THE 963rd MEETING OF THE BRODIE CLUB

The 963rd meeting of the Brodie Club was held on January 15, 2002 in Room 462 of the Ramsey Wright Building of the University of Toronto

Chairman: Fred Bodsworth
Recording Secretary: Ed Addison
Attendance: 18 members and 4 guests
Guests: Ann Fowle, guest of Bernard Muller
Steven Rowe, guest of Trudi Rising
Jim Jones, guest of Bruce Falls
Kirsten Burling, guest of Ron Scovell

Minutes of the 962nd meeting were approved as circulated and there was no business arising from the minutes. There were no reports from committees, no new business, and no election of new members or officers.

Bernard and Claire Muller are looking to meet with others interested in discussing problems of population growth. Jock McAndrews spoke of the contents of an article in the recent issue of New Scientist in which the author(s) point out that the increasing empowerment of women in world societies is providing thjem with greater controil over their own destinies and is leading to reduced reproductive rates.

The speaker was Dr. Sherwin Desser, introduced by Bruce Falls. Dr. Desser is professor of parasitology and for nine years was chair of the Department of Zoology at U of T. The entertaining talk was entitled:

How a Little Knowledge of Parasitology can Ruin your Life

Using vivid and local examples of protozoans, trematodes (flukes), cestodes (tapeworms) and nematodes (roundworms), Sherwin reviewed how parasites and diseases are intimate parts of our lives as acquired by what we eat and drink, by our choice of pets and by our travel and sexual habits. In short, he advised “Eat, drink and be merry and be infected”! While most parasites live in harmony with their hosts, providing a balance where both thrive, there are some particularly nasty organisms in southern Ontario.

Parasites from Food

The beef tapeworm, Taenia solium, is acquired when consuming poorly cooked meat infected with larval tapeworms. The ribbon-like, segmented adult worms attach with hooks and suckers to the wall of our intestines. They compete with us for nutrient which is not a problem as long as we are well nourished. Sherwin

showed a slide of an advertisement from an Eaton's Catalogue from the 1920s: "Eat, eat, eat and always stay thin – no diet, no baths, no exercise"; "FAT, the enemy that is shortening your life is banished. How? With sanitized tapeworms".

The pork tapeworm (Taenia solium) has a similar life cycle but can cause serious problems. When humans ingest eggs of the beef tapeworm (rather than larvae in eat), the eggs pass. However, eggs of the pork tapeworm hatch, penetrate the intestinal wall, and distribute via blood to tissues throughout the human body. A slide illustrated a larval pork tapeworm multiplying within a human eye.

The innocuous tapeworm, Diphyllibothrium latum, normally lives an adult in the intestine of fish. The eggs are passed in water, larvae develop in copepods, and then encyst in the muscle of fish. Humans acquire infections of adult worms by eating poorly cooked infected fish. Both the beef and fish tapeworms may be up to 15 m in length making them the longest land animal known to mankind. This tapeworm makes a good pet: "it is long-lived (15 yrs.), needs no exercising, there is no litter, they eat when you do, and every day or two you can have a conversation with segments being passed"!

Encysted larvae of the roundworms, Anisakis simplex and Pseudoterranova decipiens, may be in thinly cooked raw fish eaten as sashimi or sushi. The adult worms are in intestines of pinnipeds. Eggs, shed in feces, are conumed by and develop in aquatic invertebrates that are in turn eaten by fish such as cod, haddock, herring, etc. When living larvae from poorly cooked fish are consumed by humans, the larvae may penetrate the stomach wall sometimes leading to perforations and peritonitis.

The probable handling or consuming of poorly cooked frog's legs have created two serious mysteries and anomalous infections (one a fatality) in humans from southern Ontario. A woman from Belleville complained of something moving within her eye. After much investigation, it was identified as a larva (metacercaria) of the trematode, Alaria Americana. She had likely acquired the infection five years prior while collecting and freezing frog's legs for eating in winter. The metacercaria was killed with a laser and she recovered her eyesight. About 10 months later, a boy also from the Belleville area died. His internal organs were riddled with thousands of larval flukes consistent with Alaria. Infected muscle of Many bull frogs infected with larval Alaria were found in the rural area where he had resided. One bull frog had approximately 40,000 larvae in the legs! Infections can be acquired by consumption or by handling infected frog legs and then rubbing the eyes.

Parasites from Drink

Cryptosporidium parva is a protozoan parasite present in water. Humans become exposed most often when drinking water processed in antiquated water

treatment plants. A number of years ago in Milwaukee, Wisconsin, approximately 500,000 people all acquired diarrhea at one time. It was caused by Cryptosporidium in the drinking water.

Another protozoan, Giardia duodenalis, are sometimes acquired by canoeists, hikers and others consuming unsterilized drinking water in the outdoors. Infections have also occurred in communities including Aspen, Vail and Sydney, Australia before the Olympics.

