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SEMINAR:**

Nature's **UPCOMING ACTIVITIES** **jottings**

Newsletter of the Natural History Society of Jamaica Dec. 08

THE BOWDEN SHELL BED: THE MOST FAMOUS FOSSIL SITE IN JAMAICA

Presenter: Tom Stemann, Lecturer, Dept. of Geography and Geology, UWI, Mona

Date: Thursday, December 4, 08 at 5.30pm

Venue: UWI, Department of Life Sciences Seminar Room, Room 1, Block B

All are welcome and this should be a most interesting talk so please publicize it.

BELOW ARE SOME NOTES ON THE BOWDEN SHELF BY TOM STEMAN.

The Bowden Shell bed near Port Morant in St. Thomas was first described in 1859 and since that time has become widely known in palaeontological circles with its fossil fauna discussed in hundreds of scientific papers. The site itself is usually not very awe-inspiring- simply a bushy slope along the base of Bowden hill most people would pass by without taking a second look. When cleared, however, it yields the most diverse collection of fossil clams and snails found anywhere in the western hemisphere.

The fossils are beautifully preserved and approximately 3 million years old. They include molluscs, corals and other marine invertebrates and come from a critical period in Caribbean evolutionary history before the formation of the Isthmus of Panama. A new research project supported by the National Geographic Society and the Smithsonian Institute has brought together paleontologists from the Smithsonian Tropical Research Institute in Panama, the Scripps Oceanographic Institute and the UWI, Department of Geography and Geology to take another look at the Bowden fossils. As part of this study, the site was cleared and extensively sampled last June.

My presentation will give an overview of the site, review of the history of studies of the Bowden and discuss how and why we are looking at it again. I'll bring in images of the site as well as samples. I hope to organize a short field visit for everyone as well.

SONJA SERRANT

Sonia Serrant passed away earlier this year. Below is a copy of the citation presented to her when she became an honorary member of the NHSJ in 1996. We hope to bring you some of her early natural history studies at a later date.

CITATION IN HONOUR OF

SONIA SERRANT

For fifty six years you have been a faithful, enthusiastic member of the Natural History Society of Jamaica.

You joined the Society in 1942 when you were fourteen years of age – the youngest member then.

1942 was the year you were awarded second prize for your age group in the Matley Essay Competition promoted by the Institute of Jamaica. You were attending St. Hugh's High School then. In 1945, when you were an A- Level student at Wolmer's Girls School, your entry for the Matley Essay Competition gained first prize. This essay was on Ferns, Wild Plants and Trees in Westmoreland and St. Elizabeth.

You have participated in most of the field trips organized by the Society since you were twenty one years of age. Through these you have seen much of the Island's flora and fauna.

Your love of plants and your acute memory allows you to have at the tip of your tongue the scientific names of numerous trees, shrubs, grasses and weeds which most people do not know but here you identify with some amusement tinged with hidden envy.

You have been a member of the NHSJ's Education Committee from its inception in 1992. The valuable knowledge you acquired through study, through the field trips you attended and through teaching Botany at the high school level for thirty five years have made you an asset to the Education Committee. Through your illustrated articles for the Children's Own Magazine you have been sharing your knowledge with Jamaica's primary school children.

At the request of the President of the Natural History Society, Dr. Eric Garr away, you are writing an account of your fifty six years as a member of the Society.

The Natural History Society salutes you as a remarkable person and a dedicated member.

There was a very well attended field trip to the Caymanas factory to view the use of bamboo in the production of furniture and a number of associated items. The owner, John Hamilton, gave a fascinating talk and demonstration. Although the bamboo commonly found in Jamaica is mostly used he showed us other varieties that he grows and experiments with.

Your Settings
Activities Reports

Field trip to Fellowship Hall , St. Mary
Saturday, October 11th, 2008
Leader: Ralph Sutherland

There are not many coconut farms left in the parish of St. Mary, that are still commercially viable after decades of savage attacks by the Lethal Yellowing disease (LY). Like coconut farms in St. Thomas and Portland, Ralph Sutherland diverted to the production

of coconut water since the production of copra for coconut oil had to be abandoned because LY had wiped out up to 80% of Jamaica's coconut trees. Much cheaper imported soy oil eventually replaced the then so familiar locally produced coconut oil.

