesitate because I am not sure where to begin. Internationally, chia is known as a "super food" because it has many benefits. It is the richest plant source of omega-3, making it a vital food to slow the effects of aging, protect against heart disease, blood pressure, and inflammation of the joints and muscles. Chia soaked in water can curb cravings, thus helps with weight loss. Studies also show that chia helps block calories from being absorbed in the human's digestive system, so not only does the boost of energy help dieters burn fat, it also helps them avoid fat. There is evidence that shows how chia can control blood sugar levels benefiting people with diabetes and pre-diabetes-like symptoms. Chia is also said to help the body absorb water. The seeds can retain about ten times their weight in water once it softens into a bulky gel so the seeds soaked in water are great for protecting athletes and other hard-working people from dehydration. As a dietary supplement chia seeds are concentrated forms of proteins, fibers, antioxidants and the vital mineral, calcium.

As if that is not good enough, unprocessed chia can be absorbed whole by the body, so what you eat is what you get. Two tablespoons of these seeds contain about 139 calories, 4 grams of protein, 9 grams of fat, 12 grams of carbohydrates and 11 grams of fiber plus other vitamins and minerals.

Editor's Note: Elizabeth Andrus-Reimer is a graduate from the University of Belize and works at Reimer's Health Food Store. While she is new to agriculture and health food, she now realizes that there is nothing she would rather do than help her customers find healthy ways to help themselves and write about the healthy farm habits in Belize.

TO THE EDITOR

Dear editor,

Just exactly what are we rounding up?

What do Autism, Gastrointestinal diseases (inflammatory bowel disease, chronic diarrhea, colitis, Crohn's disease), Obesity, Allergies, Cardiovascular disease, Depression, Cancer, Infertility, Alzheimer's disease, Parkinson's disease, Multiple sclerosis, and ALS have in common?

Glyphosate - Roundup

Glyphosate may be one of the most important factors in the development of chronic diseases because all these diseases begin in your gut. And it is the gut bacteria that glyphosate attacks.

In 2009, a French court found Monsanto guilty of falsely advertising roundup herbicide as "biodegradable," "environmentally friendly" and claiming it "left the soil clean."

Monsanto has continued to claim that Roundup is harmless to animals and humans because the mechanism of action it uses (which allows it to kill weeds), called the shikimate pathway, is absent in all animals. However, the shikimate pathway IS present in bacteria, and that's how it causes such widespread systemic harm in both humans and animals.

The bacteria in your body outnumber your cells by 10 to 1. It is these bacteria that form the basis of your immune system. For every cell in your body, you have 10 microbes of various kinds, and all of them have the shikimate pathway, so they will *all* respond to the presence of glyphosate! Glyphosate *preferentially* affects *beneficial* bacteria, allowing pathogens to overgrow and take over. At this point, your body has to fend off the toxins produced by the pathogens. Once the chronic inflammation sets in, you're well on your way toward chronic and degenerating disease. Which of the above do YOU want?

Susan Barnes
Naturopathic Doctor
San Ignacio

Dear Editor,

I have read with great interest over recent years the controversies between those for and those against the methods of large commercial agriculture vs small family organic farming. We see the problem is that no successful role models of organic agriculture exist here in Belize. My wife, Rose and I were invited to come to Belize 9 yrs ago to teach natural health and organic agriculture. I am a physician and surgeon with over 25 yrs experience as an organic farmer, orchardist and gardener. We lived in Spanish Lookout (SL) 5 yrs trying to educate and grow a small organic garden on top of a hill of white marl where we rented land.

In 2010, we moved from SL onto 100+ acres purchased from a local family in Duck Run 2. The land had been under a 5 yr rental to SL farmers using a corn, bean, milo rotation. When we moved onto the land it was barren except for the residue from a recent bean harvest.

New Life Farm Ltd was founded as a role model for research, teaching and demonstration of small family farming and organic agriculture. We knew we would have to slowly transition the land from previous use. Our many years experience in N. Arkansas USA was of little value here nor were our heirloom seeds.

We laid the land fallow one year before our first plantings. We searched for and acquired small amounts of indigenous seed strains of corn, rice, beans, potatoes and other vegetables which we planted as our initial field crops for more seed over the past three years. We have had to contend with rebuilding our depleted soils and neutralizing previous chemical residues.

Do we have all the answers? By no means...are we learning every day? Yes....can land be transitioned to more sustainable agriculture? Yes, but slowly...Do we want to 'feed the world'? No, just teach families how to produce most of their own food in a more healthful and sustainable manner.

Dr. Morris F. Keller, Director New Life Farm Ltd.

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Dear Editor,

I am having a hard time understanding why Belizeans are fighting for the right to grow and consume toxic food. BT corn, Bio Technology altered corn is genetically modified GMO corn, one and the same. This differs from BT spray which is sprayed externally to protect the plant during its growing stages and not imbedded inside the corn cells. Just like paint applied to the outside of the tractor to protect and not added to the fuel tank. How many times do we hear of grand technology touted as the way of the future only to be banned 10 years later? I do believe that the USA is now the leader of the world in cancer and chronic disease which surely must come from what is consumed. All this so called science and statistics look to me like smoke and mirrors. The salesmen are most convincing with the fancy names and packaging but if the bugs are smart enough to steer clear,why aren't we? I now read labels very carefully; after all, POISON is POISON.

Sincerely,

David Ford, Maya Beach, Placencia

Mission Statement:

The Belize Ag Report is an independent quarterly agriculture newsletter. Our purpose is to collect, edit and disseminate information useful to the Belizean producer, large or small. We invite opinions on issues, which are not necessarily our own. Belize Ag neither solicits nor accepts political ads.

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TO THE EDITOR

Dear Editor,

The toxicity of glyphosate (the key component in Roundup, the most commonly used herbicide in Belize, as well as around the world) is becoming increasingly clear; study after study shows that most of the diseases and conditions associated with a Western diet, which include obesity, diabetes, gastrointestinal disorders, autism, depression, infertility, heart disease, cancer and Alzheimer's disease are directly related to the increased use of glyphosate worldwide. In fact, studies indicate that glyphosate is one of the key contributing factors fueling the current plague of chronic and immune diseases: glyphosate residues are found in the main foods of the Western diet which is primarily comprised of sugar, corn, soy and wheat. (It is proven that glyphosate adversely affects beneficial bacteria in the body allowing pathogens to multiply and overwhelm the system, and ultimately leads to chronic inflammation followed by chronic and debilitating disease). These studies, (easily accessed online) should be sending shockwaves through proponents of genetically modified (GM) crops made tolerant to glysophates and worldwide users of Roundup!

There remains no doubt that the systemic damage done to the human body and other living beings as well as the environment by this most biologically disruptive chemical demands worldwide health warnings. With all of the research conducted about its toxicity, one would assume that more people around the world would be demanding a ban. In recent years more and more scientists all over the world who have conducted peer reviewed studies have arrived at the same conclusion; they have come together to show their support for the ban of GMOs, which naturally includes the ban of glyphosates as the two are intrinsically linked.

Take note that over forty countries have now banned GMOs and Belize could follow suit. In the interim, it is paramount that individuals take control of their own health and the health of their families. Avoiding all processed foods (that are virtually guaranteed to contain genetically engineered ingredients), and focusing your diet around fresh, whole, organic foods is the only way you can protect your health and that of your families. That means growing your own food, without the use of Roundup!

"By slipping it into our food without our knowledge, without any indication that there are genetically modified organisms in our food, we are now unwittingly part of a massive experiment." ~ David Suzuki, Geneticist

Christine McIntyre, a concerned citizen

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Monkey Cap, aka Baboon Cap, In one of Jenny Wildman's **Beyond the Backyard** Columns, **The Golden Egg - Canistel**, issue 10, Feb 2011, pg 8, she made mention of monkey cap fruit. Recently Jenny received an email from a reader asking for the scientific name for this tree. Couepia dedocandra.

It was July and the trees were **fruiting** so Jenny and Jo took a short drive to Seine Bight to visit Mr. Jeffrith Marin the owner of 2 old monkey cap trees which his granny had planted in her yard. He shared some of the ripe fruits and his knowledge of local plants. Jenny notes that "Before the advent of imported candy, the local fruits were cherished by children." Indeed.

Fruit authorities cite the fruiting season as April-May, but these were late-fruiting in July as were other monkey caps in Cayo District.

Photos by Jo Carpenter

The National Agriculture and Food Production Policy

By R. Thompson, Chair of Agriculture Policy Review Task Force

The Ministry of Natural Resources and Agriculture (MNRA) with the collaboration of Food and Agriculture Organization (FAO) and the International Institute of the Cooperation for Agriculture (IICA) is revising and updating the National Agriculture and Food Production Policy that was produced in 2000. No Farmer = No Food. Although this policy is still relevant today, there are a number of issues such as climate change, risk management in agriculture, greater emphasis in value addition and agro-processing that need further strengthening.

A series of consultations with various interest groups of public and private sectors including NGOs, and civil societies were carried out throughout the country, starting in April 2014. The aim was to engage key stakeholders in this process, develop and strengthen a dialogue platform for agricultural issues and ensure ownership of the final policy. Participation was extremely encouraging and agriculture issues discussed were diverse. Some of these burning issues raised were: the need for a comprehensive taxation review that facilitates competitiveness for the productive sector; need for affordable credit; need to strengthen collaboration and coordination among public and private sector; revision of fiscal incentives regimes; strengthening of agencies responsible for standards, sanitary and phytosanitary and other protocols needed for exports; markets and marketing linkages; ease of doing business, and responsible governance at all levels among others.

The document is presently being elaborated to ensure that realistic policy instruments and strategies are formulated to address these critical constraints that will provide the enabling environment to make agriculture and the food sector more competitive, diversified and sustainable. This is intended to enhance food security and nutrition and contribute to the achievement of the socio-economic development goals of Belize. Underpinning the policy goal are four pillars:

Pillar 1: Agriculture and food industry as a driver of economic growth

Pillar 2: Innovation for agriculture competitiveness

Pillar 3: National food and nutrition security and improved rural livelihoods

Pillar 4: Sustainable agriculture and risk management

The final draft of the policy will have strategic objectives for each pillar and concrete actions to achieve these objectives. Additionally three cross-cutting themes will be addressed: governance, statistical information and energy for agriculture.

It is anticipated that by the end of July 2014, the Ministry will receive a final technically-cleared draft National Agriculture and Food Production Policy. Thereafter, at least one validation workshop will be held to increase awareness of this public document.

The policy will be supported by two additional documents: a business strategy focusing on the first two pillars and an investment prospectus that will provide greater details of agricultural interventions and opportunities.

Citrus Greening Affects Roots Before Leaves

Source: University of Florida Institute of Food and Agricultural Sciences.

Although citrus greening enters the tree through the leaves indirectly through the Asian Citrus Psyllid, University of Florida researchers have discovered that the disease attacks the roots long before the leaves show signs of the damage.

The Asian Citrus Psyllid feeds on the leaf sap and passes on the bacteria that causes citrus greening into the tree and the bacteria travels quickly to the roots according to Researcher Evan Johnson. In the roots the bacteria replicate, damage the root system and spread to the rest of the canopy. The disease starves the tree of nutrients, leaving fruits that are green and misshapen, unsuitable for fresh fruit or juice. Most infected trees die within a few years.

The University of Florida researchers found that citrus greening causes a loss of 30 to 50 percent of trees fibrous roots before symptoms are visible above ground. The early root loss means that the health of the citrus trees is severely compromised before the grower even knows it is infected.

The importance of this findings is crucial for the management of the disease. This suggests that growers should focus more effort on maintaining the health of the root system in relation to other soil borne pests and overall soil quality to maintain as much of the root systems as possible. Growers should maintain the soil pH in the optimum ranges recommended for the rootstock and the grove should be watered more frequently to reduce stress.

Journal Reference

E.G. Johnson, J.Wu, D.B. Bright, J.H. Graham. Association of Candidatus Liberobacterasiaticus root infection but not phloem plugging with root loss on haunaglongnbing-affected trees prior to appearance of foliar symptoms. Plant Pathology, 2014, 63(2): 290 DOI: 10:1111/ppa. 12109.

Do you need testing for Citrus Greening Disease (HLB)? Citrus Research and Education Institute (CREI) offers local testing using "Real Time RCR", a type of molecular detection done locally at their lab. The cost for this service is Bz $10. Put 8 leaves in a plastic bag with your name and address and mail them to Citrus Growers Association (CGA), Mile 9 ½ Stann Creek Valley Rd, Stann Creek District, Belize. The time to receive your results varies, as the lab tests when they have accumulated sufficient samples for each test batch.

Integrated Pest Management And Control Guide

In Belize the number of pests and diseases that can damage crops of major and minor economical importance exceeds 3000 with an increase of approximately 10 new pests reported every year. But the good news is that specific ones that have a major influence on productivity in any particular region are usually limited. Pests can be of different natures and can be crop specific or generic, so the range of potential control measures is huge. Nevertheless there are a number of basic principles which can be applied to reduce their impact on yield and quality. Dr. Carlos Itza compiled a list of pests for common vegetable crops, surveillance procedures and details in the non-chemical eradication of pests in a publication called *Guide to Organic Pest Management for Vegetable and Other Crops in Belize*. The guide is available to farmers and gardeners.

Studies conducted in Belize reveal that there are 3 major areas of concern for small farmers: marketing, post harvest and alternative pest control methods. Farmers report that pest damages can range from 40 - 99% in crop loss. The most common method currently used to control both pests and diseases in vegetable crops is pesticide spray. The adverse health effects from pesticide use is aggravated by several challenges, in terms of safe storage of the pesticide, safe application of the pesticide by the laborer, appropriate frequency of application for optimum benefit, and the necessity to ensure no chemical residue at harvest and market delivery. There is also the danger of resistance development to the pesticide by the target pest or pathogen.

Dr. Itza stresses the fact that Belize as a nation needs to act more decisively to implement integrated pest management (IPM) systems which have reduced the need for regular pesticide application, using it combined with traditional and natural remedies. IPM uses common-sense practices and comprehensive information on the life-cycle of pests and their interaction with the environment. Such knowledge is used to manage possible pest damage considering least possible hazards to the environment and people, and by the most economical means. IPM is a series of pest management evaluation, decisions and controls, including organic pest management techniques. The use of natural or organic pest control in Belize has started to gain momentum since the inception of organic production demand resulting from consumer consciousness of safe products. But the infrastructural development for supporting such programs is still at its infancy stage of development.

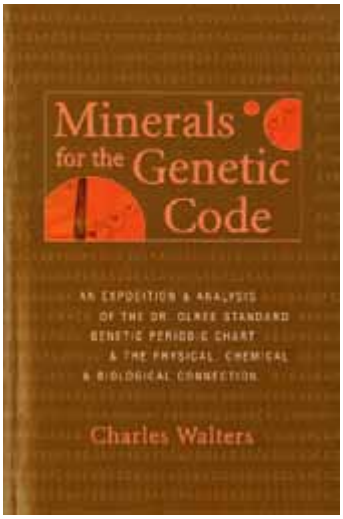
The *Guide to Organic Pest Management for Vegetable and Other Crops in Belize* is available electronically from the Ministry of Natural Resources and Agriculture or contacting the author directly at minagricpubelize@gmail.com

Editor's note: Before Dr. Carlos Itza became Director of Projects, Project Execution Unit, Ministry of Natural Resources and Agriculture, he taught at Mopan Tech (science and biology), was an agronomist and lecturer at University of Belize and a plant health officer for BAHA. Dr. Itza spent 7 years of extensive field visits and technical work alongside farmers, technicians and experts both in Belize and in different countries, including Cuba, Trinidad and Tobago, Barbados, Guatemala, Colombia, USA, Netherlands. He received training in the different areas of crop protection. You can contact him at: minagricpubelize@gmail.com

Energetic Agriculture

The Gene & the Minerals

By Bill Lindo



Belize City, July 6th 2014: In the year 1974 Dr. Henry Schroeder in his book *Trace Minerals and Man* said that unless the current pace of discovery is increased, it would take another 400 years before we understand the role of the various trace nutrients (minerals/elements) on Mendeleyev's Periodic Table.

