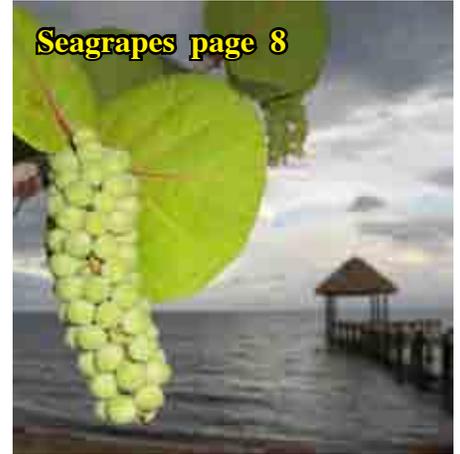


# The Belize Ag Report

Belize's most complete independent agricultural publication



Litchis page 3



Seagrapes page 8

## A New Look for Country Food's Eggs By Feucht/Roberson



The egg co-op in Spanish Lookout used to be part of Farmers Trading Center but in 1997 it split off and became known as **Country Foods**, which now produces over 50% of Belize's eggs and delivers them in cases all over the country. Approximately 78,000 cases per year (360 eggs per case) are handled at their Spanish

Lookout facility which includes 75% of the eggs produced in Spanish Lookout. The 85 farmers who produce the eggs for CF used to candle (make sure the egg is good) and grade (small, medium, and regular) their eggs before delivering them to CF but that is about to change. CF purchased equipment from Yamasa, a company in Brazil, that can expose cracks, candle, clean, grade, weigh and stamp with the CF logo 75 cases per hour. CF is doing a marketing trial now with clear plastic, one-dozen cartons. These are more hygienic and allow consumers to distinguish CF eggs. The price of the plastic containers is the same as the cardboard trays. Disposal or recycling the plastic is one of the facets in their decision, as the plastic trays would not be reusable. In the future, CF's eggs may be color coded, with different color stamps designating the grade (size).



Green Honeycreeper page 17



*Continued on page 26*



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## Litchi Fruit

### By Gary Tulloch, Hill Bank Farms

#### Brief History

Litchi (known by many today as lychee) trees are indigenous to southern China, Malaysia and northern Vietnam. Records in China record the cultivation of litchi as early as 2000 B C. The earliest known book on horticultural deals with the cultivation of litchi, whose scientific name is *Litchi Chinensis Sonn.*

The litchi fruit was highly prized by the Chinese Imperial Court. During the first century, fresh litchi fruit was delivered to the capitol by special couriers riding fast horses from Guangdong province in the south of China. The author, Ta'ai Hsiang, in his treatise on litchi reported litchi was in great demand during the Song Dynasty (960- 1279).

The western world was introduced to litchi in 1585 by the European traveler, Juan Gonzalez de Mendoza, in his book entitled *History Of The Great And Mighty Kingdom Of China*, which was translated into English in 1588.

The spread of litchi plants was slow. They did not reach Madagascar until the 1870's. They first reached southern Africa in 1869 and the Americas in Jamaica around 1870. They appear in Hawaii in 1873, and in Florida during the late 1870's.

Today litchis are also grown in Brazil, India, Israel, Bangladesh, southern Japan, Mexico, Central America (now including Belize!), Australia and elsewhere.

#### Litchi in Belize

When my wife, Lizbeth, and I first acquired acreage in Belize to start a farm, we wanted our initial crop to be unique in the country. We discussed this with Ken Duplooy, founder of Belize Botanic Gardens. Ken said that the worldwide demand for litchi fruit always exceeded the available supply. Furthermore, he knew litchis would grow in Belize because he had some in his botanical garden. Therefore we chose litchis and began acquiring litchi plants during the 1990's, importing plants from Australia, Hawaii, and Honduras; later we found some near Orange Walk. Our varieties or cultivars are mostly Brewster, which in China are known as Chen Zi or Chen Family Purple. We also have Kwai May Pink and Salathiel.

In different parts of the world litchis mature at different times of the year. Here in Belize our trees begin to flower in late December and continue flowering until late February or early March. The fruit ripens from Mid-April until early June.

We sell all of our fruit locally in Belize, and have found a ready acceptance of the fruit by the Belizian consumer. We sell primarily in Belize City, Belmopan and San Ignacio, but occasionally market fruit in Orange Walk, Stann Creek, Placencia and the islands. Our fruits are all marketed the day after they are picked to ensure freshness and quality.

We hope you will have the opportunity to enjoy this delicious, nutritious fruit this season.

#### Nutritional and Health Benefit Facts

Litchis are low in calories, contain virtually no saturated fats and no cholesterol, but are rich in dietary fiber which can be very important for individuals who are concerned with their

## Litchi Grove at Hill Bank Farms



body weight. Research studies have found that litchis are rich in oligonol which has several anti-oxidants and is effective against the influenza virus. In addition, litchis improve blood flow, reduce weight, and protect the skin against harmful UV rays. Litchis are an excellent source of vitamin C; 100 g of fresh fruit provides 119% of the daily-recommended value. Studies suggest that fruits rich in vitamin C help the body resist against infectious agents and scavenge harmful pro-inflammatory free radicals. Litchis are good source of B complex vitamins, such as thiamin, niacin and folates. These vitamins are essential since they function by acting as co-factors to help the body metabolize carbohydrates, protein and fat.

Litchis also contain 11 different minerals including magnesium, calcium, potassium and copper. Magnesium and calcium are essential to healthy bones and muscles. Potassium is an important cell component that helps control heart rate and blood pressure, thus offering protection against strokes and coronary heart disease. Copper is required in the production of red blood cells. The anti-carcinogen properties of litchi seem to work particularly well in helping to prevent breast cancer.

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## To THE EDITOR

Dear Editor

Below is a link to an article that I believe your readers will find noteworthy. This is a worldwide issue of great importance and one I believe everyone involved in agriculture should be concerned about. I understand that three common neonicotinoids (including imadacloprid) are licensed and (widely) used here for seed treatments. I checked with our PCB (pesticides control board), this is indeed alarming. There must be a better way of protecting seeds than using such harmful insecticides.

[http://www.rodale.com/pesticides-bees?cm\\_mmc=TheDailyFixNL-\\_-875940-\\_-04102012-\\_-the\\_bee\\_killing\\_chemical\\_on\\_your\\_plate#.T4Sd6za3Cyg.email](http://www.rodale.com/pesticides-bees?cm_mmc=TheDailyFixNL-_-875940-_-04102012-_-the_bee_killing_chemical_on_your_plate#.T4Sd6za3Cyg.email)

Best regards,

A. E. "Eddie" Bouloy Jr.  
Managing Director  
Bravo Investments Ltd  
4 1/2 Miles Western Highway

*Note from the editor:* for a direct link to the Harvard University study on honey bees and colony collapse disorder relating to nicotinoid use: <http://www.hsph.harvard.edu/faculty/chensheng-lu/files/in-situ-replication-of-honey-bee-colony-collapse-disorder.pdf>

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### Mission Statement:

*The Belize Ag Report is an independent bi-monthly 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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Dear Editor,

Thank you for another great issue of The Belize Ag Report! The articles are informative and timely, and fill a void left unattended far too long. I learn more useful and valuable information from your newsletter than from any other local news source. I especially appreciate the broad spectrum of talented and qualified contributors you've assembled to share their knowledge and expertise. In every issue there is something for everyone from the casual hobbyist to the largest producers. I know the amount of work involved, but hope you expand to a monthly publication that would allow for more timely classified ads and calendar of events, perhaps a seed swap section, and more articles on organic methods for Belize. Food security for the future is something which should concern everyone, as well as keeping the chemical pollutants out of our environment. Their disastrous affects can be avoided if we build a knowledgeable and prosperous organic agriculture industry in Belize. Your publication is a big step in the right direction, and I wish you continued and great success!

With sincere appreciation,  
Phyllis Lane  
Ek Tun Jungle Lodge  
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## Belize Citrus Growers Association Citrus Research & Education Institute

### The fight against citrus leprosis

Citrus leprosis is one of the many diseases that are affecting the Belize citrus industry. It was first detected in Belize in August 2011. It is a viral disease that produces symptoms on leaves, twigs, and fruits. When the disease is severe, extensive crop loss and tree weakening occurs.



Citrus leprosis is spread by mites (*Brevipalpus phoenicis*). It feeds on the infected trees and transfers the virus to the uninfected tree during feeding. Leprosis has been known to cause severe economic loss due to fruit drop and twig dieback caused by the disease.

### Symptoms and host range

Leprosis affects twigs, leaves and fruits. Leaf symptoms are usually roundish with a dark-brown central spot about 2-3 mm in diameter, surrounded by a chlorotic halo, lesion sizes vary from 10 to 20 mm, though larger lesions may form by the fusion of 2 or more adjacent lesions.

On fruits, necrotic spots about 10-20 mm wide are formed. These spots are sunken and gum exudation is occasionally observed on the lesion.

On stems, lesions are protuberant, cortical, grey or brownish. Twigs die back and fruit falls when a tree is severely infected.

Leprosis is observed primarily on sweet orange; however, sour orange and mandarins are also reactive to the disease. Other citrus cultivars do not normally show conspicuous symptoms. The disease has not been observed on non-citrus hosts or transmitted experimentally to them.

### CGA, BAHA and MOA at work to control its spread

CGA in collaboration with BAHA, MOA and the Maya Center citrus community implemented a program to help reduce the mite population by applying a miticide (Vertimec). The second step in combating this disease involved the severe pruning (cutting and burning) of infected branches of affected trees to eliminate the presence of the virus. Pruning for removal of infected branches works because the disease is localized and superficial, as opposed to being systemic. During the months of February and March 2012 for a period of three weeks, an estimated 300 acres of citrus groves were sprayed. The third step will be another application of miticide to new flushes of the pruned trees to eliminate any mite carrying the virus that might have survived the first miticide application.



### Working hand in hand

*Preventing its spread in Belize is of utmost priority. Steps in preventing the disease include:*

1. Establishing an awareness campaign on the citrus leprosis for the general public.
2. Training growers and technical personnel for easy field identification and recognition of symptoms.
3. Training quarantine and custom officers to scout for infected undeclared plant material.
4. The quarantine of citrus fruits, plants or cuttings from countries with citrus leprosis, into Belize.

CGA and other key organizations such as BAHA are working hand in hand to help combat the citrus leprosis and other major diseases in Belize that is causing a great economic loss in the citrus industry.