Lisa and Andrew Gordon, old -time friends of Ralph Sutherland, made arrangements for the visit to his 200 acre farm. Weather forecasts indicated an improvement after a series of washed out week ends.

We met at the SRC at 08:30a.m. and departed by 09:00 a.m., being joined by other members at Manor Park and Stony Hill en route to Junction Road. On reaching the junction, progress on road construction was evident right through Port Maria and Oracabessa. Many section were completely re-routed with solid civil engineering inputs like new bridges and raised road levels. A bit of old Jamaica's road side scenery had disappeared.

In Oracabessa, the center of the town was closed to through traffic and a detour via James Bond beach – formerly the banana wharf - had to be taken to get back to the main road, direction Boscobel. Urbanization along the widened A3 made it difficult to find the the turn to Mango Valley Road. Helpful folks on the road side showed us where to turn for Mango Valley and thence to Fellowship Hall. As indicated on the map, the road wound up to a lofty altitude with breathtaking

views of the north coast, passing from time to time through wood- lands and settlements. Neither sign nor stands of coconut trees betrayed the entrance to the farm. Following the villagers direction, we turned back a few yards and took a sharp right turn into an inconspicuous, winding driveway, where we were greeted by Ralph Sutherland in boots, the farm's center being just around the corner, ending on a gentle slope. Various older buildings with more recent additions

zinc roofed sheds, laundry lines and rusting parked implements rendered a rustical rural charm to this idyllic setting, a relief from the architectural atrocities of St. Andrew.

The jewel of this setting is the Sutherland family house, built on a cut-stone foundation in lumber with clinker walls, sash windows, zinc roof extended over the front porch, and a lawn with the view ending in a massive rubber tree, serving as a natural windbreak. Our host came quickly to the topic, the menace of the LY – type diseases, that are prevalent not only in coconut palm (*Cocos nucifera*) but also in other palm species. In Jamaica LY had been first described in the 19th century and came on many Caribbean islands and later in Central America, Mexico and Florida. It is caused by a mycoplasma (a bacteria like organism with no cell wall) and transmitted by the sap-sucking plant hopper, *Myndus crudus*.

Hurricanes may have aided its distribution.

Save of a few prominent stands in the island, the then dominant Jamaican Tall had been wiped out during the forties and fifties. The Coconut Industry Board's record shows, that out of the 6 million susceptible Jamaica Tall coconut palms in 1961, 90% had been killed by LY by 1981.

The progressive symptoms of LY are mainly the following:

1. premature drop of most of the fruit regardless of their development stage
2. blackening of newly opened inflorescences
3. ascending yellowing of the leaves (from lower to upper)
4. spear leaf death and collapse, with possibly a few green leaves remaining
5. fall of the whole crown, leaving a bare trunk

Infected plants usually die within 3 to 7 months after appearance of the first symptom. When the nature of the causal agent was discovered, antibiotic injections were tested in Florida and Jamaica. It was found that the tetracycline group of antibiotics suppressed the symptoms development if applied before leaf yellowing. However, this chemotherapy was not applied on a commercial scale because of its high cost.

The Malayan Dwarf (of yellow-, red-, or green fruited types) were the first cultivars identified as tolerant to LY during the 1950s in Jamaica. They were also planted on a large scale in Florida. However these dwarfs were found to be quite sensitive to the environmental stresses such as drought, insect attacks and hurricanes. They were gradually replaced by a new tolerant hybrid called “Maypam”, obtained in Jamaica by crossing the Malayan Dwarf (red and yellow types) as female and the Panama Tall as male.

As it turned out, the Maypam hybrid, previously considered highly resistant, is currently devastated by a renewed outbreak of LY . There are several possible causes for this change.

Studies have been conducted since LY affected planting material in Jamaica by using the DNA comparison method with cultivars of five different countries.

An update on results may be obtained from the Coconut Industry Board.

Mono cultures are prone to diseases and it may seem that constant generic modifications are required to secure existence of coconut palms here in Jamaica and elsewhere.