But in the year 2003, after some twenty-plus years studying genetics, Dr. Richard Olree, a practicing chiropractic physician, shattered the prediction of Dr. Schroeder. By sequencing the amino acids in the process of constructing proteins, Dr. Olree traced all the elements, including the 22 sub-atomic particles to their participatory function in the life process of man, animal and plant. A few years later in 2006, a full length book**,** *Minerals for the Genetic Code* was written by Charles Walters to popularize Dr. Richard Orlee's Standard Genetic Periodic Chart and the physical, chemical and biological connections. Every serious student of minerals, genes, and m-state elements should keep a copy.

In the year 1840, a German chemist, Baron Justus von Liebig* published an essay titled, *Chemistry in its Application to Agriculture and Physiology*. In it he wrote that everything required by living plants was to be found in the mineral salts present in their ashes once the plants had been incinerated to destroy all organic matter they contained. This theory was opposed to centuries of agricultural practice and certainly to our common sense. But the visual results of the application of artificial nitrogen, phosphates, and potash, together with lime has seemed to prove von Liebig's theory. The last 100 years has seen the skyrocketing climb of artificial fertilizer production by the chemical/pesticide/biotech industry to one of the largest industries in the world.

The late Dr. William Albrecht, PhD in soils and eminent professor at the University of Missouri, the father of scientific agriculture, terms this sudden blind dependence upon nitrogen, phosphorus, and potassium, the main constituents of artificial fertilizers, or NPK – an *"ash mentality"* since ashes suggest the idea of *death* rather than life. Today this ash mentality still rules as incomplete salt fertilizers based on NPK have virtually destroyed the nutritional value of the foods we eat, while they have brought armies of insects, diseases and weeds in their path. The business plan of the giant chemical/pesticide/biotech cartel to deal with the sudden growth of insects, diseases and super weeds is toxic rescue chemistry along with genetic engineering which has now caused an explosion of degenerative diseases (heart, diabetes, auto immune diseases, cancer, etc.) in humans. DNA is basically four minerals – carbon, hydrogen, nitrogen and oxygen, attached to a phosphorus molecule, which is the backbone. But the "ash mentality" says that phosphorus is needed in half the quantities of potassium. This is one of the causes for insects in plants: incomplete fertilization. Next to calcium phosphorus is very important for humans, animals and plants.

Some 100 plus years ago, at the turn of the last century, British scientists, Robert McCarrison, and Albert Howard, working in Barbados and especially India at Indore discovered that returning to the land carefully accumulated animal and vegetal wastes increased the humus, resulting in fertile soils that produced high quality nutrient-dense foods and crops. According to Howard, *"None of my animals were segregated…none were inoculated; they frequently came into contact with diseased stock. I have several times seen my oxen rubbing noses with foot-and-mouth cases. Nothing happened. The healthy, well-fed animals failed to react to this diseases exactly as suitable varieties of crops, when properly grown, did to insect and fungous pests – no infection took place."* He wrote two books which were shunned by the agricultural experts and the new burgeoning artificial fertilizer and pesticide industries. Both McCarrison and Howard were knighted by the British Empire for services to the Empire. Their work caused Lady Eve Balfour to prove their theories and later wrote her famous *The Living Soil*. Meanwhile, during the Great Depression in America, government being nervous of the deteriorating social conditions, was spending huge sums on agricultural research. This was the time when chemical methods were developed to test soils by Dr. Morgan; and Prof. Albrecht had discovered "Cation Exchange Capacity (CEC)"**, plus he also discovered Nature's secret of balancing minerals to obtain fertile soils for optimum growth of nutrient-dense crops and plants.

Beginning in 1938 and continuing through the 1960's, Dr. Maynard Murray, a medical doctor who was tired of helplessness in healing his patients, researched the crucial importance of minerals –especially trace elements – to plants and animals. Dr. Murray discovered that ocean water contains a concentrated, perfect balance of 70 + trace minerals in bioavailable form. Through instruments some 84 elements have been found in ocean water. Ocean water is full of life.

Continued on page 9

Energetic Agric...Continued from page 8

After the year 1999 scientists found that in addition to the 84 elements, ocean water also contains over 5,000 exopolymer particles per milliliter and what are called m-state elements in both ocean water and soil and come out of the earth. Some say they are probably what makes Earth living. They are elements such as calcium, iron, and iodine, plus mineral elements or atoms that don't fit into Mendeleyev's Periodic Table of the elements. The table can be thought of as three dimensional. That is, some of these atoms, in particular, the metals, can exist in another form when broken down out of their atom clusters. An example was written under the headline *Impossible Sodium Chlorides* in the Dec. 20, 2013 edition of sci-news.com: scientists have discovered that under certain high pressure conditions even plain old table salt (NaCl) takes on new forms which violate standard chemistry predictions. "We found crazy stable compounds such as $NaCl_3$; $NaCl_7$; Na_3Cl_2; Na_2Cl; and Na_3Cl", said lead author Dr. Wei Zhang. No names have been given to them.

Hippocrates, the modern father of medicine wrote thousands of years ago that '*food is medicine*'. Since the turn of the last century we have known that nutrient-dense foods can come only from fertile soil. We have also known for the last 70 + years that soil produces nutrient-dense foods only if minerals are in the soil and in the right balance. We knew how to replace and balance the minerals of the soil; what we didn't know was about the traces, the sub-atomic particles and the m-state compounds. Since the publication of Dr. Richard's Olree's Genetic Mineral Chart in 2006 we now know how and why the trace elements are essential. An example from Olree's chart is number 39 –Aluminum. Its codon is AUU and its amino acid is isoleucine. Aluminum is called for 23,556,091 times in the sequenced genome. It helps in the pericardial sac and circulation in general. It is a trace element with +3 valence. Excess is always the problem. In soils any excess over 1.0 ppm leads to severe root problems for plants. This is one of the major problems with Citrus Greening (HLB) in Belize. According to the book, *Minerals for the Genetic Code*, aluminum inhibits boron; then silicon is spent. The structure of the brain is compromised – Yttrium is canceled out – the result is Alzheimer's Disease, an aluminum toxicity problem. Use of deodorants containing aluminum ingredients (to kill the sweat) creates another point of entry and can contribute to a toxic aluminum level in the body. Certain American (USA) cheeses melt easier on burgers due to aluminum added to facilitate the melt. All food coloring with the insignia **Lake** is aluminum-based. Do our doctors know that when they prescribe coated aspirin such as *Ecotrin*, that they are giving each patient 49.5 mg of aluminum per pill? Flu vaccines also contain much aluminum. Some municipal water boards put aluminum sulfate in drinking water to clear up turbidity. We are a toxic society.

Nowadays, many people are hungry all of the time. They eat but are not satisfied; so they eat more. They remain tired and hungry; so they have to "sleep it off". My belief is that they are still hungry and tired because they are not getting all of the nutrients/minerals they need in their foods. Plants must be the same. They "eat" nutrients which have been solubilized from the soil. They transpire water into the air as the nutrients are removed for food. If there is insufficient nutrition in the plant food that the roots bring in, more water must be transpired into the air to make room for more solubilized minerals from the soil. Unlike people, plants don't get fat when they eat too much; they just waste water.

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Find a diagram and explanation of **Leibig's barrel, used to explain his Law of Minimum with regard to minerals, on page 24 of this issue, in the Minerals & Salt article.*

***Find article by Harold Vernon about CEC on page 17 of this issue.*

Editor's Note: Charles Walter's Minerals for the Genetic Code, is high among favorite references. Don't let the title intimidate you; most readers with farming and/or health interests will find it most relevant and useful. Regular referrals to the charts/indices alone, especially Part 3: Sourcing the Elements, keep my copy warm from handling. Buy one for your doctor as well; he will thank you.

BEYOND THE BACK YARD

LET'S SWITCH

By Jenny Wildman

Switchels, Oxymels and Shrubs Regaining Popularity

Switchels, oxymels and shrubs have one thing in common and what I am about to say may leave the soft drink companies groaning. I walk the beach most mornings and every few feet encounter plastic drink bottles galore. I wondered what people used to drink. The switchel, oxytel and shrub were the forerunners to today's energy drinks, rehydration fluid, soft drinks and concentrates. The switchel, a splendid word that rolls off the tongue and describes an equally refreshing beverage, is made from water, vinegar, sugar and ginger with other ingredients such as oatmeal, lemon, and lime. It is similar to ginger beer in taste and originated in the Caribbean. As early as the 17th century it migrated to the USA and quenched the thirst of southern farmers who christened it haymaker's punch.

The oxymel is a medicinal drink courtesy of the ancient Greeks made from four parts honey with one part vinegar simmered to reduce the volume, then diluted with water. It was used to fight bacteria, break congestion and coughs, soothe a sore throat, restore energy and cure a host of other maladies. Different herbs can be added for various conditions and personal taste. The herbs are infused for weeks, and the jar shaken regularly to impart the flavours of the healthy ingredients. This makes a refreshing drink or perky addition to salad dressings and sauces. Try making small batches and experiment with ratios.

Next we have the shrub whose name is derived from the Babylonians' date vinegar. It was passed down in history from country to country. The Colonial Mariners carried a shrub concoction aboard ship to prevent scurvy and a goodly amount of vinegar to disinfect the ship. The shrub is a mixture of vinegar, any seasonal fruit muddled and kept in a dark place for up to 4 weeks then boiled with sugar to create sweet and sour syrup, which can then last for months. There are many ways to make a shrub concoction and lots of uses such as a glaze for meats, a marinade, drizzled on cheese or vegetables, in dressings, cocktails, desserts, or as ice cream topping. Here is an easy cold pressed version of a shrub: add one cup of chopped fruit to one cup of sugar, stir to combine and then cover and leave in the fridge for 1 or 2 days. It should now look like syrup. Strain the syrup from the fruit. Add one cup of vinegar and stir well. Put in a clean bottle, shake well and store in the fridge. Check it, smell it and shake it periodically for a few weeks. It is now ready for the taste test. It should be lightly sweet and sour with a rich fruit flavour. You can now use it like squash or cordial.

There are vinegar bars and stores where one can sample the best vinegars from around the world, just like wine tasting. An example of a prized one is Four Thieves Vinegar. The story goes that in France in the medieval time during the Plague of the Black Death four thieves were caught robbing the dead. They were offered leniency in exchange for information on how they managed to not be affected by the rampant disease. Their secret recipe of herbal infused vinegar was rubbed on the hands, ears and temples before touching a victim. So as early as then its disinfectant properties were recognized. Today many types of vinegar, such as apple cider, champagne, malt, red wine, balsamic, and rice, are regularly found in the kitchen but we have many local ingredients that can prompt some exotic choices. For example vinegar can be made from the banana flower, Surinam cherries, sorrel, mulberry, grusero, soursap, coconut water, lime, hibiscus and cane. The process takes a few months and for those impatient persons wanting to make any of the drinks I have mentioned, you can start by purchasing your vinegar. The fruits for your shrub are endless. My new start is cacao vinegar (bought), panella, pineapple, fresh ginger and a touch of turmeric. The aroma brewing is wonderful and the taste, tantalizing.

There are many uses for vinegar other than just pickles. It is claimed that vinegar helps loose weight, reduces blood cholesterol, controls diabetes, aids digestion, wards off osteoporosis, treats nail fungus, kills head lice et al and whilst we can not substantiate all these claims, vinegar will surely spice up your life and find its place in the home. It is a wonderful cleaning agent to polish, disinfect, freshen laundry and neutralize odors, clean drains, dissolve lime scale on faucets, wash windows, break up burned food in pans and in the garden it can be sprayed to kill weeds.

The plastic bottle, which was around since 1947, was not cost effective until the 60's. The plastic shopping bag, however, was only invented in 1962 in Sweden and certainly not popularized until the 1970's. By 1997 the Great Pacific Garbage Patch was found in a remote area of the North Pacific by Captain Charles Moore. This should have been the wake up call for countries around the world to eliminate unnecessary plastics from the environment. In 2002 Bangladesh became the first country to take that initiative. Only this year, 2014, did Los Angeles join 132 cities in the USA in an anti-plastic bag legislation. I recently watched a video made by a young man, Boyan Slat, who is an avid diver. He talked passionately about creating a cleanup program to rid the waterways of dangerous plastic. These small particles of plastic are mistaken for food and consumed by fish, now entering our food chain. The leaching of these chemicals into our waters can never fully disappear.

What can we do to reduce some of the plastic? Some of the choices we make at home or as producers with our packaging can make bold steps in the right direction.

I hope you enjoyed some of this trivia and start bringing back some tasty concoctions into your kitchen.

Jenny Wildman, spectarte@gmail.com

Photo by Xen Wildman

Exotic Birds in Belize

Not Wild Avians……We're Talking Chickens

By Roberson/Feucht

A visit to the Chrissie Tupper's farm near Cheer's Restaurant, reveals that the poultry of Belize are at least as diverse as the people.

Our expectations were to see her Guinea hens, whom she affectionately calls 'the polka dot mafia', but we were treated to a wide collection of exotics including Guineas, Silkies, Polish, Frizzles, local turkeys and assorted ducks. Chrissie maintains over 200 head, and year-in and -out, her farm provides all the eggs for their Cheer's restaurant (between 300 to 600 eggs /wk., depending on the season).

The approximately 80' x80' chicken yard has a well-drained foundation; used rice hull stable bedding from her horses provides a nice dry footing, and the decomposing manure provides some delectable insect treats to supplement the poultry's diet. Next year Chrissie will move the fowl yard and use this very fertile area for a garden. A raised and gutted school bus, (see photo) offers shade and protection under the bus while the inside of the bus has partitions which can be closed to keep night predators out, creating a comfy giant chicken condo.

Chrissie with Nick Roberson

Chrissie, an avid poultry aficionado, maintains her incubator upstairs; down stairs, a brooder with a heat lamp, and a converted horse stall accommodate interim juveniles until they are ready to face the main yard.

First on our tour she showed us her **Polish chickens**, (cover photo), who are maintained in a separate enclosure inside the main chicken yard. Polish have a domed skull with a rock-star tufted crest of hair, which, in fact, restricts vision – making them seem timid or frightened. For that reason they do better by themselves.

