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PROMOTING APPRECIATION, ENHANCEMENT AND CONSERVATION OF BERMUDA'S ENVIRONMENT

WELCOME

to our winter edition of Envirotalk, just in time for the festive period. In this issue –

- **Dr. Sheila McKenna**, marine ecologist, and **Dr. Fred Ming**, Director of Environmental Protection, introduce the international initiative, The Sargasso Sea Project, which is being spearheaded by the Bermuda Government.

- As promised, **Claire Jessey**, our Plant Protection Officer, reports on how medicinal herbs and plants may be of benefit to Bermuda's bees.

- **Paul Harney**, President of the Botanical Society, leads us down memory lane as the Botanical Society celebrates their 25th anniversary.

- Bermuda's very own celebrity chef, **Fred Ming**, kindly allows us to use his wonderful cassava pie recipe.

- As usual, we have our popular Winter planting calendar.

Please contact:

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THE SARGASSO SEA PROJECT

The high seas, those areas of the sea situated beyond national jurisdiction,[1] are the least protected places on our planet. Although the high seas encompass 64% of our world's oceans and are subject to increasing threats, alarmingly few laws apply. As a result, a host of destructive activities occur outside national jurisdictions that impact numerous species such as tuna, billfishes, sharks, sea turtles, seabirds, whales, deep bottom dwelling invertebrates (e.g. sponges and corals) whose populations have declined drastically, leaving the integrity of open ocean ecosystems in question.

Recently, interest has grown in the Sargasso Sea. Defined by currents, (the Gulf Stream, the Canary Current and the North Equatorial Current), not coastlines, Sargasso Sea is a large, oval, North Atlantic sea mass rotating in a slow clockwise fashion. Although once thought of as lifeless due to its high salinity, the Sargasso Sea actually holds many species that are associated with or depend on the unique open ocean drift algae habitat formed by the *Sargassum*. This sea with its patches of floating seaweed forest boasts a wide variety of life with 1800 species of microbes[2], 145 species of invertebrates, over 100 species of finfish (e.g. billfish, dolphin, wahoo and tuna), five species of turtle, six species of marine mammals (e.g. humpback whales) and numerous species of sea birds (e.g. Bermuda petrel). Crucial habitat is provided for sea turtle hatchlings, juvenile fishes and the *Sargassum* fish by the drifting Sargasso seaweed. Further, the Sargasso Sea is the critical spawning site for two species of eel, (the American and European species), both of which have suffered severe population declines. Threats to the Sargasso Sea stem from: a) unsustainable fishing practices; b) pollution (e.g. intentional and unintentional ship discharges, tar and plastics); c) vessel traffic; and d) commercial collection of *Sargassum* weed for use as fertilizer, feed for cattle or extracts, and biofuel, though current levels are presently unknown.

So what can be done?

Since the 1980s there has been a gradual increase in the number of coastal and island states around the world where marine protected areas (MPAs) have been established as a way to manage human activity within important marine ecosystems. MPAs exist within territorial waters (e.g., up to 12 miles offshore for Bermuda) or within the larger exclusive economic zones, which extend 200 miles offshore and sometimes further. Having seen the success of these, marine conservationists, fishery scientists, legal experts and others have become committed to the idea of applying MPA principles

[1]Areas of the ocean not included in the territorial sea or in the internal waters of a state

[2]Microscopic living organisms such as bacteria, protists, virus and fungi

to the high seas. The challenges are many: providing robust scientific proof of the threats, getting many nations to agree on new policies and regulations, and their enforcement for the long term, mutual interest of all parties. On a global level, our failure to achieve such steps will deplete biodiversity and cause the destruction of established, and very complex oceanic ecosystems.

Within MPAs, human activities are regulated to ensure the continued health of the habitat and species. Working to establish specific high sea areas as MPAs, are a group of experts from various disciplines (e.g. species, fisheries, ecology and maritime law experts). To advance the realization of MPAs on the high seas, legal and scientific gaps need to be addressed while practical experience is gained through establishing pilot candidate sites. At the International Union for Conservation of Nature (IUCN) World Conservation Congress in Barcelona in October 2008, the Sargasso Sea was included as one of the top ten open ocean areas of particular significance in the publication, *High Seas Gems: Hidden Treasures of Our Blue Planet*. Subsequently, at the Convention on Biologically Diversity's Scientific Expert Workshop in October 2009, the Sargasso Sea was highlighted as an illustration of the kind of ecosystem that met the criterion for defining ecologically or biologically significant and unique areas in the open oceans and deep seas (McKenna and Hemphill 2009).