The late Mr. Moxon, a retired British Army officer dedicated much of his time by creating a cottage industry, utilizing coconut palm trunks for products like floor paneling and craft. He also ran the famous restaurant with his name.

Ralph Sutherland tried to produce copra at one stage. Because of the long drying period required to produce copra, he experimented at one stage with the setting up of a

“barbecue” to accelerate the process. One day however, a fresh breeze fanned up the fire and the nuts caught fire too.

He considered eventually to enter the more lucrative coconut water bottling industry, which had been aided by various agencies including the OAS. The Jamaica Bureau of Standard established the parameters for the bottling of coconut water, which is highly susceptible to bacterias, causing fermentation. We had been guided through his rather rudimentary plant donning plastic bonnets on entering the chilling and filling section, protected by a fly screen.

Sanitation begins with a dip of the nuts in a bleach solution. One worker sits outside to cut the nut with his a cutlass, which also has to be dipped for disinfection. He did five nuts in a minutes.

The decapitated nut is passed through an opening to a lady in charge of emptying it's contents into a vessel. The coconut water is filtered to remove debris and chilled and afterwards filled in sterilized plastic bottles. Labeling

(Mellow Fellow brand) is done at a later stage. This operation requires electricity for chilling and light.

For our lunch we got a bottle each 'on the house'; by guarantee not diluted with tapped water.

An other field of agro diversification on the farm is the cultivation of scotch bonnet pepper.

Ralph Sutherland had us walking to the field, equipped with a drip irrigation system.

The crop had been harvested and only a few peppers were left.

The harvest is sold to processors of pepper sauce.

After lunch on the porch of this lovely house we gradually got on our way back to town.

There was of course the visit to “Crab Woods” on the program, the area above the honeycomb cliffs at Galina, an intriguing thickly wooded district at Mason Hall.

While most of the members left directly for Kingston, I was determined to cross this district from a road in Oracabessa to Mason Hall and Grants Town back to the main Road to Port Maria.

The time was very limited, so we could not conduct any scouting into the bushes.

We made inquiries at a bar/shop on trails, one leading through the “jungle” down the cliff to Galina. This was very exiting to hear and noted the location for a dedicated field trip in future.

As we continued in direction Grants Town, we occasionally saw evidence for the existence of a probably fairly intact endemic wood land.

The lady passengers, Jeane Cohen, Hazel Richardson, Joy Royes and Cicely braved the rough ride back home just before dark.

Prepared by Hermann Tobisch

(References on LY from Ralph Sutherland and the Coconut Industry Board)

Seminar on Molecular Phylogeny

by Wayne McLaughlin

September 25, 2008

Life Science Department

Molecular Phylogeny is a study of the genetic diversity of viruses, bacteria and plants and also a study of genetic relationships.

Darwin's theory of evolution by natural selection underlies all modern biology. Darwin had concluded that every living thing shares an ancestry.

DNA studies can reveal unexpected relationships between seemingly dissimilar groups. One strand of DNA is always retained in replication so this will be passed on in several generations.

Pigmentation in Zebra fish and Humans

It was found that melanin in fish and in humans is similar.

The gene is SLC 24A5. Phylogenies or evolutionary trees are basic structures to measure similarities or differences in species. Comparison of genomes will yield to phylogenetic separation.

(Example of a phylogenetic tree was shown, but cannot be reproduced in this report)

Taxonomy aims to group organisms according to shared characteristics.

Molecular Biology

Genetic diversity of plants, bacteria and viruses.

Plant Microbe interactions

Insect-Microbe interactions

A chart of phylogeny of kidney beans was shown here.

Work was done on the kidney beans and peppers throughout the Caribbean, tomatoes,

Lethal Yellowing

In Lethal yellowing in coconuts there is a plant microbe interaction.

Markers used to infer Phylogeny

Restriction enzymes sites (enzymes are present in bacteria)

RAPD

AFLP

Microsatellites

Molecular sequences

DNA

Amino acid / protein

Restriction Sites

Early work on variations in DNA sequences used variations in restricted sites.

Restriction enzymes are produced by bacteria.

Restriction fragments

Restriction sites can change by mutation.

Matrix

Species [Character in terms of the bands

[-----

[1 2 3 4 5 6 7

The phytoplasm will correspond with character.