Silkies and half-Silkies were fascinating as well as unbelievably soft. Silkies were first mentioned to the world outside China, by Marco Polo. The Dutch obtained them and told folks that they were half chicken and half rabbit! Side shows purportedly billed them as having mammalian fur. They sport turquoise blue earlobes and extra toes. (Silkies have 5 on each foot, other chickens have 4 per foot.) They are marvelously soft and silky to the touch – their feathers lack functioning barbicels, so are almost like down. Due to this type of feather, they cannot fly. They are one of the very few breeds which have black meat, black bones and cartilage and black skin. In China they are a prized gourmet food; soup made with it is said to have curative properties, which is not surprising since it is known to have more carnosine than other chicken. Chicken experts recommend this breed as having an excellent temperament and mention that they are very suitable as children's pets. Silkies are good layers (average 100 eggs/yr.) and many people maintain them to raise offspring of other less broody breeds. Many of the traditional commercial breeds have had broodiness, or motherliness, bred out of them.

The **Frizzle** is also an Asian breed, which has a curly type of feather (see photo). In fact, it is recommended not to breed them to each other, as roughly half might have feathers too fragile, and are known as **Frazzles**. Mating Frizzle to Frizzle will net 25% smooth feathered, 25% very frizzled and 50% frizzled of varying quality. (Wikipedia) Some of the feather fragility can cause bald patches.

Guinea Fowl, originally from Africa, roam the farm at will, but provide excellent services for their board. Chrissie has all 3 types prevalent in Belize: helmeted, pearl-fronted and pied (see photo). Guineas are known to be independent, and if you wish to catch them, are best acquired as keets (baby Guineas). Also, never catch a Guinea as you would a chicken (by the leg); it can cause a broken leg. Catch them by putting your hands on each side of their wings. Guineas lay about 100 eggs a year and seasonally, as did their ancestors. Their eggs are smaller than chicken eggs (3 Guinea eggs =2 chicken eggs), are more pointed and have tougher shells. Guineas are noisy, will fly over tall fences, will occasionally nibble on unintended plants; BUT, they will provide some predator deterrence for all of the flock, and will definitely provide insect reduction and chemical free pest control for your crops, both fruit and row. They also purportedly hunt in groups, for rodents and snakes, and drive them out of their domain.

Meet Valley of Peace Farms Ltd and Cayo Grain & Agro Supply Ltd

By Roberson/Feucht

The agriculture community has been following with great interest, the frenzy of activity this year as an enormous dryer, huge storage silos and grain handling equipment rise on the south side of the George Price Hwy at Mile 54. Belize Ag visited with Douglas Johnson, general manager of both Valley of Peace Farms Ltd (VOPF) and Cayo Grain & Agro Supply Ltd (CG&AS) to discuss their project, plans and visions. Doug brings decades of experience and a world marketing view to their state-of-the-art operation there.

Approximately 10 years ago, Doug and his wife Laurie heard about an opportunity in Belize to purchase farmland and after making several trips to the country and discussing it between themselves for some time they asked themselves the question…. "Are we up for this challenge?" The thought they had was "If we don't try it, we will never find out how good it might have been." So, the journey began…..

After 35 years of farming mainly yellow corn, soybeans and raising 16 million lbs of turkeys annually in Minnesota, Doug is turning his South Central Minnesota operation over to his son. In 2005, the Johnsons purchased the first lands for Valley of Peace Farms Ltd. His first row crop here was corn in the rainy season of 2007. Soon, his love for agriculture sparked an interest in a bigger goal: a commercial operation to address the CARICOM market, and that led to the formation of sister company, Cayo Grain and Agro Supply Ltd. (CG &AS) in 2013. Doug feels that Belize's greatest advantage in agriculture at this time is being part of CARICOM, and our central location regarding sales to Central, North and South America. The state-of-the-art installation reflects the company's focus: "to add value to our agricultural products by cleaning, sorting, grading, polishing, and packaging, with the use of modern technology. We [CG&AS Ltd.] want to stimulate regional trade, increase employment, diversify exports, and produce more value-added agricultural goods to increase foreign exchange, all consistent with GOB policies." They see as one of their main objectives is "to help Belize develop and diversity its agricultural sector and to emerge as an important regional food supplier." Belize's primary competition is corn from the USA. Presently, much of the corn which is allowed into CARICOM (when the grain inventories of CARICOM member states are low enough to allow outside CARICOM purchases without tariffs), is from the USA and is often of inferior grades (#2 or lower) to that produced in Belize. However, it is also often cheaper than what is sold from Belize.

Approximately 1000 acres of both white and yellow corn are in production this season at VOPF. The locally-purchased Pioneer and Dekalb seeds were planted with a Caterpillar Challenger tractor that has rubber tracks, especially effective in heavy black soil and a Case IH 24 row planter, set up with a Trimble GPS system which is accurate to within 3 to 5 inches. Corn (white and yellow), soybeans, black-eye peas, light red kidney beans and other edible beans are all on the planting agenda for VOPF and CG &AS.

CG&AS can receive corn at 5,600 100 lb bags per hour. The huge grain dryer being installed is made by Brock in the USA and can dry 4,000 100 lb. bags in a continuous process: 2 ½ hours start to finish. The drying process is very slow to minimize damage, called stress cracking or implosion (exploded kernels from internal moisture being drawn out too rapidly) that can occur if the drying is done too fast. There are 6 grades of corn, depending on insect damage and moisture; exploded corn is called F. M. (foreign material) and decreases quality, grade and storability. High quality corn requires slow drying. The Brock QUANTUM® Dryer Controller provides total dryer management for accurately controlling moisture during the grain drying process. The electronic QUANTUM Control regulates the discharge speed of the grain to match the capacity of the unloading system. To prevent over-drying grain, the controller can automatically reduce the dryer's plenum heat if the unloading rate limit is exceeded. The dryer will be powered by LP gas (locally sourced as available) and electricity.

For on-site storage, installed already are 3 silos for beans with capacity for 54,000 100 lb bags (5.4M lbs.) and 2 bins for corn which can hold 224,000 100 lb bags (22.4M lbs.) The Brock grain bins have a state-of-the-art grain monitoring system called Intelliair BinManager, which intelligently monitors the moisture content and temperature of not just the grain itself, but also the outside air. This way, the system can automatically run the aeration fans, which will kick on only at optimal times. The use of the innovative moisture cable technology allows supervision of the equilibrium moisture content of the grain. This system runs by itself without the need for any human intervention. BinManager allows remote management through the internet, and can potential problem alerts via e-mail or text messaging. This ensures perfect grain quality.

Kahler Automation has built two complete electrical rooms for Cayo Grain and Agro Supply Ltd. using standard 40 foot shipping containers. These units were built at Kahler Automation's facility in Fairmont, Minnesota, USA. Each shipping container consists of the main service equipment with power monitoring, MCC's (motor control centers), panel boards, step down transformers, PLC's (programmable logic controllers) and graphic touchscreens.

Although most of the white corn growing now will go to our Central American neighbors, CG &AS plans to begin construction of a corn meal processing line by the end of the year that will process some of the crop now in the ground and expand their product line.

Continued on Page 13

Meet Valley of Peace... Continued from Pg. 12

Quality is a high priority with CG&AS. USDA, FDA, HACCAP and other export requirement systems will be adhered to, to maintain high standards. Their future plans, mid 2015, include construction of a laboratory to test for moisture, fungus, bacteria, foreign material (called clean out), test weight and nutrients, especially protein. Soy bean testing will include protein content and oil testing. Presently, soy and wheat are sold by protein content but corn is not. Typically, corn is graded 1 to 6, but the price for grades 1 and 2 is the same. US corn is graded by test weight, moisture, and damage from insects but not protein. However,

it is obvious that corn which is more nutrient dense and has higher protein will result in savings of time and other feed costs when finishing animals with it. Belize already has a reputation for higher-than-average quality grains. CG&AS sees continuing on this marketing path as most beneficial for all farmers here. Although prices in our part of the world reflect in great part the Chicago prices, CG&AS envisions a future when Belize grain prices are increasingly influenced by world prices. They are analyzing how futures contracts might work within Belize to deliver higher prices to the farmer. Soil fertility is also an important factor in producing high-quality, nutrient-rich products; CG&AS plans to contract soil testing to 3rd party labs.

VOPF and CG&AS currently have 45 employees, only 1 of which is a foreign national but they hope to employ up to 60 or more full time workers by July, 2015. Many of these will be sent abroad for training to run and manage the hi-tech equipment. Contract processing for grains belonging to other companies/ individuals will also be available from CG& AS.

Doug sees another opportunity for farmers in Belize: servicing the North American seed market – corn and beans. When North American companies oversell certain varieties of seedstock, they must turn to other locations with differing winter climate to meet the quantities contracted to farmers up there. South America has long been the venue for this, but with Belize's proximity to North America, and the easier shipment possibilities (by land if necessary) meeting that seed stock need could be a lucrative niche for Belize. Corn grown in our winter months might possibly require irrigation; currently rice is the only irrigated row crop here.

Another potential agricultural venture for Belize is wheat (hard red or spring types) production. Wheat has been grown successfully here; Old Colony Mennonites in Barton Creek, Cayo District, have had success in growing wheat; however they found the predation by birds made it not worth the effort to cultivate. CG&AS has made contacts with agronomists who specialize in wheat production, who believe certain wheat varieties might be successfully grown here commercially.

Exports other than that to Central America, which can be shipped by truck, are presently all done in 50k lb. containers. Bulk sales and shipping would open new markets currently closed to Belize farmers but much coordination and cooperation with our ports is prerequisite. CG&AS has begun discussing infrastructure improvements (storage and loading equipment) to export grain in bulk at a port. Growth in the ag sector at large is necessary to have the increased quantities of product available to sell, but some feel that within 3 to 5 years we might have both the amounts which could merit use of bulk sales and port facilities to accommodate them.

When you see the Cayo Grain &Agro Supply Ltd. sign and prices bill board along the George Price Highway at Mile 54 in front of their headquarters, you will know they are ready to begin purchasing grain from local farmers. This should be in time for purchase of the 2014 corn crop. No advance contracts are currently being given, although the management is discussing and looking forward to the time when a futures market may work in Belize.

In the future CG&AS also may retail and wholesale local and imported ag supplies such as seed, fertilizer, chemicals, and crop inputs of all kinds. However for finished products, their eye is on exports. Contact them onsite or as per the information in the advertisement accompanying this article.

Can your soil be harmed by effects from too much lime?

Can you apply too much lime?

By Neal Kinsey

Finding the correct answer to that question can be quite confusing. The problem is complicated because some soils produce extremely well that have a high pH and very high calcium levels, and yet other soils, sometimes on the same farm, with the same pH and calcium levels are a big problem. We see this in soils from several parts of the U.S., France and Austria for example. Because some soils do so well with a high pH and high calcium, it can give the false impression that too much lime to supply more calcium would never be a problem. But it can be, and it is an expensive problem to fix once you have it.

Many farmers have been told, "You can't use too much lime." That is not true! In our work with thousands and thousands of acres that have previously been over-limed, detailed soil testing continues to prove applying too much lime is a detriment to most soils. This holds true not only for grass and forage crops, but for whatever crop you are intending to grow. And once this happens, it can be far more expensive to correct than just the cost of spreading an excessive amount of limestone or other calcium containing material.

What makes identifying the problem somewhat complex is the fact that it can take up to three full years to see the whole picture from the total effects of too much limestone that is applied on a field. If too much is used, it is not normally noticeable in the first year. In fact, if lime is needed, but in substantially less amounts than what is actually applied, noticeable improvements will likely become evident within the first year or two. But by the end of the third year, when problems from any excess will be most evident, many growers have already forgotten the possible long-term negative effects of an excessive limestone application, and tend to place the blame elsewhere (on weather, fertilizer, seed, etc.).

The adverse effects from over-liming can show up in a number of ways. Principally it requires dealing with the damage caused by nutrients being tied up from too much of an increase in calcium and/or magnesium as well as the effects that increasing the soil pH has on nutrient availability. And this is the real crux of the problem – if enough of all the other needed nutrients are present, the extra lime will be helpful to a soil. However, if any critical nutrient is already lacking or even present in an amount that is barely sufficient, the lime can effectively reduce its availability and cause problems unless or until that lack is correctly identified and adequately supplied.

The higher the calcium level climbs from the use of calcium carbonate limestone, or gypsum, or from the calcium make-up of dolomite lime, or any other significant calcium source, the more chance the trace elements, plus potassium and magnesium, have of being tied up in the soil - to the point that the crops can no longer take them up in sufficient amounts. Then plants suffer in terms of quality and yield which translates into problems for the cows and nutrients in the milk.

Some growers might be led to think that just as long as there is not too much limestone applied, there is no problem. High calcium limestone (calcium carbonate) and gypsum (calcium sulfate) are the most common sources of calcium. But the problem can be caused by other materials too. The list includes oyster shell, rock phosphate, kiln dust, marl rock or other ground sea shells, sugar beet processing lime, and stack dust from the scrubbers of utilities or industrial facilities burning high sulfur coal. All of these, as well as poultry manure, especially from laying hen operations (where calcium is supplemented to strengthen the egg shells) can be a significant source of additional calcium - and for some dairies, the lime sprinkled in the barn that gets incorporated with the manure can be a significant source as well. Compost should always be suspect until the actual calcium content is accurately determined by testing and the date is determined that any extra lime may have been added. Also wood ashes that are applied at high tonnage rates, and irrigation water, can contribute substantially to the increase of the levels of calcium in the soil.

Adding calcium also increases the pore space of each soil. This is a desirable result until pore space reaches 50% of the total soil volume. But when too much calcium is applied by over-liming, so much pore space can result that the soil dries out much easier than before. So farmers can lose efficiency of water use, whether it's from rainfall or irrigation, if soils are over-limed.

Here is a critical point to understand: the application of too much calcium from lime or any other source will affect the availability of all the other elements, which can be tied up or rendered unavailable by its addition as well as any adverse effects from a higher pH. This is not meant to discourage you from applying needed lime or calcium. Just consider first that how the lime affects the soil should be known and the appropriate steps taken to prevent any adverse effects. The fact is without a measure for any negative effects, it is not possible to correctly manage them. The proper amount of limestone should always be applied; the adverse effects from too much lime can make problems that could have been caught in time with the proper measure of these adverse effects, thus avoiding far more serious negative consequences in terms of needed plant nutrition. So don't be fooled; applying too much lime or other sources of calcium can be costly in terms of lowering crop nutrients and yields. But the failure to apply needed calcium because it "might" hurt the availability of other nutrients will cost far more. Even in pastureland or so called "low pH crops", too little calcium (sometimes still not reflected by a low soil pH), can cost you just as much and likely far more in most cases, if not corrected.

The best way to determine what is actually needed or not needed in terms of liming is to use a detailed soil analysis. The soil analysis should include measurement of calcium and magnesium and the percentage of saturation of each in the soil. Only by checking for both calcium and magnesium saturation and measuring the micronutrient levels can it be determined when there is too little or too much there, or if the proper amount is already present.

BEL-CAR UPDATES

As corn prices have remained stable, there has been no significant increase in acreage planted in corn. The corn in the ground this rainy season is looking promising, as there appears to be less problems with the chronic earworms. This is thought to be because there was much rain soon after planting. The new lands, reddish-brown soil near Hillbank and Indian Creek (Yalbac purchase), was suffering due to the dry weather up to the last days of July. Spider mites are beginning to be pests, also surmised to be from the dry weather. Normally there is more rain in July, and then a mini-dry 'mauga' season in August. This year has shown us a dry July - until the last days of the month. A wet August is predicted by some.

