

Envirotalk



GOVERNMENT OF BERMUDA

Ministry of Environment, Planning and Infrastructure Strategy

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PROMOTING APPRECIATION, ENHANCEMENT AND CONSERVATION OF BERMUDA'S ENVIRONMENT

WELCOME

to our spring edition of Envirotalk.

In this issue –

- Curator of the Bermuda Natural History Museum, **Dr. Robbie Smith**, talks about our shifting shore line and the exciting discovery at Jobson's Cove.
- **Mica Murray-Caines**, offers some details on the Agricultural Exhibition which will take place this coming April.
- Community gardens are taking shape on Bermuda's city limits, Greenrock's Heathly Harvest Director, **Omari Dill** talks about this ongoing project.
- The BIOS Bermuda Air Quality Programme is detailed by Associate Scientist and Programme Manager, **Andrew Peters**.
- Tomatoes, tomatoes, tomatoes! Farmer **Carlos Amaral** offers up some growing tips on this luscious red fruit.
- See the Spring planting calendar to get a head on what to plant this spring.

Please contact:

Caroldey Douglas (Tel: 239-2307 or e-mail: cdouglas@gov.bm) with ideas for future articles.

Kimberly Burch (Tel: 239-2322 or e-mail: kmburch@gov.bm) to be added to the subscriber list.

Editor's note

22 April 2012 marks the 42nd anniversary of Earth Day. More than one billion people worldwide will participate in this event. To find out more about Earth Day, please visit the Earth Day Network at: www.earthday.org. Share your pledge.

SHIFTING SANDS ON THE SOUTH SHORE

The South shore of Bermuda really is one of the most beautiful stretches of coastline on the planet. When Bermudians travel abroad we seek to find places that measure up and it is easy to convince ourselves that there are very few that do. We should feel very proud of the limited development that has taken place along this stunning shoreline and that we have kept extensive parts of it available to the public and our visitors as parks and preserves. From Cooper's Island to Church Bay we have many beautiful vistas, secluded beaches and unperturbed dunes to enjoy. We must also appreciate that the extensive boiler reefs protect our coastline from the worst of the gargantuan waves that hurricanes send our way.

Recent hurricanes have had significant impacts on the dunes on the South shore. Hurricane Igor in 2010 produced an extended period of intense wave action on the South shore that completely removed the massive dune that protected the small beach at the western end of Horseshoe Bay and heavily eroded the massive dunes at Elbow Beach.



Figure 1. Loss of the dune at the western end of Horseshoe Bay caused by Hurricane Igor (Photo: R. Smith)

These are the expected patterns of dunes, which are dynamic and ceaselessly shifting, only stabilized over long time spans by plants (such as the seaside morning glory, rush grass and beach lobelia) that bind the loose sands. Storms such as Igor have displaced most of this sand material offshore and it lies between the beach and the boiler reef, waiting to be pushed up onto the beach again by minor storms. There is a continual back and forth of sand on the beach, where it is either piled into dunes or

eroded away, regulated by the frequency and intensity of hurricanes and winter storms. Right now it looks as if the hurricanes have the upper hand. We know our beaches “come and go” reflecting the high energy winter months but the scale of dune movement and erosion over the past 10 years is very significant.

Although storms are destructive, they do peel back layers of time and an interesting discovery was made in February of this year. Mark Rowe, former Hydrogeologist at the Department of Environmental Protection, discovered a turtle skeleton extruding from the eroded face of a dune at Jobson’s Cove, exposed by Hurricane Igor (Figure 2). He determined that it was located 3.6 m above sea level in a dune about 4000 years old. I excavated the skeleton and sent images to Dr. Peter Meylan (Eckerd College) who has worked on Bermuda sea turtles and he believes it to be a green turtle (*Chelonia mydas*) about the size of a typical turtle in Bermuda today. But he is not sure it is as old as the dune, maybe only a few hundred years old. So Igor has uncovered a bit of a conundrum for us to resolve: how can you bury a young skeleton in an old dune? We will need to carbon-date the skeleton to more fully understand the relationship between the dune and the time the turtle was buried there and the results will tell us more about the dunes.



