

# The Belize Ag Report

Belize's most complete independent agricultural publication



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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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## Visit a Tropical Kerala (India) Spice Farm... right here in Golden Stream, Toledo District

### Presenting The Belize Spice Farm & Botanical Gardens

By Beth Roberson



One of the delights of being a writer for the Ag Report is discovering and exploring fascinating and diverse individuals and farms within Belize's borders.



One of the very richest agricultural veins we have struck is The Belize Spice Farm and its owners, Dr. Thomas Mathews and Mrs. Tessy Mathews.

Having purchased a packet of their potent and fresh Golden Stream Black Pepper (*Piper nigrum*) a few years ago in Punta Gorda Town, we set out to meet the owners of this farm and tour it, for the paper. As Dr. & Mrs. Mathews are often absentee landlords, this proved an elusive task, but certainly worth the wait. The Mathews had visited Belize while on vacation over 20 years ago. They were immediately struck with the similar conditions of weather, soil and growing conditions of their native Kerala, India\*, and the possibilities for them to start a farm in Toledo growing some of their native Keralan products. They purchased land on the Southern Highway south of the Golden Stream River. After importing various spice plants such as black pepper, nutmeg, cardamom, and vanilla, with the cooperation of the GOB, and bringing in native Keralans experienced in spice farm management, the enterprise began. Today, visitors will marvel at the fruits of the many years of intensive investments: financial, technical and labors of love which have come together in this agricultural wonder. Other very rare imports growing at the Belize Spice Farm are sandal wood, silver oak, *Phyllanthus emblica* and the sacred banyan tree.

A 2 1/2 hour drive south from Belmopan will land you at the gates to the farm. You will be less than an hour north from Punta Gorda Town, where you can find overnight lodging. Buses also travel this route, between Belmopan and P. G.

Two of the crops most identified with the farm (in addition to the large citrus operation) are black pepper (*Piper nigrum*) and vanilla, (*Vanilla planifolia*). The pepper vines stand in stately shade, clinging to the *Erythrina* trees imported from Costa Rica for this specific task. Although almost any type of tree can be the supportive host for pepper, even coconut, the more sun on the vines the more water is required. The crew at Golden Stream harvests the pepper during the early winter months and dries and processes them in a special building on the grounds. Current production is approximately 3000 lbs per year.

The vanilla harvest is under way now. When the beans are full and starting to turn yellowish on the end, they are picked to start the 3 months

curing process, also done on the plantation. The Bourbon system of curing is preferred by Dr. Mathews; this method is commonly used in many parts of the world including Madagascar and produces a fragrant



Black Pepper at Belize Spice Farm

vanilla. In some years the ubiquitous chachalacas have destroyed much of the vanilla crop by consuming the vanilla blossoms. Part of the allure of tropical farming may be the continuous and changing challenges which lambast the farmer on a regular basis.

Other unique specialties on the farm include several which have been subjects of articles in our publication such as 'Little Pickle' or Tindora in Jenny Wildman's *Beyond the Backyard*, issue #13 of Sept-Oct, 2011 and 'Observations of *Eugenia stipitata* or Sour Peach' by Dr. Mandy Tsang in issue #10 of Feb-Mar 2011. Every visit to this farm presents the visitor something new and overlooked on the last tour, or not having been fruiting on prior visit. One comment we hear from every visitor we have taken there is that all know someone with whom they cannot wait to share the knowledge that this special and magically-ambianced farm exists in Belize. A nursery is open on the grounds; some plants are in stock and orders may be placed. The Mathews have been very gracious in sharing their hard-earned knowledge with other horticulture enthusiasts within Belize.

Attention, school teachers and parents of primary school children: do consider The Belize Spice Farm for your end of the year class trip. You will not be disappointed. Tours can be arranged by calling the farm at the contact information on their ad on page 2. The Belize Spice Farm may be conveniently visited on the way down or back from The 4<sup>th</sup> Annual Organic Fair, to be hosted in P.G. Town Oct 26 & 27<sup>th</sup>.

**Editor's Note:** \*Kerala State on the Southwest coast of India is one of world's most intensive producing areas for coconuts, black pepper, nutmeg, cinnamon, cardamom, cloves, vanilla and mushrooms. Belize could greatly benefit by inputs of agricultural technology from this part of the world.

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## To THE EDITOR

Hi Beth,

I read your latest Belize ag report and enjoyed your Brix article. I have a refractometer made by Pike Industries (Pike Agri-Lab Supplies, Inc.\*\*\*) and have used it for many years. When doing grasses or dryer materials you will need a hand held garlic press from the kitchen. With our dry summers testing grass in July August proves a challenge but the press solves the problem. On my old ranch in Manitoba I grew a crop of cereal Rye, and rented the field next to it to another local farmer who also grew rye. Mine was organically grown his commercially with chemicals. I grazed mine with sheep for 3 weeks while the plant was young and it went on to produce a nice crop yielding 45 bushels/acre. He fertilized his lowering the brix and stressing the crop. Grasshoppers ( prairie locusts) moved in and devoured the crop he got 8 bushels/acre. They never touched mine as it was healthy with twice the Brix reading!

Rob Fensom, Harmonious Homestead, Salmon Arm, B.C., Canada

**Editor's Note:** Rob Fensom is not only an avid rancher of sheep, goats, rabbits, and pigs; he is a fellow ag journalist, occasionally published in both *Small Farmers Journal* and *Shepherd* magazine. His blog site is [fensomsofolly.blogspot.com/](http://fensomsofolly.blogspot.com/)

\*\* <http://www.pikeagri.com/component/virtuemart/plant-testing-meters/refractometers> is the link to the Pike Agr-Lab Supplies site where they sell the refractometers which Rob recommends. Current prices range \$97-112 USD for hand held and \$169+USD for digital handheld.

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## Blue Creek Cowboys Take the Lead

By John Carr, *BLPA Chairman*

On July 25<sup>th</sup>, 2012 The Blue Creek Cattle Committee started a pilot testing program. This included testing for brucellosis, tuberculosis and putting identification tags in each ear. These numbers with statistics are being entered into the National Computer System located at the Belize Livestock Producers Association (BLPA) office. The Blue Creek cattle men had good corrals and only had to rope 15 head at one farm. While a few cattle had to be re-checked for some reactors, on the following tests they proved to be clean of brucellosis and TB infections. Most of us never thought our cattle had these problems, but it is a very comforting to be proven clean.



This pilot program was assisted by Belize Agricultural Health Authority (BAHA), The Ministry of Agriculture (MOA), BLPA, the National Cattle Sweep Project, and the samples/testing was done by Mexican vets. We must commend the Mennonite men and women who all started early and stayed up late almost every day to accomplish this great effort. They ran 2 teams of 4-7 people and in many cases when a mechanical chute was available they did more than 1 a minute. If they had only an alley, it took 2-3 minutes. They had to gather the 15 head of cattle that were in the bush. Because there were no corrals, they had to rope them from horses and it took 10 mounted ropers 1 and 1/2 hours to secure 15 head into a trailer. They said that their horses were very tired at the end of the process and several fences were in shambles.

As of September 15<sup>th</sup>, they tested 16,808 of 18,000 heads of cattle. They worked about 7 weeks and the two teams averaged approximately 450 heads per working day. They took one week off and never pulled blood on Sunday; however they were forced to read TB test results on some Sundays because of the 72 hour reading rule.

At a meeting of the National Livestock Sweep Committee on September 17<sup>th</sup>, chaired by MOA, we were trying to pull the final loose ends together. The last items that were of major concern were the M.O.U signing (agreement with Mexico), vehicle conditions, some hiring, and the desire to have the lab at Orange Walk ready to go to test the brucellosis serum. When the project continues, it will continue to work in the Corozal-Orange Walk districts. The project has been a long time coming, but it is moving forward and we do thank the Blue Creek Mennonite cowboys and cowgirls who contributed time, effort and money for leading the way.



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## An Overview of the Import Permit Application Process for Agricultural Commodities

By: **Francisco Gutierrez, Technical Director, Plant Health Services**

The Belize Agricultural Health Authority (BAHA) has been designated as the competent authority for agricultural health and food safety. This means BAHA is in charge of all those aspects related to veterinary services, plant protection, quarantine procedures, and regulations for safe and wholesome foods. In essence, the role of the organization is to mitigate risks associated with these broad roles. All these services are arranged into two main categories of work: export compliance and import regulations. This article focuses on the latter aspects of our work.



With the creation of BAHA in 2000, the Government of Belize decided to streamline the process of importation of agricultural commodities. The importation process can be a very complicated one under certain conditions and scenarios, since in many cases more than one government agency may be involved in authorizing importations depending on their mandates. For example, certain commodities are quantitatively restricted and require import licenses by the Supplies Control Unit of the Ministry of Economic Development, e.g., lumber, fruit juices, grains, etc., while other commodities, such as vegetables, grains, meats, etc., are jointly controlled with the Ministry of Agriculture. Other agencies, such as Forestry, also have restrictions for forestry seeds, and even the Police Department may need to be consulted in case products have narcotic properties.

The role of BAHA is to minimize risks associated with agricultural products that may end up affecting our agricultural industries, natural resources, and pose risks to human health. In compliance with the law, BAHA instituted an importation permit process to manage risks. The permit document is not a license; it is a means of controlling the importation of restricted commodities, to prevent the importation of prohibited commodities, and to ensure that importations comply with prescribed sanitary and phytosanitary requirements that have been determined to mitigate the risks associated to these importations.



Due to the complexities of the importation process, BAHA was designated as the “one-stop shop”, where the process initiates, and where the final authorization is granted, after having been cleared by all other relevant approving agencies. For a permit to be successful, all relevant agencies have to approve of the importation related to their own mandate.

An importer initiates the permit process by submitting an application with all the necessary information at any of the BAHA offices across the country. The base information required includes the name of the product, amount, intended use, origin, contact info, and point of entry. This information is sent to the relevant department in BAHA for vetting. Plant and plant products are sent to the Plant Health Department, animal and animal products are sent to the Animal Health Department and processed products are sent to the Food Safety Department. BAHA has already established conditions for many products from many sources.

*Continued on Page 30*

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# Fighting Weeds With Fire

## Flaming Provides Alternative Weapon in War on Weeds

by Francesca Camillo  
Reprinted from ACRES USA  
www.acresusa.com

Wedding the proficiency of the flame with the compressed liquid power of propane has served many farmers and food producers well over the past century. Flame weeding (also referred to as flaming) has been an apt option for organically ridding row crops and fields of uninvited weeds while also replenishing the soil with nutrients from the resulting carbon. According to the Northwest Coalition for Alternatives to Pesticide, the first agricultural flame weeder was patented in 1852. Flame weeding is done by generating intense heat through a chosen device — whether it is a handheld torch or tractor-mounted — that sears the leaves of the weeds, which causes the cell sap to expand, thusly damaging the cell walls. “You’re watching for the color change, depending on the weed and its maturity,” says Charles House of Earth & Sky Solutions. Leaves wilt and dehydrate the plant, leaving the pesky invaders no other option than to wither and die, sometimes up to three days later. “The key to successful flame weeding is the maturity of the plant you’re trying to eradicate. The smaller, the better,” he explains. The best time is when they’re immature and in the cotyledon stage.