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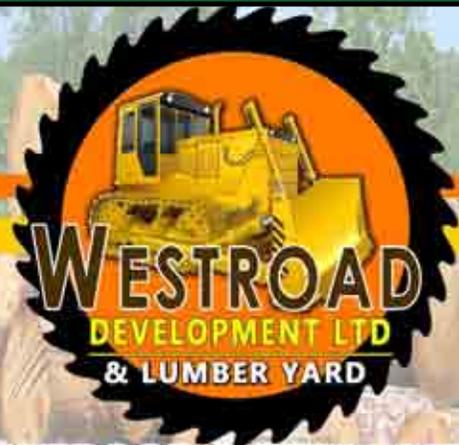
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# The Hot and Cold of It A Look at Belize's Temperatures

By Dottie Feucht

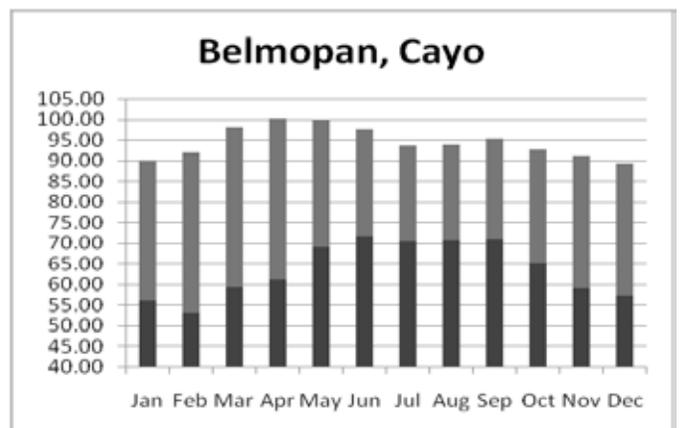
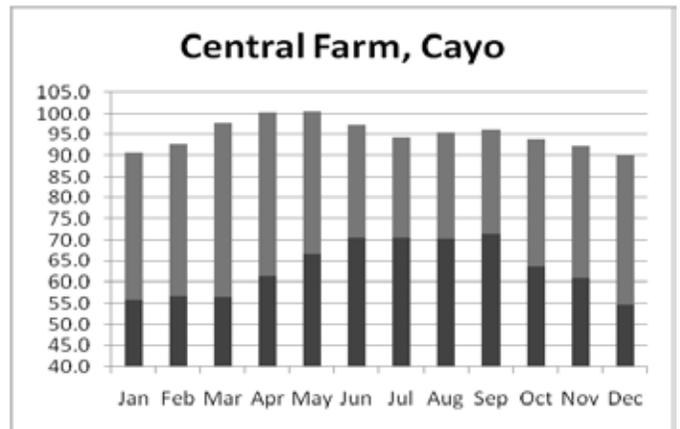
If you want to escape the heat in Belize in April there aren't very many places to go to, especially not Orange Walk (OW), with the highest monthly temperature in the past 12 years, 105.98 F°, recorded in April 2005. Although April's temperature there exceeded 95 F° 8 times over the 12 year period 2000 – 2011, May's and September's temperatures exceeded 95 F° every year. Don't go to Belmopan either; the highest monthly temperature there was 105.3 F° in April 2005. As a matter of fact, the highest monthly temperature there exceeded 100 F° 4 months in a row in 2005: March through June. The highest monthly temperature at Central Farm, 104.9 F°, was recorded in April 2003. May is hotter than April at Central Farm though; the temperature was over 100 F° 8 times over the 12 year period. The hottest April in Rio Bravo, Orange Walk occurred in 2003: 104 F° but March, April and May are all hot there, having temperatures over 100 F° 7 times in the data collection period. Punta Gorda, (PG) Toledo is the next hottest place in April with 102.2 F° recorded in 2003 but over the 12 year period (albeit many data points missing – maybe because of the heat?) temperatures in March through October exceeded 90 F° every year. The hottest temperature in Melinda Forest Station (MFS), Stann Creek was recorded in April 2010: 101.3 F°. The hottest months there were April, May and September when the monthly temperatures exceeded 90 F° every year. September was a particularly hot month the last three years when the temperature exceeded 95 F° all 3 years. The hottest temperature in Savannah Forest Station, Toledo was the same as Stann Creek but it occurred in March 2003, not April. And the following year the high temperature in March was only 87.8 F°! With the exception of that month the temperatures for March through October, like PG, exceeded 90 F° every year over the 12 year period. Only twice did it exceed 100 F°. The only place in Belize where the maximum monthly temperature did not exceed 100 F° was at Philip Goldon Airport in the Belize District and it occurred in March 2003, not April: 99.1 F°. The highest April temperature, 98.6 F°, occurred in 2010. August and September were the hottest months there with temperatures exceeding 90 F° every year over the 12 year period.

The cool season in Belize coincides with the tourist season: November through March. Although the coldest temperatures in the recording period occurred in December and January, MFS, Stann Creek's coldest months occurred in November 2002 and February 2006, both at 53.6 F°. But their December and January recordings included temperatures in the 50's 7 times. The coldest temperature, 45.5 F°, was recorded in Rio Bravo, Orange Walk in both January and December of 2010. That year started and ended on a frigid note! 2006 wasn't much warmer; 40's were recorded as the coldest monthly temperatures in January, February, November and December. The next coldest December temperature was recorded in Tower Hill, OW in 2010: 47.3 F°. Other than that their coldest December temperatures were in the 50's every year. Only twice in January was the temperature in the 40's. (So Orange Walk is the prize winner of both the maximum and minimum temperatures!) Belmopan's coldest monthly temperature

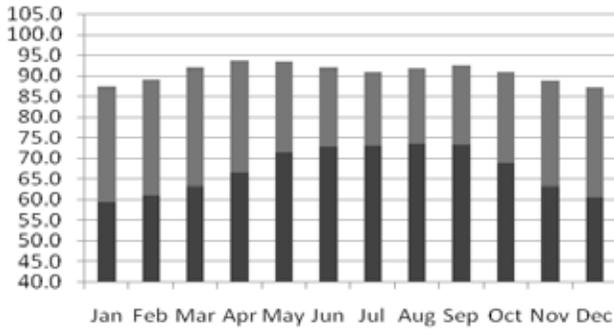
occurred in December 2010: 50 F° and 50's were recorded 10 out of 12 times in December but 11 times in January for the recording period. At Central Farm, except in February 2008 (61.5 F°) and November 2011 (a balmy 69.8 F°), the coldest monthly temperatures were only in the 50's from November through February for their entire recording period. Their coldest temperature, 52.6 F°, was recorded in December 2011 following the balmy November! A similar coldest monthly temperature, 52.9 F°, occurred in PG in January 2000, but 2001 was the cold year in PG; the temperatures for the first 4 months were only in the 50's. Toledo's coldest monthly recording was in December 2010: 53.6 F° - the same as Stann Creek's coldest temperature, but Toledo's coldest month over the last 12 years was January when the temperature was only in the 50's 7 times. The "warmest" of the coldest monthly temperatures was recorded at the international airport in January 2001: 54.6 F° but in 2009 the first three months had low temperatures in the 50's; 50's were also recorded as the lowest monthly temperature 6 times in February and December and 9 times in January in the past 12 years.

The following charts show the average maximum and minimum monthly temperatures for the years 2000 – 2011 (with some data points missing) which were recorded at the data recording stations of the Belize National Meteorological Service. The temperatures are shown in F° with the lighter shade depicting the maximum and the darker shade, the minimum temperatures.

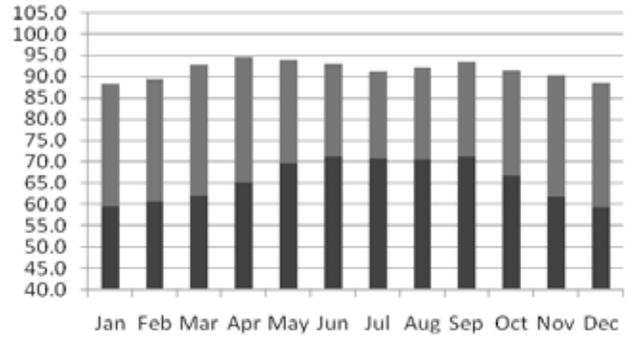
**Monthly Average Maximum and Minimum (or High and Low) Temperatures for Belize from 2000 - 2011. Data provided by Hydromet.**



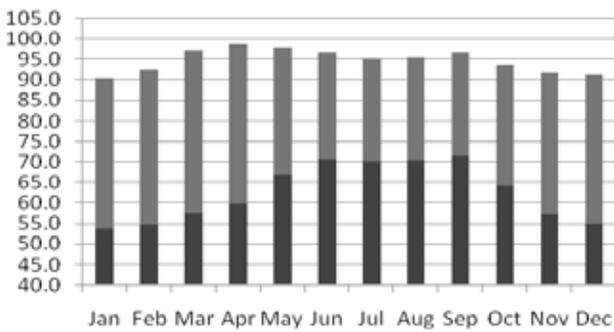
### International Airport, Belize



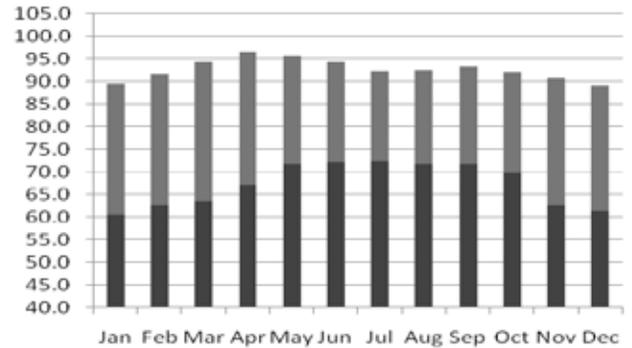
### Melinda Forest Station, Stann Creek



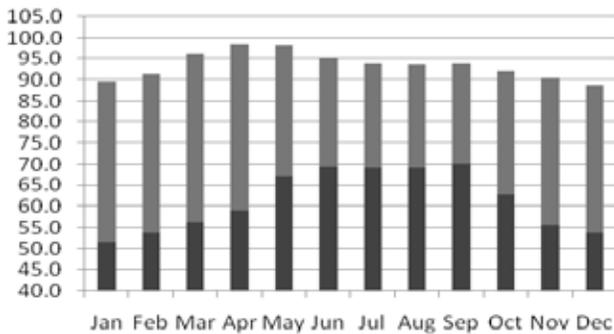
### Tower Hill, Orange Walk



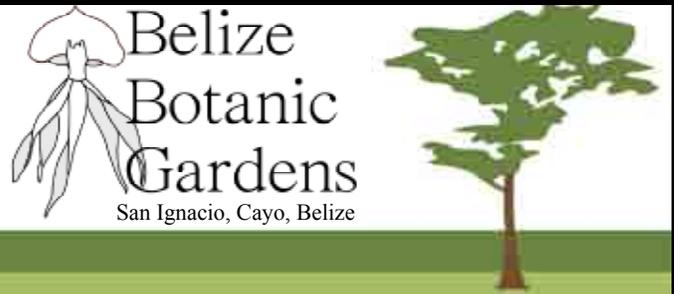
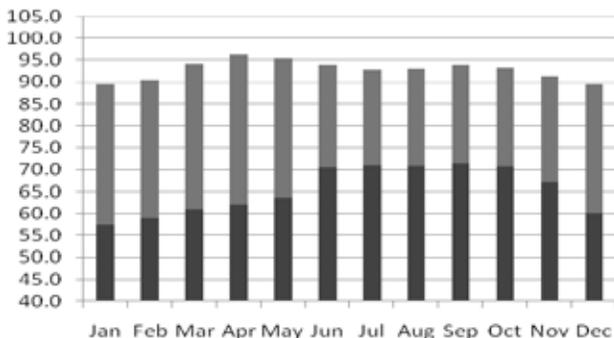
### Savannah Forest Station, Toledo



### Rio Bravo, Orange Walk



### Punta Gorda, Toledo



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# BEYOND THE BACKYARD

## The Miracle Tree

By Jenny Wildman

My introduction to the **seagrape** was back in the heyday of the famous Fontainebleau Hotel, Miami Beach. I was impressed by the pink marble bathroom with gold taps but the highlight of that day was the poolside lunch. A Cobb salad deliciously presented and adorned with a strand of amethyst berries. I remember thinking how wonderful it would be to do the same here in Belize. The problem is that some of our best fruit and vegetables flourish in the off season when few tourists grace our shores.