The corn inventory is fine, and supplies should last until the first harvests around September 1st. BEL-CAR has purchased four new silos from Sukup in the USA. Each has a capacity of 4,200 tons. Also, BEL-CAR added another new elevator.

In 2014, BEL-CAR exported for the first time a small shipment of chia, Salvia hispanica to Canada (see pg. 3, this issue, for article about chia). Although processing chia seeds for export has a few challenges for BEL-CAR at this time due to the small size of the seed, BEL-CAR is always interested in exploring new ag exports for Belize. Cleaning and processing of the tiny chia seeds would require investment in new equipment to handle that size product.

Article based on interview with Paul Penner of BEL-CAR and reported by Roberson/Feucht.

FAO 'Seed for Development' Project

A Bright Future for Open-Pollinated Corn

The experimental seed development project sponsored by the Food and Agriculture Organization (FAO) and carried out by Cayo farmers under the direction of Lead Extension Officer, William Can, of the Ministry of Natural Resources and Agriculture (MNRA), is a resounding success! The project objective was to evaluate and multiply seeds of three improved corn varieties, two of which were white corn and one yellow, that adapted to weather and soil conditions of the Cayo District from the previous year's experiment. The slogan that evolved is **Good seed = Good yield.**

The table below gives details of the demo plots that were established.

Name of Farmer	Location	Date Planted	Corn Varieties Planted
Oscar Figueroa	La Gracia	June 3 , 2013	CARDI yc- 001 and local.
Ruben Santos	7 Miles	June 4,2013	Icta - B1
Arturo Rodriquez	Valley of Peace	June 6-7, 2013	NB6

The participating farmers painstakingly monitored the plants' growth and development as they adhered to the rigid procedures for producing high quality seeds in their one-acre plots. The charts and tables below compare the 2012 and 2013 trials. The table below shows the data that was collected in the trials of each corn variety in the 2012 corn cycle.

Varieties	Plant height (cm)	Cob height (cm)	Cob size (cm)	Days to female flower	Days to harvest	Covering of the cobs	Yield (lbs.)	Weight of 100 seeds (g)
NB-6	225	92	26	60	110-120	Good	2,172	30
NB-7	216	114	22	54	110-115	Good	3,792	31
Icta- B1	205	99	21	56	108-115	Good	3,435	35
Local	280	200	23-24	68	115-120	Good	2,853	30

The table below shows the data that was collected in the trials of each corn variety in the 2013 corn cycle.

Varieties	Plant height (cm)	Cob height (cm)	Cob Size (cm)	Days to female flower	Days to harvest	Covering of the cobs	Yield (lbs.)	Weight of 100 seeds (g)
NB-6	230	98	30	56	110-120	Good	4000	35
Icta- B1	220	90	19	55	108-115	Good	2200	36
CARDI yc-001	225	92	26	58	110-115	Good	5000	32

CARDI yc-001 has the highest yield, followed by NB-6. Note the great difference on the yield of Icta-B1 obtained in the 2012 crop cycle compared to the 2013 crop cycle. The dramatic difference shows how weather and climate affect the productivity of the varieties.

The success of the corn seed production trials is a strong support of the plans in development for training and assisting corn farmers address their most pressing issues:

1. Production and selection of quality seeds to increase yields
2. Good agronomic practices to increase yields
3. Good post harvest practices
4. Marketing
5. New technologies to increase yields per unit area by increasing plant density
6. Good management practices of the crop
7. Formation and organization of corn farmer groups to maximize production success

Ms. Fay Garnett, District Agriculture Coordinator (Cayo) /Organic Program Coordinator of MNRA says that NB-6 seeds should be available to farmers for the next growing season from seed plots in Valley of Peace. The varieties currently planted are Icta-B1, NB-6, CARDI yc-001.

According to William Can, 12 acres are presently planted for seed purposes in the Toledo district. The varieties are Icta-B1, NB-6, CARDI yc-001, one local white and one local yellow. All these varieties will be harvested and sold as seeds in the Toledo district. The farmers planted only what was ordered in that district. If a farmer wants seeds for June, 2015 they should order the seeds in November, 2014; corn to be planted in December, 2015 should be ordered in April or May, 2015.

CATION EXCHANGE CAPACITY

By Harold Vernon hmvernon@yahoo.com

A previous article in Belize Ag Report explained the chemistry of soil in terms of ionic composition. It is worth repeating here that the soil is a medium composed of minerals which yield/ retain ions and can exchange or retain ions of the soil solutions. Cations are the positively charged species: calcium (Ca++), magnesium (Mg ++), potassium (K+) , sodium (Na+). The proportion of the Cation Exchange Capacity (CEC) accounted for by those elements as exchangeable bases is frequently used as an indication of soil fertility. CEC is a concept that is arbitrarily defined and seeks to inform on the nutrient reserves held by the soil. The value is highly dependent on pH as the acidity/basicity of the soil determines the value of the exchange.

As a practical matter, soil testing frequently reports not only the values of the indicator cations but also the CEC. The principal reason for this lies in the fact that in preparation of the soil sample an extraction is performed to determine the exchangeable nutrients. Different soils have different exchange capacities that are directly correlated to the types of clay minerals and organic matter. The type of sample preparation attempts to mimic the exchange of cations as occurs in the soil when water contacts the soil.

Interpretations of CEC results for topsoils at neutral pH (7.0)

CEC (me/100g of soils)	Rating	Soil Type	Minerals	pH
>40	Very High	Heavy black clays	Limestone	>7.5
25-40	High	New alluvial	Sand, Silt, Clay	6.5-7.5
15-25	Medium	Old alluvial	Sand, Silt, Clay, OM	6.0-7.0
5-15	Low	Highly leached	Sand, Silt	5.0-6.0
<5	Very Low	Granitic, sandy	Sand	5.0

Looking at the resultant values in the table above quickly tells us that sandy soils typically will be infertile unless organic matter is built up to provide a retention site for cations. Liming is the other more practical half of soil remediation. As the silt and clay fractions increase, the fertility improves until we achieve an optimum composition of the soil. Old flooded soils and more recently flooded soils typically have fair-to-good fertility and the nature of that fertility can be readily discerned for the CEC measurement. Heavy black clay soils, on the other hand, may have too much calcium, the most common of the cations, and is much too near to the parent material – limestone, which can lead to nutrient exclusion. Please note that a capacity rather than content is being measured and reported.

CEC can serve as the most important indicator of soil quality after and in concert with pH. At the minimum, soils should be tested along with the electrical conductivity or EC. Electrical conductivity requires a note of caution as the prevalence of high quantities of sodium can lead to errors in interpretation. Normally, this error occurs only in soils in coastal regions. Finally, CEC should always be tested at the same value of pH.

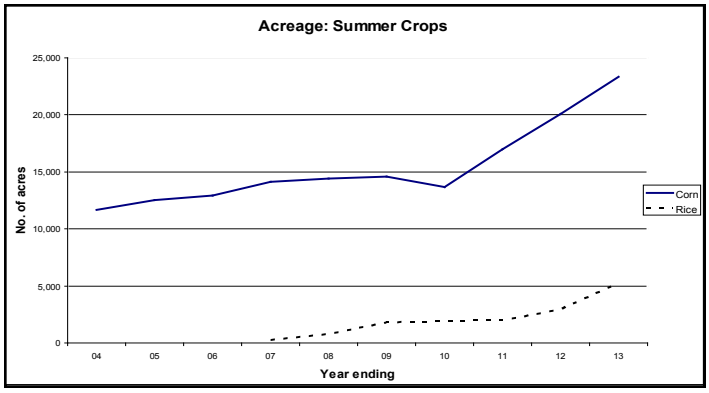
Agricultural Trends in Spanish Lookout

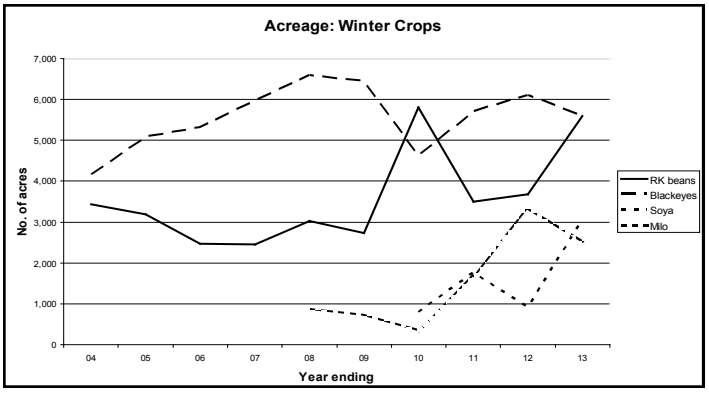
By Dottie Feucht

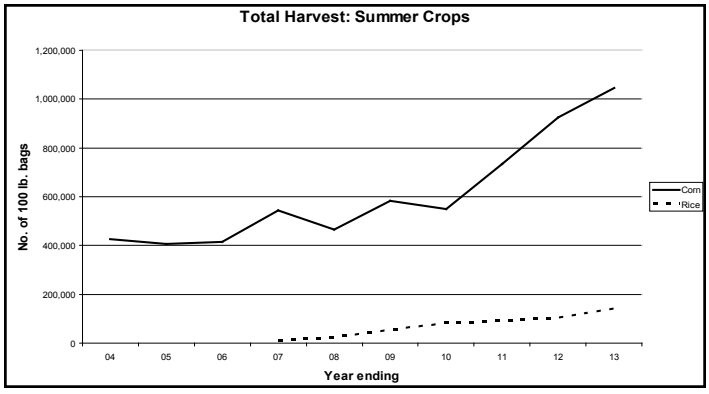
A study of the trends in agriculture in Spanish Lookout is a study of expansion and growth in terms of cultivated acreage, types of crops, and number of farmers. These life-long farmers, who took their mechanized practices with them when they moved to Mexico from Canada and then in 1958 to Belize, have faced many challenges over the years. Belize is no exception to the risks related to weather and price fluctuations; farmers make their decisions on what to grow and when to plant to minimize their risks and maximize their gain. Unlike most farmers in the temperate zone, Belizean farmers can plant 2 crops per year. Corn, the major crop in Spanish Lookout, is known as a "summer" crop, as is rice; red kidney (RK) beans and black eyed peas (blackeyes) are the major "winter" crops along with relative newcomers, milo and soybeans.

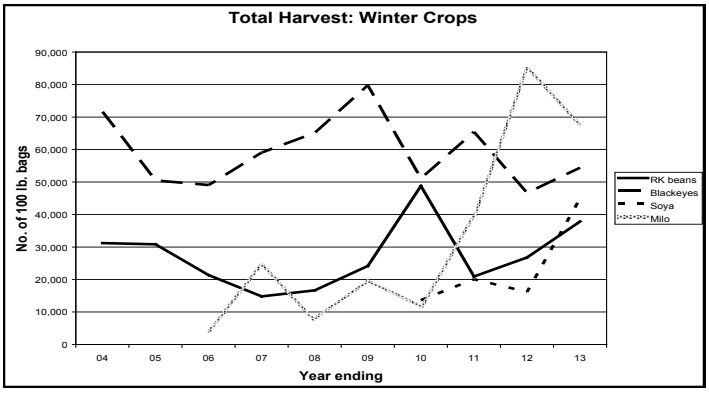
Records kept in the central office of Spanish Lookout start in 1990 but have gaps for some crops; so the charts show acreage, harvest (number of 100 lb. bags) and yield (pounds per acre) for the summer and winter crops for the years ending 2004 – 2013. Records for corn show an expansion from 4,477 in 1990 to over 23,000 in 2013, which includes rented land well beyond the borders of Spanish Lookout. Although the acreage was only a 5-fold increase, the harvest was a 10-fold increase during the same time period while the number of farmers increased from under 100 to 134. Yields have fluctuated due primarily to weather. The lowest yield, 1600 lbs. per acre, was in 1996; the highest, 4600 was in 2012. Although the other summer crop, rice, has been grown since 1993, gaps in the record preclude a complete picture; however there was a dramatic 620% increase in the number of acres between 1998 and 2014 and the number of farmers over the same time period increased from 2 to 29.

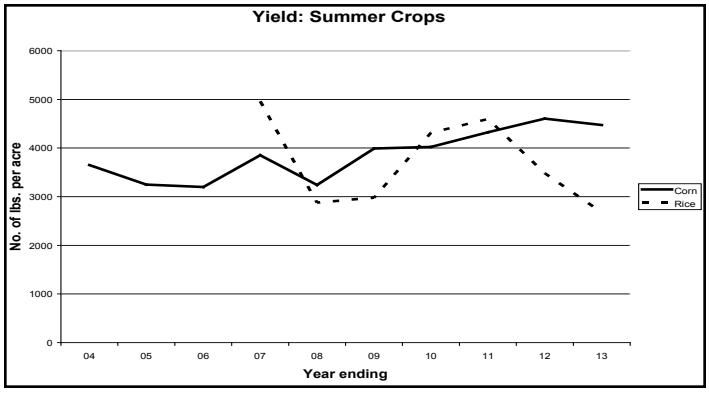
As shown in the charts the acreage for winter crops fluctuates considerably; weather and market price are the deciding factors for planting and weather is the primary determining factor related to harvest. Since 2007 the number of farmers who grew RKs increased from 36 to 86 although records show the highest number is 102 back in 1997. Over the same time period the number of farmers who grew blackeyes increased from 56 to 78 and the highest number is also in 1997: 81. Records show 2,551 100 lb. bags of milo being harvested as far back as 1990 with the highest number, 84,904, in 2012, corresponding to the highest acreage on record. Soy Beans came on the scene in 2010 with considerable fluctuation in terms of acreage and harvest.