### Background

Flaming gained popularity in the first third of the 20th century and continued through the 1960s until pesticides replaced industry attentions. Though its use waned over the following 20 years, flame weeding resurfaced and regained popularity in the early 1990s, and continues to be used today. So continues flame weeding’s renaissance. One man whose agricultural history includes using and refining his flame weeding technique is Charles House. Approximately 30 years of experience in many sectors of green industry has endowed him with ample knowledge. As a purveyor of agricultural farm equipment and owner of Earth & Sky Solutions, based in White Hall, Virginia, he has been able to create a business model in which he can share the knowledge he gained from his years of experience. “When I owned a landscape company, I got into using chemicals for a time because that’s what the market wanted. I got tired of it. And in fact, I refuse to use chemicals anymore.” His experiences have allowed him to contour his personal and professional philosophy and act as an educational and consultation resource for people who may not know much about flame weeding and its benefits, but are interested in learning. For House, flame weeding is possibly the most logical answer to eradicating weeds. “With flame weeding you don’t have to use chemicals. There are so many benefits, [among which are that] you don’t have to worry about drip.” Fueled by propane, flame weeding allows the user to not worry about spillage or drip, since it’s safely contained and is accessible on an as-needed basis. Says House, “When propane is under moderate pressure, about 200 psi, it remains liquid and burns anywhere from 1200 to 2000°F, averaging at about 1400°F.” This range is thoroughly sufficient to eliminate weeds in a garden or in row crops organically, quickly and easily. Of course many, if not all of us, know better than to play with liquid propane, right? Another issue that may seem obvious would be to use it with a lot of ventilation — and since you’ll be flame weeding your yard or row crops outside, that shouldn’t be a problem. It’s always important to prevent electrostatic charges from building up when in a liquid state, outside of the cylinder. And, if you have an open container of liquid propane, don’t use any hand tools, or anything that sparks, within the vicinity. Always wear protective

clothing. Some people even use face shields. If there’s a spill, propane will evaporate quickly. “Many organic farmers opt for flame weeding, since there are no side effects or environmental ramifications.” Another positive aspect of flame weeding is that, as House explains, “You’re not cultivating the soil. When you cultivate soil, you’re digging up weed seeds that will [eventually] germinate — it’s like a no-till type method. You’re using the flame to disrupt the growth of the weeds.”

### Flame Weeding methods



There are three methods of flame weeding: spot-flaming, pre-emergent flaming and indiscriminately treating whole beds. The stale seedbed technique begins controlling weeds early in the season, especially in direct-seeded crops, according to Appropriate Technology Transfer for Rural Areas (ATTRA). When the seedbed is prepared, the soil is tilled and set/hilled into beds, which encourages weeds to germinate and make their

*Continued on page 7*



# PLENTY BELIZE

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### Fighting Weeds With Fire... Continued from pg 6.

way to the surface. In order to have a weed-free bed, farmers will flame the soil after tillage, but prior to planting to ensure the seed crops have precedence. Some farmers will even pre-irrigate to induce weed growth, and then sweep through with the flame to kill them all off. This technique can also be helpful when preparing to transplant, essentially giving the vegetable seeds a head start so that they can develop the canopy cover that will greatly reduce weeds' ability to flourish. The earlier the weeds are taken care of, the better it is for the crops to maximize their yield. The pre-emergence flaming technique eliminates the first round of weed seedlings just before the crop seedlings emerge, since the weeds often surface first. This ensures the crop will not be harmed and nicely compliments crops that are slow to germinate. House discussed post-emergence flaming, also known as "selective flaming," a fair amount throughout our interview. This technique requires more finesse and control, since the crop plants have broken through the surface and are stretching their way toward the sunlight. Although it may seem counter-intuitive to brush your crops with over 1200°F of propane-fueled fire, time is of the essence, and hardy plants can stand it. Once the row crop is out of the cotyledon stage, it will be much more likely to withstand the heat. There are myriad flaming techniques outside of these three. Some farmers opt to cross flame, parallel flame, middle flame, and there's even water-shielded flaming. "Torque adjustment is key, as well as the maturity of the plant that you're trying to protect, and ground speed," House says. Subtle movements and being mindful of velocity and tension can make for fast, efficient work. "Penetration of the flame is only a few centimeters into the soil, and when you flame, you leave organic matter in the soil," House explains. This is essentially biochar.

*Continued on page 30*

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# BEYOND THE BACKYARD

## SPUD BUCKET

By Jenny Wildman



We tried to run a restaurant offering only local produce; however one of the items which caused major issues was the potato. Knowing the plight of the potato farmers in Belize I thought I should support them but also use cocoa yam, cassava, dasheen and sweet potatoes which grow very well here. The potato originally came from South America, taken to Europe where it was viewed with much skepticism, and it has been popularized only in

the past 200 years, becoming a staple comfort food offered in many forms throughout the world. Although the food industry is somewhat trendy and items such as sweet potato fries are currently gracing the tables of North American restaurants, the favourite is still the much-revered potato, mashed or fried. In Belize the demand for the potato has increased with the growth of tourism and people from other counties settling here replacing our daily rice and beans with hamburgers, pizza, pasta, steak and fries. Mostly the potatoes grown locally are smallish red ones with a more yellow type flesh. They are not made into French fries as they are not big enough or mashed as they are not fluffy enough, hence the influx of Mexican imported potatoes and frozen French fries. My customers were hesitant to try breadfruit, yampi, coco and even the red potatoes wondering why we do not have real ones. I was forced to recognize that the potato is, after all, a good source of vitamins C and B6, copper, potassium, manganese and dietary fiber so why not give them what they want?

The other day I was at a farm where someone had a table top of small red sprouted potatoes lying out in the sun. She said that she comes from a rice country and had no idea how to

plant them. I told her that the ground must be turned over to loosen the soil and that commercial growers usually plant 6 inches in the ground, make mounds and do not chit. I then told my friends about the bucket method. My father used to order straw and manure each year for his potatoes until he changed to container gardening which he endorsed as the simplest way to grow for home use. Since this is a lot of fun and has the advantage of being able to produce a high yield in a small space protected from many garden pests, here is how to do it for anyone who has not already tried.

Seek out some good quality seed potatoes, those cultivated to grow, not eat, or just pick out the healthiest ones you can find in the market.

### You will need:

**5 gallon buckets** or sacks or any tallish containers (clean with no chemical residue). You could use a large drum but that will be too heavy to handle at harvesting. Each potato should give 4 chits to be planted; 4 to a bucket produces an average yield of 10 pounds of potatoes.

**A drill, cardboard egg cartons, organic fertilizer, piece of screening, gravel, soil, sheet of cardboard or a tarp.**

### Planting Procedure:

1. Chit your seed potatoes; this is the process of forcing your potatoes to grow shoots in preparation for planting. Potatoes grow from the eyes and each can be a potential stem. Set the potatoes on an egg flat in a airy, dry, bright location like a window sill. They will begin to sprout in a week and in about 4 weeks be about one inch long (2.5cm). They are now ready for you to cut into 4 sections each with a shoot. Return the pieces to the carton and allow the cut surface to dry for about a week. This helps prevent disease. You can also plant the whole potato, one or two to the container.
2. In the meantime prepare your buckets or planters by drilling holes in sides close to the bottom for drainage and some in the sides to allow air.
3. In the bottom of the bucket put a generous layer of gravel then a layer of screen to prevent soil loss.
4. Add 3 inches of soil and compost. Acidic soil is best and can be achieved by adding some pine needles in layers.

*Continued on Page 9*



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## Spud Bucket... Continued From Page 8

5. Carefully plant potato chits on top of soil, **shoots or eye up**. Do not over overcrowd the containers as it will inhibit growth. Potatoes grow on top from the stem not down like other root vegetables. Now again carefully cover with 2-3 inches of soil. Water well.

6. Potatoes like sun and air so place in sunny location away from walls where the container can overheat. In general they do best in cooler climates .

7. Water frequently and use organic fertilizer

8. When new shoots appear again cover with another 3-4 inches of soil. Keep repeating this process until you reach top of bucket. Remember to water.

9. The potato greens continue to shoot up while potatoes are forming. Once the plant has bloomed you can harvest anytime (about 12 weeks) - early for small new potatoes and longer for larger. A good time to harvest is when the plant appears to die off or turn yellow.

10. Now this is the fun part which never fails to excite and delight. Put down a sheet of cardboard or tarp and start to empty the bucket and find the potatoes.

### Cautions:

Do not save this used soil for your garden; put it someplace else for use 2 years later such as long term compost pile or use to fill holes, to be sure it has no blight which can infect plants.

Potatoes are nightshades and contain alkaloids. Cooking reduces this threat and should only be a problem for sensitive individuals. We were brought up to believe that potatoes should not be eaten raw but apparently this is not true and as long as not green they contain more nutrients, have positive effects on the colon and do not increase blood sugar as cooked ones do.

Potato greens are not edible.

Green potatoes are not safe to eat as they contain the toxin *solanine* which affects the nervous system. It is part of the plant's defense mechanism to ward off predators. It forms when the tuber is exposed to too much light or heat during the growing process. So if a potato is green or has a bitter taste do not eat it.

Wash potatoes thoroughly before cooking.

Misuse of chemicals can lead to death and disease.

Save some potatoes for next year.

Spread out to let them dry before storing potatoes in cool dry dark place.

If you grew up in a meat and potatoes society you have probably missed good flavourful potatoes. There is nothing quite like the taste of freshly dug spuds. There are very sound reasons for growing your own potatoes or knowing where they come from and how they were grown. Commercially they are cultivated more often than not with the use of very dangerous agro chemicals and pesticide residues are commonly found on potatoes.

Please take some pictures of your successes, document your experience and send any comments you care to share.

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

## Pasture Planning

By Maruja Vargas

Planning more pasture for next season? The choice of grass to plant depends on the animals you intend to graze there.

For example, the choice for cattle is Brizantha, Humidicola and/or Mombasa. On the other hand, the top choices for horses are Tanzania, new hybrid "Aires" and Mombasa. All of these grasses have their origin in Africa. All have been tried and tested extensively in Belize. All are perennial. (The two legumes mentioned further into this article originate from South America.)

**Bryzantha** (*Brachiaria brizantha*) is highly resistant to pests, particularly grasshoppers and a pasture lasts 5 to 7 years before needing reseeding. It has a high germination rate of approximately 90%. Seeds germinate in 8 days and the pasture is ready for grazing in 8 months. Protein can be 9 to 12% depending on the soil. This grass is suitable for medium to high land.

**Humidicola** (*Brachiaria humidicola*), a close relative to Bryzantha, is the first choice for low land, as it will tolerate long periods of standing water as well as periods of drought. The protein content is on the low side, being 3 to 6%. Palatability also suffers. This grass is frequently managed in tandem with a legume, wherein the legume, such as calopa or arachis pinto (perennial peanut), is planted in a separate pasture. The cattle are then rotated into the legume pasture for one-half day every 2 days of grazing on the humidicola. The germination rate is approximately 65% and period of germination is 3-4 weeks. The upside of this grass is its ability to tolerate lowland standing water conditions, a characteristic unmatched by any other grass.



Humidicola

Continued on Page 14

### HEALTHY PLANTS native foods

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## Fertigation (Fertilization + Irrigation) Workshop

By Dottie Feucht



TAIWAN



The Ministry of Natural Resources and Agriculture (MNRA) in collaboration with the ROC (Taiwan)

Technical Mission (TTM) held a 2-day workshop on 25-26 July on the University of Belize, Central Farm campus, to introduce the efficient and effective application of soluble fertilizer for plant use through irrigation systems. Mr. Melanio Pech, OIC Central Farm, Dr. Wang Tzeng Huoy, Chief of TTM, and Mr. Eugene Waight, Chief Agriculture Officer MNRA, spoke of the importance of the event in their opening remarks. Mr. Ricardo Thompson, Principal Agriculture Officer, NMRA, moderator of the workshop, used the event to express best wishes to retiring Mr. Melanio Pech for his 38 years of service.