The Coccoloba tree was named for its red leaves and the inclusion of Uvifera for its resemblance to European grapes but it is actually part of the buckwheat family! (polygonaceae not the "little rascals") Looking at some of the DOE reports I discover that the seagrape or baygrape has plenty of cousins here in Belize; e.g., Coccoloba diversifolia (pigeon plum) a mid-size upright tree growing up to 35 feet and an excellent ornamental shade tree with leathery round-to-oval shaped leaves. Coccoloba tuerckheimii (edible wild grape) and Coccoloba Belizensis (wild grape) have rougher textured more oval-to-pointed shaped leaves whose wood is hard but tends to be brittle. The Coccoloba uvifera (seagrape) with its shiny green leathery, distinctively round shaped leaves that turn red to brown spreads its limbs widely. The sap (kino) is used for dyeing and tanning, ink and medicines. The wood is hard and strong, deep red in colour and can be used for carving or carpentry. The Caribs used it for making weapons and the gum for varnishing. It makes excellent wood chips for the smoker, good firewood and charcoal. These uses all possess a certain physiognomy that unites them but for me that would be the edible fruit.

The Coccoloba enjoys the sunny seaside, helps build up the sand and is a low-maintenance, hardy hurricane-resistant species tolerant of salt and wind, making good coastal protection. Seagrape trees are very important to the animals that look to them for sustenance. Birds do a fairly good job discharging seeds. The seeds need to be planted as soon as possible as they do not store well. The tree can also be propagated from cuttings. Being a magnet for termites, it should not be planted close to wooden structures. Found throughout Florida and the Caribbean, all are dioecious, male and female flowers on separate trees; therefore cross pollination is required for the fruit to develop and insect life is crucial.

Tips for picking include taking a bucket and holding it under a bunch of grapes, running your hand down delicately to pull off the fruits or putting a tarp underneath the branch and shaking it.

The grapes are high in pectin and make excellent preserves. In Florida this is a commercial enterprise and one can also find the most desirable seagrape honey .

**Seagrape jelly** : 4 cups of juice to 4 cups of sugar, boil rapidly to 228 degrees, pour into sterilized jars; for jam: 1 cup of fruit to 1 cup of sugar, add lime juice if desired and boil until it reaches jelly stage.

**Seagrape Leaf Tea** (medicinal): 4 green leaves to 3.8 liters of water (8 pints), heat to boiling point and keep on stove and brew for 4 hours until the leaf compounds break down.

**Seagrape Soup** (recipe from the Seminole Indians): 3 cups of just-ripe pitted seagrapes, 4 cups of clear, rich beef broth, 1 tablespoon of sugar, and salt and pepper to taste. Put ingredients into a saucepan, bring to a boil then reduce and simmer for about 3/4 hour or until the grapes become tender. Cool the mixture and spin in the blender, then add 2 tablespoons of white rum. Cool in the fridge then serve in chilled cups with a sprig of fruit on the side.

I have also made wine, seagrape vinaigrette dressing and seagrape rum cocktails.

Medicinal uses include lowering blood sugar, leaf extract for skin rashes and leaf tea to treat asthma. The bark is used for diarrhea and ground roots for drawing toxins, purifying blood, liver and kidneys.

Easter of 1982 hundreds of people flocked to the site of an old seagrape where a 92 year Miami resident claimed he recovered sight from the sap of the tree. A doctor observed that the tannins could well have cleared the mucous caused by cataracts but the masses saw it as religious experience. The tree gained fame hitting the headlines as the miracle tree.

I was just noticing the abundance of flowers on the seagrape trees this year, perhaps heralding a bumper crop. I believe we will all be picking seagrapes this summer.

Enjoy and please share any ideas on this and other related topics to

Jenny Wildman  
[spectarte@gmail.com](mailto:spectarte@gmail.com)



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## Sorrel, a Delicious Health-Promoting Beverage, Food, Herbal Remedy, Safe Food Coloring and Fiber-Producing Plant

By Mary Susan Loan of Cristo Rey, Cayo

Imagine a plant that is colorful, beautiful, easy to grow, flavorful, rich in vitamins and anti-oxidants in its leaves, sepals and seeds, with many healing properties and a diet aide. Sorrel, also known as roselle, Jamaican sorrel, sour-sour, rosebud, jelly okra, lemon bush, African mallow, Florida cranberry and many other names, is that plant. Sorrel, classified as *hibiscus sabdariffa*, is a member of the *Malvaceae* family and not to be confused with another plant, the green leafy herb sorrel, a member of the buckwheat family.

There are two primary varieties of the hibiscus sorrel plant. One variety, *altissima* grows to be sixteen feet high and is spindly and cultivated for use as a jute-like bast fiber and not edible. *Hibiscus sabdariffa* sorrel is a shorter flowering plant which grows to be approximately six to eight feet high with three-to-five inch alternating green leaves. The stem and leaf veins are reddish in color. Showy, two-to-five inch ivory-to-buff-colored flowers have a carmine red center. The flowers turn pinkish at sunset and the calyces turn red and produce the delicious calyces (sepals) used for beverages and food source. The calyces are crisp and juicy; when ripe they are from one-and-a-fourth inches long to two-and-a-half inches long. The taste is described as a unique sweet-sour, mellow pleasant, cranberry-like taste. The leaves and seeds are also edible. Sorrel grows well in tropical climates and does not tolerate frost or cold. The secret about sorrel is that the plant is photoperiodic; for this reason sorrel crops cannot be grown successively throughout the year.

David Harder, proprietor of All Fruit Nursery in Springfield, Belize, explained that he favors starting sorrel seeds in June with anticipated harvest in December. He is growing some unusually large variety sorrel with calyces two-and-a-half inches long, and exceptionally deep red in color. David added that the plants must be successively harvested at least every two weeks to maintain high productivity for the plant. Sorrel is easily harvested by hand and is easier to pick in the morning than the evening. Harder recommends picking from the bottom to the top of the plant. He says some hospitals in Guatemala serve their patients sorrel juice to aid the healing process.

Each seed pod produces approximately 15 to 20 seeds. Unharvested pods split open and reseed themselves. The seeds resemble seeds from morning glory pods. Sorrel seeds are ready to plant once the pods are dry and brown. Dried seeds have been used as a coffee substitute and food for chickens and in Africa as a food for humans and animals.

Sorrel is typically a Christmas beverage as the calyces ripen in time for the holidays. Fresh calyces are considered to be tastier than the dried pods which are available all year long. Belikin Beer Company of Belize brews a special Christmas sorrel beer. The Carib Brewing Company brews a sorrel beer known as Shandy beer. In Guatemala 'roselle aid' is a favorite hangover remedy. Rosita Arvigo of Belize sells 'Jungle Juice' ([www.arvigotherapy.com/rainforest](http://www.arvigotherapy.com/rainforest)) which contains dried sorrel calyces.

Sorrel is a very productive plant and can produce three to sixteen pounds per plant and up to 19,000 pounds per acre. It is commonly grown in backyard gardens for home consumption. Sorrel is generally propagated from seed. The best method to grow sorrel is to plant from four to six seeds per hill approximately four feet apart and thin to the two strongest plants per hill. The

plant is very vigorous and requires little to no fertilizer. Sorrel's main enemies are root nematode and mealy bugs, a mild one-half strength fertilizer may be used. Sorrel requires approximately ten inches of rainfall or watering per month. The plant is considered a perennial, but is generally grown as an annual. Purdue University has done extensive research about sorrel. The findings may be found at the university website.

Sorrel is native to India and Malaysia. Writings and drawings of the plant date back to the 1500's. It is believed sorrel seeds made their way to the warmer climate areas of the Caribbean during the days of sea exploration and slave running. Sorrel has been grown in Brazil since the 1600's, in Jamaica dating back at least to the 1700's.

Sorrel is rich in antioxidants and vitamins and contains eighteen out of twenty-two amino acids. It is a proven treatment for lowering high blood pressure; a mild diuretic; helpful for nervous disorders; a mild laxative; good for liver, bladder and kidney problems; an assistance to reducing growth of cancer; immunity booster; cold, cough and sore throat aid. Sorrel reduces muscle pain, lowers cholesterol, helps prevent tooth decay and is an appetite suppressant. It is said to also slow down the aging process. The leaves and dregs from the tea are used to treat all kinds of skin problems, including ulcers, foot cracks and boils as well as smoothing the skin.

Sorrel calyces may be eaten raw in fruit salads, cooked as a side dish, and used for food coloring, juice, wine and beer ingredient, jelly, sauce or syrup. Young tender leaves and stems may be eaten raw or cooked as greens. Germany is the primary importer of sorrel for food coloring.

Sorrel juice is simple to make. There are many recipes. Here is a basic one. Start with two cups of fresh cleaned and deseeded sorrel calyces or one cup dried sorrel calyces; place in stainless steel pot with ten cups of water; add about one cup of sugar (or less to taste) and bring to a boil; then simmer for ten minutes, strain, and serve for hot tea or let the mixture cool for several hours; then strain, add ice and enjoy. Don't throw away the sepals. They may be eaten as a relish or side dish, added to bread, or made into jam. Other ingredients may be added: grated or sliced ginger, orange peel, cinnamon sticks, cloves, rum, sherry or wine. Some recipes advise letting the sorrel juice sit for up to twenty-four hours before serving.

Look for sorrel in the San Ignacio farmers' market. It sells for approximately \$2.00 per pound in season.

You will discover a wonderful, delicious fruit with many possibilities and health benefits.



## The Pesticide Registration Process in Belize

The formal scheme for the registration of pesticides by *trade name, concentration of active ingredient and formulation* commenced in Belize in 1995 with the implementation and enforcement of Statutory Instrument # 77 of 1995 Registered and Restricted Pesticides (Registration) Regulations, which was signed into law by the Hon. Minister of Agriculture Russell Garcia.

This step was one which had been recognized as a necessary step at the FAO Round Table on the Regulation of Pesticides held in Belize in 1989 for the further development of Belize's pesticides regulatory framework. Prior to this development, and with the establishment of the Pesticides Control Board (PCB) on 31 December 1988, there existed an informal scheme for the approval of pesticide *active ingredients*. Pesticide importation was then open for any pesticide formulation so long as it contained an approved active ingredient. Presently, only pesticide formulations duly registered by the PCB are allowed entry into and use in the country.

Pesticide registration by trade name and formulation is the globally accepted regulatory norm which allows for the comprehensive technical review of a specific pesticide product. In Belize, this review is based on a regionally harmonized data set submitted by the pesticide manufacturer or formulator. The data submitted includes information on both the active ingredient and the formulation's physical and chemical properties, toxicological and eco-toxicological study reports, manufacturing and analytical processes, reports on the product's bio-efficacy, and aspects related to its post-registration product stewardship such as remnant management.

The registration procedure entails a preliminary screening of the registration dossier by the Registrar of Pesticides, followed by a technical review by the Registration Committee which is comprised of members from the agriculture, health and environment public sectors. Once a pesticide is reviewed and considered appropriate for use in Belize, the Committee recommends its registration to the PCB at one of its quarterly meetings for approval and entry in the Register of Pesticides.