Figure 2. A green turtle skeleton exposed in a dune at Jobson’s Cove. The white spiked part was exposed to air and is part of the plastron or under-shell of the turtle. The long paddle-shape bone is part of the shoulder. Scale ruler is 10 cm long (Photo: R. Smith)

Hurricanes Fabian and Igor were distinctive because of either their power or duration. But an underlying factor that may have increased the magni-

tude of their impact may be the steady rise of sea-level. Studies from the mangrove peat deposits at Hungry Bay have shown that sea-level has risen by at least 28 cm (approximately 1 foot) in the past 100 years. We do not know if our boiler reefs have been able to keep pace with sea-level rise over this time period and so more water may now be able to reach the shore with more power. There is uncertainty about the predicted height of future sea level by 2100 and concern about the capacity of our boilers and reefs to continue to grow at the same rate in a warmer and more acidic ocean. So we must be concerned about anticipated sea-level rise, driven by climate change, which may result in the collapse of parts of the rocky coast, the removal of more dunes and erosion of our beaches. The loss of our natural reef barrier would only make our coastal erosion problems worse and so we must ensure that our reef ecosystem is protected from destructive activities and continues to provide an invaluable ecosystem service for us.

Dr. Robbie Smith

Curator, Bermuda Natural History Museum

Department of Conservation Services

A VISIT TO THE AGRICULTURAL EXHIBITION

A visit to the 74th Bermuda Agricultural Exhibition is a must this April. This well-loved national event is a perfect blend of the old and the new, and it is wholesome fun event for the whole family.

Held on Thursday, 19 April; Friday, 20 April and Saturday, 21 April, the Exhibition showcases the best Bermuda has to offer both agriculturally and culturally. Each year livestock, vegetables, fruits, floriculture, homemade food products, woodcraft and educational categories are brimming with entries. Cow milking, equestrian events, poultry judging, home baked goods... everything you would expect will be found on-site at the Botanical Gardens in Paget.

In addition, this year has some new features like the drum line and the feed the "kid" goat competition with a mix of old traditions like the parish relay race and the tug of war. Entertainment in the lower ring provides a second focal point for those who have wandered away from the Main Ring.

Thursday is the most popular day with seniors, pre-schoolers and anyone else who wants to see the items on display at their peak of freshness. Friday has been titled "No school day" and the students look forward to it each year. Hundreds of students take full advantage of the holiday to see if they've won a coveted rosette or highly commended sticker. Saturday is generally a family day with many coming out to enjoy the day.

Food is available courtesy of registered charities, which set up small booths and provide fast food, Bermuda style.

Don't miss this very special annual tradition. Tickets are available at the Exhibition on the day. Adults: \$10. Children under 16 & seniors: \$5. Children under 5 are free. For more information call 2392351 or email exhibition@logic.bm or visit www.bdaexhibition.bm

Mica Murray-Caines

GREENROCK COMMUNITY GARDEN PROJECT AT THE SUNSHINE LEAGUE

On a clear, cool Monday in February, a small team of Greenrock volunteers and I surveyed the land in front of us – green grass, a small, unkempt garden sitting idly in the space and a wrought iron clothes line stretched down the length of the lawn bordered by match-me-if-you-can hedges.



The space was about to be transformed.

Almost a year after Greenrock launched the Phase II component of its' Healthy Harvest programme to establish and build community gardens here on the island, I was finally rolling up my sleeves and getting to work on what I love to do most.

And so it began – with shovels and a turf cutter – a community garden project for Greenrock's Healthy Harvest programme was

getting underway on the grounds of the Sunshine League.

Last year, Greenrock announced its plans over the next five years to build, plant and maintain a series of community gardens across the island on available arable land within private/public properties, schools and parks. The wider community was informed that Greenrock, along with help from an advisory panel, had started identifying plots for building community gardens across the island – and that it needed the community's help to make Healthy Harvest a success.

Greenrock, along with the tremendous support of Healthy Harvest programme's lead sponsor, Catlin, and I share a vision of utilizing community gardens as a way to have Bermuda residents from all walks of life benefit from the growing and consumption of local fruits and vegetables.

The process for getting Healthy Harvest up and running has been a steady learning curve for everyone involved – including me. With additional funds still needed to help support our plans, we continued to move forward as best we could to keep this idea – this 'movement' as I like to call it – alive.

I am proud to be overseeing the Healthy Harvest community garden at the Sunshine League which is largely being built, planted and maintained by volunteers, including a dedicated work crew from the Prison Farm.

This first Healthy Harvest community garden will serve as a pilot project for Greenrock, as well as a teaching and engagement tool for young people to observe each planting season in an effort to increase understanding of the importance of local agriculture and community giving. A portion of the garden's yields will also be donated to foster children and food-aid programmes.