In his basic concepts presentation, Mr. Maynor Hernandez, Dir. Research NMRA, categorized elements important to plant growth as *macro* (nitrogen, phosphorus, potassium, calcium, magnesium and sulfur) and *micro* (iron, manganese, zinc copper molybdenum and boron) and stressed that the micro elements should not be overlooked. Other factors to be considered are (1) plants obtain these elements from the soil, crop residues, and other organic additions – not just fertilizer, (2) root hairs (rhizosphere) are involved in the uptake of specific nutrients and water, and affect stress tolerance (heat, moisture) and yield, (3) the capacity to absorb elements also varies considerably by plant type and maturity cycle. However, most plants grow by absorbing nutrients from the soil and their ability to do this depends on the nature of the soil. Mr. Flint Wagner, Agriculture Officer, Belize District, picked up where Mr. Hernandez left off with a lively discussion on soil analysis to determine the nutrients available from the soil and required by external application. Soil pH (a measure of the acidity or alkalinity of the soil) is one of the most important soil properties that affect the availability of nutrients. That is, macronutrients tend to be less available in soils with *low* pH and micronutrients tend to be less available in soils with *high* pH. Lime can be added to the soil to make it less sour (acid) and also supplies calcium and magnesium for plants. Lime also raises the pH to the desired range of 6.0 to 6.5. A soil test can indicate whether lime is needed and, if so, how much to apply. Mr. Wagner's presentation included the formulae to determine the application of lime more precisely based on specific factors, including the amount of aluminum in the soil, for crops common to Belize. His basic formula,

Element =  $\frac{\text{Crop needs} - \text{Amount the soil provides}}{\text{Estimated efficiency of the element}}$

was supported by charts for nutrient requirements for specific crops at various stages of development, nutrient uptake of elements by crop, and efficiency ranges per element.

Mr. Miguel Chang, TTM, presented the basic concepts of fertigation implementation, stressing the importance of a good

design. Some fertilizer materials interact to form insoluble compounds and precipitates. The precipitates tie up the nutrients and make them unavailable to the plant and cause clogging in the irrigation equipment. For example, fertilizers containing calcium must not be mixed with fertilizers containing sulfates or phosphates; incompatible fertilizers must be separated and dissolved in different tanks. Two basic methods of application are: *quantitative* (the amount of fertilizer per acre) and *proportional* (a defined quantity of fertilizer injected into each unit of water flowing through the irrigation system). A bypass fertilizer tank is the simplest way to apply fertilizers through the irrigation water but injection of the fertilizer is not proportional to the water discharge rate. As the dilution ratio and rate of injection are not constant, fertilizer concentration is high at the beginning and decreases as irrigation progresses. In proportional fertigation, fertilizer injectors are used, such as venturi and positive displacement pumps. The total amount of a nutrient applied per unit area can be evaluated by multiplying the concentration of the nutrient in the irrigation water by the total volume of water applied. Fertigation uniformity (better distribution of the nutrients in the root zone and better efficiency) is achieved using fertilizer injectors through proportional fertigation. The length of pipelines are also important. Fertilizers that are injected at the beginning of the line might not reach the emitters if the pipeline is too long; the best practice is to inject fertilizers uniformly throughout the irrigation system.



# Fertilizer Function

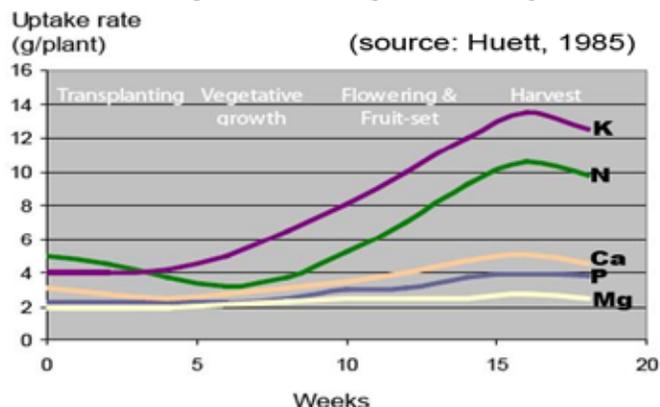
Summary of main functions of plant nutrients:

Nutrient	Functions
Nitrogen (N)	Synthesis of proteins (growth and yield).
Phosphorus (P)	Cellular division and formation of energetic structures.
Potassium (K)	Transport of sugars, stomata control, cofactor of many enzymes, reduces susceptibility to plant
Calcium (Ca)	A major building block in cell walls, and reduces susceptibility to diseases.
Sulphur (S)	Synthesis of essential amino acids cystin and methionine.
Magnesium (Mg)	Central part of chlorophyll molecule.
Iron (Fe)	Chlorophyll synthesis.
Manganese (Mn)	Necessary in the photosynthesis process.
Baron (B)	Formation of cell wall. Germination and elongation of pollen tube. Participates in the metabolism and transport of sugars.
Zinc (Zn)	Auxins synthesis.
Copper (Cu)	Influences in the metabolism of nitrogen and carbohydrates.
Molybdenum (Mo)	Component of nitrate-reductase and nitrogenase enzymes.



## Nutrient Uptake

The uptake dynamics of the macro- and the secondary nutrients by a tomato plant



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## Increasing Yields With Sulfur By Cory Schurman, Sr. Agronomy Manager, Agro-Culture Liquid Fertilizers

Sulfur deficiencies are becoming common throughout the world. The primary reason is that in the past, soils received 15-25 pounds of sulfur (S) per acre, per year from emissions from the burning of coal, and from sulfur dioxide emissions in fuels. Now with coal plants having scrubbers, and with the use of lower sulfur fuels, and overall concern for environmental quality world-wide, growers are typically now getting much less sulfur in a year on each acre. At the same time yield levels have risen, increasing the need for sulfur, so growers are seeing increasing shortages of this secondary nutrient.



The following is a list of the roles sulfur plays in plant growth and production.

1. Helps develop enzymes and vitamins in the plant.
2. Promotes nodulation for nitrogen fixation in legumes.
3. Aids in seed production.
4. Is necessary for chlorophyll formation in the plant.
5. Supports the conversion of nitrate to amino acids making it a constituent of protein.
6. Greatly helps maintain a proper balance with other nutrients in the soil.
7. Aids with the formation and decomposition of organic matter. In the soil a large percentage of the available sulfur is contained in the organic matter.
8. Synthesizes glucose.
9. Assimilates carbon dioxide.
10. Results in N<sub>2</sub> fixation.

Because in most crops nitrogen deficiency and sulfur deficiency can appear very much the same, it is important to know the visual differences so growers can determine the real concern. In plant growth sulfur is not mobile, so yellowing and deficiencies occur on the new growth. Nitrogen, because of its mobility in the plant, shows yellowing and deficiencies on older growth. So corn yellowing in the upper leaves is typically associated with a sulfur deficiency and yellowing in the lower leaves, with nitrogen deficiency.

Soil types influence the availability of sulfur. Sandy soils are more prone to leaching, but do not require a large quantity of sulfur for a yield response, due to the less concentration of all the nutrients in sandy soils. Clay soils bind sulfur, making it less available, but also leave it much less prone to leaching. Clay soils usually require higher amounts of sulfur to be applied for a yield response, due to higher concentrations of the all the nutrients in clay soils.

In some recent plant growth studies sulfur has been shown to be equally important to plant growth as phosphorus. Grass crops like corn and wheat require one part sulfur for every 14 parts nitrogen, while legume crops like soybeans and alfalfa require one part sulfur for 10 parts of nitrogen.

This chart that follows; from the International Plant Nutrition Institute (IPNI), shows the amounts of secondary nutrients required by some crops.

Agro-Culture Liquid has several options for growers to supply the necessary sulfur to their crops.

eNhance, is a nitrogen additive that is 8.7% sulfur, which research has shown to be very effective in making nitrogen more useable. Due to its low salt characteristics eNhance has

also been shown to be very effective at supplying sulfur in the band or furrow with P&K blends giving crops a banded, readily available source of sulfur for the crop.

access is a 17% sulfur product which works excellently when added to nitrogen solutions for the grower who needs to supply his crop with larger amounts of sulfur. This product is typically used in lower pH soils.

S-Calate is a 14% sulfur product with 1% calcium which works excellently when added to nitrogen solutions for the grower who needs to supply both sulfur and calcium in combination. This product works well to supply the needed nutrients in lower pH soils.

Many years of research have been done to show the benefits of adding sulfur to nutrient blends. Visit with your Agro-Culture Liquid representative David Thiessen from Spanish Lookout today and see about your options for your crop.

**Editor's Note:** Mr. Cory Schurman, the author of this article has visited Belize many times since the start-up of Thiessen's Liquid Fertilizer, a distributor for Agro-Culture Liquid Fertilizers in the USA. His visits usually entail many presentations as well as consultations with commercial farmers. Thanks, Cory!

Cover Photo: That's Cory on the left ad David Thiesen on the right.

Calcium, Magnesium and Sulfur Taken Up by Some Common Crops

Crop	Yield level	lb in total crop		
		Ca*	Mg	S
Alfalfa	8 tons	175	40	40
Coastal bermudagrass	8 tons	52	26	44
Corn	160 bu	39	52	27
Cotton (lint)	1,000 lb	14	23	20
Oranges	540 cwt	80	22	—
Soybeans	60 bu	26	24	20
Wheat	60 bu	16	18	15

\* Estimated



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## BEL-CAR Updates

### Corn



Corn harvest for the greater Spanish Lookout area growers is in full swing with approximately 800 to 1,200 more acres having been planted than last year. More acreage was anticipated; however there were adverse weather conditions at planting time.

The yield projections are being watched closely, with regards to soil types. Usually the red type soil yields more per acre than the black dirt. This year it appears that corn planted in the black dirt may yield more. About one third of the overall Spanish Lookout corn is planted on black soil, and this harvest is almost done. Farmers are now watching the harvest yield of the corn planted in red soil, which is easier to work as it is more sandy. Harvest began in the last week of August, and when the harvest finishes the end of November, we will see which soil type yielded better.

Between 70 to 80 Million lbs of corn are expected to be harvested from all of Cayo District this season, and stored at bins including Spanish Lookout feed mills and Banana Bank. The effects of the U.S. drought has increased our local price, and has encouraged our Guatemalan neighbors to do some corn shopping here. The Guatemalan market has always been unpredictable and somewhat volatile, as many factors including the Chicago Board prices affect their purchases. Also, the majority of Guatemala's consumption is white corn. When that runs out for them they turn to good dark yellow for their tortillas. Another factor which may affect prices in both North America and here is any change in bio-fuel policy in the USA.

### Red Kidney (RK) Beans



Action is underway to create quality standards for RK beans for the Caribbean. Belize instigated this action, which is headed by the Council for Trade and Economic Development (COTED). Twice a year meetings are held, usually in Guyana, to address this. There appears to be some kind of prejudice against purchasing Belizean RK beans within the Caribbean. As is the case with many manufactured goods, there seems to be a preferential feeling towards things from the USA. Currently there is a permit situation, which allows other Caribbean countries to purchase beans from external sources (USA) without the 40% tariff on them, **if we run out**. However, some feel that this regulation has been manipulated to Belize's disadvantage. Belize is pushing to encourage finishing the standards process which has been in the works for nearly a decade. There is a bean quality laboratory in Belize, which is run by Caribbean Agricultural Research & Development Institute (CARDI). Bel-Car assisted the government of Belize (GOB) by loaning Belize Agricultural Health Authority (BAHA)/CARDI the funds to set up the bean lab. Repayment is being made to Bel-Car via discounted inspection fees being made for services to Bel-Car until the loan is paid.