In Belize, registered pesticides are classified as either general-use or restricted-use. Restricted-use pesticides are those which belong to the World Health Organization's Class 1a and 1b pesticides, and which have been considered to be the most hazardous as it relates to acute toxicity. In order to purchase and/or use a restricted-use pesticide in Belize, a pesticide user must first demonstrate his capability to handle such a pesticide by attending training and taking a written or oral evaluation which, if successful, is rewarded with a Certified Pesticide Applicator's license.

The third classification of pesticides is the one designated for prohibited or banned pesticides. Aside from most of the organochlorine insecticides such as aldrin, dieldrin, endosulfan and toxaphene, which were banned when the Pesticides Control Act came into effect in 1988, also included in the schedule of prohibited pesticides are others which are known to cause unreasonable adverse effects to human health and the environment. Most of these pesticides are no longer manufactured for use, and several are the subject of global phase-out plans.

Future work for the PCB, and specifically the Registration Committee, in terms of development of the pesticide approval process, is the review of current registrations in line with newly available information on their behavior in the environment and local conditions of use which may be contributing to pesticide misuse and abuse, and for which additional regulatory controls may thus be warranted and necessary for the continued protection of human health and the environment.

## News from Thiessen Liquid Fertilizer

Thiessen Liquid Fertilizer in Spanish Lookout continues to do research trials with their Agro-Culture Liquid Fertilizer (ACLF) products on their 165 acre research farm at Mount Pleasant, just east of Belmopan. In extensive corn trials using Pioneer 30F80 seeds at different densities (27,050 to 30,850 seeds/acre) they probed variables such as different levels of nitrogen with UAN (solution of ammonium and nitrate in water) application at planting and UAN at planting with different levels of urea at 26 days. Corn seed population (seeds/acre) was also tested within various trials. Results from the trials to identify gains from Agro-Culture Liquid Fertilizer potassium product, Sure-K, were among the most striking to owner Mr. David Thiessen. Data showed that with Sure-K application costing \$75./acre, the yield value was increased by \$100./acre. The highest yield to date in all the trials was 7,800 lbs/acre using only Agro-Culture Liquid Fertilizer Products. This past year's best results, taking account of both cost of application and value of yield, are the UAN 88 liter, which cost \$124./acre and yielded 4,598 lbs/acre. Contact Thiessen's for more details.

Results for onion trials from last year's season, done on Israel Hernandez' farm in San Carlos Village, Orange Walk District, are also available at Thiessen's office. Tests using Yellow Granex Hybrid and Apollo varieties pitted drip tape fertigation with Agro-Culture Liquid Fertilizer products versus side dressed conventional dry fertilizer. Agro-Culture Liquid Fertilizer treated fields yielded 35,400 lbs for the Yellow Granex and 34,000 lbs for the Apollo. The conventionally fertilized fields yielded 31,000 for the Yellow Granex Hybrid and 30,000 lbs for Apollo. It is to be noted that the Agro-Culture Liquid Fertilizer needs to be applied only 2 times versus 5 applications for the conventional fertilizer.

Special attachments are necessary to commercially apply liquid fertilizer at planting; 6 of these liquid fertilizer planters are in Spanish Lookout presently, and others are in Blue Creek Mennonite community in Orange Walk District.

Most of Thiessen's clients do soil testing every 2 years, at the rate of one test per 40 acres. Thiessen Liquid offers this service, sending samples to a US facility for analysis. About 2 pounds should be collected (approx 3 cups) from the top 6 inches of soil. Price for this varies, but with multiple samples (3+) or waiting to combine your sample with another shipment, the fee can be as low as \$65. BzD. Two sets of recommendations (for 2 different crops) also come with the analysis. As well, you can count on the knowledgeable staff at Thiessen's to share their expertise.

By B Roberson



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## BEL-CAR Updates

BEL-CAR's years run from Feb 1<sup>st</sup> to Jan 31<sup>st</sup>, and in their 2011 year showed an increase in corn products over 2010. In 2011, BEL-CAR processed 8.6 M lbs of corn into 6M lbs of cornmeal. Sales to Guatemala were down, due to better harvests in Guatemala, as local supplies there lasted longer. Regardless of diminished Guatemalan sales, last year BEL-CAR's inventory almost ran out, as demand for BEL-CAR's corn meal continued to grow in both established and new markets. Jamaica continues to be the largest single market, with steady waves of sales approaching 80% of all BEL-CAR's cornmeal.

Three large, used storage bins, with capacities between 6.5 to 6.8 M lbs each, were purchased from GOB. These had been part of a soybean storage and processing facility donated to GOB by Brazil and set up in Yo Creek, Orange Walk District about 15 years ago, a project which never got off the ground. Prior to the set up of these bins in October of 2011, the bulk of storage was done either at feed mills or by the farmer himself. These bins now allow BEL-CAR to keep varieties separate, which in turn increases quality. The two main varieties of corn used for their grits/cornmeal products are Pioneer 30-F-80, which is the best for processing but is not the highest yield to produce and Pioneer P-35-23, which gives a lesser processing yield but a higher yield for the farmer. Other regular 'feed' corn types are purchased from the farmers and re-sold to feed mills. Moisture level acceptable for BEL-CAR is 14%, and for the feed mills, 13.5%, because corn going for processing into corn meal needs to be wet at processing.

This year's red kidney (RK) and blackeye pea crops have been facing many challenges. Huge damages from the lingering rains caused a lower yield, and some farmers' harvests yielded as low as 25% after cleaning. Some just tilled their fields up without harvest. However, the supply of RK beans within Belize should not be affected, as farmers in the northern districts have not been so adversely affected. BEL-CAR's RK exports will be less, but it remains to be seen if exports from the north will be increased. Blackeye peas were planted within a large time range, due to rains, and for the most part much later than traditionally planted. This year exports of blackeyes from BEL-CAR will definitely be down also because less acreage of blackeyes were planted. Many farmers decided to plant soy or milo (sorghum) as part of crop rotation which helps to reduce fungal problems. Newly cleared lands were planted with blackeyes. However, if the crop is down, then the shortage would have the supply-demand effect of a better price for the lower quality beans.

Another export trend is with their corn gluten by-product, used as a feed additive at feed mills; it is being purchased increasingly by Guatemalan buyers. They formerly bought approximately 50% of it; if the trend continues they will soon be absorbing close to 75%.

by B Roberson



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## Belize's Exploding Cacao Industry

By Armando Choco, San Pedro Columbia, Toledo

"Cacao Production is looking really good for this year" says Luciano Sho of San Antonio, Toledo District, who is one of the largest cacao farmers and member of the Toledo Cacao Growers Association (TCGA). While farmers are happy that cacao production has increased in 2012, Mr. Justino Peck a great pioneer of the cacao industry is more satisfied by echoing that "we have finally overcome one of the most difficult 4 year periods for the association: production was declining resulting from Monillia, cultural challenges to maintain orchard management and waiting period for production from new trees" making reference to the Maya Gold Project (2003 – 2006) in which the TCGA increased its membership from 270 – 800 (now 1190) and acreage from 500 – 3000 acres.

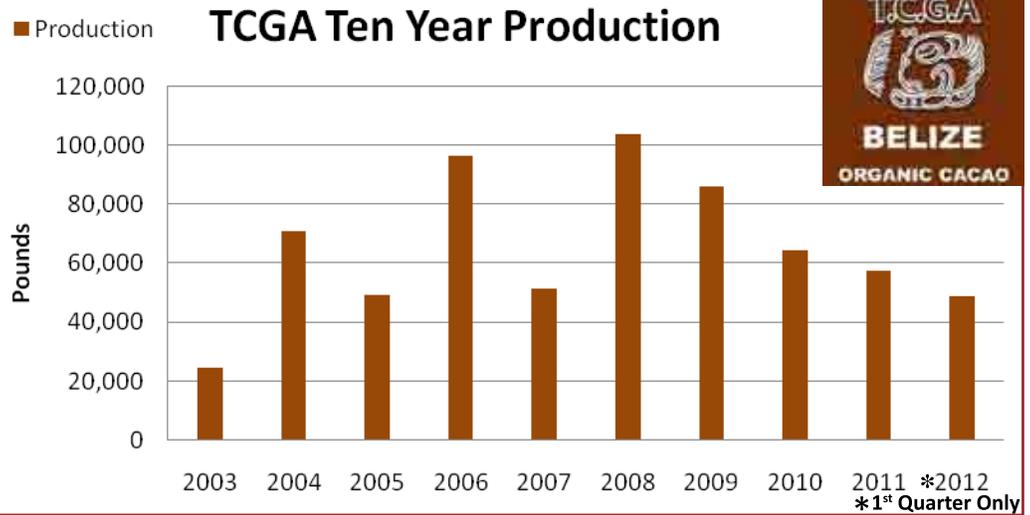
It is an exciting time for the TCGA! The technical team now tracks production from trees planted in 2003 – 2006, carefully designing



a rehabilitation program to be executed in June – August of 2012 and progressively developing infrastructure to improve bean quality.

On the other end of the cacao trade, dark chocolate is in high demand as more small-to-medium sized companies emerge to meet the increasing demand or retirees explore a better life option that is less frustrating, relaxing and exciting to satisfy the hedonistic chocolate lovers. This demand trickled to the TCGA, where by end of March 2012, 15 companies of North America, Europe and Asia expressed interest to source cacao beans from Belize. These businesses, specializing in fine dark

Continued on Page 13





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## Cacao.... Continued from Page 12

chocolate, represent additional market opportunity. They also follow an ethical sourcing principle – that of sourcing original cacao, fair trade (FT), organic, direct trade and even farmer-to-consumer products. Their demand ranges from 4– 15 metric tons (MT) (2,240 pounds per MT) per cacao season which exceeds current production.

“This is a good challenge to have” says Alvaro Pop, chairman of TCGA, who continues to encourage farmers to maintain and expand farm holdings to keep up with the increasing demand of cacao. In 2011, TCGA exported 20 MTs of cacao to Kraft Foods Ltd. and supplied approximately 5 MTs to local chocolate processors such as Goss, Cotton Tree, the Belize Chocolate Company and Cyrila’s Chocolate. By the end of the first quarter in 2012, TCGA saw a 300% increase in production compared to 2011 and approximately 30% increase compared to the best year in the history of TCGA.

### TCGA’s ten year production in pounds (2012: as of March 31<sup>st</sup>)

Still as the association works diligently to increase production and quality, two key projects are underway to foster economic growth in cacao production as well as improve economic livelihood of cacao farmers through agro and eco-tourism. The project “Mayan House of Cacao and Chocolate Museum” is funded by the European Union where TCGA is set to rehabilitate over 200 acres of cacao farms to stimulate productivity for needy farms; design, construct and operate a museum called **Mayan House of Cacao and Chocolate Museum**; and provide training in entrepreneurship and small business ownership.

The TCGA expects an increase in production by 100% over the next 3 years as the rehabilitation program continues. With the current world market price at US\$2200.00 per MT in addition to other FT organic and FT premium there is no end to organic cacao production opportunity. Belize has seen approximately 60 acres of land converted into cacao farming over the last 6 months, not counting the many investors who have returned to Belize to do organic cacao and agroforestry.

