

Envirotalk



GOVERNMENT OF BERMUDA
Ministry of The Environment and Sports

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PROMOTING APPRECIATION, ENHANCEMENT AND CONSERVATION OF BERMUDA'S ENVIRONMENT

WELCOME

You are an integral part of nature; your fate is tightly linked with biodiversity, the huge variety of other animals and plants, the places they live and their surrounding environments, all over the world.

You rely on this diversity of life to provide you with the food, fuel, medicine and other essentials you simply cannot live without. Yet this rich diversity is being lost at a greatly accelerated rate because of human activities. This impoverishes us all and weakens the ability of the living systems, on which we depend, to resist growing threats such as climate change.

2010 is the **International Year of Biodiversity** and people all over the world are working to safeguard this irreplaceable natural wealth and reduce biodiversity loss. This is vital for current and future human wellbeing. We need to do more. Now is the time to act.

Throughout the year Envirotalk will be focusing on Bermuda's biodiversity in celebration of the **International Year of Biodiversity**. To begin with **Robbie Smith, Curator of the Natural History Museum** has written a

fascinating article on the search for knowledge and understanding of Bermuda's biological diversity. Our **Plant Protection Officer, Claire Jessey** and **Agricultural Officer Tommy Sinclair**, reveal a new and worrying problem

affecting our bees here in Bermuda. We are pleased to feature our first ever student essay competition for 11–18-year-olds. We also have all the information you need on the upcoming Bermuda Annual Exhibition. Finally, we have the spring planting calendar. Our crossword puzzle and recipe pages will resume in the next issue.

Alison Green
Librarian
Ministry of the Environment and Sports



2010 International Year of Biodiversity

THE SEARCH FOR KNOWLEDGE AND UNDERSTANDING OF BERMUDA'S BIOLOGICAL DIVERSITY

We have begun a new decade this year and I hope that in 10 years time we can look back and see remarkable and positive changes in Bermuda's environment. 2010 is designated by the United Nations as the Year of Biodiversity with the aspiration that all nations will intensify their efforts to stop or slow the dramatic loss of the Earth's plant and animal species. Most Bermudians know the familiar stories about our biodiversity, such as the cedar blight, the near extinctions of the cahow and sea turtles and the successful restoration of Nonsuch Island. But there are many challenges ahead for scientists and citizens trying to study, conserve and protect Bermuda's natural environment. We still lack complete knowledge of all the plants and animals that live here, the range of habitats they occupy and their tolerance to fluctuation in environmental conditions. In this regard, it is very hard to know what is 'normal' and this limits our ability to assess the significance of changes we observe over time and the steps necessary for effective conservation. Today, we are acutely aware that we live in an era of rapid change, and our biological diversity is constantly threatened by development for human needs and faces an unknown fate in response to a warming climate, rising sea level and changes in ocean chemistry.

We know a great deal about Bermuda's terrestrial species from the early accounts by Jourdan, Governor Moore and botanists such as Britton. It was fairly easy over the past 400 years to describe the diversity of our native and endemic plants and their patterns of distribution between the coasts, hills, valleys and marshes. But we have introduced hundreds of plant species to the island, starting with our early agricultural activity, the Victorian enthusiasm for plants shown by Governors Reid and Lefroy and the products of modern horticulture. We enjoy many beautiful and benign imported flowers, shrubs and trees in our gardens and parks but we struggle to eliminate numerous invasive and destructive plants, such as the Brazilian pepper and ficus trees.

Although early zoologists such as Jones, Goode, Beebe, and Verrill provided good descriptions of our marine life, intensive research on our marine ecosystems, such as coral reefs and seagrass beds, barely stretches back to the 1960s, when SCUBA diving allowed for detailed observations in our

shallower waters. Scientists in the late 19th century used nets, traps, tongs and waterglasses to give us general descriptions of these habitats and so we know that the direct impacts of the destruction of coral reefs, seagrass and mangroves in Castle Harbour, in the construction of the airport, eliminated 10 species of fishes known only from this lagoon. BZS researcher Thad Murdoch has been exhaustively mapping distribution patterns of reef organisms in the North Lagoon and some corals and fishes are clearly restricted to localized areas. Next summer he will begin surveying our deeper reefs around the reef edge. Sarah Manuel and Kathy Coates at the Department of Conservation Services have fully described all our seagrass beds. Even with a few hundred years or a few decades of study we still have much to learn about our island ecosystems, particularly our deeper reefs and the seamount slopes. Visiting scientists at the Natural History Museum and BIOS provide great expertise and skill as we continue to explore for biological diversity in our ocean.