We continue to actively seek in-kind donations from local businesses and individuals alike from the wider community for planned future projects at other properties, such as:

- Donations of topsoil from existing or future construction projects;
- Donations of trucking and small construction equipment to help in building gardens and orchards;
- Donations of gardening equipment (i.e. shovels, planting trowels, rakes); and
- Donations of vegetable plants and fruit trees.

Members of the community who are also interested in financially supporting or volunteering for the long-term care and maintenance of the community garden pilot project should contact Greenrock at info@greenrock.org or on 747-7625 (747-ROCK).

Over time, Greenrock expects to build volunteer bases for Healthy Harvest to help minimize the cost of building, maintaining and harvesting community gardens. The charity's aim is also to develop a management model that can be used by churches, schools or other community groups.

I am happy to say that community gardens are becoming more popular around the world, including cities, due to their 'greening' of spaces and addressing long-term issues such as food security and sustainability. At the same time, community gardens are attributed to reducing anti-social behaviour in neighbourhoods.

In urban spaces like New York City, there are reportedly over 600 community gardens registered across all five boroughs. If this kind of action is possible in New York City, I believe that Bermuda can get onboard as well!

For more background on Healthy Harvest and access to the pocket-size guide online, visit www.greenrock.org (under 'Projects').

Omari Dill

Healthy Harvest Project Director

Sustainable Agriculture and Edible Landscaping Consultant

THE BIOS BERMUDA AIR QUALITY PROGRAMME

Clean air is an essential requirement for good human and environmental health. Poor air quality can lead to poor health, detrimental effects on plants and wildlife and it can cause aesthetic damage to buildings and property. In Bermuda, ambient air quality is monitored by the Bermuda Institute of Ocean Sciences (BIOS) on behalf of the Government of Bermuda.



In response to the recognition of the need for a waste incinerator on the island, the BIOS Air Quality Programme was initiated in 1987 to study and monitor the chemistry of precipitation, pollutant gases and airborne particulate matter in Bermuda's atmosphere.

In general, the air quality in Bermuda is good. Being a small island located in the Atlantic Ocean some 800 kilometres from the nearest land mass and with no heavy industry present, Bermuda is not regularly exposed to high levels of atmospheric pollution. However, there are some local sources of air pollutants which may have an adverse impact on air quality. These



include: 1) waste incineration at the Tynes Bay Waste Treatment Facility; 2) electricity generation at the BELCO generating plant; and 3) road and marine traffic emissions.

Monitoring is undertaken at a total of five locations on the island, including at Fort Prospect – 1 km from the incinerator at Tynes Bay, and close to the new cruise ship facility at the Royal Naval Dockyard. At these locations oxides of nitrogen (NO_x) and sulphur dioxide (SO_2) are continuously measured. These are toxic gases which are produced during combustion and which can also undergo chemical reactions in the atmosphere to produce nitric acid and sulphuric acid which contribute to acid rain.

Airborne particulate matter is also measured at these sites and at three other locations: on the eastbound lane at East Broadway; at a location close to the BELCO plant in Hamilton; and at BIOS in St. George's. Airborne particulate matter consists of microscopic particles suspended in the air. Long-term exposure to airborne particulate matter, particularly the smallest particles which can be inhaled deep into the lungs, may exacerbate or cause cardio-respiratory problems, including asthma and emphysema. They can also directly introduce associated toxic chemicals into the lungs. Sensitive subpopulations are at greater risk to these effects, including individuals with existing respiratory and cardiovascular disease, the elderly, children, and people with asthma.

To date, the major findings on air quality in Bermuda are:

- The ambient air quality in Bermuda is generally very good, with few incidents of key standards specified in the Bermuda Clean Air Regulations being exceeded;

- However there are locations where ambient air quality may be significantly impacted at times;
- There has been a significant decrease in the acidity of rainfall in Bermuda over the past 20 years;
- There are local and distant sources of air contaminants;
- The Tynes Bay incinerator has had no measurable impact on air quality in Bermuda in terms of nitrogen dioxide and sulphur dioxide, acid rain and airborne particulate matter;
- Road traffic emissions are a significant threat to air quality in Bermuda;
- Further data are needed to better assess the impact of BELCO emissions on ambient air quality in Bermuda.

Andrew Peters

Associate Scientist and Programme Manager

BIOS

TOMATOES – FAQs AND GROWING TIPS

Tomatoes are a large crop plant in Bermuda and when you see the fields full of support sticks and plastic sheeting you know what is going to be grown there soon. Carlos Amaral from Amaral Farms gives us a look into some common problems seen with tomatoes and some tips on how to grow this bright red fruit.

What causes blossom drop in tomatoes?

