THE BRODIE CLUB

ROYAL ONTARIO MUSEUM OF ZOOLOGY

THE 961st MEETING OF THE BRODIE CLUB
MINUTES

The 961st meeting of the Brodie Club was held on November 20, 2001 in Room 432 of the Ramsay Wright Zoological Laboratories at the University of Toronto.

Chairman: George Bryant
Secretary: Michael Boyer

GUESTS:

25 members and five guests
Joyce Peters and Henri Selles, guests of Claire Muller
Helen and Aarne Juhola, guests of Bryant
Eleonora Bertin, mother of Oliver Bertin and wife of late member Leonard Bertin

Minutes of the previous meeting were approved with one correction: Bryant is the new representative of the Club on the Federation of Ontario Naturalists, replacing Harry Lumsden.

ANNOUNCEMENTS:

Oliver Bertin showed photographs from the June field trip. He also brought copies of three highly recommended current books for perusal:

Erica Dunn (wife of member David Hussell) and Diane Tesaglia-Hymes: Birds at Ycur Feeder. Norton. 418 pp $23.50.

Ronald Orenstein: Survivors in Armour: Turtles, Tortoises and Terrapins. Key Porter. 304 pp $45.

Tim Flannery and Peter Schouten: A Gap in Nature: Discovering the World's Extinct Animals. Atlantic Monthly Press 184 pp $56.30

Bruce Falls informed members of the list of future speakers. The next meeting will be held on Dec. 11, one week earlier than usual because of the Christmas holiday. Correspondence was tabled from member Marc Johnson, who is nearing the end of his around the world travels.

Treasurer Claire Muller and co-signer Jennifer Young have opened a Brodie Club bank account. They encourage all members who have not paid their full dues to mail their cheques (made out to the Brodie Club) to Muller at 204 Wedgewood Dr., Willowdale, ant M2M-2H9, or bring your dues to the next meeting. The annual dues are $10.

Bertin would welcome volunteer secretaries for upcoming meetings.

SPEAKER:

The speaker was Dr. Ed Addison, Brodie Club member and a long-time research scientist with the Ministry of Natural Resources of Ontario. The subject was:

What Makes a Moose Tick

The speaker prefaced his talk with a suggested alternative title, *What It Takes to Prove a Good Naturalist Right,* underscoring his perception that good science is only one facet of a successful research programme. Another facet is its acceptance into the game managers' plans. He emphasized that ultimately it's the people who write the cheques who carry the most influence and have the most to say.

When his work on moose ticks began in the early 1970s at the Algonquin Park Research Station at Lake Sasajewan, there was little acceptance of the idea that parasites or other diseases played any significant role in the regulation of numbers, health or behaviour of large game animals under natural conditions.

Game managers often failed to recognize the problems for understandable reasons. Census data was difficult to obtain or took place at times when symptoms were not evident. As a consequence, it was not easy to convince the managers that limited research funds should be spent on obscure problems.

Evidence was slow to accumulate. In Manitoba, Ernest Thompson Seton, in the early part of the 20th Century, wrote in in his Life Histories of Northern Animals, that mosquitoes, blackflies and ticks were much more significant to the welfare of moose than were large predators such as wolves and bears. Perhaps more significantly, numerous observations from the West and from Ontario beginning in about 1956 indicated that large numbers of apparently winter-killed moose were often found with very little hair and infested with thousands of ticks. One report yielded a count of 86,000 ticks on a single moose. A picture of a young cow moose taken in early spring at Sibley Park revealed just how devastating the parasites could be. The animal was emaciated with bones protruding and shaggy hair hanging in tufts. But for the animal's poor condition, it could have been mistaken for one in full moult.

The accumulating evidence and perhaps a renewed interest in parasitology provided the impetus for the research project undertaken by the speaker.

The ticks in question were winter ticks which leave their host in early spring (March or April), the females engorged with blood and fertile. Photographs reveal inflated females about half the size of a quarter and barely recognizable as ticks; the males were very small and definitely tick-like. The females lay 5,000 to 8,000 eggs each. Development is delayed or slow and it is late summer before the minute larvae climb up the surrounding vegetation in the hopes of making contact with warm-blooded animals. A picture of grass spikes covered with thousands of larvae poised with spiny legs outstretched gives some idea of the fecundity of the females and the effectiveness of their dispersal mechanisms.

An impressive research programme was devised by Addison. Methods for gathering ticks involved using sheets dragged over suspect vegetation. Juvenile moose were captured and penned in a large corral, fed a balanced diet and put in the care of student attendants to whom the moose soon bonded. The speaker pointed out just how important this was and what a contribution the students made to the project. Moose, perhaps the least sociable of our mammals, were shown, unconcerned by human activity around them, tolerating, handling and

even permitting the withdrawal of blood samples without obvious stress. All protocols had to meet the concerns of the Ministry veterinarians.

The pre-conditioned animals were exposed to mite densities of 10,000 to 40,000 with matched controls. The objective of the experiments was to determine if animals exposed to ticks experienced deleterious physical, behavioural or physiological changes.

Behavioural modifications were determined by daily observation of the animals, particularly the times and intensity of grooming and rubbing. Records of.body weights and other physical attributes were also kept. Physiological data were gathered from blood samples, measurement of visceral fat and changes in the lymph nodes.

Some of the data was presented in the form of graphs. Grooming and rubbing were very much correlated with the numbers of ticks. It was also linked closely with tick development. In their life cycle, ticks are in the nymph stage until some time in January when they shed their cuticles and emerge as adults. They begin to feed in February, a time of increasingly intense grooming and hair loss by the host.