When asked “what are plans for the future?” Luciano was quick to respond “I will continue to plant until I have 35 acres of cacao. I have 4 more boys and I want them to continue planting cacao and take care of my trees” sharing a sentiment that cacao will be passed on from generation to generation, as people continue to enjoy the world’s seductive sweet.

**Note: The Toledo Cacao Fest schedule: Friday evening, May 18<sup>th</sup>, Wind & Chocolate Evening; Saturday May 19<sup>th</sup>, a Taste of Toledo: Music, Games & Chocolate Galore; Sunday May 20<sup>th</sup>, the Cultural Fair at Lubantun. [www.toledochocolate.com](http://www.toledochocolate.com)**

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## Agriculture Prices at a Glance- \$\$\$\$\$

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

<b>Belize Cattle</b>		T	A	B	<b>Grains, Beans &amp; Rice</b>		T	A	B
Young str. & bulls- 750- 1100 lbs	H	1.30 - 1.35	1.20 - 1.30		Belize yellow corn	L	.28 - .30	.27 - .28	
Cows & heifers for butcher	H	1.00 - 1.10	(thin).85 - 1.00		White corn	L	.28 - .30	.27 - .28	
Heifers for breeding 500-800 lbs	H	1.10 - 1.20	.95 - 1.10		Corn/ local retail (low volume)	L	.30 - .37	.28 - .30	
Young grass cattle- 350- 650 lbs	H	1.20 - 1.30	1.00 - 1.20		U.S corn @ 6.53-per 56 lb bushel	H	\$23.50/ BZ 100#*12¢ frt. to BZ		
U.S price -corn fed- 1000- 1200 lbs	L	1.18-US=2.36-Bz			Guatemala corn price/Peten	S	.34 - .36	.32 - .34	
U.S price - feeders 600- 800 lbs	L	1.48-US=2.96-Bz			Belize milo	L	.22 - .24	.20- .22	
U.S price- calves 450- 600 lbs	L	1.75-US=3.50-Bz			R-K's, little reds & blacks (beans)	L	.85- 1.00 farm price		
U.S price- aged butcher cows	L	.80-US=1.60-Bz			Black eyed peas	H	.90- 1.00 farm price		
<b>Belize Hogs</b>					Milled rice: retail per pound	S	.87- .88 farm price		
Weiner pigs- 25 -30 lbs- by the head	S	\$95.00 - \$100.00			<b>Citrus</b>				
Butcher pigs 160 - 230 lbs	S	1.75 - 1.85	1.70 - 1.75		Oranges per 90 lb box-lb.solid basis	S	\$14.00 Est. 2012 price		
<b>Belize Sheep</b>					Grapefruit- per 90 lb box	S	\$ 6.25 Est. 2012 price		
Butcher lambs	S	2.00 - 2.25	1.75- 2.00		<b>Sugar</b>				
Mature ewes	S	1.70 - 1.75	1.60 - 1.70		White sugar- 112 lbs- controlled	S	.45 per bag + 3-5 cent mark up		
<b>Belize Chickens</b>					Brown sugar- 112 lbs- controlled	S	.39 per bag + 3-5 cent mark up		
Broilers- live per lb	S	1.22 - 1.24	1.21 - 1.22		<b>Special Farm Items</b>				
Spent hens	S	.70 - .72	.68 - .70		Eggs- tray of 30 eggs	L	5.00 farm- retail .25 per egg		
<b>Fruits &amp; Vegetables</b>					WD Milk per lb to farmer	S	contract .50 & non contract .35		
Tomatoes, cabbages, cucumbers	S	whsl/.75-1.75; ret-\$1.00-\$2.50							
Local grown potatoes	S	.80-.90	.70 - .80						
Local onions	S	1.00 - 1.10	.80 - 1.00						

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

**Dear Ag Readers:** Cattle prices are a bit better but compared to the US and Mexico we are still really underpaid. The goal is to start the sanitary sweep in July. This has been a long time coming but will happen, and this will create sound export marketing for all cattle producers. Corn and beans and especially milo prices have slipped considerably. The acres that are being planted for row crops by progressive export minded farmers is increasing. That will cause some short terms rips, but it will cause our importers to recognize the great food production potential that Belize has and that will firm up good prices for all of us. I get the US prices from the Chicago futures markets (April 29th, 2012). May God Bless your family, your farm and our country- John Carr

## Light Rein

By Marjie Olson

Being here in Belize for over 5 years has allowed me to gain a new perspective on being a horsewoman. I knew before moving here that bringing my horses would be tough for them and not very cost effective because of transportation costs, quarantine costs and duty. Although I did not bring any of my horses I totally understand people who want to bring theirs when they come and their desire for a few "new blood lines" or training on already finished horses that are proven; but it is not a good idea to bring in horses that have bad conformation faults or lameness issues. Such issues are not going to enhance our equine industries when these mares or stallions are bred. If people want to import horses, they need to understand that health care, farrier services and veterinarian access and experience are more limited than in the US; they should be prepared to deal with issues like getting vaccines and paying a high premium. The more knowledge the horse owner has of how to care for a horse the better prospect for the horse. Of course, keeping records of previous injuries, having blood work done and a good basic checkup by a veterinarian should be standard procedure before bringing a horse to Belize.

People in Belize seem to want bigger horses, but I have found that the smaller ones here are "tough as nails" and stay much sounder than US horses. And at the Belize Equestrian Academy (BEA) I have many crossbreds (from local to an import baby) that are wonderful; so I have seen the benefit of a solid QH, Arab or TB, cross here. But my dilemma now is that I need "finished" horses that can do a specific job. **Those** horses are not easy to find here. Sometimes after a year and half of training for any specific event, such as jumping, reining, endurance, barrels, or race track, I finally get an idea if a horse is going to work out or not, and it does not always work out as I want. For example, after training for the track for 2-3 years with big hopes and a lot of dollars, I discover the horse doesn't really have the drive to run, or something goes wrong and it breaks down. That can be in any event. In the barrels event, a horse may like it a little too much but it just can't handle the stress during the runs. Reiners spend much time in training but they are notorious for having leg issues before their career even really gets going. And top Dressage and Jumpers have the same issues; *training is tough on a horse.*

You can never tell what you really have in the level of horse until you start to compete, pushing the horse to a level that will prove it is going to be what you want. And it does not always work out as you had hoped. Any horse that is trained to perform at a high level is going to be susceptible to injuries and mental stress. In Belize, there is really no way to deal with the injuries. Time off is often the only choice. Leg issues are a guess for the most part and treatments are old local remedies or doing the best your knowledge can provide, but there is no arthroscopic or



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## Backyard Birding in Belize

By Marguerite Fly Bevis

More than 500 bird species can be seen in Belize. Some are tropical residents and others migrate back and forth from North and South America. People living in Belize can do a few simple things in their own backyard to provide hours of bird-watching pleasure.

Basically birds need food, water and shelter. Shrubbery and trees



Blue-Crowned Motmot

planted in the landscape provide shelter and nesting areas. Trees and shrubs produce food naturally but you can also place food strategically to bring the birds to your favorite spot for viewing. Choose a place that you can see easily from inside, one with cover nearby. Placing several feeding stations around the yard will increase the numbers of birds. It may take time for the birds to find your feeders but be patient; with time your efforts will be rewarded.

Papaya is a favorite food for toucans, orioles, tanagers, honeycreepers and other colorful tropical birds. Papayas are

found in the market but one way to assure a plentiful supply is to plant papayas around your yard in places you can easily see. You can also use bananas, pieces of watermelon and oranges sliced in quarters. You can make a simple "orange tree" out of a sturdy limb with several branches, which are trimmed and sharpened to hold orange halves, favored by orioles and euphonias. Sunflower seeds, cracked corn and millet can be used to attract doves, seedeaters and finches.

Bird feeders range from elaborate ones found in stores to homemade ones of hardware cloth and wood. A simple platform feeder can be made with a 1' x 1' piece of hardware cloth framed with wood, hung with 3 equal length pieces of wire or chain. Feeders don't have to be expensive; just fill them often with fresh clean food.

Hummingbirds are easily attracted to household gardens. Feeders can be found in most agriculture stores and some high-end supermarkets. Make a solution of 20% sugar using 1 cup of sugar to 4 cups water. The water can be boiled depending on the water quality or just heated to dissolve the sugar easily. It's a good idea to filter the sugar water to remove bits of cane. Hummingbird feeders should be changed daily. Place the hummingbird feeder in the location you wish the birds to come. From your favorite indoor chair, find the best site for your feeders. They can be hung from trees or suspended close to windows under the eaves of your house. It is a good idea to place more than one hummingbird feeder because the males become very territorial and will drive away all newcomers. Try to place the feeders on opposite sides of the house so the birds can guard only one at a time.

*Continued on Page 23*

# REIMER FEED MILL

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## The Extruder at Reimer Feed Mill

Not all chickens eat the same thing. Those that are raised on grain have feed customized either to maximize the quality of eggs, if the chickens are layers, or to maximize the quality of the meat, if the chickens are broilers. But the feed ingredient that is the same for both is fat in the form of oil. Chickens need fat in their diet because fat-metabolism produces more energy than carbohydrate-metabolism. That's where the extruder at Reimer Feed Mill comes in. It extracts oil from soy beans. The extruder was acquired in the late 1990's and, except for one production of sunflower oil for Banana Bank, is used exclusively for producing soybean oil when soybeans are available. The extruder equipment, occupying one corner of the feed mill, is two stories high and includes a compartment on the top where soybeans are first roasted and then fed into the lower compartment for extracting the oil. The oil is measured in pounds; the number of pounds of oil per pound of feed for chickens (and cows) is 3.5. (For pigs it's 2.5.) Layers are more sensitive to their feed than broilers; they have to have extra vitamins and minerals. Reimer imports meal (powder) from Mexico that contains 45% protein and adds the oil (and corn) as required for the different kinds of feed it produces.



The problem is there are not enough soybeans grown in Belize; 2011 was a good year: 2000 acres; but this year only about 1/2 that amount will be harvested because of adverse weather conditions. Soybeans are usually planted after corn because they have to be harvested in the dry season. If the corn harvest is delayed because of weather then soybeans may not have enough growing season; so soybeans are a somewhat risky crop except in northern Belize where the growing environment is good for soybeans but the cane farmers don't diversify. The local supply is only about 5% of what Reimer needs; so they import recycled oil (from restaurants) called "yellow grease" from Mexico (85%) and the U.S. (10%). Actually it is cheaper to import oil than to produce it at the mill. Soybean oil is also imported from Merida. The Yucatan is ideal for growing soybeans but when the demand exceeds the supply soybeans are imported from the U.S. to Merida and oil is produced for export. Brazil and Argentina export soybeans but transportation costs are too high to make those places viable sources for Reimer.

Another grain in animal feed is milo although for chickens it produces less energy; this year approximately 5,000 acres were planted, a significant increase over the 1,000 acres planted in 2011. Milo doesn't need much rain or chemicals, being naturally resistant to pests. Farmers are encouraged by the price of milo: 27 cents per pound, which compares favorably with corn at 30 cents per pound. The yield is approximately 3,000 pounds per acre.

The extruder at Reimer is the only functional one in Belize. Some years ago, there was another one installed in Yo Creek as a gift from Brazil. The farmers in that region were encouraged to grow soybeans and used the extruder for producing table grade soybean oil but it was never used and is partly dismantled now.