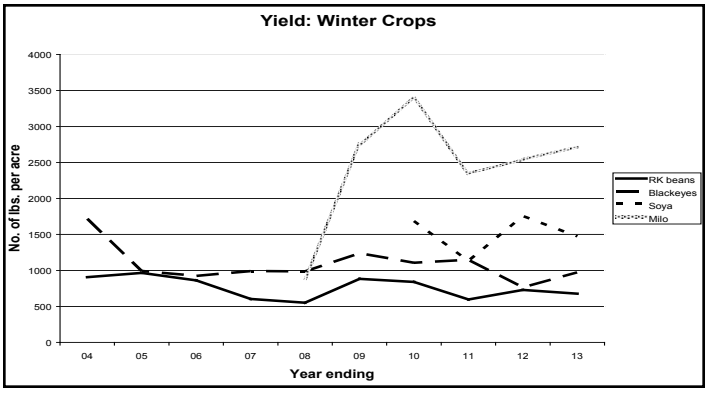












Agriculture Prices at a Glance- $$$$$

AUG 2014

A-B denotes the difference between 1st preference & 2nd preference and sometimes between wholesale & retail and bulk or small amounts . Trend (H) means Higher over last 30 to 60 days (L) Lower (S) Steady.
Prices intend on being farm gate in Belize dollars - usually price per lb

	T	A	B
BELIZE CATTLE			
Young strs. & bulls - 750-1100 lbs	H	1.95 - 2.05	1.60 - 1.90
Cows & heifers for butchers	H	1.40 - 1.60	1.30 - 1.40
Heifers for breeding 500-800 lbs	H	1.80 - 2.00	NA
Young grass cattle - 350-650 lbs	H	steers 1.95 - 2.10	heifers 1.50
U.S. CATTLE			
U.S. price - corn fed - 1000-1200 lbs	H	US$ 1.62 -1.64	
U.S. price - feeders 600-800 lbs	H	US$ 2.20	
U.S. price - aged butcher cows	H	D1 & D2 US$ 1.21	D3 - US$ 1.10
BELIZE HOGS			
Weaner pigs - 25-30 lbs - by the head	H	85.00 - 120.00	
Butcher pigs 160 - 230 lbs	H	2.15	1.95
BELIZE SHEEP			
Butcher Lambs	S	2.00 - 2.25	1.50 - 1.75
Mature Ewes	S	1.75	1.50
BELIZE CHICKEN			
Whole sale dressed	S	2.41	
Broilers - live per lb	S	1.23	
Spent hens	H	4.00 + per 4 lb bird	
CITRUS			
Oranges per 90 lb box-lb. solid basis	H	Estimated final price 1.8445 pps	
Grapefruit - per 90 lb box		9.8690 / box (2.4248 pps) est final	

	T	A	B
GRAINS, BEANS & RICE			
Belize yellow corn	S	.225 - .25	.21 - .22
White corn, wholesale Bagged	H	.35	.32
Corn/local retail (low volume)	L	.265	
US corn	L	US$ 3.65 / 56 lb bushel	
US non-GMO yellow corn	L	US$ 4.05 / 56 lb bushel	
Guatemala white corn price/Peten	H	.45 (Q160/quintal)	
Belize soy beans	L	.57	.55
US soy beans	L	US$10.58 /60 lb bushel	
Belize milo		None Available	
Red kidney beans	L	1.70 farm price	
Little reds & black beans	S	1.25 - 1.30	
Black eyed peas	H	.65 - .70	
Paddy rice per pound	S	.40 - .53 farm price, dried	
SUGAR/HONEY			
Sugar cane, ton	H	estimates 2014 crop: $62.72	
Bagasse		pending agreement	
Honey per lb (Cayo)	S	2.50 (approximately 12 lbs/gal)	
SPECIAL FARM ITEMS			
Eggs - tray of 30	L	4.50 farm price	
WD milk per lb to farmer	S	contract .53; non contract .53	
Raw milk (farmer direct sales)	S	8.50 gal (5 gal + 8.00 gal)	
CACAO			
Cacao beans (TCGA) /lb	S	2.75 dried fermented	
Cacao beans (TCGA) /lb	S	1.10 wet beans	
US Cacao beans, New York, metric ton	H	US$ 3,160.00	

Lots of rumblings and changes in the world at large and reflected as domino-like effects into ag affairs. Corn, wheat and soy all low; some (Brock at deltafarmpress.com) describes/predicts a "collapsing market" for corn and soy. With low world prices, not much increase in acreages planted in the Belize this season. In North America, a bumper crop is predicted due to ideal weather there. The Ukraine/Russia situation has all on alert. There is increasing tight credit for Russian and Ukrainian farmers; the EU cut financing to 5 major Russian banks in July, which will affect 2015 planting.

Cattle: BLPA's Macpherson reports "demand {is} outstripping supply." Local cattle prices soaring. US cattle prices are still rising, with low inventory /falling grain prices. Spent hens also are scarcity, part of the continuous cycle of glut/shortage, prices are $4/bird reaching $8! Eggs down, but will rise again.

Avocadoes – example of the range in weather/marketing conditions within our tiny country. Scarcity driving up Cayo prices, while bumper crop in North with low $.50/lb wholesale prices there. The ying to that yang is that (Bze) Northern corn crop expected only medium yields due to insufficient rain at critical times.

Overall we've been extremely fortunate in Belize, having been spared the brunt of bad weather. Drought conditions along Pacific coastal regions of C. America, from Guatemala to Costa Rica affecting cattle/grain prices – Melchor (Peten) white (tortilla) corn is fetching a startling Bz$.45/lb. D. Thompson (Bmp) reports that all of 2014 to the end of July, rainfall well below normal, and July low side of normal.

Thanks to all assisting Belize Ag Report with information collated in this page, including BEL-CAR, Palm Springs, BLPA, Don Thompson, too many to name. We invite farmers and ag-minded folk to share your news with us. Rewarding farming wishes to all, B. Roberson

****These prices are the best estimates only from our best sources and simply provide a range to assist buyers and sellers in negotiations.****

Bird Watch – From My Perch

The Chiquibul Forest Reserve - Ours to Lose

By Marguerite Fly Bevis

The Scarlet Macaw is an important indicator species for the health of the rainforest. The current population is estimated to be about 200 birds, which is not a good number. The macaws in our country are genetically distinct and geographically separated from other populations in South America. Despite the destruction of some of its habitat due to the hydroelectric dams that were built in their breeding grounds, they continue to exist. This is due in part to the efforts of Friends for Conservation and Development (FCD) and Scarlet Six Biomonitoring Team (S6). Recently, the Belize Wildlife & Referral Clinic (BWRC) also joined forces offering veterinary services in the field. Thanks to all this, along with countless volunteers, some new chicks are fledging safely. But, recently the monitoring team returned with sad news that two macaw nests had been poached due to their remote locations.

The plight of the Scarlet Macaws should serve as a giant red flag to all Belizeans as it indicates that the future of our rainforest is in trouble. Indeed, the Chiquibul Forest is under siege by poachers taking hardwoods, Xate palms, Scarlet Macaws, wildlife, and anything else they can possibly take to sell. There are farmers planting milpas and people basically acting as if the forest belongs to them.

Recently, a team crossed the Maya Mountain Divide from the Cockscomb Basin across and into the Chiquibul Forest. They were searching for Scarlet Macaws in order to understand more about their habitat and feeding grounds. On the Cockscomb side of the Divide, the hardy explorers found untouched, pristine areas. One magical place had **dozens** of Violet Sabrewings; another had hundreds of Morphos, White, Brown and Blue. It was a treacherous and difficult climb to get to the top and excitement built as they anticipated entering the Raspaculo Branch of the Macal River, known macaw nesting areas. But excitement turned to dismay as they traveled toward the "Raspa." Sign after sign of incursion: trash and campsites. The poachers have made the Chiquibul their playground. Belize has already been invaded. A quick look at the border on Google Earth will show increased milpa clearing in our "protected areas." Unfortunately, it is very difficult to monitor and control this invasion.

Groups like FCD and Scarlet Six have spent their time taking turns monitoring known nests. It seems that simply the presence of people is a deterrent for poaching. Volunteers are welcome to camp and help protect the Scarlet Macaws, which means they are helping to protect the Chiquibul Forest Reserve. Start planning now to go next year, April through August, so you can help protect the nesting Scarlet Macaws, just by being there.

FCD, together with the Forest Department, have been co-managing the Chiquibul National Park and documenting illegal activities since 2007. From the FCD website: "FCD's goal has been an ongoing struggle to reclaim the integrity of the Chiquibul National Park. Yet, the threats are ongoing and include poaching of spectacular wildlife such as the Scarlet Macaws, Great Curassows, Brockett deer and peccaries. Extraction of non-timber forest produce and primary hardwoods such as Belize's national tree, the Mahogany is being illegally smuggled across Belize's western border. Looting for Maya artifacts is extensive and incursions as a result of the agricultural expansion are dramatic. The loss is in the millions and the problem is rapidly impoverishing the ecological processes and stability of the Maya forest. The Chiquibul National Park is part of the tri-national bioregion forming the largest remaining contiguous block of tropical forest north of the Amazon. Saving this tropical broadleaf forest is not only crucial to the survival of wildlife species, but also vital to human populations from both Belize and Guatemala that depend on the environmental services and goods derived from this exuberant forest. You can be a part of this ongoing struggle by supporting our programs."

Led by Rafael Manzanero, these guys have been fighting the good fight for years and for the most part they are making little progress, but they need our help. The ultimate goal is to gain World Heritage status for the Chiquibul Cave System and Nohoch Ch'en (Holec) and Puente Natural. The Government of Belize has assigned squads of Belize Defense Force (BDF) soldiers permanently along the Chiquibul border. Funding is needed for high tech drones, tracking devices and cameras. With these tools and with the help of the BDF along the border, the tide can be stemmed.

You can help by donating time or money, equipment or supplies. Roni Martinez, S6's Director of Field Operations says: "More rangers are needed to cover the large area and further population management strategies for next season". Funding campaigns for future efforts will be announced soon. Scarlet Six and FCD are two separate entities working together for the mutual goal of maintaining a healthy and productive Chiquibul ecosystem. Both entities need your help. You can also consider a donation to the Belize Wildlife & Referral Clinic, which provides free health checks in the field for the wildlife. Please think about how you can help save the Chiquibul and the Scarlet Macaws.

http://www.gofundme.com/9p649k

Scarlet Macaw Protection Belize by Roni Martinez (roni.a.martinez@gmail.com)

www.fcdbelize.orgFriends for Conservation and Development

Belize Wildlife & Referral Clinic www.belizewildlifeclinic.org

We must not let the Chiquibul National Forest, the largest protected area in Belize, be destroyed or stolen. This is Our Jewel. It is **ours to lose**.

Happy Birding!

marguerite@pobox.com

Scarlet Macaw photo by Roni Martinez

"A culture is no better than its woods."
W.H. Auden

Brand Registration and the Belize Livestock Registry

By Alistair Macpherson

This month at Belize Livestock Producers Assoc. (BLPA), amongst other things, we are starting a drive to get all cattle owners to register, renew or get up to date with their brand registration. The Belize Livestock Registry (BLR), which is administered by the BLPA and based at their offices in Belmopan, was brought into being under the Cattle Branding Act, Number 207, and was revised in December 2000. It states that all cattle born should be branded before they reach 12 months of age or prior to sale. When you buy an animal you should brand it within 30 days of taking ownership with your own brand. This new brand should in no way alter, obscure, or come into contact with the original brand. The branding procedure is very important; if your animal is not branded it is almost impossible to prove ownership in the case of rustling, which we all know is reaching almost epidemic proportions in some areas of country, especially in Belize and Cayo Districts.

As part of the National Cattle Sweep and the BLR traceability systems, each animal in your herd, whether you have only 5 animals or 500, is given two tags with a number unique to that animal. Correlating these tag numbers with your brand makes it much easier to identify the origin of an animal. When an animal is transported, movement permits must be filled in recording the origin and destination of the animal; so when an inspection at a police or BAHA checkpoint, or even in a slaughterhouse or butcher's shop is made, this animal can be traced back to the owner, thus ensuring that it actually belongs to the seller and has not been stolen or otherwise misappropriated.

What of the cost you may ask? Cheap: only $10 per year to keep your brand up to date - a small price to pay to help ensure that in the event of theft, you can prove ownership of your animals, which may be worth many thousands of dollars. In the case of registering a new brand, or change of ownership of a brand, a small administrative fee of $20 is charged. This fee is also charged when bringing a brand up to date if you have forgotten to register for some time. To save the hassle of registering every year you can pay for five years in advance. All this can be done at our offices in Belmopan. Please take the time to come in and get your brand registered or up to date and while you are there ask about what other services and assistance BLPA can offer to our members. You will be surprised!!

BLPA----------Moooooving Forward!

See and download BLPA's Brand Registration Form on pg 37 of our ONLINE ANNEX - in the pdf of this issue on our website. Note, first time registrants should bring with them, in addition to the form, a 4" square piece of wood with the proposed brand burned on it.

HOMEMADE HEALTH

By MARGUERITE FLY BEVIS, RN, BSN

The purpose of this column is to share useful information about health that is relatively inexpensive and readily available for everyone. The information is not meant to be a substitute for health care, i.e., regular visits to a healthcare provider for check-ups and when you are ill. Instead, these are tips I have learned that help keep me and my family healthy, therefore requiring fewer visits to the doctor, saving time and money, not to mention enjoying the benefits of good health.

A key area to consider is *immune health*. A healthy body is not as likely to be susceptible to daily threats, such as bacterial and viral invasions. The body is built to resist and to heal. When it is weak, defenses are down, and it becomes more likely to succumb to disease. An obvious way to stay healthy is to eat a healthy diet, stay hydrated, stay away from processed foods, eat lots of fresh vegetables, fruit, protein, fish, chicken, grass-fed beef, and use healthy oils and fats such as coconut oil, olive oil and avocado. Exercise is very important to maintain good health. The body was built to move. When it stops moving, it starts falling apart. Muscles deteriorate and the body ceases its ability to function properly. Exercise doesn't have to be an hour work out at a gym. It is as simple as moving about during the day, taking a walk, climbing stairs, playing games with children. People I know who lived into their late 90's were active until the end, mowing their own lawns, and chopping their own firewood. They ate and drank moderately, exercised, and they lived long lives.

Several years ago, I learned another trick to improve immune health. I started taking 200 micrograms of selenium and 3 tablespoons of spirulina every day after learning the remarkable theory of Dr. Harold Foster, a medical-geographer, and professor at the University of Victoria for 41 years. Although I was working in a hospital, I was rarely sick; I didn't even get colds. Selenium is a trace element that is naturally present in many foods and is available as a dietary supplement. Spirulina is blue-green algae that can be found in the world's oceans and lakes. The combination of selenium and spirulina provide the essential nutrients for good immune health: selenium, cysteine, glutamine, and tryptophan.

Dr. Foster was also a consultant to the United Nations and NATO in disaster planning and avid researcher. He was an expert at finding out why certain diseases occurred in different geographic locations. He developed the Foster Calamity Magnitude Scale ranking the AIDS Pandemics in 2001 and 2015 as the worst. When Dr. Foster's wife became ill with cancer he threw his considerable skills and background into discovering more about cancer. Unfortunately, she died before he could help her; but his knowledge can help many others.

Dr. Foster discovered five variables associated with either a low or high incidence of cancer mortality. 1) Selenium: Areas with high levels of selenium in the soil had extremely low levels of cancer. 2) Hard Drinking Water: Areas with hard drinking water (lots of calcium and magnesium) also had low levels of cancer mortality. 3) Sunshine: Areas with lots of sunshine had low cancer mortality levels - except too much seemed to increase skin cancer. So on one hand, sunshine seemed to protect people from every type of cancer, while too much increased skin cancer. 4) Mercury: Areas with high levels of mercury in the soil had high levels of cancer mortality. 5) Road Salt: Areas with a lot of road salt usage had high levels of cancer mortality. Understanding that just because something is highly correlated does not mean it "causes" it, he nevertheless hypothesized that if he could find a region of the world with high selenium, hard drinking water, lots of sunshine, no mercury and no road salt, they should have very little cancer.

Dr Foster knew that the small country of Senegal in West Africa had the second highest concentration of selenium in the world, some of the hardest drinking water on the planet, and being on the equator, no need for road salt and plenty of sunshine. Sure enough, Senegal has one of the lowest cancer rates in the world for almost every type of cancer. Senegal also has the lowest incidence of HIV/AIDS in Africa despite the fact that polygamy is legal and the sex trade is quite active. Dr Foster conducted trials using dietary supplements in Africa with amazing results. Unfortunately, pharmacy companies were not interested because vitamins and supplements are inexpensive and there is no money to be made.