Blossom drop can be attributed to several causes, most often related to either temperature and or stress. In Bermuda, the most common cause of this is a night temperature above 68 °F. During these times of high night temperatures, a hot set tomato variety should be grown.

Why do my tomatoes crack as they ripen?

Tomatoes tend to crack when they receive irregular water. If your tomatoes have gone through a dry spell and you try to make up for it with frequent watering, the inside of the tomato will plump up faster than the outside can stretch and grow. As a result the outer skin of the tomato splits open or cracks.

Why do the bottoms of tomatoes turn black and soft?

You are describing blossom end rot. This is thought to be caused by insufficient calcium. However, don't rush out to buy a calcium supplement for your soil, as Bermuda's soil contains an abundance of lime and calcium. The most common case of this problem is lack of or insufficient water at the time of fruit set and formation.

How do I increase fruit size?

Proper suckering and thinning of the flower sets, as well as ensuring that the plant is watered and fertilized regularly helps increase fruit size.

Are there benefits of pruning tomato plants?

Yes, one of the biggest benefits is that you can grow larger tomatoes. Actually, pruning out the suckers reduces the quantity of fruit each plant will produce, but results in larger tomatoes.

For example, instead of producing 50 tomatoes, a pruned plant may produce only 30. Since there are fewer fruit competing for water and nutrients each may weigh more.

Growing Tips:

- For optimal growth, the temperature at night should be between 65 and 68 °F.
- Once the tomato plants are about 3' tall, remove the leaves from the bottom 1' of stem. These are usually the first leaves to develop fungal problems. They get the least amount of sun and soil-borne pathogens can be unintentionally splashed up onto them.
- Pinch and remove suckers that develop in the crotch joint of two branches. They won't bear fruit and will take energy away from the rest of the plant. In addition you can thin leaves to allow the sun to reach the ripening fruit.

Tomato Facts:

- Tomatoes produce lycopene, which is known to fight cancer.
- California produces nearly half of the world's tomatoes, making it the largest grower of tomatoes in the world.
- There are two types of tomato plants:
 - **Determinate** tomatoes are varieties that grow to a fixed mature size and ripen all their fruit in a short period.
 - **Indeterminate** tomatoes are actually vines that continue growing in length throughout the growing season.

The majority of tomato varieties are indeterminate including most heirlooms and most cherry types. Other indeterminate tomatoes include: 'Beefsteak', 'Big Boy' and 'Brandywine'.

*Carlos Amaral,
Amaral Farms*

PLANTING CALENDAR – WHAT TO PLANT IN THE SPRING...



VEGETABLES

March

Beans, Beets, Broccoli, Cabbage, Carrots, Cassava, Cauliflower, Chard, Christophine, Collards, Corn, Cucumber, Eggplant, Kale, Leeks, Lettuce, Muskmelon (Cantaloupe), Mustard Greens, Okra, Pepper, Potatoes, Pumpkin, Radish, Rutabaga, Squash, Sweet Potato, Spinach, Tomato, Turnip, Watermelon

April

Beans, Beets, Broccoli, Cabbage, Carrots, Cauliflower, Chard, Christophine, Collards, Corn, Cucumber, Eggplant, Kale, Muskmelon (Cantaloupe), Okra, Pepper, Pumpkin, Radish, Rutabaga, Spinach, Squash, Sweet Potato, Tomato, Turnip, Watermelon

May

Beans, Cucumber, Okra, Pumpkin, Radish, Squash, Sweet Potato, Tomato

FLOWERS

March/April

Acrolinium, ageratum, alyssum, antirrhinum, aster, aubrietia, baby blue eyes, bachelor's buttons, bird's eyes, blanket flower, begonia, bells of Ireland, calendula, candytuft, carnation, centaurea, chrysanthemum, cineraria, coreopsis, dahlia, African daisy, dianthus, forget-me-not, geranium, gerbera, globe amaranth, globe gilia, godeita, gypsophila, hollyhock, impatiens, larkspur, lathyrus, marigold (African), marigold (French), nasturtium, nicotiana, pansy, petunia, phlox, phlox (annual), red tassel flower, rose everlasting, rudbeckia, salpiglossis, salvia, scabiosa, statice, snow-on-the-mountain, spider flower (cleome), star-of-the-veldt, stock, sweet pea, sweet William, verbena and viola.

May

Amaranthus, balsam, calendula, celosia, coreopsis, cosmos, gaillardia, gazania, globe amaranth, hollyhock, marigold, portulaca, rudbeckia, vinca and zinnia.

ON HER MAJESTY'S SERVICE



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