The Bermuda Government steps up to the plate

Most of the Sargasso Sea is in the high seas, and only a small portion is under national jurisdiction, within the Exclusive Economic Zone of Bermuda. International cooperation and action within the framework of the United Nations Convention on the Law of the Sea are thus essential. Recognizing the importance of this vast area of ocean and the need to protect it, the Bermuda Government along with international partners has taken its leadership role seriously; and, working to build the necessary political relationships with the assistance of the UK government, kick-started the initiative by convening a multi-disciplinary experts workshop in February 2010.

Private funds provide a head of steam

Thanks to US scientist Dr. Sylvia Earle who received the prestigious TED wish award, the Sargasso Sea was highlighted with the support of the Bermuda government and its partners as a Hope Spot during the Mission Blue cruise in April 2010. This resulted in raising the project's profile and in finding donor support for the alliance. Further, the importance of the Sargasso Sea and the alliance's goal to enhance its protection were

highlighted with Dr. Earle's visit to Bermuda with *Time* magazine this past September. The Alliance aims to mobilize support from a wide variety of national and international organizations, governments and donors for the institution of protection measures for the Sargasso Sea in a wide variety of fora. With private support now available, the Alliance has been able to appoint an Executive Director, to lead the initiative full time. Assisted by executive and steering committees, Dr. David Freestone, having just taken up the post on 1 December 2010, visited the island for a series of meetings to begin engaging all stakeholders here in Bermuda and abroad on this exciting new initiative under the leadership of the Bermuda government.

Dr. Sheila A. McKenna, marine ecologist, consultant,

Dr. Fred Ming, Director, Department of Environmental Protection

McKenna, S.A., Hemphill, A. (2009) Sargasso Sea: Uniqueness Illustration. Convention on Biologically Diversity. http://www.gobi.org/Our%20Work/rare-2

BEES – TASTING THEIR OWN MEDICINE

In March 2010, members of the Department of Environmental Protection had the opportunity to meet with a visiting animal practitioner who had interesting information to share regarding the health of bee populations. Ms. Elizabeth Whiter is a qualified animal and human healer, specializing in zoopharmacognosy. Zoopharmacognosy refers to the process by which animals self-medicate, by selecting and using plants, soils, and insects to treat and prevent disease. This behaviour has been recorded in chimpanzees, birds, elephants and many other animals[1, 2]. Ms. Whiter has travelled the world working with vets, doctors and leading animal charities.

Ms. Whiter was very interested to hear that our bees were dying in Bermuda as a result of the Varroa mite which was found in 2009. Based on the work that she does with larger animals, Ms. Whiter believes that ensuring our bees have easy access to a variety of those flowering plants and herbs considered to have curative properties, will allow the bees to select the 'medicine' which their immune system requires and boost their natural defences.

Plant-based medicines have been used since man discovered that positive effects could be gained from manipulating his intake of certain plant types. Scientists have evaluated the extracts of many plants for their healing and beneficial properties and confirmed their findings in respected medical journals. Extracts from the roots, leaves and flowers of medicinal plants have been evaluated for their healing properties[3,4,5,6] and it is possible that by association the nectar and pollen of these plants may have medicinal value also, although this has not been confirmed in scientific literature.

Oregano in flower. Photo courtesy of Lisa Greene

Bees collect nectar and pollen from flowers to use in their own hives for food for themselves and for feeding young, developing bees. Bees convert flower nectar into honey in the hive. Beekeepers harvest some of this honey for commercial purposes but always leave enough to sustain the hive. Ms. Whiter suggests that bees, like many other animals, will instinctively collect pollen and nectar from plants that possess the chemicals that confer healing qualities that the bees in the colony require.

Ms. Whiter recommends planting thyme and borage for their antimicrobial and antibiotic properties, and echinacea for immune-stimulation and its antimicrobial properties. She also reports that bees favour self-seeding English marigolds (different from French) for vitamin A and sulphur. Another easy-to-grow medicinal plant to have in the garden is clover. Most people kill clover in their lawn with herbicides because they find it unsightly; however Ms. Whiter recommends it as a blood tonic that supports the immune system of bees and notes that bees feed readily on it when it is available. Any of the more well known herbs such as flowering sage, marjoram, peppermint, rosemary and lavender will be beneficial to the bees, and can be utilised in natural remedy preparations by the gardener as well[7].