## Belize's First NBHA Races

Here is the scoop on the NATIONAL BARREL HORSE ASSOCIATION BELIZE.

First run in the books as of March 25<sup>th</sup>. Placings and points are as follows: first place receives 5 pts, 2<sup>nd</sup> place 4 and so forth. Total monies paid out \$287.00. 16 entries OPEN and 12 Teen/Youth and 1 Senior

OPEN 1D: Marjie Olson 5 pts Estuardo Alvarado 4 pts

OPEN 2D: Hugh Milton 5 pts  
Stephawn Scott 4 pts

OPEN 3D: Abi V Coverdale 5 pts  
Valerie Thiessen 4 pts  
Trey Roberson 3 pts  
Katherine Roberson 2 pts  
Philip Wilson 1 pt



TEEN 1D: Estuardo Alvarado 5 pts  
TEEN 2D: Joel Neal 5 pts

TEEN 3D: Valerie Thiessen 5 pts Abi V. Coverdale 4 pts

YOUTH 1D: None YOUTH 2D: None

YOUTH 3D: Logan Harsta 5 pts Chase Harsta 4  
Daniel Wilson 3 Peyton Gentry 2 Amberlee Reimer 1

SENIOR 1D: Marjie Olson 5 none in other divisions

Membership is \$60 for twelve months to allow you to run for points and year end awards or a non member fee of \$10 is charged at each show to be eligible to run for money only and no points are given.

Champion GIST Buckles will be awarded to all divisional winners. All top 5 placings are eligible to run in the USA at the WORLD FINALS. And a NATIONALS will be held in 2013 here in Belize.

Dates at the BEA location: basically the last weekend of every month rotating Saturdays and Sundays.

May 26<sup>th</sup> June 30<sup>th</sup> July 29<sup>th</sup> Aug 25<sup>th</sup>. Then depending on finding more arenas to host NBHA Belize or not, we will continue to run at the BEA but will do two per month from Sept on if no other arenas want to participate. Stay tuned for more dates and information. We are shooting for 12 for the year. Help us expand and talk to us about our coming into your area and producing the event. A minimum of 9 will be run for year end points here at the BEA..

For more info contact Marjie Olson at [Shotzy08@live.com](mailto:Shotzy08@live.com) or 663-4609 or stop in at the BEA (Belize Equestrian Academy)

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# Spinosad, an Alternative to Chemical Pesticides/Insecticides

By Dottie Feucht

Only caterpillars and mosquito larvae can be controlled with the well-known biological pesticide Bt (*Bacillus thuringiensis*), but a newer biological pesticide, **Spinosad** (pronounced spin-OH-sid), can control caterpillars as well as the Colorado potato beetle, diamondback moth, cabbage looper, imported cabbageworms, fruit flies, European corn borer, fall armyworm, corn earworm, hornworms, thrips, and leafminers. (It moves through the leaf cuticle to reach leafminer larvae.) Amazingly enough it spares most beneficials such as lady beetles, predacious fly larvae (hover flies and midges), most parasitic wasps, lacewings, spiders, predatory mites and bugs. It is a fermented product, much like the more familiar Bt materials farmers have been using for years, but lasts over twice as long as the best Bt product on the market. It provides a full week of protection for most pests.

## What is Spinosad and how does it work?

The spinosad parent bacterium, *Saccharopolyspora spinosa*, is made up of two complex organic compounds, spinosyn A and spinosyn D. These compounds are produced by certain microbes that were first discovered in 1982 in soil found at an abandoned Caribbean rum factory. It was soon found that these bacteria produce a substance that works as both a neurotoxin and a stomach poison in many (but not all) insects. Susceptible insect species that are exposed to spinosad stop eating within minutes and death occurs within 48 hours. Spinosad has a novel mode of action which helps prevent cross-resistance with organophosphates and carbamates (which are acetylcholinesterase inhibitors), and even Bt products which are also stomach poisons, but work differently from spinosad. Spinosad overstimulates nerve cells by prolonging electrical impulses across synapses by acting like acetylcholine. Receptor sites in muscles are over-activated producing contractions, tremors and paralysis from which the insect does not recover.

Similar to Bt, spinosad breaks down in sunlight, so late-day applications are better for exposing insects to the toxins. Spinosad has a longer period of residual effectiveness compared with Bt, often providing good protection from pests for five to seven days.

## How effective is Spinosad?

Over the past 30 years many studies and agricultural experiments have been conducted by universities and agricultural research organizations. Integrated Pest Management Program (IPM) at University of California at Davis lists spinosad as the most effective in a list of insecticides to treat corn earworm. Bt was listed 7<sup>th</sup>. T. Jude Boucher, from the Cooperative Extension System of the University of Connecticut, calls spinosad the first selective, broad-spectrum insecticide. (The term "broad-spectrum" means that it is toxic to a wide variety of insects.) The report on the 2009 *Agrochemical Entrepreneurs Summit*, contains the talk given at the 2009 International Conference on Crop Protection Science & Technology by Mr. Hang Chio from National Taiwan University on his team's discovery of spinosad which he called an excellent anti-insect pest product with no antimicrobial activity. U.S. Environmental Protection Agency (EPA) gave a grant to American Farmland Trust for distribution to the University of Hawaii at Manoa and commercial corn seed growers. The study showed spinosad's

effectiveness against corn thrips and earworms. EPA received similar results from the University of Colorado. Sweet corn growers in Washington conducted controlled experiments with Spinosad-based products and reported that spinosad is also effective against European corn borers, corn earworms and fall armyworms that regularly feed on sweet corn.

## How safe is Spinosad?

It is toxic to bees when wet, but is relatively safe for them once it dries, so it should be used when pollinators are not actively foraging. This insecticide has extremely low toxicity to mammals (LD<sub>50</sub> oral and dermal > 5,000 mg/kg), birds, and many aquatic invertebrates, is moderately to slightly toxic to fish, but is highly toxic to marine mollusks (shellfish). In the environment, its solubility is low (above pH 5), tends to bind to soil particles/organic matter, and does not persist in the soil. Sunlight and soil microbes break it down into carbon, hydrogen, oxygen and nitrogen; so it is unlikely to leach to groundwater. It was registered under EPA's fast-track *reduced-risk* program; besides vegetable crops it is used on lawns, ornamentals and fruit trees and in most states in the US it does not require posting of pesticide warnings after applications. It has only a 4-hour reentry interval (REI) for worker protection and a one day-to-harvest (dh) restriction, so it won't disrupt harvesting schedules. Due to its superior selectivity and environmental safety profile, spinosad won the US EPA Presidential Green Chemistry Challenge Award in 1999 then again in 2008 with slight modification in structure. So far, spinosad is the only insecticide that has been awarded this Green Chemistry Challenge Award twice. The Organic Materials Review Institute currently lists 21 approved spinosad products.

## How expensive is it to use?

Spinosad is economical on a per acre basis for most pests because it is effective at extremely low rates (1.5-4.5 ounces/acre). If used wisely and timely, the cost of application can be kept very low. For example, the presence of large numbers of eggs on fresh corn silks indicates the potential for damaging populations. Eggs hatch in 5 to 7 days following oviposition. Once larvae enter the corn ears, control with insecticides is difficult; so insecticidal control must be directed toward young larvae that are feeding on the exposed ear tips.

T. Jude Boucher, Cooperative Extension System in CT says that for crops like tomatoes, peppers, eggplant, kohlrabi or leafy greens farmers can control almost all the major insect pests in New England with just spinosad, and another "soft" insecticide like Bt. This should allow for the survival of more beneficials and result in fewer sprays over the long run. Insect pests that would not be controlled on these crops with such soft materials include the cabbage and pepper maggots, black cutworm, aphids (but the natural enemies should control these most of the time), flea beetles and stink bugs (although there is evidence in some studies of reduced incidence), and a few other oddities or minor pests that are rarely encountered.

## Is Spinosad available in Belize?

According to Miriam Serrut, Registrar of Pesticides, there is currently only one formulation registered with the Pesticide Control Board:

**GF-120 NF Naturalyte 0,02 CB 0304-1 Insecticide Spinosad Dow Agrosciences**

"However," she says, "Under our Minor-Use Authorization (MUA) provision, a farmer or other pesticide user may apply for a MUA for importation of a different formulation."

## Bufo Marinus

By Dr Mandy Tsang, BMChB, DRCOG



*Bufo marinus*, commonly known as the common cane toad is native to the New World and is largely found in man-made cleared areas. They are terrestrial but can be found near rivers and ponds for the purpose of breeding. The tadpoles can withstand a 15% salt content in water; therefore breeding can also take place near sea areas. The cane toad was used in the 20<sup>th</sup> century for the purpose of biological pest control and was therefore introduced into many places including Australia, Hawaii and many parts of the Caribbean and Oceania, where they are now viewed as pests due to their over-population. The popular name 'Cane Toad' is derived from the successful control of sugar cane pests, including the cane beetle, by the introduction of these toads into sugar cane plantations. Moreover the toads were used in controlling the white beetle infestations in sweet potato plantations.

The defensive mechanism of *Bufo marinus* is an extraordinary entourage of chemical warfare; it releases toxins from the skin and from the parotid glands behind the ears. The chemicals can be fatal with ingestion and there are documented fatal incidents among mammals, dogs, snakes and crocodiles. It is interesting to note that two types of snakes in Australia have evolved into smaller-headed snakes so that they can no longer have the capacity to swallow these cane toads. It is generally the cardio-toxic and muscular paralysis components of the chemicals which cause fatalities; but I would like to point out that there is no documented evidence of anti-coagulant properties in the toad toxin. It is a popular belief in the Toledo area of Belize that if a dog exhibits bleeding problems (usually from nose and mouth) that it has been exposed to toad toxins. Most likely, the bleeding problems are caused by snake bites particularly the dreaded "Tommygoff" (*Bothrops asper*).

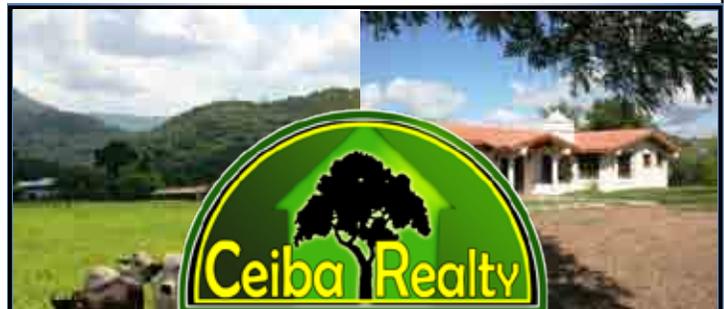
Research has yielded the isolation of many important chemicals of pharmacological and therapeutic value. Broadly speaking they can be classed into the following therapeutic categories:-

1) Anti-microbial: Toads secrete anti-microbial proteins inside their bodies and also secrete them through the pores of their skin. Studies have shown inhibitory effects against *Staphylococcus aureus* and *Escherichia coli*. Aryurvedic medicine has traditionally used live toads to rub on cankers and sores of domesticated livestock which

shows that the anti-bacterial activity was put into use long before modern times.