Overall the planting trend for RK's has been in decline in the last 5 years but as the black eye peas have been challenged by fungus issues, there has been a trend to increase RK's again during the last 2 seasons. This year, for the first time ever, Belize exported RK beans into the USA (two containers, approximately 40k lbs per container).

### Black Eye Beans



Last year the black eye crop had difficulties due to bad rains. The new black eye crop, due to be planted in November, is not anticipated to increase; however there are hopes for a higher yield. Last year there were 5 M lbs of black eyes harvested in the Greater Spanish Lookout community.



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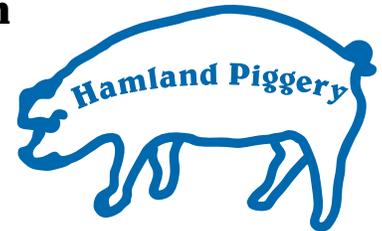
#### PLANT LOCATION:

Route 20 East  
Spanish Lookout,  
Cayo District, Belize



## Ernie Thiessen

**Spanish Lookout  
Cayo District  
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### New Bean Cleaning Equipment

The management of Bel-Car is anxiously awaiting the arrival of some new bean cleaning equipment which will remove dirt balls and discolored /damaged beans, increasing the quality and grade. The color sorter, which required an investment of approximately \$750K BZ, is made in Japan by Satake Corp. but assembled in the USA. They anticipate that it will be ready to work when the bean harvest begins this winter.

**Article based on an interview with CEO Otto Freisen and Paul Penner of BEL-CAR and reported by Beth Roberson**

**Pasture Planning... Continued From Page 9**

**Mombasa** (*Panicum maximum* cv. *Mombasa*) is the first choice for dairy and requires medium to high land. It will not tolerate standing water. This is a very viral grass. It germinates in 5 days with approximately 90% germination rate. It is also the fastest growing grass of the three, and can be ready for grazing as soon as two and one-half months after seeding. Its protein content is as high as 16%, which is comparable to alfalfa. These pastures need to be rejuvenated every 5 years for optimum performance.



**Mombasa**

The first choice for horses is **Tanzania** (*Panicum maximum* cv. *Tanzania*). It is very comparable to Mombasa in digestibility, palatability, protein content, growth habit and forage production. Tanzania can also be baled for hay. It is ready for grazing as soon as two and a half months after seeding. Management is important with panicum grasses. To maintain protein content, the height of the grass should be maintained between one and two feet. If grazed too low, or allowed to top out at five to six feet, these two conditions will degrade the protein content of the pasture. The grass is also suitable for dairy given the protein content.



**Tanzania**

Mombasa is frequently used to graze horses as well.

**“Aires”** (*Panicum maximum* cv. *Aruana* x *Panicum maximum* cv. *Centauro*), a relatively new, patented hybrid grass, is gaining popularity with the horsemen in Cayo. Its main characteristic is its re-growth capacity after grazing. It is drought resistant, highly digestible and highly palatable. Its protein content ranges from 10 to 15% depending upon soil conditions. This grass is related to Tanzania and Mombasa.



**Aires**

Most grasses can be intercropped with legumes, not only to increase the protein value of the pasture, but to amend and sustain the health of the soil upon which the grass grows, thereby extending the life of the pasture between reseeding cycles. Check carefully with the seed supplier as to the compatibility of a selected legume to the grass seed that you might wish to augment.

Seeding of grass is completed just prior to the start of the rainy season. Large areas can be economically seeded by plane. Older pastures are best disced prior to reseeding to aerate the soil after years of animal traffic that compacts the soil. Some farmers also disc pastures every several years for the same benefit, i.e. to aerate the soil for enhanced grass growth and extended pasture life.

All of the above grass seed is available from MidWest Steel in Spanish Lookout. Midwest Steel also maintains a number of 1000 square foot test plots of all of these grasses plus many others. If you wish to view any of these grasses at the test site, you may contact Carlos Herrera in the agricultural building at the MidWest Steel location in Spanish Lookout across from ESSO gas station and Crossroads Farm Supplies. He will also be able to give you the seeding rate per acre or hectare for any of these grasses.



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## Making Cocoa Powder in Belize

By Kerry Goss of Goss Chocolate, Placencia

The cacao bean contains about fifty percent fat. This fat, called cocoa butter is used to make chocolate as well as many other products, especially cosmetics such as make-up and hand and body lotions. It is prized for these uses because, unlike most edible fats, it never spoils or goes rancid at room temperature. To make cocoa powder, most of this fat must be removed from the cacao.



Coenraad Van Houten invented the cocoa butter press in 1828. Until then it was impossible to make chocolate as we know it. His machine used heat and pressure to squeeze some of the cocoa butter out of the cocoa. It also made the drink cocoa more palatable by removing much of the fat. Before the cocoa press, chocolate was mostly used to make a drink something like our hot chocolate. It was much more fatty though, with a layer of melted fat floating on top. After the fat was removed it made



a milder drink that was cheaper, and the powdered cocoa mixed much more easily with milk or water. To make modern cocoa powder, the fermented and dried beans are cleaned and inspected for quality. Then they are roasted to bring out the flavor. The beans are then cracked and winnowed to remove the shell of the bean. The clean pieces of cacao bean are called nibs. These nibs

are then ground very fine until they turn into a liquid called chocolate liquor. Steel roller mills are used commercially to mill the nibs but here in Belize the scale of a roller mill is too large for our needs. At Goss Chocolate we use granite mill stones to mill the liquor. The size of the particles of bean are reduced to no more than 15 microns. A micron is one millionth of an inch. The particles are so small you cannot feel them on your tongue. The liquor is pressed through a filter to remove most of the cocoa butter. Like Van Houten we use heat and pressure (twenty tons) to squeeze the cocoa butter out of the liquor. The cocoa left behind after removing the butter is called cocoa cake. This is what cocoa powder is made of. The cocoa cake is ground and sifted by machine to make a very fine powder, which contains the healthiest parts of the cocoa including many minerals, vitamins, protein, and healthy bioflavonoids that can reduce blood pressure and blood sugar. They also make you feel good due to the flavor which releases natural endorphins and theobromine which is a substance that acts like caffeine. Most commercial cocoa is made from bulk African beans. Because Belize produces some of the best flavor beans in the world, our cocoa is tastier than commercial cocoa.



## Potato Storage Using Rice Hulls

By Dottie Feucht

Potatoes to be stored for long periods of time need to be in a cool, dark place. Light makes them sprout. What better way than packing them in rice hulls in holes in the ground or large containers! Ervin Plett, general manager at Country Foods, says that it is common practice among families in Spanish Lookout. Rice hulls may be agricultural waste material for some processes, such as polishing rice, but they are very useful for other purposes such as storing potatoes or onions. Rice hulls contain approximately 20% opaline silica in combination with a large amount of the phenyl propanoid structural polymer called lignin. Anyone who has ever tried to burn rice hulls knows how they do not easily and cleanly burn. The bulk density of loose rice hulls is similar to that of baled straw; air cannot flow freely through a pile of rice hulls to provide the oxygen needed to sustain rapid combustion. But that property makes them perfect insulation for storing potatoes and onions. The additional properties that make them excellent for preserving raw potatoes and onions are (1) they are highly resistant to moisture penetration and fungal decomposition, (2) they do not transfer heat very well, (3) they do not smell or emit gases and (4) they are not corrosive to aluminum, copper, or steel.



Studies done on rice hulls by R & D Services in TN show that at 90% relative humidity, the equilibrium moisture content of rice hulls remains at or below 15%, the same as at 50% humidity. Since the rice hull is hard and yet elastic, it resists settling and compression far better than shredded newspapers, another common method for storing potatoes.

The hull represents on average about 20% of the rough harvested weight of rice; so rice polishing companies in Belize generate plenty of hulls. According to Mr. Plett, Country Foods, alone, distributed approximately 800,000 pounds of rice in 2011; that means 160,000 pounds of rice hulls. So if you have a large crop of potatoes to store, go check out the nearest rice polishing company for hulls.



Exactly what is a "rainy day"? There appears to be no such thing as "exact". In the UK and the US anything over .01 inch ( 0.254mm ) is considered a rainy day. In many other countries, including Belize, .0039 inch (0.1 mm) is considered a rainy day. Just remember: when it's humid and you collect over .1 mm water in a rain gauge from condensation dripping off a roof that's not really a rainy day. Maybe .254 mm is a better standard for a "rainy day".

If you want to know how much water your acre of crop received from a rainfall, the accurate measurement is 1.0 mm = 4046.8 liters per acre.

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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 days (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	1.50 - 1.55	1.40 - 1.50		Belize yellow corn	H	.29 - .30	.28 - .29	
Cows & heifers for butcher	H	1.25 - 1.30	(thin)1.15 - 1.25		White Corn	H	.29 - .30	.28 - .29	
Heifers for breeding 500-800 lbs	H	1.25 - 1.30	1.15 - 1.25		Com/ local retail (low volume)	H	.34 - .40	.32 - .34	
Young grass cattle- 350- 650 lbs	H	1.25 - 1.35	1.15 - 1.25		U.S corn @ 7.66-per 56 lb bushel	L	\$27.35/ BZ 100#+10¢ frt. to BZ		
<b>U.S. Cattle</b>					U.S soy beans-16.70per 60lb/bush	H	55.60/BZ/per100+10¢ frt. to Bz		
U.S price -corn fed- 1000- 1200 lbs	H	1.26-US=2.52-Bz			Guatemala corn price/Peten	S	.35 - .38	.33 - .35	
U.S price - feeders 600- 800 lbs	H	1.47-US=2.94-Bz			Belize milo	H	.24 - .27	.23 - .24	
U.S price- calves 450- 600 lbs	L	1.65-US=3.30-Bz							
U.S price- aged butcher cows	H	1.00-US=2.00-Bz			R-K's, little reds & blacks (beans)	S	.85- 1.00 farm price		
<b>Belize Hogs</b>					Black eyed peas	S	.90- 1.00 farm price		
Weiner pigs- 25 -30 lbs- by the head	S	\$95.00 - \$100.00			Milled retail rice per pound	S	.87- .88 farm price		
Butcher pigs 160 - 230 lbs	S	1.80 - 1.85	1.75 - 1.80		<b>Citrus</b>				
<b>Belize Sheep</b>					Oranges per 90 lb box-lb.solid basis	S	\$14.25 Est. 2012 price		
Butcher lambs	S	2.00 - 2.25	1.75- 2.00		Grapefruit- per 90 lb box	S	\$ 6.50 Est. 2012 price		
Mature ewes	S	1.70 - 1.75	1.60 - 1.70		<b>Sugar</b>				
<b>Belize Chickens</b>					White sugar- 112 lbs- controlled	S	.45 per bag + 3-5 cent mark up		
Broilers- live per lb	S	1.22 - 1.24	1.21 - 1.22		Brown sugar- 112 lbs- controlled	S	.39 per bag + 3-5 cent mark up		
Spent hens	S	.70 - .72	.68 - .70		<b>Special Farm Items</b>				
<b>Fruits &amp; Vegetables</b>					Eggs- tray of 30 eggs	S	5.00 farm- retail .25 per egg		
Tomatoes, cabbages, cucumbers	S	whosal/75-1.75-ret-\$1.00-\$2.50			WD Milk per lb to farmer	S	contract .50 & non contract .35		
Local 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:** The bible says in Proverbs 29:18 “ Where there is no vision the people perish...” . Belizeans in agriculture have every reason to have hope. We are getting record prices for cattle, record corn crops are looming on the horizon - 20,000 acres of sugar cane and a factory are being discussed in the Cayo District. We thank God most of all for almost perfect weather.” Please stay away Mr. Hurricane”. The main corn harvest will be done by October 15th. We expect increased production in the export oriented crops. Hopefully a food canning or processing unit for smaller vegetable and fruit growers will happen in the future. We continue to pray that a positive moral, criminal, and justice system will permeate our country, so we can feel safe as we work and enjoy this beautiful country of Belize--It is hard to really celebrate and feel September 21 as Independence Day when we move around with a certain feeling of fear. All the Best- **John Carr**

## Light Rein Vaccines...

By Marjie Olson

In the U.S. it's easy to vaccinate any animal you have. Or yourself for that matter. Here in Belize vaccines are often hard to find, or are expired, and when you own several or many horses, can be very costly...