Borage in flower. Photo courtesy of Lisa Greene

In countries that rely upon monoculture cropping with vast fields of oilseed rape, almond groves, citrus or cranberry production, bees are limited to feeding on only one

source of nectar and pollen and as a result are unable to diversify their diet[8]. Pollen and nectar varies in its composition depending on the botanical source and scientists agree that an undiversified diet over time will stress the immune system of the bees allowing them to be more susceptible to pests and diseases[9]. Ms. Whiter adds that without access to herbs with healing benefits, the bees cannot self medicate or re-stabilize their immune system.

However, bees that have access to gardens with a varied selection of herbs, medicinal plants and good nectar and pollen sources allows foraging bees to diversify their diet and strengthen their immune system. Ms. Whiter suggests that this is what gardening enthusiasts can do in Bermuda to help our bees and she encourages any gardener to grow plants with medicinal properties and those known to be attractive to bees. And of course, herbs in the garden can naturally be incorporated into cooking recipes and many remedies and preparation guidelines can be found on the internet or at the library.

Although Bermudian beekeepers have not historically supplied their bees with additional food, such as liquid sugar, this is a practice that is employed in other countries when pollen and nectar sources are unavailable or limited, such as over the winter, or during a drought. The availability of naturally occurring food sources in Bermuda has been catastrophically poor this year for bees. Due to an unusually dry spring, the flowering of fiddlewood was extremely poor; the Mexican pepper that would have provided a fall honey flow was decimated at flowering by Hurricane Igor[10]. The coming months may, for the first time, have the local beekeepers considering providing their bees with extra food. Ms. Whiter suggests that using a natural, unprocessed sugar, most similar to that found in flowers, would be more suitable than sugar solutions made from refined white sugar and corn syrup preparations that are commercially available for bees. Ms. Whiter suggests using agave nectar, which is the sap from the agave plant, heated at low temperatures in a process similar to making maple syrup from maple sap. Ms. Whiter reports that agave nectar is high in iron, calcium, potassium and magnesium.

Ms Whiter also suggests that bee hives made out of cedar would be beneficial to the bees that would be housed in them. Based on the historical abundance of Bermuda cedar, *Juniperus bermudiana*, prior to its decimation by a scale insect in the 1950s Ms. Whiter suggests that feral (wild) Bermudian bees have probably co-existed with our local cedar trees using naturally formed holes in trunks or branches as a place to store their honey and raise their brood – a natural bee hive. In doing so, the bees would be utilising the medicinal properties of the wood to their advantage.

Juniper oils are considered to be antiseptic and have pest and disease repellent properties.

There is little doubt that Bermuda's bees are experiencing stresses this year that they have never faced before. The Department of Environmental Protection is developing a strategy based on international best practices to try and prevent further bee losses. Plants with medicinal properties have been utilised by humans and animals for their curative properties for centuries[11]; bees may also have this instinctive behaviour. Ensuring that our bees have access to many varied flowering plants by diversifying our gardens will support our bee population. Limiting the use of pesticides in our gardens and surroundings will also protect the bees from the negative effects of man-made chemicals. These seemingly small efforts to assist could well contribute to a healthier bee and a healthier environment for all.

[1]Reynolds, Vernon, *The chimpanzees of the Budongo Forest: ecology, behaviour, and conservation*. Oxford University Press. pp. 41–43, 2005.

[2]Mishra, Prof. Pradeep, Bhupesh C.Semwal, Sonia Singh, Zoopharmacognosy: Nature's Pharmacy Used by Animals, www.articlesbase.com, 2008.

[3]Weiguang Yi, Hazel Y Wetzstein, "Biochemical, biological and histological evaluation of some culinary and medicinal herbs grown under greenhouse and field conditions", *Journal of the Science of Food and Agriculture*, 90(6): 1063-1070, April 2010

[4]MedCentral Health System. A Guide to Common Medicinal Herbs. http://www.medcentral.org/Main/HealthLibrary/A-Guide-to-Common-Medicinal-Herbs-76.aspx

[5]El-Mansy, Laila Hussein et al., "Evaluation of antimicrobial effect of different medicinal herbs against single species of Enterococcus faecalis and Candida albicans (an in-vitro study)", *Egyptian Dental Journal*, 56(3.1), July 2010.

[6]Akharaiyi F.C. and Boboye Bolatito, "Antibacterial and Phytochemical Evaluation of Three Medicinal Plants", *Journal of Natural Products*, 3: 27-34, 2010.

[7]Hemphill, John & Rosemary Hemphill, *Complete Book of Herbs*, 1995. The Chancellor Press.