I have experienced several events that demonstrate the excitement of discovery and the need for research since my return to Bermuda last summer to become the Curator of the Natural History Museum. I was greatly surprised to learn that



A diamondback terrapin. Photo Courtesy of Mark Outerbridge

we have a population of diamondback terrapins (*Malaclemys terrapin*) living in three ponds in Hamilton Parish that had somehow escaped the notice of the early naturalists for a few centuries. Although it is mildly embarrassing to admit that I missed the news of its discovery by a few years, it reinforces an important point that Bermuda's scientists need to share our knowledge efficiently and disseminate this information to the public as widely as possible. The new DCS web site, www.conservation.bm, will provide an important forum for communication.

BZS researcher Mark Outerbridge is leading the study of the diamondback

terrapins. However, it is clear that they are threatened by chemical pollution described for other pond animals. Dr. Jamie Bacon, another BZS scientist, and Mark are cleverly using invasive toads and red-eared slider turtles, who inhabit the same ponds, to study pollution impacts that primarily affect their reproduction and the development of their offspring. We can use these pest animals in order to assess the challenges to our endemic pond killifishes (*Fundulus* spp.) and native diamondback terrapins, both of whom appear to have problems with their reproduction. Animals that cannot reproduce successfully may not survive into the future. In this case, using invasive animals as tools to understand a problem will enhance our conservation efforts.

Another surprise occurred as a result of the “fish kill” event last September. These are fortunately rare events in Bermuda and generate concern and action to try to understand possible causes, in the hope of mitigating the event or minimizing their recurrence. The Department of Environmental Protection coordinated a collaborative effort to assess the scope and scale of the event with BZS and BIOS scientists and a critical follow-up study by a US fish pathologist. Bacterial pathogens have been identified on affected fish and work remains to be done with some unanswered questions. This event just points to how difficult it is to respond to an unusual phenomenon when we lack complete knowledge of all possible environmental factors, the physiology of each fish species that was affected and the responses of



*A new Bermudian, the spotted spoon-nosed eel.
Photo Courtesy of Robbie Smith*

potential threats to fishes (bacteria, plankton and parasites) to environmental shifts and how they might impact the affected fish species. It is a complex puzzle that we may only resolve through sustained research.

The fish kill did produce a bonus! An ardent beachcomber, Bob Patterson, reported an

unusual freshly-dead eel at Clearwater Beach. I collected and examined

the strange fish and, after confirmation by a colleague at the Smithsonian Institution, I was able to report the Spotted spoon-nosed eel, *Echiophis intertinctus*, as a new record for Bermuda. To me it seemed astounding that this 1.5 metre long fish had escaped observation by two centuries of



Waltheria. Photo Courtesy of Lisa Greene

study by very industrious ichthyologists. To be fair this is a cryptic eel that burrows in the sands near seagrass beds, so it is pretty well hidden and forages primarily at night. I feel lucky that in a decade of seagrass studies I never disturbed one sleeping in the sand!

My last surprise happened recently when I offered to help former Government Conservation Officer Dr. David Wingate and the National Trust with a re-planting effort at a nature reserve, powered by a stalwart team of volunteers. After the hard work was done David and Trust Executive Director Jennifer Gray lead tours along new trails. As we walked David remarked

that he had found a native plant in the reserve, *Waltheria indica*, that he had not seen in a long time. He mused that this re-occurrence changed some of his ideas on our pre-colonial plant communities. To me this was remarkable that someone with over 50 years of conservation experience is still making discoveries, still searching for the truth about our native and endemic species.