There are many vaccines on the market and most are considered a necessary evil. Encephalomyelitis - Standard -Eastern-Western-Venezuelan (transferred by mosquito/blood), influenzas (infected by inhaling the Influenza A virus that is shed by infected, coughing horses or via equipment), Rhinoneumonitis-Herpes virus or EHV (transmitted by direct or indirect contact with infectious nasal discharge), tetanus (acquired from anaerobic bacterium commonly present in soil; 50-75% death rate of infected horses), rabies (100% fatal, 100% preventable-bite or saliva transfer to open area), strangles (highly contagious with any contact of an infected horse), West Nile (blood transfer), Rotavirus A (severe deadly diarrhea in foals, fecal-oral route, vaccine for pregnant mares for passive transfer of antibodies), botulism (another soil dwelling bacteria), Potomac (flukes from snails), viral areteritis (venereal disease). All are available from different companies, all recommended if your horse lives in an area where the nasty bug has been around or your horse travels to attend events which house a large number of equine from all over the country.

Here in Belize, many of the killer diseases are not a worry; they have not been brought in, *but that does not mean they couldn't be*. This country never had equine infectious anemia (EIA), also known as coggins or swamp fever, until a few years ago, when some thoughtless person brought horses in illegally and without any testing... BINGO! At least one horse with the disease has now infected clean BZ horses; and there is **no** vaccine for EIA. An infected horse will be a carrier even if he survives the illness itself...and it is often a deadly game.

It must be understood that all vaccines need a "primary series" before an annual booster will be enough, meaning that from weanling, the vaccine is given in a series of spaced out shots, usually starting around 3-4 months and then every 3-4 months for a series of 3 shots. Once the primary has been administered (and remember that older horses still need a series the first year given), now it can be a once-a-year thing for some vaccines and up to quarterly for other vaccines if those horses are traveling and coming into contact with other equine. Risk factors need to be determined to decide whether once a year is enough or every three to four months.

Rhinoneumonitis needs to be administered every 5-7-9 months for pregnant mares, Rotavirus A at 8-9-10 gestation points.

Another thing to consider for foals to yearlings, is if the dam was vaccinated during the pregnancy which will help the foals immune system and may allow for one less in the series.



If you live in an endemic area, then boosters may be a smart way to go...

**Rabies and tetanus are the two most needed vaccines** here in country with **EEE-WEE-VEZ Encephalomyelitis following a close third**. How often is there hidden barb wire, rusted from the elements, but hidden from the enveloping mass the jungle has produced? Or the old machete now jagged and rusted and precariously abandoned? With tetanus virus living in the ground it is so easy for a horse to become infected with any open wound/puncture. Many fox, bats, opossum and coon wander our horses' areas, and we have had horses die in the past 12 months due to a Venezuelan Enceph outbreak.

A reminder: **do not use modified live virus** for rabies and remember it's double dose for a horse compared to a dog. Tetanus is not like a human's vaccine where it can be done every three to seven years; it needs to be done annually after the initial series and if a puncture/wound happens a booster should be given at that time as well.

Please realize this is just a "tip of the vaccine iceberg", discussed in general terms. Each vaccine needs to be evaluated and directions followed by a veterinarian, for specifics in the series time frame and what is recommended for your area.

Always use a clean needle and syringe for each injection!!! Do not mix different vaccines in one syringe. The few extra cents it would cost for those precautions could stop an epidemic from scouring our beautiful country. If you are doing multiple vaccines at once, rotate the sites but better yet, split them up over a week so the horse does not get sore or have an injection site reaction which could lead him to becoming hard to handle for the next vaccine.

"Never sell your saddle, cause life's a long, long ride"

*Marjie J. Olson, Light Rein Farm, Cayo, Belize*

### NBHA BELIZE RESULTS SEPT 1<sup>st</sup> 2012



We had an amazing show on September 1<sup>st</sup>! After rescheduling from our original date of August 25<sup>th</sup>, we had a great turnout and wonderful weather. A **huge thank you** to Vicky Coverdale and Maruja Vargas as they are always such great help and a thank you to Michelle Leonard for doing a great announcing job. The Barn and Grill served up awesome food and everyone had a great time. If you haven't been to one of our events, you need to come by; it's a great family entertainment day.

OPEN NBHA BARRELS: 22 entries

OPEN 1D: Stephawn Scott 17:438 Marjie Olson 17:908  
Sherman H Fuentes 17:933 Sherman H Fuentes 18:077  
Stephawn Scott 18:150

*Continued on Page 19*

Marjie Olson has brought

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**NBHA Results.... Continued from Page 18**



**OPEN 2D:** Stephawn Scott 18:477  
Estuardo Alvarado 18:503 Tre Roberson 18:559  
Isaiah Reyes 18:942 Valerie Thiessen 19:028

**OPEN 3D:** Cuatro Neufeld 19:944 Katherine Roberson 20:209  
Joseph Cadle 21:314 Joezane Vasquez 21:869 Abigail Coverdale 23:418  
Jorde Usher 25:156 Amberly Reimer 29:976 Peyton Gentry 31:835

**NO TIME:** Hugh Middleton Joel Neal Marlon Lobo Cesar Xi  
**NBHA YOUTH/TEEN BARRELS:** 21 Entries

**TEEN 1D:** Sherman H Fuentes 17:281 Hugh Middleton 18:060

**TEEN 2D:** Estuardo Alvarado 18:422 Katherine Roberson 18:691  
Marlon Lobo 18:902

**TEEN 3D:** Valerie Thiessen 19:505 Jozane Vasquez 20:000

Jessica Leonard 20:337 Dennis Alvarado 21:070  
Joseph Cadle 21:285 Katherine Roberson 21:682

Jorde Usher 22:909 Abigail Coverdale 24:403

**YOUTH 1D:** Isaiah Reyes 17:851

**YOUTH 2D:** N/A

**YOUTH 3D:** Sydney Remple 26:114 Amberly Reimer 29:611  
Peyton Gentry 30:564 Peyton Gentry 31:427 Sydney Remple 44:424

**NO TIMES:** Joel Neal Abigail Coverdale

**2D POLES:** 23 entries: **1D** Marjie Olson 27:730  
Amir Rodriguez 27:910 Amir Rodriguez 29:166

**2D** Cesar Xi 29:816 Cuatro Neufeld 30:165 Estuardo Alvarado 32:326  
Valerie Thiessen 33:193 Jorde Usher 33:265 Isaiah Reyes 34:709

Jozane Vasquez 35:608 Dennis Alvarado 37:051 Sydney Remple 38:406  
Abigail Coverdale 44:358 Amberly Reimer 66:217

\*\*\*\*\*

**NBHA BELIZE POINTS THRU SEPT 1<sup>ST</sup> 2012**  
4 SHOWS TO GO TO FINAL POINTS FOR CHAMPIONS

**OPEN 1D:** Marjie Olson 21, Sherman Herrera Fuentes 12,  
Estuardo Alvarado 9, Tre Roberson 8, Stephawn Scott 5,  
Assad Bedran 3, John Carr 3, Valerie Thiessen 1

**OPEN 2D:** Stephawn Scott 19, Marjie Olson 14, Hugh Milton  
5, Amir Rodriguez 4, Valerie Thiessen 4, Estuardo Alvarado 4,  
Tre Roberson 3, Isaiah Reyes 2

**OPEN 3D:** Jozane Vasquez 10, Katherine Roberson 9, Marjie Olson 9,  
Valerie Thiessen 8, Philip Wilson 8, Keenan August 6,  
Cuatro Neufeld 5, Santiago Juan 5, Abigail Coverdale 4,  
Tre Roberson 3, Amir Rodriguez 3, Joseph Cadle 3

**TEEN 1D:** Estuardo Alvarado 13, Hugh Milton 9, Sherman H Fuentes 9,  
Denzel Wagner 5, Valerie Thiessen 4, Joel Neal 4, Dennis Alvarado 1

**TEEN 2D:** Estuardo Alvarado 10, Abigail Coverdale 5, Joel Smith 5,  
Valerie Thiessen 5, Jozane Vasquez 4, Katherine Roberson 4, Denzel Wagner 4

**TEEN 3D:** Abigail Coverdale 14, Dennis Alvarado 10,  
Valerie Thiessen 10, Jozane Vasquez 8, Jessica Leonard 7,  
Katherine Roberson 5, Joseph Cadle 1

**YOUTH 1D:** Isaiah Reyes 5

**YOUTH 2D:** N/A

**YOUTH 3D:** Sydney Remple 14, Amberly Reimer 11, Chase Harsta 8,  
Logan Harsta 8, Peyton Gentry 6, Isaiah Reyes 5, Jacob Wilson 5,  
Daniel Wilson 3

**2D POLES:**

**1D:** Amir Rodriguez 14, Marjie Olson 9, Hugh Middleton 5,  
Sherman H Fuentes 4, Denzel Wagner 3

**2D:** Estuardo Alvarado 8, Sherman H Fuentes 5, Jozane Vasquez 5,  
Katherine Roberson 5, Cesar Xi 5, Stephawn Scott 4, Joel Neal 4,  
Dennis Alvarado 4, Jennifer Hartsa 4, Isaiah Reyes 4,  
Cuatro Neufeld 4, Valerie Thiessen 2, Sydney Remple 2,  
Keenan August 2, Jessica Leonard 1, Abigail Coverdale 1

The remaining show dates are Saturday, October 27<sup>th</sup> and Sunday,  
November 25<sup>th</sup> and the final date tentatively a Saturday, Dec 15<sup>th</sup> ...  
Points are tight and the Buckle Chase is heating up.



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## RAISING SHEEP IN CAYO, BELIZE

By Jerry B. Stevens

Eighteen years ago, there were few sheep in Belize. The price hovered around \$5 to \$10 per animal. People would butcher one for BBQ for a special occasion: a wedding, going-away or birthday party; it was not a usual thing. Farms had them and the fact that they survived without care proved they were hardy. They look like goats with no consistent color pattern. The difference is that the goat tail stands up while that of a sheep hangs down.



By carefully looking at sheep as I traveled around Belize I noticed hints of several breeds of sheep mixed in most animals but all had one distinct feature; they were hair sheep. Some had small patches of wool, which made them look shabby. None of the sheep I saw were heavy bodied animals like those seen in European and American breeds. They were cervine or deer-like in body type plus their behavior was deer-like. They could run fast and jump about.

The base breeds were Barbados Black Belly, Pelibuey, and Dorper, representing Barbados, Cuba and South Africa, respectively. There are other breeds of hair sheep but not in Belize. One of them is Kathadin. This is an unusual hair sheep. A breeder in Maine, the most northeast State in the United States, developed Kathadins from a hair sheep crossed with wool sheep and eliminated all lambs that had wool until they bred true. The hair sheep used in the cross was St Croix, a breed we do not have in Belize.

