

ENVIRONMENT

Size isn't everything: insights into fascinating Protozoa

Can you recall your last "banana/fig hunt" in the market where you favoured larger better-looking bananas over the smaller locally-grown "figs?"

Or how about your last trip to the orchid show, when your eyes were drawn to the larger, brightly coloured flowers, automatically dismissing the smaller, less captivating buds? And what about your team selection for the recent World Cup? Did you support a team that was renowned for its skill and finesse on the field or an "underdog" whose chances of making it beyond the group stage were slim at best?

Size more often than not matters to humans. In our appreciation of the natural environment, this also holds true as we sometimes overlook "smaller" seemingly insignificant organisms. However, our focus today will be on a fascinating phylum of organisms called protozoa which have significant impacts on ecosystem health and human well-being.

One of the things that make protozoa so unique is the fact that all of their life processes are conducted within the confines of a single cell. This contrasts greatly with the vast array of multicellular organisms which have a more complex setup whereby a group of cells form tissues, a group of tissues form an organ and a group of organs form a system eg the circulatory system or the respiratory system.

A single protozoan cell is comprised of many organelles (sub-units which are responsible for carrying out specialised functions). Structures such as cilia and flagella aid in locomotion, contractile vacuoles assist with the removal of excess water, mitochondria produce energy and the chloroplasts play an important role in photosynthesis (the process whereby light energy is converted into chemical energy). How then are these unicellular organisms relevant to the environment and humans?

Can you remember your last visit to the Buccoo Reef in Tobago when you peered through the glass panels of the tour boat and marvelled at the sight of live coral? Well, protozoa were responsible for that sighting.

Some types of protozoa (dinoflagellates-specifically those called zooxanthellae) have a mutualistic relationship with corals. This relationship is defined as mutualistic because both organisms benefit; zooxanthellae are provided with a secure habitat within the corals while the corals are supplied with food from the zooxanthellae. Only corals with mutualistic zooxanthellae are reef-building corals. Locally then, protozoa are essential components of the reefs that we find in Tobago (eg Buccoo, Speyside). Coral bleaching, a process whereby zooxanthellae are expelled from corals as a result of warmer



GREAT star coral with christmas tree worms in Tobago.

PHOTO BY RYAN MANNETTE

waters, pollution or disease, has unfortunately been recorded in Tobago within the last decade and is one of the many threats to coral reef ecosystems.

Can you also remember waiting hours in traffic to catch a glimpse of the glowing Ortoire River in April of this year? Once again, protozoa were responsible for that glow. Certain types of protozoa (dinoflagellates) are capable of producing a bluish-green light.

This phenomenon, bioluminescence, involves the production of light as a result of a chemical reaction by a living organism. Protozoa are not the only bioluminescent organisms, as this phenomenon also occurs in certain fish, fireflies and fungi. Biologists suggest that bioluminescence may be employed as a means of defence against predators, which possibly

explains why the water in the Ortoire River had to be agitated before the bluish-green light was observed.

Soca artiste Alston "Becket" Cyrus once belted out the line, "Small pin does look hard". This phrase describes the potential impact of certain protozoa on human health.

The "small pin" in this case a particular unicellular protozoan, is capable of impacting negatively on human health by causing diseases. Humans may come into contact with parasitic protozoa such as Giardia and Cryptosporidium upon exposure to contaminated water. These parasites occupy the intestines of humans (the host), exit the body via faeces and can cause diarrheal illness.

The faeces of infected humans or animals may contaminate water in instances where sewage effluents and

runoff from animal farms enter natural water bodies. Simple measures such as boiling and filtering water have been recommended to ensure that certain protozoan parasites are killed or removed from drinking water.

When most people hear of the disease malaria, the majority of the blame often falls upon the Anopheles mosquito. However, it is important to understand that the Anopheles mosquito is simply the vector (or carrier) of the protozoa Plasmodium vivax. The protozoa are the actual culprits which invade a human host and cause the disease malaria. Over the years, a few cases of malaria have surfaced in Trinidad and Tobago.

At the end of the day, protozoa are truly fascinating. Although they are merely single celled, we multi-cellular organisms cannot afford to ignore them! And even though size often matters, it might be worth your while to sometimes consider the smaller locally-grown "silk figs" which are often sweeter than their larger counterparts, the less captivating orchids which might actually be fragrant and the "underdog" team that might just make it to the World Cup finals and have a shot at winning the match!

Today's feature was written by La Daana Kada Kanhai (Instructor I-Environmental Biology, Department of Life Sciences, UWI). For more information on our natural environment, you can contact the Trinidad and Tobago Field Naturalists' Club at admin@ttfnc.org or visit our website at www.ttfnc.org. The Club's next monthly meeting will be held today at St. Mary's College, POS. Today's lecture: "Update on the status of seabirds in Tobago" presented by Darshan Narang.



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