I am very glad to have returned to the island to join such a dynamic group of scientists, and conservationists, and I hope my knowledge and efforts will augment their work. We have achieved remarkable accomplishments in the conservation of sea turtles, seabirds, wetlands, caves, and fish spawning grounds over the past few decades, through partnerships between Government scientists, advocacy groups and committed individuals who have all devoted time, sweat and money towards these goals. I believe that Bermuda faces very tough challenges in the conservation of our marine and terrestrial ecosystems and that through collaboration and dissemination of knowledge we will have a better chance of success. In the future I believe

that this Year of Biodiversity will be seen as a critical turning point for our conservation efforts.

Dr. Robbie Smith

Curator

Bermuda Natural History Museum

VARROA MITE FOUND IN BERMUDA



A varroa mite on the body of a pre-adult bee that has been removed from its capped cell

In November 2009 an observant beekeeper, Lewell Woolridge Jr., found something new and unexpected in a swarm of bees he and his father had removed from within a ceiling at a house in Southampton: varroa mites.

A sample was sent to the USDA Bee Lab in Maryland, where it was

confirmed as *Varroa destructor*, a serious pest of bees. As a result of this find, a survey of wild (feral) hives and managed hives was undertaken by Agricultural Officer, Tommy Sinclair, to determine the extent of the infestation. A number of hives were inspected across the island and each parish checked tested positive for mite infestation. At the time of writing the only parishes not surveyed were Devonshire, Paget and Pembroke. This early information suggests that most local hives, managed or feral, either currently have mite infestations, or, based on scientific information about this pest and experiences from other countries, will do so shortly. It is unknown how or when this pest was introduced into Bermuda.

Varroa mites are considered to be the most damaging honeybee pest worldwide. It is a cosmopolitan pest, found in all countries, with the exception of Australia. If not controlled, the mite will kill almost all honeybee hives. Varroa mites are small (1-2mm) oval shaped red-brown discs that are suitably flattened to slide between abdominal segments of

the bee and feed on its haemolymph (blood). The mites reproduce inside the brood cells, and can be found predominantly in drone (male) brood cells and on adult drones. A smaller percentage of mites can also be found in worker brood cells and on adult worker bees. Developing mites feed on bee larvae within the cells. A pregnant female mite emerges from the cell with a new adult bee and searches for brood cells to invade and lay more eggs for the next mite generation.

The effects of mites feeding on adult bees can include: (1) introduction of bee viruses such as sac brood virus, chronic bee paralysis virus, deformed wing virus and Kashmir bee virus. These viruses can in-turn lead to reduced longevity and deformities of the bees; (2) abnormal brood pattern; (3) deformed wings and abdomens; (4) absconding of the bees (abandoning the hive); (5) reduced honey supply and; (6) decline and possibly death of the hive.

Interestingly, also in November, in light of the recent interest in Colony Collapse Disorder, and prior to the varroa mite being found in Bermuda, a bee colony health survey was carried out by the government entomologist. All the beekeepers surveyed indicated that their hives were thriving and they had suffered no noticeable declines in hive health, bee population and honey production in spite of what we now know to be varroa mite infested hives. Research indicates, however, that this situation is not likely to continue and both the managed and feral hives are expected to suffer negative effects and population declines in the near future.

The Departments of Environmental Protection, Conservation Services and Parks are developing a strategy to assist beekeepers with managing this novel pest. Overseas there are several synthetic pesticides that are being used to control mites. However, residues of these pesticides are often found in honey and wax of treated hives. It has also been shown that the bees themselves may suffer from the effects of these chemicals. This method of treatment has not received support from local beekeepers. Currently local beekeepers do not use any pesticides in their hives and they are interested in continuing beekeeping without the use of synthetic chemicals if at all possible. At the moment we are busy researching alternative treatments such as organic and natural pesticides, cultural controls and IPM (integrated pest management) techniques to control this pest.

The survival of the honeybee is critical not only for production of honey

but also for the pollination of numerous agricultural crops, fruit trees, ornamental plants and wild flowers. We are on a steep learning curve dealing with this new pest and can use your help.