- 2) Anti-viral protein isolated from *Bufo andrewsi* has been shown to exhibit anti-HIV activity and inhibition of recombinant HIV-1 reverse transcriptase activity.
- 3) Cardiovascular effects: Isolated toad venom has been employed in traditional Chinese medicine for centuries; the medical preparation, called *Chan'su*, is used as a cardio-tonic. Bufalin, amongst other isolated chemicals, has shown to increase myocardial contractile activity without increasing the heart rate. The cardio-active chemicals exhibit activity similar to digitalis and therefore might be useful in controlling conduction disorders of the heart, including atrial fibrillation.
- 4) Psychoactive components including bufotenine and 5-MeO-DMT (from *Bufo alvarius*) may offer greater research potential in the field of psychiatry, particularly in the understanding of schizophrenia.

The purpose of this article is to show the myriad of uses of the common cane toad. They can keep pest populations down in plantations and can act as deterrent to snakes and crocodiles. There is so much potential in the medical therapeutic value of the toad-toxin that, with time, more pharmacologically useful components may be isolated which can lead to greater breakthroughs in medicine. Who knows what may happen in the future?...We might be farming cane toads for the extraction of therapeutic drugs. We need to keep an open mind and realise the great potential of everything in nature, even the common cane toad.



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## Tilapia for Small Farms

By Dr Alessandro Mascia, BMBS, CHed

Whenever you start doing the same thing over and over again there is a good chance that it is going to start feeling repetitive and before you know it, you're stuck in a



rut! Well, we've got to get out of the mushroom rut and talk about something different this issue; after all, not everybody is interested in mushrooms (I feel sorry for them!) and I actually do spend my time doing things other than eating mushrooms. Let us talk about **tilapia** and the small farm.

This time around I am going to keep the discussion on the practical level since there are thousands of published pages in the literature telling all about this edible fish and how to raise it commercially. Many years ago, when I had just arrived in Belize, I spent an incredible amount of time reading about how to do things (instead of actually doing them) and in the recesses of my mind, I remember reading about tilapia. Having grown up in Singapore I also remembered eating this fish and liking it (even though the friendly neighborhood biologist tried very insistently to convince me that I actually didn't...) so, to make a long story a bit shorter, a seasonal pond project was undertaken for the purpose of raising this fish.

From memory, the main points that I remember about tilapia are that:

- 1) There are lots of species that will mate and hybridize together.
- 2) They grow quickly.
- 3) They breed even faster and take over waterways if released into the local environment. (This is why the biologist didn't like me.) Seriously though, if you want to keep this particular livestock, don't let it get out; it is purely a controlled environment project.

At the commercial level, the rapid breeding rate is a problem (too many small fish being produced stunting the growth of the big fish) and all sorts of tricks have been developed in order to have same sex ponds with no breeding taking place so that the fish grow instead of over populating and stunting the crop (hand sexing, hormones, etc). On the small farm, however, this rapid breeding characteristic is not necessarily a problem if managed effectively and you are clear about what you are trying to achieve.

I enjoy eating fish every once in a while but I don't need that many big fish; the dogs and the rest of the farm animals that will eat fish don't seem to have a minimum size requirement. It works very well at the small farm level to continuously harvest small fish for your dogs/chickens/ducks/pigs/whatever, thereby allowing a few big fish to grow out for your own eating pleasure, without having to go through the shenanigans that commercial tilapia raisers have to go through in order to make money.

On my own farm, the fish get fed termite nests, guinea pig

droppings, old bread, etc. and every day, once they are established, we use welded wire baited fish traps with small openings to catch a pound or two of fingerlings at a time which very conveniently feed the dogs. The population is therefore kept under check and a proportion of the fish make it to the three-to- four pound stage over time. We then catch these fish with appropriately sized traps (fishing is no fun for me) and either eat them or put them in a small pond we keep filled over the dry season to re-introduce into the big pond when the rains of the rainy season re-fill it. It is a very convenient and minimal work farm technique for lazy farmers (like me) to save a couple of bucks on dog (chicken, pig, etc.) food (which they then don't have to earn elsewhere), feed themselves on some nice fish and have something to look at in the evenings when they go out to enjoy the sunset. (Looking at fish lowers blood pressure...).

Go forth and spread the sp...err...I mean fish (not into the waterways though)!!

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**CASA MASCIA, TOLEDO, BELIZE.**

**Breadnut....Same English name for two different trees....Confused?**

**By Maruja Vargas**

Spanish don't appear to be confused, as they offer two names for the two trees, Ramón (*Brosimum alicastrum*) and Castaña (*Artocarpus camansi*). Both trees are members of the Mulberry family, but separate species. The



**Ramón Maya nut fruits**

Ramón has smooth leathery oblong leaves. The Castaña has easily recognized huge 'saw tooth' leaf. The Ramón produces masses of yellow, round, one-inch fruits. Inside



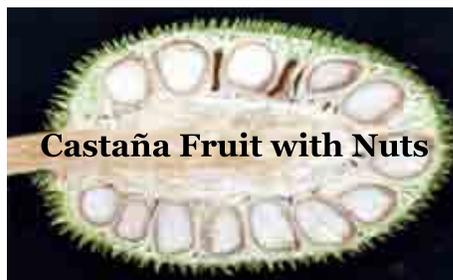
**Ramón Maya Nut tree**

the thin, tasty citrus-flavored orange-colored skin is a large, edible nut that can be boiled or dried and ground into a meal for porridge or flatbread. In stark contrast, the fruit of the Castaña is large, oblong lime green spiny mass that can weigh upwards of 2 kilos. These fruits have little pulp and are primarily grown for their large, nutritious seeds high in protein and relatively low in fat which can be prepared by boiling or roasting.

Ramón, also referred to as the Maya nut tree, was planted by Maya two thousand years ago and is an easy tree to cultivate, tolerating many soil types. Ramón grows rapidly. The leaves offer forage for cows, sheep and goats. A single breadnut tree can yield 1,000 kg (2,200 pounds) of fruits that contain protein-rich seeds. The Ramón nut is extremely high in fiber, calcium, potassium, folic acid, iron, zinc, protein and B vitamins. It has a low glycemic index (<50) and is very high in antioxidants. The fresh seeds can be cooked and eaten or can be set out to dry in the sun to roast and eaten later. The dried nut, ground, has been used to prepare tortillas, sweet pastries and a thick porridge. The nut when stewed tastes like mashed potato; roasted, it tastes like chocolate or coffee. The nuts can be boiled and made into a paste, or the nut, roasted, is used to make a coffee-like drink. The milk-white sap of the tree is a nutritious drink.



**Castaña Breadnut tree**



**Castaña Fruit with Nuts**

Archaeologists believe that the Ramón Maya nut was a staple along with maize and beans in ancestral times. It was very easy to preserve for long periods of

time as it has only 6.5% water content. It is one of the twenty dominant species of the traditional Maya forest garden.

The Castaña breadnut is native to New Guinea and was introduced into the Caribbean 300 years ago along with its close relative, the breadfruit (*A. altilis*). The picturesque introduction into the New World seems to be connected with the memorable second voyage of Capt. William Bligh in HMS "Bounty", where the tree was successfully cultivated in Jamaica. From there it spread throughout the Caribbean.

The large, spiny fruits of the Castaña have little pulp and are primarily grown for their large, nutritious seeds, which can number several hundred in one large fruit. Immature fruits, seeds and all, can be thinly sliced and cooked as a vegetable. The nuts when boiled or roasted have a texture and flavor similar to chestnuts. The Castaña breadnut can be readily distinguished from its close relative, breadfruit, by its very spiny fruits with little pulp and numerous large, light-brown seeds. The breadfruit carries little to no seeds and has a more smooth outer skin.



**Castaña Nuts**

Ramón generally fruits March to May, and the Castaña is at the end of the rainy season. It appears that these trees may be complimentary when cultivated in the same garden for year round supply of breadnut.

The following link contains detailed information on the Ramón cultivar... <http://tculhane.bol.ucla.edu/rainforest.htm>

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## Deep Pipe Irrigation

Although not very well known in Belize, deep pipe irrigation is a very effective and water-conserving method of irrigation which has been around since the 1980's. More popularly used in climates drier than Belize, this low-tech system can be useful keeping young trees watered and fed at the deep root zone during our dry season. Mr. Graham Herbert of B-Oil Belize has been installing these on his jatropha plantations in Cayo District this year and is very pleased with the results to date.



Herbert uses 2" PVC pipe, in 18" lengths, which is drilled along one side with 4 holes of approximately 1/8" diameter. The bottom and top have a 1/16" hole, is capped permanently, and the top has a removable cap, allowing easy filling but preventing ingress of debris and insects. Others have used bamboo for the pipe, and screening, or even sticks tied together for the top cover. Herbert's 18" pipes hold approximately a half gallon of liquid and he takes advantage of the continuous fertigation opportunity available with this system. He reckons that for each half gallon fertigation filling, the cost is on average 36 cents for the diluted fertilizer. After the first filling, which disperses rapidly, he finds that the liquid takes nearly 3 weeks to slowly weep through, a great savings over traditional above ground watering in both labor and water. Sawaf reported in a 1980 study in Africa, that "crop weight with deep pipe drip system was more than double that of surface drip, and six times larger than conventional surface irrigation." Root development is better in deep pipe irrigated trees, water loss due to evaporation is reduced, there is no wasted run-off on hillside irrigation, and weed growth is reduced too.

The rule of thumb is to place these pipes in the ground at the drip zone of the tree, with the holes facing the tree. Be sure to mark a line going to the top of the pipe, marking the location of the holes. Dig the hole for placement slightly larger and deeper than the pipe, place in the pipe and then fill in the area immediately around it with sand for a good snug fit. If pipes are placed carefully with only the cover exposed, cleaning by bush-hogging should not affect them. Placement in a vertical or near vertical position is recommended at a minimum of 2 ft from trees, but for small seedlings recommendations are for as close as 2.5 to 7.5 inches. (With young seedlings the pipes are planted first.)



In the photos of this article, the jatropha trees are planted at 7 ft intervals, and the pipes are 3.5 ft from the trunks, one per tree. For larger trees several pipes may be used, and pipes may be moved to accommodate growth.

By B Roberson

## Backyard Birding ... Continued from Page 17

If tending to hummingbird feeders daily doesn't appeal to you, you can plant shrubs, trees and flowers that will attract them naturally, both for food and for places to hide while they wait for their turn at the feeder. Bananas are beautiful and birds love them if you can resist picking the fruit. Schefflera, or Umbrella Plant, a common houseplant, will flower after two or three years if planted outside. The fruit, beloved by toucans, resemble a cluster of small orange grapes. Other plants that attract birds and grow easily in Belize are Flamboyant trees, common Fire Bush, Hibiscus, Heliconia, various plum trees, Sapote, Chico Sapote, Bay-leaf Palm, Trumpet Tree (Cecropia), and Royal Palm. Birds even enjoy the fruit from the Poisonwood tree. The list is almost endless.



Collared Aricaries

The last essential ingredient for developing a backyard that will attract birds is to provide a source of fresh clean water; ideally, a creek, or pond, but otherwise, use store-bought birdbaths or just use shallow pans. Dripping water is irresistible to birds so any dripping faucets are probably already bringing birds in to your yard. Place a shallow pan below the faucet and you have the perfect bird spa.

Finally, find a good bird book like "Birds of Belize" by H. Lee Jones & Dana Gardner, available on Kindle and in many stores. Get up early, grab a cup of coffee, sit back, and enjoy.