Perhaps surprisingly, tick feeding did not impact on red blood cell counts, so the animals were not anemic. Albumin (the blood protein maintaining the osmotic balance of the blood) fell to extremely low concentrations by late winter. These concentrations correlated with the intensity of tick infestation. Visceral fat, both heart and mesentery, decreased with the intensity and duration of infestation. Perhaps most striking were the alterations in the appearance of the lymph nodes. They increased dramatically in size, their colour changing from cream to scarlet, indicative of internal haemorrhage.

A well-documented picture emerged of highly stressed young moose surviving the winter under the conditions of these experiments. Their survival would be compromised under natural conditions, given the exposure to additional variables such as climate, food availability, reproductive stress, age, predation and hunting pressure.

From the managerial perspective, ticks are significant to moose. Some interesting experiments carried out in 1983 and 1984 attest to the part played by climate in regulating tick density. Once free of the host, ticks are subjected to the full range of environmental variables. If they fall prematurely onto ice or snow, ticks freeze to death or fall easy prey to jays and ravens, which seem able to anticipate their vulnerability during this period.

In 1983, ticks were distributed in two contrasting sites, open, shrubby habitat and closed forest, with the expectation that temperature would influence larval numbers. It did but in rather unexpected ways. The open site supported very much earlier development but many fewer total numbers of larvae as the season progressed. Because 1983 proved to be the hottest and driest summer on record to that time, the experiment was repeated in 1984. The differences were striking. Larvae appeared several weeks earlier on the open site, increased much more rapidly and sustained much higher numbers through the mid-summer and fall period.

QUESTIONS:

EADIE: What can be done for those moose which are infected by ticks?

A quick solution, while desirable, would be difficult. We have a widely dispersed population of moose, a highly adapted parasite, a recently exposed host in evolutionary terms, with no evolved tolerance or resistance. Applied controls, such as chemicals, seem impractical or undesirable. Natural factors are operating now and may be best in the long run. Infested animals are vulnerable to predators, with reduced fecundity if not outright mortality, leading through natural selection to greater tolerance or resistance.

BERTIN: Does the parasite affect wolves and humans?

Wolves are affected in many ways. Weakened individuals fall prey to wolves. There is some evidence of a resulting increase in wolf population and hence increased predation. There is some evidence of an increase in shared internal parasites between wolves and moose. But ticks are rarely found on wolves and humans.

BODSWORTH: Are there many tick species?

Most of our mammals have ticks, some specific, others less so. The moose tick is unique as a one host, one time feeder. Many other species feed several times on different individuals of the same species or other species. Moose ticks can also bite other animals including humans, but cannot complete their life history in the absence of moose.

MULLER: Any evidence oftolerance to the ticks?

Little. The moose is our most recently introduced mammal and has had little opportunity to develop tolerance or immunity. Two populations don't have ticks, in Alaska and Newfoundland. The former is genetically distinct, the latter derived from a small founder population in the Maritimes.

BENDELL: How does one explain the expansion of the moose population?

Moose have increased in numbers since the thirties and forties, while deer populations have decreased. Release from hunting pressure, vegetational changes, the nematode disease passed from deer to moose -- all may have played a role in the population changes in moose. There is some evidence that the die-off of moose from tick infestations occurs more frequently in high-density populations of moose and that game managers weren't seeing it in low-density populations,

Bendell thanked the speaker.

OBSERVATIONS:
BRYANT: Collected a nest from a forest edge that proved to be that of a House Finch with the tell-tale marks of dried waste accumulated around the rim. Bagged in plastic, he is watching to see which insects and mites emerge.

RISING: Suggested that the law forbids the collection of old nests, engendering considerable discussion.

CURRIE: Reported sighting two Cape May Warblers at Humber Bay East on Nov. 10.

McANDItEWS: Reported on the finding of two mastodon tusks at the site in New York State. These were Pleistocene or Holocene findings. He reported the findings at a conference there. Another significant paper proposed a theory that the late Pleistocene extinction of the mastodons was due to tuberculosis, based on evidence found from the bones of the animals buried there,

TOVELL: Found up to 20 Fox Sparrows at one time at his feeder.

EADIE: Showed some photographs from her travels: Mushrooms on a living maple tree; a Townsend's Solitaire at Presqu'ile Point; and forest fires burning since August near the Grand Canyon. Apparently, the fires are left to bum themselves out.

IRON: On a "kinglet killer." Nine Golden-crowned Kinglets were ensnared on burdock over a 200-metre stretch in Toronto. This rampant weed grows in open waste areas and should be controlled, Iron said. Burdock-snaring has been reported previously for this species and also for humming birds, Ruby-crowned Kinglets and small bats. She also reported on a visit to the Niagara River. Gulls were down in number but several rarer species were sighted. Also seen were a Snowy Owl and an adult Bald Eagle.

ABRAHAM: Saw 16 Pine Grosbeaks at his feeder until they were chased off by the arrival of a Cooper's Hawk.

HELEN JUHOLA: Saw 15 swans at Sunnyside beach, including both mute and trumpeters.

RISING: The advantages of flight: A red squirrel chased Blue Jays from the ground to the roof of a feeder and back again. The birds flew but the squirrel had to climb.

YOUNG: Reported a black squirrel chased by a red. It appears that red squirrels have been known to catch and castrate greys.

NEXT MEETING:

Please note the next meeting of the Brodie Club will be at 8 pm on Tuesday, Dec. 11, a week earlier than usual because of the Christmas holidays. The speaker will be Dr. Peter Money, a retired government geologist who will talk on Penguins, Petrels, Pinnipeds, Pleurophyllum, Plus. Members are invited to bring Christmas treats to the meeting.
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