The public can assist by contacting the Department of Environmental Protection (239-2311) to report the locations of any feral or wild hives. These may be in trees, houses, abandoned buildings or holes in rock walls. By monitoring the decline of the feral hives, we can track the progress of this emerging pest situation. You can also email any information about feral hives to bermudabees@gmail.com.

See subsequent articles for more information on Colony Collapse Disorder, Report from the North American Beekeeping Conference and updates on varroa mites.

*Claire Jessey
Plant Protection Officer
Tommy Sinclair
Agricultural Officer*

ESSAY COMPETITION

EnviroTalk wishes to announce it's first Essay Competition, open to students between the ages of 11 to 18. Students may submit one essay from the topic in their age category. **Please submit all entries to Essay Competition, Department of Environmental Protection, Botanical Gardens, 169 South Road, Paget, DV 04, by 5 April 2010. Preferably by hand.**

Age Category, Topics and Word Count:

11–13: Energy Conservation (Word count: 400-500 words)

14–15: Bermuda's Biodiversity (Word count: 500-600 words)

16–18: Environmental Concerns in Bermuda (Word count 600-700 words)

Topic Descriptions:

- **Energy Conservation:** Describe Energy Conservation and how it can be implemented in Bermuda. Describe ways to efficiently use energy on a small island. Describe two sources of renewable energy and explain how they can benefit Bermuda.

- **Bermuda’s Biodiversity:** Define and describe Biodiversity and how we as Bermudians benefit from it. Explain how we can conserve Biodiversity in our environment. Choose one of two issues to include in your essay:
 1. **Endemic and Non-native Species:** Emphasis must be placed on Bermuda’s endemic species and the threat that non-native species have on both their habitat and our economy.
 2. **Habitat and Climate Change:** Detail how habitat loss and climate change effects biodiversity and what conservation efforts we can use to eliminate or lessen their effects.
- **Environmental Concerns in Bermuda:** Describe two environmental concerns Bermuda is facing. Choose two of three issues to include in your essay:
 1. **Environmental Degradation and Conservation:** Emphasis must be placed on Bermuda’s Invasive species and how we can manage Bermuda’s native habitats.
 2. **Pollution and Waste Management:** Include information on water or air pollution and how we can properly manage Bermuda’s waste output.
 3. **Resource Depletion:** Include information on how we exploit Bermuda’s natural resources, what we as Bermudians can do to conserve our resources and how not conserving our resources hurt Bermuda’s economy. Resources to cover (choose two): over fishing and unregulated fishing, deforestation of green spaces, construction of farmland and over-consumption of resources.

Awards: First place winners will get their essay published in EnviroTalk. Second place winners will receive honourable mentions in EnviroTalk. First place, second place and notable writers will have their essays displayed at the Annual Exhibition.

Stipulations: All essays must be written by the student only. Adults (parent, guardian or teacher) may not write or dictate any portion of the essay. All essays must be handwritten and legible. If unable to handwrite (disability) please provide a typed essay with signature or printed name at the bottom of the essay. Please include name, age and school (if home school please note teacher or owner) in the top right corner of essay.

** A general understanding of the majority of the topics can be found in past issues of EnviroTalk. **

PLANTING CALENDAR – WHAT TO PLANT IN 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, Aubrieta, 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, Dianthis, 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.

BERMUDA ANNUAL EXHIBITION



OPEN DAILY:

Grounds:

8.00 a.m. to 6.00 p.m.

Exhibition houses:

9.00 a.m. to 6.00 p.m.

Admission:

Adults: \$10.00

Children under 16 years: \$5.00

Children under 5 years: Free

Senior Citizens presenting
identification: \$5.00

We invite the community to participate in this improved event. It is our mission to enlighten students about Bermudian traditions in agriculture, horticulture and animal husbandry.

The theme for this year's annual exhibition is Sustainable Bermuda and it is one of our goals to include within the divisions and sections the mandate to reduce, recycle and reuse.

For more details please contact:

The Annual Exhibition Office

P.O. Box HM 20, Hamilton HM AX

Botanical Gardens, 169 South Road, Paget, DV04

E-Mail: exhibition@logic.bm

Website: <http://www.bdaexhibition.bm/>

ON HER MAJESTY'S SERVICE



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