Quoting Dr Foster: "The AIDS and Hepatitis C pandemics are only two of the ongoing global catastrophes involving viruses that encode the selenoenzyme glutathione peroxidase. The world is experiencing simultaneous pandemics caused by Hepatitis B and C viruses, Coxsackie B virus and HIV-1 and HIV-2. As these viruses replicate, because their genetic codes include a gene that is virtually identical to that of the human enzyme glutathione peroxidase, they rob their hosts of selenium. Paradoxically, however, they diffuse most easily in populations that are very selenium deficient, possibly because their members have depressed immune systems." Dr Foster goes on to explain that the expansion in the use of fossil fuels and deforestation by fire has resulted in pollution that has increased the acidity of global precipitation, reducing selenium's ability to enter the food chain. The situation is worsened by the use of commercial fertilizers since their sulphates, nitrogen and phosphorus all depress the uptake of selenium by crops.

Thankfully, Dr Foster's research is ongoing and readily available for those interested to learn more. You can visit the site at http://www.hdfoster.com/ where you can download free PDF files, books entitled "What Really Causes…" (AIDS, Alzheimer›s, Schizophrenia, and Multiple Sclerosis.) For a very small fee, you can join to receive ongoing health updates from the Harold Foster Foundation. If you read even one Foster book, you will gain understanding in why selenium and spirulina work together to improve immunity.

He discusses biochemical abnormalities than can cause these conditions and has suggestions for correcting the imbalances.

Continued on page 23

Homemade Health...Continued on page 22

But you don't have to read the books; just begin adding 200 micrograms of selenium (no more) and a couple of teaspoons of spirulina to your diet every day to improve your immunity and enjoy better health. Selenium tablets, 200 mcg, are available in health food stores and some grocery stores. Spirulina comes in a powder form or in tablets or gel capsules.

The powder can be mixed in smoothies but the dark green color of the algae can put people off. I can't promise you better health, but it's certainly worth a try.

Disclaimer: The information here is not intended to substitute for medical care or advice. Please see a doctor or nurse if you are ill.

Editor's Note: Some local food sources of selenium are: sorrel (Hibiscus sabdariffa) AKA Rosa de Jamaica - 143 ppm; lemongrass (Cymbopogon citratus) - 62 ppm; pumpkin seed (Cucurbita pepo) - 32 ppm; Raspberry leaves (Rubus idaeus) - 25 ppm; aloe vera (Aloe vera) - leaf - 23 ppm; garlic (Allium sativa) - 16 ppm; ginger (Zingiber officinale - rhizome - 10 ppm; Spanish Bayonet (Yucca bacatta) - 9 ppm. Facts/figures extracted from C. Walter's Minerals for the Genetic Code.

ppm = parts per million

Salt and Minerals for Livestock

By Roberson/Feucht

Animals, including humans, have been given a natural taste for salt, but not necessarily for trace minerals. That is probably why in natural states (solid and solution), salt is found with a wide variety of minerals, often balanced in the best proportions enabling their utilization by animals. In the wild, animals find their salt and minerals by selectively eating to their requirements. Domesticated stock need regular, if not constant, supplementation to optimize their growth, reproduction and immune systems.

Sodium chloride, or salt, is vital for maintaining the osmotic pressure in the body's cells, enabling both nutrients and waste to move across cell membranes. Trace and other minerals are becoming more appreciated as their exact functions are defined by researchers such as Dr. Richard Olree. He states "Cells are all protein producers. Trace nutrients govern the kind of protein you will have." Charles Walters adds, "If deficiency labels a mineral or if there is a toxicity of a given mineral, then proper genetic expression becomes impossible." Balanced minerals are essential.

According to the barrel illustration here, "**Liebig's law of the minimum** states that growth is controlled not by the total amount of resources available, but by the scarcest resource, which is the limiting factor." Imagine that every vertical stave of the barrel is a different mineral. When any one of the required minerals runs out, a domino effect kicks in whereby other minerals are unable to be metabolized, due to the shortage of the scarcest resource.

Premixed livestock minerals include the usual 7 trace minerals: iron, copper, zinc, manganese, cobalt, iodine and selenium. Most will also have calcium and phosphorus added as well. All of Belize is known to be deficient in phosphorus, so extra is added in the special formulations that Lakeland Animal Nutrition produces for Belize.

Lakeland states that "the relative bioavailability of the mineral and the amount of the mineral in the supplement are important factors to consider when purchasing a mineral supplement. Organic mineral sources are characterized by the presence of an amino acid or carbohydrate carrier for the trace mineral that is to be fed to cattle. In a process informally termed **chelation** or **protonation**, the organic carrier molecule is chemically bound to the trace mineral of interest. Inorganic sources of minerals are much more commonly encountered in the livestock feed industry. They are mined or chemically synthesized from natural mineral sources and are not bonded to a carrier molecule. They are fed as the naturally occurring inorganic mineral complex."

According to Purdue University's Dr. Don Huber, "Many herbicides and pesticides are chelators. … Glyphosate decreases nutrient availability." Researchers Dr. Mae Wan Ho and Dr. Eva Sirinathsinghji state that glyphosate causes "chelation and immobilization of micronutrients, such as manganese….. and harms microbes which cripple the soil's ability to uptake phosphorus and zinc." Hence, more mineral supplementation must be given to stock grazing on lands which have received glyphosate or consuming feed grown on glyphosate-treated land, to make up for nutrient/mineral losses.

Reimer Feed Mill carries two types of salt/minerals for livestock. Lakeland Animal Nutrition's Belize Range Minerals, which has between 15 -17% salt plus trace minerals, calcium and phosphorus, costs $44.60 /50 lb. bag or block.

Cargill's Champion offers Sulphur Salt, which is between 92 - 97% salt, at $26 /50 lb. block. The sulphur discourages ticks and insect pests. The product Champion TM is 98% salt and is $27 /50 lb. block.

Reimer sells 3 times more of the more expensive special Range Minerals than the predominately NaCl ingredient blocks. Ranchers and dairy farmers know balanced nutrition pays off.

Animals consume twice the amount of salt if it's loose rather than in block form. Professionals recommend 1 mineral feeder for every 20-30 head of cattle. If animals have continuous opportunity to partake of the minerals, then each mature bovine is estimated to consume 3 to 4 ounces per day. For 100 head this is roughly 167 lbs. /week.

Mineral consumption changes whenever there are changes in diet/ pasture of the animals. Other factors include stages of production and the weather. Overdoses of salt are rare, as NaCl is excreted in urine, as long as an ample amount of drinking water is available.

"Liebig's law of the minimum, often simply called Liebig's law or the law of the minimum, is a principle developed in agricultural science by Carl Sprengel (1828) and later popularized by Justus von Liebig. It states that growth is controlled not by the total amount of resources available, but by the scarcest resource (limiting factor)." Wikepedia

Below are some tips from the University of Arizona's *Using Salt for Livestock*by E.P. Schwennesen.

- Placement of salt/mineral can provide the benefit of attracting cattle herd's feet into areas which need short term disturbance.
- Always move the salt/mineral with plant recovery time in mind. Never leave a salt/mineral in one spot longer than the time it takes for the first nearby desired plants to begin regrowth.
- The least desirable location for salt on rangeland is close to the water source. The water is already an attractant, and salt/ mineral will increase animal presence in that same area. Some Arizona ranchers place it as far away from the water as the pasture will allow, to get the animals exposed to as much of the forage as possible.
- Moving the salt/mineral often will cause herds to utilize areas they don't normally use.

HISTORY OF SALT

Solid salt mines were formed by the drying up and evaporation of ancient seas long ago – 600 million yrs ago (long before dinosaurs, in the Precambian era). After eons of pressure, heat and time, the deep rock salt eventually was thrust up to the surface. The first historical mention of natural salt licks was in 326 BC, when Alexander the Great's mounted troops noticed their horses licking the rocks in the Khewra area of modern Pakistan. Natural salt from this area is prized and marketed worldwide as 'Himalayan salt'. Pakistan's Salt Range has the world's largest deposits of highly pure salt, but is not the largest salt production area or source.

Chile's Atacama Desert mine produces 6.5 M tons of industrial salt and the Sifto mine in Goderich, Canada produces 7.25 M tons of salt annually. For salt from sea water, the Esco, Holland solution mine, produces 8 M tons from pumped sea water. The largest sea salt operation is Guerrero Negro, Mexico, which is owned jointly by the Mexican government and Mitsubishi Int'l Corp. It produces 7 M tons per year.

The Belize Ag Report thanks Mr. John Dueck of Reimer Feed Mill, who supplied information on the various livestock minerals / salt products which Reimer's handles.

Salt historical and production information was gleaned from Salt Block Cooking by Mark Bitterman. See link below to Glyphosate Effects on Crops, Soils, Animals, and Consumers by Dr. Don Huber, Professor Emeritus of Plant Pathology, Purdue University.

http://www.netwerkvlv.nl/downloads/Powerpoint_presentatie_lezing_Don_Huber_25_okt_2011.pdf

For more information on minerals in foods relative to health, see Dr. August Dunning's chart on our ONLINE ANNEX, which appears in the online pdf of this issue, as page 39. The Dunning chart illustrates the eerie inverse relationship between the dropping mineral content in modern foods (post 1920) and the increase in health problems.

National Agriculture and Trade Show 2014– A Growing Success

The 41st annual National Agriculture and Trade Show (NATS) 2014 welcomed approximately 36,000 visitors at the newly updated 60+ acre Belmopan Fairgrounds from May 3-5. Attendance has steadily increased since its inception in 1973. Despite the cloudy and rainy weather, the mood of the event was sunny. The fairgrounds have been restructured to separate agriculture, animal and entertainment exhibits.

The theme of the NATS 2014 was "Stimulating Prosperity in Agriculture Through Renewed Public and Private Partnerships". The goal of this event was to educate the public about the importance of sustainable agriculture in Belize and to inspire the younger generation to consider farming as an occupation. Numerous vendors displayed their equipment and agriculture-related products. An exhibit of all the co-ops and their products for sale was a popular feature of the event. The venue, serving also as a nation-wide social event, featured rodeos, farm exhibits, lively music, entertainment and food.

Profits from the 2014 NATS will be used to improve the NATS for 2015. Mark your calendar for April 24 – 26, 2015.

Have you a suggestion for an article topic or have a finished article about Belizean agriculture to share?.....

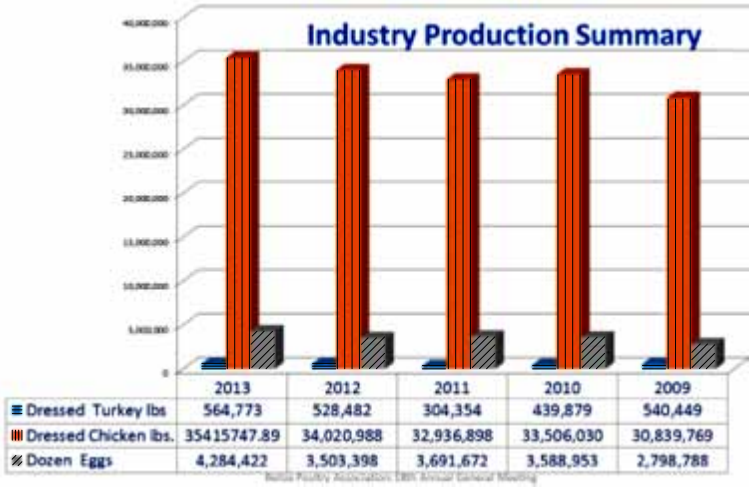
Be a part of the *symphony of agricultural news* in the Belize Ag Report.

belizeagreport@gmail.com ~ 663-6777

Belize Poultry Association

By Orlando Habet, BPA Consultant

The Belize Poultry Association (BPA) held it 2013 annual general meeting on Wednesday March 12, 2014 at the Biltmore Hotel. The guest speaker was the Hon. Gaspar Vega, Minister of Natural Resources and Agriculture. The new BPA Board of Directors is chaired by David P. Reimer of Spanish Lookout. Other members of the executive are Larry Reimer, Vice-Chair; David Hiebert, Secretary; and Bernhard Bergen, Treasurer. The highlight of the report was the increase in production of broiler meat (4.1%) and table eggs of 22%.



	2013	2012	2011	2010	2009
Dressed Turkey lbs	564,773	528,482	304,354	439,879	540,449
Dressed Chicken lbs.	35415747.89	34,020,988	32,936,898	33,506,030	30,839,769
Dozen Eggs	4,284,422	3,503,398	3,691,672	3,588,953	2,798,788

The industry is poised as one of the highest contributors to agricultural GDP and the highest contributor to the livestock GDP. The industry wholesale value now stands at more than 100 million dollars. Chicken hovers above 107 lbs. of meat per capita and eggs are at 156 per capita. The industry is ever mindful of the potential entry of diseases and therefore remains ever vigilant through its biosecurity programmes. The BPA is planning a poultry school for the first week of November as a means of continuing education for its members.

The Belize Agriculture and Health Authority (BAHA), along with industry, are looking at the possibility of a salmonella prevalence study at the slaughter facilities. This will give an indication of where we are in terms of food safety and allow us to tweak things to acceptable levels if required.

Talks have commenced with the Directorate of Foreign Trade regarding increased production, compliance with standards, poultry health, food safety, labelling and other requirements for market access and the potential for poultry export to the Caribbean, Venezuelan or other markets.

See BPA's new website: belizepoultry.com

Belize Pig Council Updates

The Industry Slowly Expands and Thrives

By Beth Roberson

Three swine inventories are done annually in Belize, and they reveal that there are about 20,000 live pigs in the country at any one time. Overall, our country pig head count is up 5-10% since our last swine industry article in Issue 17, August 2012. The geographic proportions for locations of the pigs in country are unchanged; 75% of the industry is still located in Shipyard, Orange Walk District. There are about 3 farms with over 1,000 head within Belize; one is in Spanish Lookout and the other large piggeries are located in Shipyard. Being smaller scale has its advantages regarding disease control. Pigs in Belize do not require any regular vaccinations. Coccidia treatments (wormers) are administered, and occasionally iron shots are given to the animals.

Mexico is experiencing some problems with Porcine Epidemic Diarhea (PED); those farms are located in northern Mexico, far from Belize. PED does not affect humans, so is not a human public health issue.

Porcine dressing percentages remain about the same, a respectable 74-76%, and slaughter houses note that there is an increased leanness on most carcasses.

Regarding input costs, corn prices are stable and soybeans are up. Swine prices to the farmer are also rising. Weaner pigs (25-30 lbs) range from $85 to $120 for the top grade and finished butcher pigs (180 -230 lbs) are bringing $1.95 to 2.15/lb. Sale quantities are up and it appears Belizeans are consuming more pork, although a small number have been exported to Peten, Guatemala.

Anyone paying cess on pigs at slaughter is automatically a member of the Belize Pig Council. The Council has purchased an imported boar from Costa Rica, and members can purchase young boars by this boar, for breeding, at a cost price. Below find the current officers for the Belize Pig Council:

Ernie Thiessen	Spanish Lookout	Chairman
John Penner	Shipyard	Vice Chairman
Henry Peters	Shipyard	Secretary
John Mohamin	Ladyville	Member
John Reimer	Little Belize	Member

Chairman Ernie Thiessen urges all members to be cautious traveling from farm to farm, and advises restricting visitors. All boots/footwear should be disinfected entering and leaving the pig barns. Thiessen can be reached at 674-9807 or ernieth@westerndairies.com.