As a hobby, I started raising sheep by buying several ewes and one ram that looked like Barbados Black Belly (BBB) to help me clear land. Because there was no such thing as a pure bred BBB sheep in Belize, I decided to try to recover their genes. Color pattern and head shape seen in the crossbred sheep strongly resembled Black Bellies. Another trait common to Black Bellies was that they often had horns. Because of all of these things, the breed seemed like a good place to start the recovery program. In addition to appearance, the BBB sheep tolerated heat well and were pretty much tick-resistant. In fact, if they got sick one of the first signs we noticed was ticks in their ears.

As an aside, BBBs browse, that is eat leaves, and twigs, and grass. They did a great job of eating down nine years of growth to

manageable levels for chopping. What cattlemen say about cattle eating pasture down to the dirt is not any truer of cattle than it is of sheep. If you over stock and graze one pasture excessively they both will destroy it.

I chose to use an intense breeding program. The people who designed the system named the breeding system 'pulse breeding'. It takes five months for a sheep to have lambs. Based on a heat cycle every 13 to 19 days, one month with the ram usually resulted in near 100% pregnancy rate. In a pasture situation, one ram is all that is need for 30 or 35 ewes. In a stable situation, the number of ewes per ram can go higher. After five months, lambs were born. I kept the lambs with the ewes for three months. After three months, all of the lambs were eating grass. After that, I reintroduced the ram, to start the next cycle. Therefore, the cycle was 8 months long, which resulted in three "lambings" in two years. Productivity was about 1.8 lambs per ewe per lambing. A real advantage of this system is that my shepherd had to spend only a short lambing season in the field picking up and burying placentas. If you keep the pastures clean, the vulture problem, which can get out of hand quickly, is minimized. You cannot get rid of them completely but you can hold their populations down.

Another advantage of the pulse breeding system was we could take better care of newborn lambs and see that lambs nurse early to get the mother's antibody. Unfortunately, some ewes were bad mothers, especially at the first lambing. The shepherd had to restrain the ewe until the lamb nursed for about two or three days. I never did much milk replacer feeding because of the high cost of dried milk. I selected for ewes that had two lambs. The original ewes were having three and four, rarely five, lambs. Lambs from multiple births were small and often did not survive because they weighed in at about 2 pounds or less. In contrast, normal birth weight for single and twin lambs was around 6 pounds.

I culled lambs based on phenotype (what they looked like) because I was not in the meat production business: color patterns, head shape, cervine character, straight legs, and without horns (polled lambs) among other things. If I had been strictly in meat production, I would have selected for stockier, meaty animals. At first, the cull rate was over 85% but fell to about 15%; it took 16 years to get to that level of genetic purity. It is true that I was not as fussy at first because if I had been, there would not be any lambs left. As time went on, I became fussier. Only getting to 15% is a nice way of saying I never achieved my goal. The problem was that there were no pure bred rams, which would have been a big help. I went to Tizimin, Mexico but could find none; not even one.

*Continued on page 25*

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## Apples of Belize: Featuring the Velvet Apple and the Red Custard Apple

By Mary Susan Loan of Cristo Rey Village

Generally apples are considered a fruit that grows in the land of four seasons, not in a tropical environment. Belize and other Central American countries are also "apple" producing countries. Apple varieties in Belize include: Malley Apple, Custard Apple, Rose Apple, Velvet Apple, green and purple Star Apples, Wax Apple as well as classic Red and Yellow Apples. This article will feature the Velvet Apple and Custard Apple varieties.

### Velvet Apple

The Velvet apple (*Diaspyros blancoi*), known also as Mabolo apple, Kamagong or Peach Bloom, is a relative to the persimmon and is a genus ebony tree and grows well in tropical settings and near evergreen forests. Velvet apples are botanically not true apples, but are widely recognized as an apple variety. They are actually a rare, minor tropical fruit. Velvet apple trees are very productive, useful and attractive with many natural benefits from the shade, delicious fruits, leaves, branches, bark and durable wood.

Velvet apples are native to the Philippines. Trees are propagated by seed or grafting. Trees started from seed bear fruit in approximately six to seven years while trees grown from grafts produce fruit in three to four years. The fruits look similar to peaches with their velvety reddish orange skins. The fuzzy skins are initially a reddish brown rusty color then turn pale orangey red when ripe. The fruit under the peel is usually white in color with a mild, sweet, delicate, dense, smooth creamy, but, mealy texture which has been described as "a sort of apple pear banana taste". Each fruit contains from about four to eight black seeds; each seed is approximately one inch long. Seedless varieties of the Velvet apple exist, but are rare. A unique feature of the Velvet apple is the aroma the fruit produces, a sort of odd strong 'cheesy' odor. A few hours of refrigeration is said to dissipate any negative smell. The fuzzy skin is not easily eaten. Some believe that once the fuzz is wiped away the skin may be consumed.

Trees produce attractive foliage and showy dark green four-to-ten inch long leaves with a silvery underside. Velvet apple trees grow to be from sixty to one hundred feet tall and are drought resistant. The dark colored wood is extremely dense and hard. The wood is used for making fine furniture, durable

kitchen utensils, jewelry, black piano keys, and martial training implements.

In Belize, Velvet apple trees produce fruits June through August. The fruits do not have a long shelf life and are quite perishable and bruise easily. The fruit is slow to discolor. Surprisingly, many residents of the Cayo area are not familiar with the Velvet apple and it is not openly available in the market. It is often grown in backyard gardens where they make an excellent attractive fruit-producing shade tree.

Velvet apples are high in fiber, are said to increase endurance, as they are low on the glycemic scale, improve digestion, help smooth skin, and contain significant levels of iron, calcium and vitamin B complex and antioxidants. Velvet apples are used to treat diarrhea and dysentery by extracting the astringent juice from the unripe fruits. The bark of Velvet apples is used as a cleanser and eyewash when boiled and cooled. Velvet apples are also used as a treatment for spider and snakebites as well as cardiac distress and hypertension.

### Custard Apple

The Custard apple (*Annona reticula*) also known as ice cream fruit, Cherimoya, Anona roja, in Spanish, Tsu-jpux or Oop in Mayan, was described by author Mark Twain as "the most delicious fruit known to man". The Custard apple is not a true botanical apple, but a tropical fruit referred to as an apple. The Custard apple is believed to be a native tree of the West Indies which spread centuries ago to Central America and the Caribbean where trees are widely cultivated with some wild native varieties growing in undisturbed tropical areas.

Continued on page 26

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## Wild Edibles of Belize Part 2

### *Hamelia patens*

**Common Names: Red Head, Firebush**

**By Dr Mandy Tsang, BMChB, DRCOG**

As I was driving through San Pedro Columbia Village in the Toledo District I could not help but notice the distinctive flame-red colours of this plant growing in abundance by the roadside. Every opportunity is a foraging opportunity and I have no qualms about stopping the car to note the huge amount of foraging material and to pick some edible berries to eat. This tree comes up in the wild in roadsides, abandoned lots and secondary bush. It is a semi-woody shrub which grows to about 3 metres in height, with tubular orange and red flowers. The leaves are elliptical in shape growing to about 15cm, with red veins and a grey-coloured underside. The edible berries mature from green-yellow to red and finally to black. This tree is from the coffee family, Rubiaceae, and the berries have a very interesting flavour, reminiscent of coffee with a tannic quality. The taste of the berry is not sweet as you would assume, but actually has a mildly unobjectionable bitter and medicinal taste. It requires acquired taste, experimentation and a little bit of imagination to tweak the berry into a tasty edible. Rather than being intimidated by the unfamiliarity of the taste, meet it as a challenge.



I am already familiar with this tree since I have several clumps of it growing on my farm but I did not think it would hurt to discover other locations of this interesting edible as a 'back-up stash' so to speak. The berries are favoured by many birds, so you have to keep an eye on your plant to harvest the berries; otherwise you may conclude that your plant never bears fruit. Hummingbirds are attracted to the flowers of the plant. Aside from the edible use, the plant is actually better known for its medicinal value. The flowers, leaves and stems are boiled in water and skin conditions such as wounds, sores, rash and insect bites are bathed in the decoction. Furthermore, the oral consumption of the decoction of the flowers and leaves is supposed to relieve menstrual cramps.

Here are two of my recipes for 'Red head' berries; the sauce can be served with chicken or fish, providing a very pleasing refreshing taste and a very interesting black-coloured sauce. It can also be enjoyed in combination with carambola as a chutney, a tasty compliment to any main meal. Enjoy the wild edibles!

#### **Red Head Catsup**

Ingredients:-

2 cups Red-head berries, 1/2 cup mild vinegar, 2/3 cup water,  
1 cup brown sugar, 1/2 tsp each of clove, ginger and paprika,  
1 tsp cinnamon, 1/2 tsp salt

Put into a saucepan the berries, vinegar and water. Boil the berries until they are soft (5 minutes). Put through a blender or food processor. Then add the sugar, spices and salt. Simmer for 3 minutes. Serve at room temperature.

#### **Carambola and Red-head Chutney**

4 cups carambola, peeled and pipped, cut into small pieces,  
1/4 cup Red-head berries, 2 cups vinegar, 2 cups sugar,  
1/4 cup finely chopped ginger

Put in a heavy saucepan vinegar and sugar and bring to boiling point. Add the carambola and ginger. Cook on low heat for 2 hours, stirring occasionally to prevent sticking to bottom of pan. Add berries in the last 10 minutes of cooking to allow them to retain their shape.

*Editor's Note: Also known locally as chichipince.*



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## The Stinkhorn Mushroom

Dr Alessandro Mascia, BMBS, CHed

This issue's edible mushroom is the stinkhorn mushroom. I have to admit that this one is probably going to appeal only to the hardcore enthusiasts out there but since it fruits abundantly on my farm without any work on my part, I eat it and enjoy it for what it is.

Stinkhorns are one of the easiest mushrooms to identify; in one form or another they resemble phallic protrusions when mature. They are different from other mushrooms in that they spread their spores with the help of flies and carrion beetles (lovely, isn't it!) which are attracted to the smelly, slimy spore mass that adheres to the tip or head. To quote David Arora from Mushrooms Demystified because I could not do a better job in describing these unusual mushrooms:

The stinkhorns' most outlandish feature, however, is the unpleasant or provocative odour of the mature spore slime, which has been variously characterized as "foul," "fetid," "compelling," "disconcerting," "nauseating," "like rotting carrion,"...and most apt and understated of all: "indiscreet." Lured from afar by the stench, flies and carrion beetles come to feast on the slime and if the day is hot, roll around in it. With their eventual reluctant departure, spore dissemination is accomplished (some spores stick to their feet, others are presumably passed through their digestive tracts)...

Now that I have thoroughly disgusted everybody with the general description I shall try and answer the question: "Why would you want anything to do with such a mushroom, let alone eat it?" Well, while the mature mushroom itself is thoroughly unappealing, the immature or shall we say, "un-erupted," mushroom looks like a puffball on the outside and if sliced open reveals a miniature stinkhorn compressed inside with a gelatinous substance beneath the outer skin and a darkly coloured spore mass on the "head."



It is at this stage which it is worth eating and, in fact, these odourless (thankfully!) eggs are considered a delicacy in parts of China and Europe. Allegedly, they are pickled raw and may be found in markets in mycophilic countries.