Parasites from Dessert

Sherwin referred to

Sherwin referred to Cyclospora cayetanensis, another protozoan, as “dessert delight”. This parasite was unknown to mankind until discovered ten years ago. Humans in Toronto acquired infections from raspberries and strawberries imported from central America.

Parasites from Travel

Parasites are often acquired while traveling, particularly to tropical areas. One strain of malaria is deadly. Malaria keeps adapting by developing resistance to anti-malarial drugs as they are developed. In 2000, there were 1000 malarial cases in Toronto and 7 infected people died. Early detection can lead to successful treatment and avoidance of death.

The long list of other possible infections acquired in travel include Chagas disease, filariasis, leishmaniasis and bilharzias.

Parasites from Pets

It used to be thought that humans had parasites distinct from those of other animals. However, we have come to recognize zoonoses (diseases transmissible from non-human animals to humans) as being quite common.

The dog tapeworm, Dipylidium canium, develops in its larval stages within fleas. Children (and older humans) will ingest infected fleas when kissing and hugging their dogs.

Foxes or dogs become infected with Taenia crassiceps, a tapeworm, when eating rodents containing larval stages. The adult worms in the dogs/foxes shed eggs which are then acquired by the rodents in contact with feces. An infection of a human in Toronto with T. crassiceps was new to medical history. A woman complaining of eye problems had a larval tapeworm removed from her eye. It was reproducing asexually within the eye, increasingly reducing vision. She regained her eyesight. She had been sleeping with her infected dog. Upon

gaining entry to the body the larval tapeworms penetrate the intestinal epithelium and get dispersed throughout body tissues via the blood.

Cats are the final host for Toxoplasma gondii, a parasite that Sherwin called the "perfect parasite". It is a "perfect" parasite because, under most circumstances, it is not pathogenic to its host and it can be transmitted by a variety of methods including directly by fecal contamination, by consumption of improperly cooked infected meat and by being passed to the fetus maternally. Infections contracted in the first trimester of pregnancy may result in deformation (often extreme) of a fetus. By the final trimester of pregnancy the immune system of the fetus is sufficiently active to cause the parasite to become latent. Transmission of T. gondii is so efficient that approximately 50% of us are infected. Livestock acquire T. gondii by contact with infected cat feces. Thus, this very much a parasite of our agricultural ecosystems.

Parasites from Sex

The sexually transmitted protozoan, Trichomonas vaginalis, is common in both males and females but has its greatest impact on females. Infections can be effectively treated but only if both partners are treated. Phthyrus pubis, the crab louse is another example of a sexually transmitted parasite.

Summary

Don't let knowledge of these parasites ruin your life. Still enjoy life to the fullest, just avoid eating raw fish and meat, boil water when out in the woods ands avoid excessive intimacy with pets. Enjoy life!

Discussion

How effective is smoking fish? – Smoking may or may not kill parasites (e.g. Trichinella in pork). It depends on variability in the aspects of the process.

What is the problem with eating live oysters? - Oysters may filter Cryptospridium from contaminated water.

How infective to humans is dog hookworm? Unsure at this time.

How often do these diseases occur? Are there records available? – Records are kept when zoonoses are diagnosed. However, this would not represent all cases. Sometimes occurrences of zoonoses are also well covered in the media.

How does all of this relate to 'night soil' (manure) on agricultural lands? – Lots of organisms are transmissible in night soil. However, in most cases sewage treatment will kill organisms.

What temperature kills parasites in meat? – A good rule of thumb is that meat should not be eaten if red. In a sanitarium in Paris, the residents are fed raw meat and 100% of them are infected.

What about meat inspection? – Certainly pork is checked for the pork tapeworm and for presence of larvae of Trichinella.

Observations

George Bryant observed tracks of opossum in High Park last week and a dead skunk on the 401 between London and Toronto today. George described seeing a clump of garter snakes last September in a pine tree at the Don Valley brickyards. He noted a recent article describing arboreal mating of garter snakes [Galbraith, D.A. 2001. Arboreal courtship behaviour by eastern garter snakes, Thamnophis sirtalis sirtalis, in September in Bruce County. Can. Field Nat. 115: 347-348.]. Mary Tasker and Bruce Falls have both seen garter snakes on hedges/bushes.

Jean Iron introduced a new book on sparrows [Beadle, D, and J. Rising. Sparrows of the United States and Canada – The Photographic Guide. Natural World. San Diego. 328 pp.]. Jim was the author the text. The exceptional photos were a compendium from many contributors.

Fred Bodsworth noted many more redheads than usual. Jean Iron indicated that there were about 4,000 on the Toronto waterfront. Fred also saw a goshawk sitting above the road near Uxbridge. Coyotes on the Leslie Street spit have mange.

Raccoons are tearing apart the bird feeders of Ron Scovell.

Ken reading reports plants in bloom in Thornhill, including dandelion and forsythia.

Harry Lumsden had 3 female pine grosbeaks and evening grosbeaks in a flowering crab today in Aurora. Also in Aurora, Ed Addison smelled a skunk at midnight on January 10.