****

Pigs in the Americas

The Belizean collared peccary, Tayassu tajacu, is a member of the family Suina and descends from the ancient Percheorus, who thrived in the Eocene era about 37 M years ago. Their cousins, the domesticated pig, originated in Eurasia and are also members of that Suina family. The Chinese domesticated the pig around 5000 BC. From China they spread throughout Asia, Europe and Africa. Christopher Columbus was the first to bring pigs into this hemisphere, carrying them on his ship by order of Queen Isabella, landing in Cuba in 1493. In 1539 Hernando deSoto sailed to Florida, carrying the first pigs on to the American mainland. The feral (wild) pigs of the Americas are descended from the escaped domestic pigs, not peccaries.

Flamboyant Trees in Belize

By Mary Susan Loan

The **flamboyant** tree has been described as one of the loveliest and most colorful trees in the world. With a blaze of yellow to crimson red blossoms and delicate fern-like leaves, the magnificent flowers grace Belize from April until September in Belize and all around the earth in tropical climates. Flamboyant trees belong to the family Fabaceae/ Legumiosea, sub-family Caesalpiniodeae. In addition to being a joy to behold, flamboyant trees also have healing properties and may be a source of revenue for Belize farmers and growers.

Flamboyant trees, *Delonix regia,* have been grown primarily as ornamental shade trees since at least the 17th century. The tree is indigenous to Madagascar. Since the 18th century Flamboyant trees have been widely cultivated in most tropical regions. Other common names for the tree include: flame tree, fire tree, peacock tree, arbol el fuego. The tree was previously considered to be in the genus *Poinciana* and was known as royal Poinciana.

Flamboyant trees are recognized by their brilliant, exuberant clusters of flowers which range from tree to tree from yellow to orange and all shades of orange-red to crimson and vermillion red. Yellow flowers are the rarest. Each individual flower has four spoon shaped petals which are approximately three inches long with one slightly longer petal which is often spotted yellow and white. The long delicate bi-pinnate fern-like bright green leaves of the tree grow to be about one to two feet in length and about five to seven inches wide with hundreds of small leaflets. Trees grown in Belize start flowering during the dry season months of April and May and continue flowering through September. Once the trees have flowered, they produce bright green pliable pods which are about twelve to twenty inches long and about two to three inches across. The pods eventually turn dark brown and are filled with approximately fifty dark brown to black seeds approximately 1/3 to ½ inch long. When planted the seeds become fast growing deciduous trees which generally grow to be from twenty to forty feet in height with an umbrella shaped canopy. Flamboyant trees can easily grow five feet or more in one year. The trunk of the tree has a smooth gray-brown bark.

Flamboyant trees are very hardy and pest-resistant and grow well in a wide variety of well-drained soils from acid to alkaline and from loamy to gravely and, if managed well, even in the dark clay-like soil in parts of Belize. The trees are tolerant to draught and may be grown close to the sea, but not right on the beach. Flamboyant trees are not able to survive in zones that go below 45 degrees Fahrenheit. In windy areas, trees are susceptible to branch breakage.

It is easy to plant a flamboyant tree. Start with a closed pod, open the pod and remove the seeds. The seeds have a high germination rate for several years. The seeds grow faster when they are either nicked with a knife or rubbed for about fifteen seconds with sandpaper then soaked overnight. Alternatively you may place the seeds in a pot of water, bring it to the boiling point, remove the pan from the heat source, and leave the seeds in the water until it is cooled. Once the water is drained the seeds are ready to plant; plant them in a location that receives full sun. Plant three or four seeds per tree and thin to the strongest one once they have sprouted. Trees may also be grown from branch cuttings of the tree. It is advised not to plant flamboyant trees close to sidewalks as the shallow roots may protrude through the sidewalk and present a tripping hazard.

In addition to providing delightful dappled shade all year and a profusion of flowers for almost half of the year, the bark and flowers of the tree are rich in phytochemicals and flavonoids and contain anti-microbial, anti-oxidant and anti-inflammatory properties and have been used for hepatic protection and as a treatment for diarrhea. The dried pods on the tree produce a nice crackling sound in the wind and are easily gathered on the ground to be used as a fuel for fire.

Check under flamboyant trees after the pods are on the ground and you may also find seedlings ready to plant which will grow to be the same color as the tree the pods and seeds fell from.

Enjoy and spread the profusion of flamboyant trees in Belize by planting more trees along roadways and in gardens and parks and, if room allows, in your own backyard.

loanmarysusan@gmail.com

Byrsonima crassifolia, aka: CRABOO

Love it, or .....not

By Beth Roberson

It's craboo time in Belize as we go to print. Children along the Hummingbird have been hawking them for weeks, and now in most of Belize it's craboo season too.

There are some fruits, if one is not a native to their native area, growing up with them and their exotic smells and tastes, can never attain a 'favorite fruit' status. Newcomers to the tropics seldom stop by the speed bumps to purchase a $1. bag of craboo. But to those raised in craboo's native lands, from Mexico to Brazil and in much of the Caribbean, Byrsonima crassifolia is a treasured fruit, a reminder of their childhood, collecting ripe fruit under trees and eating fermented craboo during the Christmas holidays. Craboo has a particular aroma – indescribable, but unlikely to be utilized by the perfume industry. Other names include *nance* in Mexico, *tapal* in Guatemala, *nance verde* in El Salvador, and *golden spoon* in some of the Caribbean.

Craboo can be either a large shrub or a tree, reaching up to 33 feet. More commonly it's 20 feet or less. It thrives on sandy, alkaline-sandy and rocky soils, in elevations from sea level to 6,000 ft. It's a lovely tree in bloom when it's covered with racemes, starting yellow, turning orange and finally red. The flowers provide a notable late dry season source of nectar for bees. It tolerates droughts, is easy to cultivate and has been recommended as suitable for restoring infertile lands.

In Belize, trees blossom in the dry season, and fruits ripen from July thru September. Fruits fall off the tree when ripe and are mainly harvested after they fall to the ground. If not harvested, the area will smell from the fermentation. If you pick them or if you buy them, make sure the bag is open until you are ready to use them. Don't wash them either, until ready to consume or prepare.

Even though most trees fruit abundantly, there is very little commercialization of it. It is said that children, birds (especially parrots), small animals, and a shrinking group of 'rural folks clinging to the old ways' are the main consumers of craboo. Tapirs are said to like nibbling on the bark.

Crabboo is a member of the acerola family and is a drupe or stone fruit. There are many varieties but basically there are the usually larger sweet ones and the smaller less sweet ones. Folks who eat fresh or canned and also ferment Christmas craboo use the larger sweet ones for eating fresh and canning and use the more tart type for fermenting, since much brown sugar is added to those anyway. Find a recipe for Christmas (fermented) craboo as pg 38 in the online version of this publication at our website.

Craboo can be eaten plain, or as dessert, crushed with evaporated milk, or stewed with sugar. Some make craboo ice cream and a craboo wine. Costa Rica and Mexico make nance (craboo) liquors. Older recipes, (1800's) mention craboo in soups, in stuffings for meat and with stewed chicken.

Other uses for craboo include dyeing cotton with green (unripe) fruit which makes a light brown color, stunning fish by putting small pieces of branches into streams, and using the bark to tan hides. The bark can contain between 17 -28% tannin and almost 3% oxalic acid. Presumably the oxalic acid is what stuns the fish. Strong fibers can be taken from the bark. The wood was and is used for boat ribs and other small pieces, such as trims and tool handles.

It is said that the craboo leaves can be used as tea to treat diarrhea. Also reportedly "a bark infusion creates an astringent which is taken to stop diarrhea, lower fever, aid lung ailments, and can tighten the teeth where the gums are diseased" (Morton). Ms. Morton also reports that in Belize it has been used as a snakebite antidote, that the Guyanese use the pounded bark on wounds and that in Mexico it has been used on ulcers. The roots are purportedly anti-bacterial. There has been recent research (http://www.ncbi.nlm.nih.gov/pubmed/20734144), which has found the fruit and seed of craboo useful as an antihyperglycemic (lowering blood sugar for diabetics), as an antihyperlipidemic (lowering fats) and affects antiglycation beneficially as well.

"Good judgment comes from experience, and a lot of that comes from bad judgment."

Will Rogers

Making Vinegar from Tropical Fruits

By Deborah Harder

There are times when God gives us fruit so abundantly in the tropics that we don't always know what to do with it all. Homemade vinegar can be one way of using some of the excess, yielding a product with many uses: household, culinary and medicinal.

We have made vinegar from many different fruits, including sweet and sour carambola, wax jamboo, Malay apple, pineapple, wild grape, and blackberry (java plum). I'm sure we have not exhausted all of the possibilities. Often, as in the case with pineapple or sweet carambola, vinegar is made from the peels and trimmings of a canning project, or in the case of blackberry or wild grape, with a juice making endeavor. Good, whole fruits can also be used, though we would tend to select the best Malay apples, for example, for other purposes and use the culls for vinegar. Once we made vinegar from a failed mango sauce canning project. A neighbor made vinegar from a bucket of orange juice left over from a wedding. In our communities, sour carambola has been the most faithful standby for vinegar, as it bears abundantly, but is too sour to eat as is. But fruits do not need to be sour to make good vinegar, for acetic acid is produced from sugar.

To make vinegar, layer your fruit, cut up if necessary, with sugar in a container such as a plastic bucket. The sugar is necessary for fermentation and also helps to draw juice out of your fruit. About 2 cups of sugar per 5 gal. bucket of fruit should be enough. Cover with a plate and place a weight like a heavy stone on top, making sure that the juice is covering the pulp. In the case of dry fruits or pressings, you may need to add water for cover. Now cover the bucket with either a cloth secured with a string, or loosely with a bucket lid, not snapped shut. Allow your fermenting pulp to stand for about 3 days. Then you need to press out the juice. This can be done by pouring the contents of your bucket into a cloth bag such as a pillow-case with another container underneath to catch the juice. Hang the bag overnight till the juice has dripped out. The process can be speeded by squeezing the bag with your hands. Now, if you had a 5 gal. bucket of fruit pulp, you would have about 2 gals. of strained juice. Pour it into a plastic, glass, enamel or stainless steel container where you can let it stand for several months.

The next step is to add the mother of vinegar, if you have one. Mother of vinegar is vinegar's "starter", a rubbery, whitish layer that grows on top of your developing vinegar. It should float, undisturbed, until the fermentation process is complete. You may obtain a mother of vinegar from us or anyone who makes vinegar, but your vinegar should produce its own mother, given enough time. Adding a mother will make the process faster and more sure. According to a book I read, the mother should be added after the alcoholic fermentation of your fruit juice is complete; in other words, when bubbles no longer appear on the surface. However, the home vinegar makers I know do not know this, and normally add the mother as soon as the juice is in the bucket. This method has yielded successful vinegar for us many times as well. Now you just need to let it stand, loosely covered again, until it smells and tastes like good vinegar. This may take one month, six months, or longer. If your vinegar becomes scummy, try straining it into a clean container, and add another ½ cup or so of sugar. Be patient, and keep watching and hoping. A good practice for a life of faith!

When your vinegar is done, remove your mother and put her into a jar covered with vinegar until you need her again. Strain your vinegar and bottle it. Use it for making salad dressings, and canning pickles and relishes. Add some to your rinse water for sparkling clean dishes and laundry. Use it instead of alcohol for making herbal tinctures. Apply it to bee stings for fast relief. Thank God for his amazing chemical processes which provide for so many useful things to us humans!

"The world will not be destroyed by those who do evil, but by those who watch them without doing anything."

Albert Einstein

ASK RUBBER BOOTS

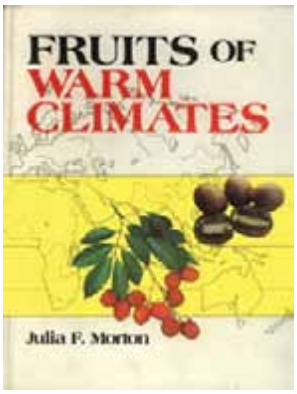
Dear Rubber Boots,

Can you recommend a good tropical gardening reference book? Thanks.

Sincerely,

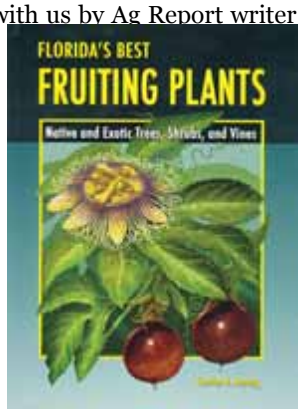
Tropical Newcomer

Dear Tropical Newcomer,



The absolute best reference on tropical fruits is Julia F. Morton's encyclopedic 1987 gem, ***Fruits of Warm Climates,*** ISBN: 0-9610184-1-0**.** She was a world renowned Research Professor at the University of Miami and served on numerous horticultural boards in the USA and internationally. Her maxim was: "I don't want to suppose. I want to *know***.**" The printed version is distributed by Creative Resource Systems, Inc. Box 890, Winterville, N.C. 28590, or find new and used copies on Amazon. Luckily, it is also online at Purdue University's site: http://www.hort.purdue.edu/newcrop/morton/index.html. The Bibliography in the back of this very reader-friendly classic 500+ page tome is 37 pages; this is THE source book for tropical fruits.

Another recommendation, shared with us by Ag Report writer Mary Loan, is ***Florida's Best Fruiting Plants,*** by Charles R. Boning, ISBN-13:978-1-56164-372-1. Not quite as encompassing as the Morton and with its focus on Florida, it is chockblock full of useful information, has lots of great color photos and is less costly than the Morton.



Readers, please tell us your favorite references, which we will share in this column.

Submissions to Rubber Boots, questions, suggestions and also replies can be sent to Belize Ag Report, P.O.Box 150, San Ignacio, or emailed to belizeagreport@gmail.com

The Honeybee Crisis

According to John Ross Crooks, editor of Sovereign Living magazine, 23% of American honeybee colonies died in 2013. In fact, every year since 2006, about 30% of the nation's honeybee colonies have perished. If honeybee populations continue to decline, a serious crisis lies ahead because they are vital to insect-pollinated plants that make up 1/3 of the human diet. The USDA estimates $15 billion in agricultural production hinges on the survival of the American honeybee.

There is still some mystery behind colony collapse. Monoculture (the practice of growing a single crop over a large area), parasites, pesticides, sickness, genetics and habitat loss are believed to be factors. However, according to recent study by the Harvard School of Public Health, neonicotinoid, a pesticide class similar to nicotine, is a significant factor in the shocking decline of honeybee colonies. Neonicotinoids are applied to seeds of industrialized crops such as corn. The poison seeps into the seed and renders the plant toxic to insects. Normally, this doesn't affect bees, because they don't pollinate corn, wheat or soybeans. But modern mechanized planting techniques result in large clouds of neonicotinoid dust which can drift and blanket the areas that bees visit. The U.S. Fish and Wildlife Service has banned the pesticide in Oregon, Washington, Idaho and Hawaii. The European Environment Agency (EEA) has banned three of the seven types of neonicotinoids.

AG BRIEFS

Israel Encourages Farmers to Observe Biblical Sabbatical Year: The Israeli government has reportedly set aside NIS 100 million (~$29M USD) to encourage local farmers to honor the biblical command to let their fields lie fallow for one year every seven years.