They are generally easy to find; on my farm, I have a naturally fruiting patch that comes up after heavy rains under Salmwood trees. All I do is walk around the area, use my nose to spot the carrion smell, look for the mushroom sticking out of the ground and then use my hands to shuffle all the leaf mulch around looking for the "eggs," and they are approximately egg-sized. They also randomly pop up in the garden, especially if we have



been fertilizing with cacao trash, in the grass occasionally, and of course, in leaf litter in the bush. We generally get two types, though there are plenty of different species varying in size, colour and appearance: *Dictyophora indusiata* or the tropical basket stinkhorn, which has a net around the phallic protrusion and *Phallus impudicus* or common stinkhorn which just looks like a phallic protrusion.

So, how do you eat them? I have never had them pickled but I can attest to the eggs being sliced and then either fried or stewed. Fried crunchy they are unequivocally better; when stewed, they are too gummy and chewy with no particular taste. We enjoy them on our farm because they are free, no work bounty that adds variety to our diet but I will admit that this is truly a mushroom for the dedicated mycophile only.

Go forth and spread the spores!



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## Conserving Food Freshness

By Dottie Feucht

To some companies in the food industry *preserve* connotes adding chemicals to extend shelf life but *conserve* means maintaining the original flavor and texture and interrupting the aging cycle by means of *modified atmosphere packaging (MAP)*, a procedure of extracting the air from a package and replacing it with the optimum combination of oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>), and nitrogen (N<sub>2</sub>) for conserving its content. MAP does not negate the necessity for refrigeration but extends the shelf life of fresh vegetables and hard cheese and yogurt, for example, to 6 months. Fabrigas Belize Ltd. provides the gases and expertise for this innovation in Belize. Quality Poultry Products Ltd. now uses it for its processed meat: sausage, lunch meat, etc.

For many food items lowering the amount of O<sub>2</sub> to 3 - 5% slows down oxidation and inhibits the growth of aerobic organisms which cause spoilage; CO<sub>2</sub> can lower the pH and inhibit the growth of bacteria; N<sub>2</sub> is commonly acknowledged as an inert gas. The mixture of gases is critical and dependent on the food to be conserved and whether the food item is packaged in bulk or smaller packages for retail. Raw red meat, for example, requires a combination of O<sub>2</sub> and CO<sub>2</sub> in different proportions for bulk and retail. Fresh fruit and vegetables and dried food products require 100% N<sub>2</sub> for both bulk and retail. It is well-known that CO<sub>2</sub> is used in soft drinks, but for liquid food and fruit beverages it's N<sub>2</sub> that's used, (100% for both bulk and retail). Raw poultry in bulk requires 100% CO<sub>2</sub> but for retail only 25% CO<sub>2</sub> is combined with N<sub>2</sub>. Cut poultry is different yet; it requires about 75% O<sub>2</sub> and 25% CO<sub>2</sub> for both bulk and retail to maintain freshness. Conserving raw fish for retail depends on the fat content of the fish; for bulk raw fish both require mostly CO<sub>2</sub> and approximately 25% N<sub>2</sub> but for retail packing of low fat fish, O<sub>2</sub> is added to the gas mixture. The gases for conserving crustaceans and mollusks are the same as low fat fish. Hard cheese requires only CO<sub>2</sub> for both bulk and retail.

No O<sub>2</sub> is used to conserve cooked vegetables, grated and soft cheese and food items such as pasta, bakery items, prepared meals, seafood, poultry, and cured meat; only a mixture of CO<sub>2</sub> and N<sub>2</sub>. A convenience store in Mexico with hundreds of stores across the country prepares its sandwiches at a central location and uses MAP to conserve freshness and maximize uniform quality and profit margin.

Modifying the atmosphere around food products is not new. As far back as 1930 ships transporting fresh fruit used CO<sub>2</sub> in their holding rooms to extend shelf life of the fruit. In the 1970's modified atmosphere packages reached the stores when bacon and fish were sold in retail packs in Mexico. The interest in MAP has grown due to consumer demand and led to advances in both packaging techniques and packing material, one of the latest being *equilibrium modified atmosphere packaging (EMAP)* which takes into account the material used for packaging as well as the mixture of gases. Equilibrium of the modified atmosphere is achieved when the permeability (exchange of O<sub>2</sub> and CO<sub>2</sub>) of the packaging film is adapted to the product's respiration rate. Meat and fish need very low gas permeability films so for non-respiring products (e.g. meat, fish, cheese), high barrier films are used. However, fruits and vegetables are respiring products where the interaction of the packaging material with the product is important. Water vapor transmission rate, mechanical properties, transparency,

type of package and sealing reliability are all important film design considerations. Traditionally-used packaging films like low density polyethylene (LDPE), polyvinyl chloride (PVC), ethylene-vinyl acetate (EVA) and oriented polypropylene (OPP) are not permeable enough for highly respiring products like fresh-cut produce, mushrooms and broccoli; thus the development of permeable film that allows the transmission of gases to and from the package. EMAP films developed to control the humidity level as well as the gas composition in the sealed package are beneficial for the prolonged storage of fresh fruits, vegetables and herbs that are sensitive to moisture. These films are commonly referred to as *modified atmosphere/modified humidity (MA/MH)* films.

The equipment for large scale MAP is usually customized for the product and includes automation of the entire process; however, a very simple, low cost machine that extracts the air and infuses the gas mixture can be used for small scale packaging. One gas tank with the appropriate gas mixture is used.

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**Raising Sheep.... Continued From page 20**

Stocking rate for sheep has not been studied but in 1987, I visited Belize to collect some information concerning agriculture. At that time, the average amount of land needed to sustain one cow/calf was 2.2 acres. That means that roughly ten ewe/lamb units would need that much land. Modern grasses have improved, so theoretically less land per ewe lamb unit is needed. This overlooks one of the big advantages of sheep, which is that they can live very nicely on marginal land—too rocky to drag equipment though.



I marketed all lambs that did not look like what I thought they should look like. I was fortunate to have someone who would buy all the sheep I could produce. He would buy everything I had to sell, not only lambs but cull ewes as well. I could not produce enough. He bought and fattened them on beef fattener, which is the cheapest form of concentrate. Now, feeding corn is prohibitively expensive. It takes about 7 pounds of corn to make one pound of meat in a growing lamb. At 15 cents a pound for corn, it costs \$1.05 to produce one pound of lamb. If you did not bother to charge for your labor nor consider what it would cost to produce or buy the lamb to feed, you could still make some money. An important point was that grass fattening could produce more money but less quickly, especially if the sheep were grazing marginal land. For me, the market was as good as it could get. There never was enough lamb to satisfy the hotels and restaurants. As a testament to this, look at the commodity charts in the Ag Report. The live price of beef is about one-half that of lamb. My operation was grass based. I did feed 1/4 pound fattener per lactating ewes for two to three months during lactation. Good rams weigh in, at most, about 150 pounds. Adult ewes range around 100 to 110 pounds. Animals mature slowly in the tropics. As I said, I was not in the production business but if I were, I would have selected Dorpers, which are heavier than BBBs.

Hair sheep meat is about as good as meat gets. It is not fatty as marbled beef can get. It is tender meat if it comes from young animals. It has the flavor of goat meat. In addition, it does not acquire the mutton flavor even in older animals. You do not need special cooking instructions, sauces, or spices.

Health care of sheep is not challenging. Parasites, foot rot, mastitis, and abscess were among my leading problems. There are vaccines for enterotoxaemia and tetanus available at farm supply stores. There are vaccines for a devastating disease called sore mouth (contagious eczema) but good luck. I ordered it

from Denver Serum Company through Prosser's but it took me several years to get it.

In addition to producing sheep for meat production, the Barbados Black Bellies have been used on "hunting" farms in Texas. Farm owners selected and bred animals with horns to stock their farms just as I selected against horns. Horned Black Bellies are not only beautiful animals but because of their breed, Black Bellies are deer-like in behavior; thus in high brush they present a challenge to hunters. For \$600 dollars, if you are in Texas, you can shoot one.

As my aunt, a sheep rancher in Montana, used to tell me sheep are good real estate. I agree.

**Editor's Note:** Dr. Jerry Stevens, a retired veterinary pathologist from U. Minnesota and N.C. State, Raleigh, never went by 'Dr.' for the 20 years that he resided in Belize. A humble and altruistic man who loved his Cayo District Firetree Ranch, he is sorely missed by his Cayo fellow farmers and friends, as is his lovely wife Maudine. They returned to their homeland, answering the lure of 6 children, 14 grandchildren and many great grandchildren, mostly all resident in North Carolina, USA.

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## Apples of Belize.... Continued from page 21

In the seventeenth century Custard apple production was introduced to Africa by the Portuguese explorers and now is grown throughout Southeast Asia. Custard apple cultivation and production is new to Belize since the mid 1980's when a man named Laurence Zill collected and planted *Annona reticula* varieties in Belize and Northern Guatemala.



He named the varieties of Custard apples he grafted and planted after the town or area where they were planted, such as Tikal, San Pablo, Benque, and Caledonia. Planting by seed remains the usual means of propagation.

Custard apples grow on low erect trees with a rounded or spreading crown and are a member of the soursop family. The semi-deciduous, evergreen trees are fast-growing and typically reach approximately twenty to twenty-five feet in height. Trees are productive in approximately four years. Irrigation is required during significant droughts. Wood of the tree is soft. The drooping leaves of the Custard apple tree are typically four to eight inches long and approximately one to three inches wide and have a pungent aroma. Custard apples are harvested in the spring in Belize. Each rounded lumpy, scale covered irregular shaped fruit is about four to six inches in diameter and are known in the West Indies as 'boullacts' or bull hearts as the fruit resembles the heart of a bull. Custard apples come in a few colors: green-yellow, red, and reddish-brown. The fruits are eaten only when ripe when the skin gives slightly to touch. The taste and texture are smooth, delicious, sweet, slightly granular and creamy. Their taste has been described as a combination of tropical flavors, such as banana, coconut, strawberries, mangos, papaya and pineapples combined. Custard apples taste best when picked green to light red in color and allowed to ripen until the tough thin skin may turn yellow or brownish red when fully ripe. Custard apples are delicious and contain an abundance of protein, carbohydrates, phosphorous, iron, thiamine, niacin, riboflavin, copper and vitamins A and C. Although the tree is well-known and the fruit widely consumed, Custard apples trees vary in productivity and seed germination is challenging. Fruit bats and bugs, especially the Chalcid fly are attracted to the ripe fruit. It takes about one month to germinate a seed. The fruits are highly perishable with a short shelf life. The fruit is considered best when it is eaten chilled directly from the skin. Be sure to avoid the large shiny black seeds as they are highly toxic and poisonous when crushed.



The Custard apple tree and its fruit have many healing qualities and applications. The bark and seeds are used as an insecticide. The bark of the tree is used to soothe toothaches. In the West Indies the leaves are crushed and processed for use as a

blue-black dye which is also used as a tattoo ink. Leaves of the Custard apple tree have been utilized to treat ulcers, burns and other skin ailments when they are applied topically. Juice made from the leaves is known to kill lice. Pulp of the fruit is used to make fermented drinks. Custard apple remedies are used in Ayurvedic applications for treatment of digestive and skin ailments. Healing properties from leaves of the trees are used against tumors and cancer. Enzymes and fiber from the fruit help facilitate good digestion. A decoction made from the leaves is used as an effective remedy to expel intestinal worms. The fatty-acid methyl ester of the seed oil is recognized as an accepted bio-diesel fuel. The Custard apple is considered India's top favorite fruit. Custard apples may be found in the spring in the San Ignacio farmers' market.