[8]Somerville, Doug, Honey Bee Nutrition and Supplementary Feeding, Agnote DAI/178. NSW Agriculture, 2000.

[9]Alaux, Cedric et al., "Diet effects on honeybee immunocompetence", *Biology Letters*, 2010

[10]Personal communication Randy Furbert, Beekeeper and Tommy Sinclair, Beekeeper. October 2010

[11]M. Adams, C. Berset , M. Kessler , M. Hamburger, "Medicinal herbs for the treatment of rheumatic disorders—A survey of European herbals from the 16th and 17th century", *Journal of Ethnopharmacology*, 121: 343–359, 2009.

For more information on Elizabeth Whiter please visit www.healinganimals.org.

Claire Jessey
Plant Protection Officer

25 YEARS AND STILL 'GROWING'...

Bermuda Botanical Society

In the summer of 1985 a small band of botanical enthusiasts under the leadership of Dr. Roberta Dow of the Ministry of Agriculture and Fisheries, fondly termed "Ag and Fish", gathered in the building named Horticultural Hall in the Botanical Gardens. The purpose of that meeting was to see if there was enough public interest in the botanical sciences to form an association. It was unanimously agreed upon that day.

With 30 members, a constitution was written at a meeting on 23 September 1985, and the first general meeting was held on 25 November of the same year.

The Mission of the Bermuda Botanical Society remains today:

To encourage and support the botanical sciences within the community and promote the further development of the Botanical Gardens and Arboretum

On 4 December 1987 the young society was registered as a permanent charity under the 1978 Charities Act.

Through the years the Bermuda Botanical Society or 'BBS' has worked closely with managers of the Botanical Gardens, such as Horticultural Officer Mr. Peter Truran, to discuss planning and development. Monies have been raised by the society and donated to the Botanical Gardens for special projects such as the National Bonsai Garden which was established by society members who donated their own plants to the project; repairs to the roof of the Cacti Garden; the Blind Garden etc.

Some significant launches for BBS were:

- 1988 – Began the Annual Plant sale, fundraiser
- 1989 - Moving into the former Tavern on the Green building
- 1995 - BBS launched Botany Camp, a summer programme for children aged eight to 13 years
- 1997 - BBS society created the Dr. Roberta Dow Scholarship Fund.
- 2000 – Launch of Fall Festival
- 2009 – Recreating subcommittees Events/Finance/Operations/Scholarship
- 2010 – Current president in talks with Parks for a 21-year agreement for continued use of the Visitors Centre building

Over the span of time dedicated volunteers from BBS have led countless tours for enthusiasts, ranging from overseas visitors to local school students, through the Botanical Gardens during most months of the year.

BBS has established relations with many recognised national and international botanical gardens such as Kew Gardens; The Royal Botanical Gardens of Edinburgh; the New York and the New Jersey Botanical Gardens. The BBS was also involved in the opening and development of the Botanical Gardens in the British Virgin Islands. The society members have been fortunate to have enjoyed lectures by visiting officials from all of the above listed gardens and other renowned facilities.

My interest in gardens began at a young age, having been inspired by the gardens created by both my grandmothers, one in England and the other on the island of Somerset. My parents nurtured my interest as a youngster and as an adult I carved a career out in the industry. I joined the BBS to expand my knowledge of the botanical sciences and to meet like-minded people. I never dreamed that one day I'd be President of the Bermuda Botanical Society. It is a true honour to be part of something so beautiful, which has such an impact on so many thousands of people, and which connects us all, Bermudians and non-Bermudians alike.

It is my desire to create sustainability in this quarter-century 'young' society by continuing to assess our mission and fine tuning our position in society by keeping ourselves relevant to the needs of our diverse community, which includes people of all ages and abilities.

It truly is an honour to serve with the employees of the Parks Department. Ms. L. D. Johnston, Mr. M. Darrell and Mr. N. Richardson are doing a good job with their respective teams at the Botanical Gardens and we want to say thank you for keeping the Botanical Gardens something to be proud of.

Finally, I want to repeat what I said at our 25th 'kick-off' anniversary dinner celebration held this Thanksgiving and that is thank you to all of those people who worked so hard from 1985 to 2010 to keep the BBS alive and purposeful; we have something good to build upon.

Here's to another 25 years Bermuda Botanical Society.

Paul Harney, President ~ 2010-2011

LYN VAUGHAN RETIRES

Nine years ago Lyn was hired by the Botanical Society as Volunteer Co-ordinator. At that time we were still located in the room which is now the Education Room with a small shop, café and many volunteers.