Exodus 23:10-11 reads: *You may plant your land for six years and gather its crops. But during the seventh year, you must leave it alone and withdraw from it…*

The commandment is repeated in the Book of Leviticus. The next sabbatical year (known in Hebrew as shmita) will begin on Rosh Hashanah in late September of 2014 and a ceremony will mark the end of the shmita during the Sukkot holiday in 2015. While farmers in modern Israel have rarely, if ever, honored the commandment due to the loss of income they would incur, the government and religious authorities are hoping to influence a change of heart.

Glyphosate (RoundUp™) under Periodic Review in the US. Glyphosate is currently under review this year in the US by the Environmental Protection Agency (EPA). A recent meeting of EPA with concerned citizens whose children have been mentally and/or physically compromised, the underlying factor appearing to be exposure/ingestion of glyphosate (the most frequently used herbicide in the world today) has resulted in the EPA asking Monsanto (the patent holder) for the results of their study on human breast milk and the levels of glyphosate detected in their samples. Glyphosate is on the radar this year following its ban in El Salvador, Sri Lanka, Amsterdam, and sectors of Argentina. Prosecutors in Brazil have also asked that it be banned.

USDA allocated $1.5M USD in new funding, to fight Citrus Greening Disease (HLB). Over .5M of that will go to Dundee Biological Control Laboratory, for work breeding a parasitic wasp to prey on the vector of the HLB bacteria, the Asian citrus psillid. Dundee expects to produce over 300,000 wasps/month by the end of 2014. Other facilities in Florida, Texas and California are also working on wasp breeding projects.

Spanish Lookout's average yields for the 2013-2014 winter crops were: RK Beans – 677 lbs/ac ; Black Eyes – 972 lbs/ac ; Soy Beans – 1,473 lbs/ac and Milo (Sorghum) – 2,716 lbs/ac.

Monsanto pressures El Salvador with hold-up of foreign aid over Salvador's reluctance to purchase Monsanto GMO corn. The Millennium Challenge Compact aid, administered by US foreign aid corporation Millennium Challenge Corporation, will withhold approximately $277M USD in aid, earmarked for El Salvador. El Salvador prefers to purchase non-GMO seeds from El Salvador's own farmers. Salvador imports 58% of its food, which tempts some foreign aid organizations to take advantage of their situation for monetary gain. The US used similar coercion policies in Haiti, which some feel "has effectively destroyed Haiti's agricultural economy and created an over-reliance on food aid." www.foreignpolicyjournal.com/2014/06/13/monsanto-and-foreign-aid-forcing-el-salvadors-hand/

The Lahore {Pakistan} High Court ordered Pakistan's federal government to halt all licensing for GM corn and cotton. This will result in the complete holdup on sales of all GMO seeds within Pakistan. The court considered that 'these crops have elsewhere been found to cause super bugs, super weeds, and human and animal illnesses'. Specifically named in the ban include 23 varieties of BT cotton and 14 new Bt corn varieties. **Of these, the GM corn MIR 162 and MON 810 have both been banned in China and parts of the European Union**.

Chardhry Gohar, a progressive cotton farmer from Multan, Pakistan told the local media:*"The use of uncertified varieties of GM seeds increases input costs for farmers. The low levels of pest resistance in these seeds have increased insects' immunity,* ***necessitating the use of nearly double the normal amount of pesticides. The NBC {National Bio-Safety Committee} also relaxed germination levels for crops from 75% under SEED ACT, 1976, to less than 50%."***

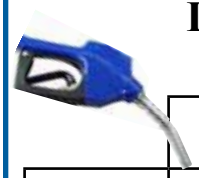
For Information on the status of the

IGUANA CREEK BRIDGE

waters rising or falling, out of water, under water, go to iguanacreekbridge.blogspot.com

The Iguana Creek Bridge crosses the Belize River near Black Man Eddy Village, off the George Price (Western) Highway.

Local and Regional Fuel Prices



	Cayo, Belize	Quintana Roo, Mexico	Peten, Guatemala
REGULAR	↑$11.88 Bz/Gal	↑ $7.92 Bz/Gal	↑$10.70 Bz/Gal
PREMIUM	↑$12.24 Bz/Gal	↑ $8.35 Bz/Gal	↑$10.91 Bz/Gal
DIESEL	↓$10.54 Bz/Gal	↑ $8.24 Bz/Gal	↑$10.32 Bz/Gal

AG BRIEFS

France announced mid-June that they would ban all aerial spraying with pesticides, progressively affecting all crops which had permission previously to be exempt from the ban. All corn spraying is immediately stopped and within 18 months rice and vineyards may no longer aerially spray. Bananas in the French West Indies are also now prevented from aerial spraying via this ban. Spain had published a Royal Decree no. 1311 in 2012 banning aerial spraying in general, but they continue to issue permits authorizing exceptions. Source: agroquimica.es

FAO's World Food Day will be celebrated on Friday, October 17th, in Belize City, at a venue to be announced. Contact the Ministry of Natural Resources & Agriculture for details. **Visit the Belize Ag Report's booth** there and tell us your ideas, what you want to read and how to spread the ag news. Primary teachers, find printouts for school ag projects.

Sustainable Harvest International's (SHI) 6th Annual Organic Fair will be held in Punta Gorda Town, Toledo District, from Thursday Oct 23 thru Sunday Oct 26th, 2014. See SHI ad pg 31 for contact info.

Feria X'matkuil, the finest agriculture fair in the Yucatán, México, is scheduled for 3 wks in November, 2014. **The Feria Internacional de Ganaderia Tropical will be 17th to 30th November,** and the Congreso Mundial Brangus 2014 will be 10th to 15th November. There will be exhibits/events for the whole family; X'matkuil, close to Mérida, is a former henequin plantation converted to a permanent expo center. This fair has the AAA rating from the Belize Ag Report. Information: ganadoyucatan99@hotmail.com , tel 01(999).948.11.10 or 948.11.30

The Roots and Shoots 2nd Annual Mini Ag Fair has set **Saturday 7th February, 2015**, for their Consejo, Corozal event. Mark your calendars; contact Bev Griffiths at bevgriffithscs@gmail.com for booth /presentation info.

From The Telegraph, UK: **A pesticide made from spider venom has been found to kill insects without harming honeybees. Researchers at Newcastle University combined venom from the Australian funnel-web spider and lectin from snowdrops to create a "bio-pesticide".**

Common neonicotinoid pesticides used on crops in Britain are believed to be behind a catastrophic decline in honeybees in recent years. Approximately 90 per cent of the world's plants rely on pollinating insects to survive, meaning that a decline in bees could have a devastating impact on food production. The new pesticide — Hv1/GNA — will allow bees to forage and pollinate without harm, scientists at Newcastle University's School of Biology believe. It is thought that neonicotinoids harm honeybee populations by attacking their nerve system, which disrupts learning and memory so that they cannot locate pollen or find their way back to the hive. During the Newcastle study, bees were exposed to varying concentrations of the spider and snowdrop poison over seven days. Researchers found it did not affect the bees' memory, even in high doses. **Dr Geraldine Wright, of the university's Honeybee Lab said: "If we destroy the biodiversity of pollinators then it will be irrelevant how effective our pesticides are because we won't have any crops to protect.** There is now substantial evidence linking neonicotinoid pesticides to poor performance and survival in bees and what we need now is a clear directive from government to develop and introduce bee-safe alternatives." There is currently a two-year Europe-wide ban on neonicotinoid pesticides, which runs out in April.

PUBLIC RELEASE DATE: 23-Jun-2014

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University of California - Davis Health System

Study finds association between maternal exposure to agricultural pesticides

(SACRAMENTO, Calif.) -- Pregnant women who lived in close proximity to fields and farms where chemical pesticides were applied experienced a two-thirds increased risk of having a child with autism spectrum disorder or other developmental delay, a study by researchers with the UC Davis MIND Institute has found. The associations were stronger when the exposures occurred during the second and third trimesters of the women's pregnancies.

The large, multisite California-based study examined associations between specific classes of pesticides, including organophosphates, pyrethroids and carbamates, applied during the study participants' pregnancies and later diagnoses of autism and developmental delay in their offspring. It is published online today in *Environmental Health Perspectives*.

"This study validates the results of earlier research that has reported associations between having a child with autism and prenatal exposure to agricultural chemicals in California," said lead study author Janie F. Shelton, a UC Davis graduate student who now consults with the United Nations. "While we still must investigate whether certain sub-groups are more vulnerable to exposures to these compounds than others, the message is very clear: Women who are pregnant should take special care to avoid contact with agricultural chemicals whenever possible."

California is the top agricultural producing state in the nation, grossing $38 billion in revenue from farm crops in 2010. Statewide, approximately 200 million pounds of active pesticides are applied each year, most of it in the Central Valley, north to the Sacramento Valley and south to the Imperial Valley on the California-Mexico border. While pesticides are critical for the modern agriculture industry, certain commonly used pesticides are neurotoxic and may pose threats to brain development during gestation, potentially resulting in developmental delay or autism.

The study was conducted by examining commercial pesticide application using the California Pesticide Use Report and linking the data to the residential addresses of approximately 1,000 participants in the Northern California-based Childhood Risk of Autism from Genetics and the Environment (CHARGE) Study. The study includes families with children between 2 and 5 diagnosed with autism or developmental delay or with typical development. It is led by principal investigator Irva Hertz-Picciotto, a MIND Institute researcher and professor and vice chair of the Department of Public Health Sciences at UC Davis. The majority of study participants live in the Sacramento Valley, Central Valley and the greater San Francisco Bay Area.

Twenty-one chemical compounds were identified in the organophosphate class, including chlorpyrifos, acephate and diazinon. The second most commonly applied class of pesticides was pyrethroids, one quarter of which was esfenvalerate, followed by lambda-cyhalothrin permethrin, cypermethrin and tau-fluvalinate. Eighty percent of the carbamates were methomyl and carbaryl.

For the study, researchers used questionnaires to obtain study participants' residential addresses during the pre-conception and pregnancy periods. The addresses then were overlaid on maps with the locations of agricultural chemical application sites based on the pesticide-use reports to determine residential proximity. The study also examined which participants were exposed to which agricultural chemicals.

"We mapped where our study participants' lived during pregnancy and around the time of birth. In California, pesticide applicators must report what they're applying, where they're applying it, dates when the applications were made and how much was applied," Hertz-Picciotto said. "What we saw were several classes of pesticides more commonly applied near residences of mothers whose children developed autism or had delayed cognitive or other skills."

The researchers found that during the study period approximately one-third of CHARGE Study participants lived in close proximity – within 1.25 to 1.75 kilometers – of commercial pesticide application sites. Some associations were greater among mothers living closer to application sites and lower as residential proximity to the application sites decreased, the researchers found.

Organophosphates applied over the course of pregnancy were associated with an elevated risk of autism spectrum disorder, particularly for chlorpyrifos applications in the second trimester. Pyrethroids were moderately associated with autism spectrum disorder immediately prior to conception and in the third trimester. Carbamates applied during pregnancy were associated with developmental delay.

Exposures to insecticides for those living near agricultural areas may be problematic, especially during gestation, because the developing fetal brain may be more vulnerable than it is in adults. Because these pesticides are neurotoxic, in utero exposures during early development may distort the complex processes of structural development and neuronal signaling, producing alterations to the excitation and inhibition mechanisms that govern mood, learning, social interactions and behavior.

"In that early developmental gestational period, the brain is developing synapses, the spaces between neurons, where electrical impulses are turned into neurotransmitting chemicals that leap from one neuron to another to pass messages along. The formation of these junctions is really important and may well be where these pesticides are operating and affecting neurotransmission," Hertz-Picciotto said.

Research from the CHARGE Study has emphasized the importance of maternal nutrition during pregnancy, particularly the use of prenatal vitamins to reduce the risk of having a child with autism. While it's impossible to entirely eliminate risks due to environmental exposures, Hertz-Picciotto said that finding ways to reduce exposures to chemical pesticides, particularly for the very young, is important.

"We need to open up a dialogue about how this can be done, at both a societal and individual level," she said. "If it were my family, I wouldn't want to live close to where heavy pesticides are being applied."

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Other study authors include Estella M Geraghty, Daniel J. Tancredi, Lora D. Delwiche, Rebecca J. Schmidt, Beate Ritz and Robin L. Hansen, all of UC Davis.

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At the UC Davis MIND Institute, world-renowned scientists engage in collaborative, interdisciplinary research to find the causes of and develop treatments and cures for autism, attention-deficit/hyperactivity disorder (ADHD), fragile X syndrome, 22q11.2 deletion syndrome, Down syndrome and other neurodevelopmental disorders. For more information, visit mindinstitute.ucdavis.edu

NOTICE OF INTENTION TO USE A BRAND

BELIZE **DATE: _____, 20 _____**

TO THE REGISTRAR OF BRANDS: NOTICE is this day given by me:

_____ of _____

that the BRAND with which I intend to BRAND all cattle belonging to me after twenty-one days from the date on which this NOTICE is received by you is as follows:

(Here specify, describe and reproduce the BRAND intended to be used and the part of the body of the cattle on which it is intended to placed the BRAND)

_____

SIGNATURE OF OWNER

_____

MAILING ADDRESS OF OWNER

_____

E-MAIL ADDRESS

_____

SIGNATURE OF WITNESS

OCCUPATION OF OWNER: _____

RECEIPT OF NOTICE

I hereby acknowledge to have this day received the above NOTICE vide Ordinance No. 8 of 1964 amending No. 20 of 1956.

DATE APPROVED: _____

EXPIRY DATE: _____

_____

REGISTRAR OF BRANDS

REMARKS

BRAND REGISTRATION NUMBER

Mrs. Itza's SPECIAL CHRISTMAS CRABOO

This is a simplified method of how to ferment a 5 gallon bucket of craboo (*Byrsonima crassifolia*).

Step 1: Wash the craboo and take out the stems.

Step 2: Drain the water and add 10 lbs of brown sugar. Put the lid on tightly so no air can spoil the craboo.

Step 3: After 3-4 weeks check to see if all the sugar has dissolved; if not then mix the craboo and sugar with a clean utensil. After maybe another 1-2 weeks sugar should be dissolved; drain out **all** the water (liquid) that is in the bucket. The reason for this is that all that liquid is very sour!! (not spoiled but sour as in 'lime sour'). By this time the craboo has changed in color from yellow to light brown.

Step 4: After you drain the sour liquid add 10 lbs of brown sugar again.

Step 5: Check again maybe 2-3 months later and taste the craboo. If it is still sour then add more sugar, and leave it until maybe 2 more months to check again. By this time the color of the craboo is very brown and not yellow as fresh craboo.

*** The secret for not spoiling the craboo is not to tamper with it very often. Leave it and the sugar will ferment the craboo fruit by itself. The other thing is that the bucket should be tightly sealed, or else air could go in and it would make the craboo spoil. And, when mixing make sure that you use clean spatula or spoon.

The craboo that is well fermented can last for years, and the more years the more fermented it stays. Remember when serving the fermented craboo always use clean utensils (spoons etc.)Some people put spices, but that is at your discretion to maybe to add cinnamon or other spices. In the case of this recipe, it calls for only Belizean brown sugar!!

Chart Regarding Salt and Minerals Article Page 24

For more information on minerals in foods relative to health, see Dr. August Dunning's chart on our ONLINE ANNEX which appears with the regular .pdf of this issue, as page 39. The Dunning chart illustrates the eerie inverse relationship between the dropping mineral content in modern foods (post 1920) and the increase in health problems.