Phylogenetic Tree or Phylogram

This would be used to explain relatedness.

Diagram given

Each node represents an ancestral line. Branch connections and length of lines are important.

Longer lines show more diversity. Relationships are shown in the phylogram.

RAPD or AFLP data in Phylogeny

A given DNA band is present when a PCR primer sequence.....

In RAPD, analysis is carried out using 10 – mer primers

Randomly selected primers

All 10 bases must match the template for amplification.

AFLP more tedious process

AFLP detected differently from RAPD

AFLP 20-mer primers

RAPD Jamaican Tangerines

Genetic relatedness of peppers

Microsatellite (VNTR) loci

Tandemly repeated sequences – di, tri, tetra, penta.

Number of copies of the repeat used within the species.

Increased genetic variation.

A marker that is highly variable in a species and cannot be found in a neighbouring species.

Molecular Sequences

In principle all parts of the genome are descended from one much smaller ancestral piece of

nucleic acid.

All genes and genomes have originated from this genome by:

Duplication

Ancestral genes

Mitochondria

Viral coat protein

Replication

Mitochondria genome originated from the bacterial domain of life.

Inferring phylogeny from sequence requires key software.

The ribosome is a large complex of both component RNA and protein, but it is the RNA component

that catalyzes one of the most fundamental and most highly conserved biochemical activities:

Protein Synthesis

RNA is present in all extant species and presumably dates back to the earliest forms of life.

Phylogeny – Molecular Sequence

Identify the DNA sequence of interest.

Identify other sequences.

Target genes.

Alpha -proteo bacteria- an ancient bacteria.

Summary

Relationships of the taxa

Relationships of the sequences

Relationships of the functional genes

Prepared by Cicely Tobisch

Bamboo Factory Field Trip

On Saturday November 8 there was a very well attended field trip to the Caymanas factory to view the use of bamboo in the production of furniture and a number of associated items. The owner, John Hamilton, gave a fascinating talk and demonstration. Although the bamboo commonly found in Jamaica is mostly used he showed us other varieties that he grows and experiments with.

Associated meetings and activities

Joy Royes represented the NHSJ at the EFJ's Membership and Stakeholders Forum in October. Andreas Oberli attended the Strategic Forest Management Plan 2009 - 2013 workshop. Both submitted reports to the NHSJ Committee.

Andreas Oberli and Hermann Tobisch were volunteers in NEPA's beach clean up at Palisadoes on Saturday, November 18, 2008. It had been found that garbage was hindering the progress of the hatchling turtles on their journey down to the sea. The good news is that in monitoring the turtles NEPA representatives found that at least 9 female turtles came more than once during the season to lay their eggs on Palisadoes beach.

Hermann submitted a brief report in which he states that he is preparing a longer Jotting for us. We look forward to that.

Below is a copy of the email to them from Ricardo Miller Environmental Officer, Ecosystems Management Branch, NEPA

I would like to thank all the persons who turned out on Saturday to give their time and effort in cleaning the turtle nesting beach along the Palisadoes. Trying to clean the entire 3 km stretch of beach was more than ambitious and we did not get close to finish, but nevertheless, the sections that we cleaned were cleaned well. We hit a few hurdles, such as a late start and vehicles getting stuck in the sand but we managed to get alot of work done.

Special thanks to the UWI contingent who came out in a large numbers and did a really good job. Thanks to Hermann and Andreas who operated as if they were on solar. Thanks to the two 'late bugs' (they know themselves) who worked as if they were making up for lost time. Thanks to the accounts staff who always manage to accommodate me and my late request for funds. Drivers: Bailey, Magnus and Scottie (Henry)... nuff thanks.

Unfortunately, everyone was so busy at work we had no time to take pictures of people in action. I have added a link nonetheless that shows the work that has been going on since the start of the survey on September 15.

<http://picasaweb.google.com/Hopandskip/SeaTurtleMonitoringAlongThePalisadoesKingstonJamaica#>

Take note of the baby turtle that got stuck in the container of water. I am sure by our efforts last Saturday the chances of this happening again are greatly reduced.

Thanks all.

Prepared by Jill Byles 27/11/08