*Note: The bird photos for this article were taken by Marguerite and her husband, Jim, who have been proprietors of Mountain Equestrian Trails for the past 23 years.*

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# AG BRIEFS



Following Belize's March reelection of the UDP, **Prime Minister Dean Barrow re-organized the Ministry of Agriculture and Fisheries.** The Hon. Gaspar Vega, formerly Minister of Natural Resources is now



Minister of Natural Resources and Agriculture. Mr. Hugo Patt is the Minister of State (with special emphasis on Agriculture) in that newly combined ministry. Ms. Beverly Castillo is CEO, and a 2nd CEO, Mr. Jose Alpuche was appointed for Agriculture. Forestry, formerly under Natural Resources, and Fisheries, formerly with Agriculture, were combined to create the new Ministry of Forestry, Fisheries, Sustainable Development and Indigenous People, with the Hon. Senator Liselle Alamilla as Minister and Dr. Wendel Parham as CEO.

## The 2<sup>nd</sup> biannual **Spanish Lookout Commercial and Industrial Expo** was held

on February 24<sup>th</sup> & 25<sup>th</sup> 2012, at Countryside Park, in the outskirts of Spanish Lookout. The park was established in 2008 as a venue for the community's 50<sup>th</sup> anniversary celebrations. Permanent infrastructure includes a large covered pavilion and several outbuildings. Hundreds of trees and flowering plants grace the grounds providing ample space and shade.



This year, there were 140 booths occupied, with 100 exhibitors from Cayo, San Pedro, Big Creek, Orange Walk, Corozal, Placencia and, of course, Spanish Lookout itself. About 45 - 50% were Mennonite-owned businesses, and a good portion of all the exhibits were farming oriented. Over 4,000 people visited the fair on Friday and over 10,000 on Saturday. There was no admission fee for the fair and many schools took advantage of this to bring busloads of students on Friday.

Livestock, cattle and horses were on hand, although no judging was done. Local ranchers are hoping that judging and permanent livestock facilities may be added for the next Expo in 2014. A petting zoo which included pigs, goats and rabbits was a popular attraction too.

The Spanish Lookout Office has tabulated the **average yellow corn yield** for the community for the 2011 season. **The 2011 yield was up 9.2 %, reaching 4,260 lbs/acre**, up from 2010's average of 3,900 lbs/acre. 93% of the corn planted was yellow corn; the remaining 7% was the white type favored for tortillas.



**The USDA reported** on April 27, 2012 that in a single day, US exporters sold a whopping 1.44 metric tons of corn and the 4 day total for that week was 2.84M metric tons. Attributing to this mega sale of US corn are the rapidly expanding Chinese market (China's hungry hog herd approaches 690M head) and the drought in South

America. Predictions for the coming season are that US farmers will increase corn acreages to the high 1937 level; the International Grains Council forecasts a global 4% increase, to 900 M tons for the year beginning July 1<sup>st</sup>.

**SAGARPA's Sec. of Agriculture has released figures for agriculture exports**, which indicate Mexico is the world's leader for exports of avocado, watermelon, lemon and papaya. Avocado export figures showed the most



outstanding growth, with an average of 20% annual gain since 2001 (71,000 tons in 2001, 369,000 tons in 2010). In dollars, 2011 avocado export revenue soared 47% to \$990M USD. The USA remains the largest customer for Mexican avocados at \$794M USD; Japan is 2<sup>nd</sup> at \$86M USD. Total value of 2011 fruit exports was \$2,827M USD. The primary destination is the USA; Russia, China, Germany and Hong Kong are among those increasing Mexican agricultural imports. For the 2012's first quarter, total Mexican food exports exceeded \$4,000.M USD, an 8% growth over same period of 2011. (data: AGENCIA REFORMA & Eleconomista)



Texas A & M University's Professor T. Erik Mirkov has received the green light from the USDA for **field testing in Florida of genetically modified HLB-resistant citrus trees**. Professor Mirkov expects that it will take at least a year for definitive results, but he is very optimistic due to his greenhouse test results to date. Grower costs (USA) have increased up to 40%, attributed to coping with Citrus Greening (HLB) challenges. Professor Mirkov opines "a GMO orange tree might be the only solution to protecting the citrus industry." GMO citrus would need to be approved by EPA, FDA and USDA for commercial production.

The April issue of CITRUS INDUSTRY (CitrusIndustry.net) reports that discussion and search for funding is underway in Florida for proposed research to develop **a genetically engineered citrus psyllid (vector for HLB) which might halt the spread of citrus greening**. GE African mosquitoes already developed to combat malaria and dengue increase scientists' confidence and provide inspiration for this project.

Mr. Bob Scott, an extension weed scientist of the University of Arkansas, states that **glyphosate (Roundup) was "an extremely valuable and useful tool for the past 15 years,"**



**but he continues that the problem now is the weeds once controlled are becoming resistant to it.** Farmers in the Mississippi delta report weed-controlling expenses have grown from \$45 to \$100+ / acre in the past 2 years. Monsanto's Mr. Rick Cole says that their company recommends "multiple modes of action", including more than one chemical, crop rotation and tillage. The company is developing new seed lines, such as a soybean, resistant to both glyphosate and dicamba. In addition to North America, glyphosate-resistant weeds have been confirmed in Australia, South America and China. The cycle of creating resistance is purported to happen more rapidly in warm climates where multiple crops are grown within a single year. Currently Roundup-Ready (RR) crops make up 84% of GMO plantings worldwide.

**Dow Chemical has applied to the USDA for permission to market its new 2,4-D Resistant corn;** 140 farm, public health, consumer and environmental groups as well as 365,000 individuals protested. Aside from the health concerns to human health (2,4-D exposure being associated with cancer, Parkinson's Disease, nerve damage, hormone disruption and birth defects), **farmers are concerned that increased use would lead to more 2,4-D drift crop damages** and litigation. 2,4-D product labels warn of possible 'contamination of groundwater' and 'contamination of aquatic areas'. Use of 2,4-D in the USA currently exceeds 27 M lbs/yr: ag scientists predict that it could swell to over 100M lbs should 2,4-D-resistant varieties of corn, soybeans and cotton become available.

## Local and Regional Fuel Prices



	Belmopan, Belize	Quintana Roo, Mexico	Peten, Guatemala
REGULAR	↑ \$11.94 Bz/Gal	↑ \$6.06 Bz/Gal	↑ \$10.83 Bz/Gal
PREMIUM	↑ \$12.30 Bz/Gal	* \$6.50 Bz/Gal	↑ \$10.97 Bz/Gal
DIESEL	↑ \$10.81 Bz/Gal	↑ \$6.31 Bz/Gal	↑ \$10.14 Bz/Gal

\* Unchanged

**Solar panel prices** have indeed dropped during the last year, 30% or more. For us in Belize this brings a savings; but a significant part of our cost is the cost of transportation to bring them here, so we are probably seeing closer to a 5-20% decrease in panel cost. The real decrease has come in the improvement and lower cost of MPPT (Maximum Power Point Tracking) technology, which saves money for middle size and larger systems. Although out of the reach of the rural poor who might put in a single panel, the MPPT systems are very useful for people wanting a system in excess of 400W.



**The Belize Poultry Association (BPA) held its 16<sup>th</sup> Annual General Meeting** at the Life Spring Ministry Church in Spanish Lookout on March 28, 2012. Messrs. Allan Reimer and Norman Reimer welcomed attendees and Chairman Jake Rempel spoke about BPA's 2011 accomplishments including production

data. The main address was delivered by the Hon. Gaspar Vega Minister of Natural Resources and Agriculture. Minister Vega was accompanied by CEO in the Ministry of Natural Resources Mrs. Beverly Castillo and Mr. Jose Alpuche, CEO in the Ministry of Agriculture. Minister Vega, applauded the BPA in its organization and exemplary performance throughout the years, supplying the country with a basic food commodity that has occupied the most important form of animal protein in the Belizean diet. He urged the industry to continue its share in the national food security scheme, employment and GDP contribution. The Minister committed his Ministry of Agriculture and its departments such as BAHA, to work closely with the BPA, to ensure the continued vibrancy and success of this national industry that supplies basically all the domestic demand in poultry and poultry products. In the thank you address by Mr. John Dueck, he stated that the industry was pleased to have the Minister and his guests, noting that it had been more than 5 years since a minister of Government had participated at one of the BPA's AGM.

The Manager, Mr. Orlando Habet presented a detailed report of the production and performance of the industry in the year 2011. Dr. Victor Gongora of the BPA and Dr. Joe Myers of BAHA presented on the Poultry Health programmes (the Belize Poultry Improvement Plan and Surveillance programme).

Mr. Jake Rempel of Blue Creek was reelected to serve on the Board of Directors while Mr. David Reimer and Mr. Otto Friesen replace



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Mr. Isaac Dueck and Mr. John Dueck of Spanish Lookout for a three year period. The meeting ended with a usual raffle of items donated by the various companies that are members of the BPA.

Production Data	Dressed Turkey lbs.	Dressed Chicken lbs.	Dozen Eggs
<b>2011</b>	<b>304,354</b>	<b>32,936,898</b>	<b>3,691,672</b>
<b>2010</b>	<b>439,879</b>	<b>33,506,030</b>	<b>3,588,953</b>
<b>Per capita 2011</b>	<b>.97</b>	<b>105</b>	<b>150</b>

Based on average wholesale prices for chicken, turkey and eggs, the report estimates a wholesale value of the industry at some 82.5 million Belize dollars.

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**Eggs....Continued from Page 1**



Small eggs come from layers that are just coming into production but the size increases with the age of the layer. All of the layers are Hy-line Brown which produce only brown eggs; CF considered white eggs in the past but white eggs are too susceptible to breaking, although the white laying chickens have a lower feed requirement. A common perception in Belize is that white eggs may be illegal contraband; there are no commercial outfits with white egg layers at this time. CF's egg market (7 - 8 thousand cases per month) is consistent except during the November and December when it increases by 20 to 25%, due to holidays and accommodating the tourist trade. And that's usually the only time the price fluctuates as the supply after Christmas exceeds the demand and prices are lowered to sell the excess. CF has such a big turnover at their warehouse that eggs don't have to be refrigerated; eggs are in and out in a matter of days. Producers, who are under contract with CF, buy their own hens but CF has the right to sell hens if egg production exceeds demand. Excess birds and chickens at the end of their 16 to 19 month laying cycles are sold in Spanish Lookout at various outlets. The increasing trend is for many of these birds to be legally exported to Guatemala.

Although eggs represent 71% of CF's business, CF also handles beans which represents 18% of their business and rice is the other 11%. Cleaning of the beans is done either by contract with Bel-Car or the farmers clean the beans themselves and CF re-bags them. Beans are grown by local farmers in and around Spanish Lookout, Shipyard and Little Belize. Although 80% of the beans are red kidney, CF also markets black, cranberry, and small red beans and black-eyed peas. *Tropical Country Rice*, a local hybrid rice is marketed by CF in 20, 50 and 100 pound bags. The annual distribution of rice is approximately 800,000 pounds and is just under the estimate for beans handled, which is approximately 900,000 to 1,000,000 pounds. Rice and beans are distributed throughout Belize, the same as the eggs. CF does not export their products.



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