When we moved into the new Visitors Centre with a much larger shop and

café and less volunteers Lyn's role expanded to Manager. She also worked a lot more hours, and if that was not enough, volunteered to get the work done. The shop was her joy and we all remember the many lovely items she found overseas.

The Visitors Centre was a warm place for volunteers and visitors. Visitors could always ask Lyn any question about plants, transportation and other places of interest.

Our volunteers and executive wished Lyn a happy retirement at a tea party on her last day of work. Now she will have time to enjoy her home, garden and pets and to take those trips she was dreaming about.

IN THE KITCHEN

CASSAVA-FARINA PIE RECIPE

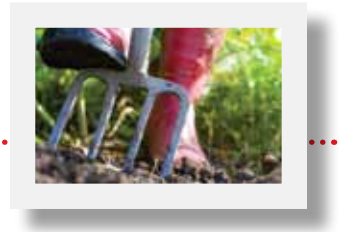
Ingredients:

½ lb. farina
1 ½ lbs. cassava
6 eggs
8 oz. butter
4 oz. Crisco
6 oz. sugar
Nutmeg to taste
Salt
Vanilla and lemon flavouring
2 ½ lbs. cooked chicken
2 cups milk or stock – more if mixture is still dry

Method:

Soak farina in milk or stock in which the chicken has been cooked until all the granules are saturated. Mix well with the drained cassava, add the sugar and salt, soft butter and Crisco. Mix in thoroughly. Stir in the eggs until the batter is of a light consistency. Place some of the mixture on the bottom of a greased casserole, garnish the centre with the cooked, diced chicken, and cover with the remainder of the mixture. Bake for approximately 150 minutes, basting frequently with cooking liquid from the meat.

Many thanks to Bermuda celebrity chef, Fred Ming, for allowing us to reproduce his cassava information and recipe from his cook book, *Bermuda Traditions*. Copies of this book are available from book shops.



WHAT TO PLANT IN WINTER...

Vegetables

December

Beans, Beets, Broccoli, Brussels Sprouts, Cabbage, Carrots, Cauliflower,

Celery, Chard, Chives, Kale, Leeks, Lettuce, Mustard Greens, Onions, Potatoes, Radish, Rutabaga, Spinach, Squash, Strawberry, Tomato, Turnip.

January

Beans, Beets, Broccoli, Brussells Sprouts, Cabbage, Carrots, Cassava, Cauliflower, Celery, Chard, Christophine, Kale, Leeks, Lettuce, Mustard Greens, Potatoes, Radish, Rutabaga, Spinach, Squash, Tomato, Turnip.

February

Beans, Beets, Broccoli, Cabbage, Carrots, Cassava, Cauliflower, Celery, Chard, Christophine, Corn, Cucumber, Kale, Leeks, Lettuce, Mustard Greens, Potatoes, Pumpkin, Radish, Rutabaga, Spinach, Squash, Sweet Potato, Tomato, Turnip.

Flowers

December

Ageratum, antirrhinum (snapdragon), aster, aubrieta, begonia, bells of Ireland, candytuft, carnation, centaurea, chrysanthemum, cineraria, dahlia, dianthus, geranium, gerbera, gypsophila, impatiens, larkspur, lathyrus, nasturtium, nicotiana, pansy, petunia, phlox, rudbeckia, salipiglossis, salvia, statice, snow-on-the-mountain, spider flower/cleome, star-of-the-veldt, stock, sweet William, verbena and viola.

January

Agratum, antirrhinum, aster, aubrieta, begonia, bells of Ireland, candytuft, carnation, centaurea, chrysanthemum, cinerariam, dahlia, dianthus, geranium, gerbera, gypsophila, impatiens, larkspur, lathyrus, nasturtium, nicotiana, pansy, petunia, phlox, rudbechia, salipiglossis, salvia, statice, snow-on-the-mountain, spider flower/cleome, star-of-the-veldt, stock, sweet William, verbena and viola.

February

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, Africa daisy, dianthus, forget-me-not, geranium, gerbera, globe amaranth, globe gilia, godetia, gypsophila, hollyhock, impatiens, larkspur, lathyrus, marigold (African), marigold (French), nasturatium, nicotiana, pansy, petunia, phlox, phlox (annual), red tassel flower, rose everlasting, rudbeckia, salipiglossis, salvia, scabiosa, statice, snow-on-the-mountain, spider flower (cleome), star-of-the-veldt, stock, sweet pea, sweet William, verbena and viola.

ON HER MAJESTY'S SERVICE

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