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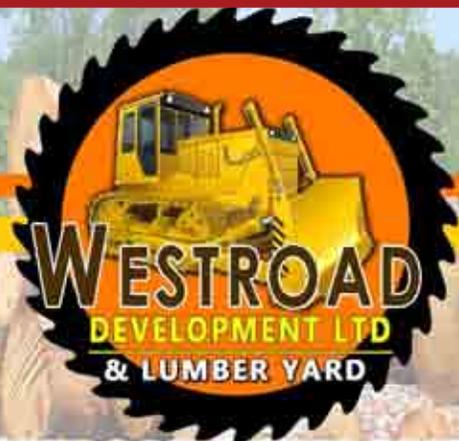
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## ASK RUBBER BOOTS

Dear readers,

The best snake identification book that we have found is *A Field Guide to the Snakes of Belize* by Tony Garel & Sharon Matola, ISBN 9968-730. Rubber Boots & family have identified many snakes with this, and found their information ultra-accurate. The preface of the book expresses the writers' hopes that the field guide may be useful to identify snakes in the wild. Rubber Boots found it useful both in the wild and, unfortunately, in our home as well. Actually, for a neophyte, having a snake inside offers more opportunity to study the features and make a positive identification. For those living with any of the following: thatched roofs, semi-pourous walls, doors without tight closing features, and cracks under windows from dried (shrunken) lumber – and especially when high shrubbery sits outside that window, take notice! All of these are fairly taken to be invitations for entry by our reptile and amphibian friends.



Recently, I had the pleasure of the company one of the most lovely nonvenomous snakes in my living room, the green tree snake, *Leptophis ahaetulla*, common to all districts except Corozal (say Garel & Matola). Bright lime green, with turquoise around the eye, as he smells you his turquoise tongue is visible too. They can reach 6 ft as indeed my visitor was; see photo.

So, how to entice him to depart: If you have husband home, call him. Plan B, (in my case) call your son. Lickity split, he came, bringing his neighbor, Amador Leal of Santa Elena, Cayo. Amador carried with him a piece of laundry line cord – about 12 or 13 ft long. They searched under my home to find a stray piece of 1" PVC pipe about 5 feet long - into which they pushed the doubled up cord, using a

A cool- working snake snare: Easy to make and use!



Amador Leal

stick to force it down. When the doubled cord exited the far end of the pipe – it creates a small snare – controlled by the loose ends at the user's end of the pipe. Amador coolly put the snare close to the snake, and on about the 3<sup>rd</sup> try, quicker than the eye could see, the snare had captured the snake by lasso, kind of, and was held tight to the pipe. The snake calmly adjusted to this new situation, with his center held tightly with the snare at the end, so of a 6 ft snake, 2 halves of 3 ft each, wound around the pipe, with his extremities not reaching the user's end. VOILA! So simple, no blood in the house, no death to a harmless and useful snake, and such a cool maneuver! Our friend released the snake in the back of the yard, with request that he refrain from reentry. An online search for 'snake snares' showed many similarly devised gadgets, fabricated of more sophisticated materials and costing between \$30 to \$60 USD. It felt good to not only 'beat the system with a home-made gadget', but good to have freed a wild creature without harm.

Hope this may be useful.

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# AG BRIEFS



World Food Day, celebrated worldwide, will take place in Belize on October 19, 2012 at Escuela Mexico, Corozal District.

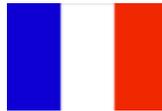


Feria Yucatan X'matkuil, one of the largest educational agriculture fairs in our region, will be held just outside Merida at the permanent grounds at X'matkuil from 11 November until 4 December 2012. The livestock judging commences with sheep judging on 13 November; cattle judging starts on 15 November and ends with Parade of Champions on the 25<sup>th</sup>. A cattle auction will take place on 19 November and an equine auction on 24 November. BLPA Chairmen and the Belize Ag Report encourage our readers to attend this fair and experience the best of Yucatan and its agriculture.



Brazil approved Monsanto GMO cotton variety, Bollgard II Roundup Ready Flex, said to resist moths and butterflies such as the army worms, which have plagued cotton plantations in Brazil. This variety has been in use in N. America since 2005.

France maintains her ban on GMO in a move targeted at Monsanto's MON810 maize, the only GMO currently allowed in Europe. The French Prime Minister Jean-Marc Ayrault announced on September 15, 2012 that France also is considering bans on crop dusting and wishes to see a general reduction of chemical use in agriculture, in keeping with their public sentiment. President Francois Hollande set an agenda with strong environmental concerns overall, including reducing France's nuclear energy from the current 75% to



50% by 2025. New wind energy farms are also being developed offshore, one off France's Atlantic coast near Noirmoutier and other in the English Channel, off Treport in Normandy.

Californians will vote in November on whether to require GMO labeling on food products. So large is the California food industry, that many small to midsize companies would simply label all their products rather than maintain 2 separate sets of labels (one for California and another for the rest of USA). Public polling seems to indicate that the label requiring side has more public support; however those opposed to required GMO labeling appear to have deeper pockets for advertising.



Syngenta, a large USA-based biotechnology corporation, announced that it has agreed to purchase Pasteuria Bioscience. The companies have been doing cooperative research and collaboration to develop biological controls for nematodes, utilizing the naturally occurring bacteria, Pasteuria. It is Syngenta's goal to introduce more biological controls, as other products are withdrawn from the market.



Costa Rica announced that their exports to Asia have grown by 33.9% in 2012. Their pineapple exports have totaled \$468.5 M USD; exports to China have grown 107%. Costa Rica's main purchaser of exports is North America at 42%, EU countries at 18.5%, Central America 13.8% and Asia 13%.



*Continued on page 29*

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[BelizeNews.com](http://BelizeNews.com)

**Ag Briefs .... Continued from page 28**

Guatemala's AGEXPORT, Asociacion Guatemalteca de Exportadores, organized a trip for officials and farmers, to various cities in China. Participants commented that they were amazed not only at the amount of South American products, especially from Chile, but also the relatively high prices paid for them in China. The group's mission was to identify and familiarize themselves with trends in this rapidly expanding Asian ag marketplace. They also were investigating shipping possibilities,

as many ships coming laden to the western Hemisphere from Asia, often depart empty. The President of AGEXPORT summed up their findings with, "It's a big market with big demand for high volumes."



Peruvians complain that their banks and financial institutions do not understand agribusiness, "because they lend money with really high interest rates and expect quick repayments." In Peru reports state that local institutions loan funds with a maximum of 5 years – which is often not feasible, especially in the cases of many crops which do not even bear fruits until their 5<sup>th</sup> year, such as avocados. They



praised the Canadian banks and lending institutions, which give credit for 20 years and at interest rates of between 5 and 6% for agricultural projects.

Seven European countries are cooperating on PicknPack research, to develop robots for packaging produce, under the coordination of Wageningen UR Horticulture, with collaboration of Food & Biobased Research. The advantages of a robot doing this are many; for example, robots can keep up continuously at repetitive work for 24 hours a day; robots can work in workplaces at 4degrees C and with little oxygen, both which would extend shelf life. Also robotic inspection may be superior to the human eye.



Common sense is returning to marketing restrictions and to choices in UK by retailers and buyers, regarding produce with slightly imperfect outside appearances. This year has been a challenging year for UK producers with one of their wettest and coldest summers ever. Problems of poor germination, crops rotting and inability to access lands for harvest have all contributed to the overall bad season. Lee Abbey of the National Farmers Union stated "The NFU has been calling on supermarkets to relax their standards because we do not want perfectly good fruit and vegetables rejected. Common sense should be applied."



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### Biochar

According to the CarbonZero Project, biochar is “created using a pyrolysis process,” which is the thermochemical decomposition of an organic element. In the case of flame weeding, the organic elements are the uninvited weeds that are trying to be eradicated. To further elaborate on a seemingly simple process, a “biomass is heated in a low oxygen environment, and once the pyrolysis reaction has begun, it is self-sustaining, and requires no outside energy input.” When a farmer flame weeds his or her row crop, this process is occurring with each sweep of the flame-tipped hose. In many cases, when farmers use biochar on crops, it’s spread across the top layer of soil. Flame weeding omits the physical application of biochar, saving farmers time while adding nutrients to the soil that turns something invasive and uninvited, into a helpful, nourishing presence. A generous amount of research shows that it can increase crop yields. Biochar has high porosity and has been known to retain moisture and replenish organic carbon levels in the soil; further, it also prevents fertilizer runoff and leeching, which decreases the need for fertilizers, and ultimately decreases pollution of soil and surrounding areas. Deciding on whether or not to flame weeds depends on the condition of the site, and exercising good, old-fashioned common sense is the best policy. It never hurts to dig into the soil to test the seedlings’ progress. Physically knowing where the plant is will always help you best gauge when and when not to flame. Asking oneself if the crop has grown too large so that the method of flaming has become prohibitive is a viable starting point. Essentially, can you get in there? If not, you may want to change the device, but if that’s cost-prohibitive, other options should be explored. As with most things, flame weeding proficiency comes with repetition. The more you do it, the more you can refine your technique. A popular method is to use a sweeping motion, “away from your body, but it all depends on what type of unit you’re using,” House cautions. “With a hand torch, it’s typically a sweeping motion. Think about using an eraser — flame weeding is really a weed eraser.” He suggests to “do some prep first,” and “get combustible materials out of the way before flaming. Combustible material has a life span of its own.” That life span can be, and often is, short, but it can also be more protracted, so be careful. “Stay away from rayon,” he says facetiously, though with seriousness. “Some people say they get better results when they flame when it’s still a bit wet,” House explains, since “water is a really good conductor of heat.” On the whole, flame weeding may be one of the best options for ridding one’s space, whether a garden or a multiple-acre farm, of weeds. As an organic process, its benefits are twofold: as it kills weeds and gives crops or other plants an opportunity to grow, it replenishes the soil of nutrients without any human effort. As a succession of natural processes, it’s both accessible and intuitive, making it a universal tool for farmers across scales.

For more information email [info@earthand skysolutions.com](mailto:info@earthand skysolutions.com) or visit [www.waycooltools.com](http://www.waycooltools.com). Another source of information is [www.flameengineering.com](http://www.flameengineering.com).

Reprinted from



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**Editor's Note:** Belize Ag is aware of one propane flame weeder in country at Sol Farms Ltd., Camalote Village, Cayo District.

In these cases, if the products require a supplies control license or Agriculture Department license, the application is internally forwarded to these agencies. Signing officers in these departments then may modify amounts, sign as is, or refuse a license. In the case of refusal the process stops and BAHA does not grant an import permit.



If the licenses are granted, BAHA processes a specific document that includes the commodity, amounts, source, date of validity, approved point of entry, and more importantly, the conditions of importation. Examples of these conditions generally include sanitary or phytosanitary certificates, specific treatments, or specification of freedom from certain plant pests, animal diseases, or food-borne organisms. The permit document is used by the importer for clearing their consignments at the point of entry. Not having a permit constitutes a violation that may result in the product being confiscated and destroyed and a fine levied. Every importation requires a permit which is valid for a single importation and within the amounts of products specified.

First time importation of certain commodities may require that these products go through a more rigorous process known as risk assessment. This is a process that determines what risks are associated with a commodity - risks which may be dependent on the products as well as the sources. The process also includes determining the possibility of these risks after importation and the conditions to mitigate them. A risk analysis process is very dependent on the availability of information from the source and collaboration with the exporting country. It may sometimes take several months for completion and may result in the determination that a product is not permissible for importation.

It is advisable for persons interested in importing commodities to Belize to call BAHA as the first step to get an indication whether it even makes sense to initiate the process. Here we provide pointers on what processes to follow and critical advice on how to make a successful importation. We are not here as a barrier to the importation of wholesome agricultural products but rather to facilitate the process and at the same time safeguard our precious resources and our agricultural patrimony.

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*Buckminster Fuller*

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