

MINUTES OF THE 891st MEETING OF THE BRODIE CLUB

JANUARY 18, 1994

The meeting was held in the Faunal Lab of the South Borden Building, University of Toronto. It was called to order at 8 p.m. by the Chairman, Bruce Falls. Fowle acted as Secretary.

There were 15 members and 5 guests present.

Guests: Janet Cooper (Savage); Vicky Draper (Fowle); Maudie Reynolds (Reynolds); Micheal Quinn (McNicholl); R. Wagner (guest of the club).

Minutes: The minutes of the meeting of December 14, 1993 were reviewed and after a few corections, accepted.

Announcements: McNicholl announced that the annual meeting of the Ontario Bird-Banding Association would be held at the Royal Botanical Gardens on March 5.

Savage drew attention to the pre-publication announcement of "Ornithology in Ontario", edited by Martin K. McNicholl and John Cramner-Byng and published by the Ontario Field Ornithologists as Special Publication No. 1.

Speaker of the evening: The speaker, Dr. Bridget Stutchbury was introduced by Fred Bodsworth. Dr. Stutchbury is a Research Fellow in the Department of Biology at York University. She received her Master's degree at Queen's University and her Ph.D. at Yale. She has been engaged in a number of research projects and has an impressive list of publicatons to her name. The topic of her presentation was " Hooded Warblers --Extra-pair mating and DNA fingerprinting"

Dr. Stutchbury began by pointing out that, although there were well-known exceptions, such as the Red-winged Blackbird, it has long been assumed that most birds are monogamous and that most males of monogamous pairs assist in the rearing of the young. However, the new techniques of "DNA fingerprinting" have revealed many cases in which the females of apparently monogamous pairs mate with one or more males in addition to their mates. These are called "extra-pair matings" or "extra-pair copulations (EPCs)".

This discovery raises a number of interesting questions regarding the advantages, mechanisms and evolution of such mating systems. What advantages accrue to the male and /or female ? How do males find oportunities for mating outside their own pair bond ? What is the significance for the survival of the species and of individauls ?

Three models for mechanisms have been proposed:

a. Male controlled: Aggressive males invade neighbouring territories and force matings on resident females (EPCs). In this model no advantage accrues to the female but males are able to

father more offspring bearing their genes than they might otherwise do. There is no expenditure of energy for parental care because EPCs produce young that are carried for by other males.

b. Female controlled: Females may solicit matings from males on nearby territories. Could this have advantages for females ?

c. Partial female control: Females stay on their territories. Extra-pair males move onto the territory to mate but must evade the resident male. This seems to be the case with the Hooded Warbler.

The field work for the study described by Dr. Stutchbury was carried out in a woodland near Erie, Pennsylvania, which is occupied by a fairly dense population of about 40 pairs of Hooded Warblers. (Secretary's note: After the meeting Dr. Stutchbury commented that the area was a "hardwood" forest that had been selectively logged about every 15 years. As a consequence there was an abundant, low, dense growth of shrubs and regeneration which apparently provided attractive habitat not found in nearby woodlots where warblers were much less abundant.) All the territorial birds and nestlings were color-banded. Nest-finding was facilitated by the almost continuous vocalizing of the females while building nests. (Chip, chip, chip, etc.)

EPCs may be detected by observation but this is difficult. The convincing evidence comes from DNA fingerprinting. There is no evidence that females move off their territories to seek matings. In Dr. Stutchbury's study about 40% of the nests contained nestlings resulting from EPCs and about 30% of the young produced were from EPCs. Clearly, EPCs make a large contribution to annual productivity.

Why do females participate in EPCs ? Are they simply overwhelmed by aggressive males (females making the best of a bad situation) ? Can females benefit in some way by mating with "high quality males" ? What are the characteristics of high quality males ?

The older females arrive first in the spring and may be able to select the "better quality males". Young females arriving later may seek EPCs with "quality" males already paired with older females. So far there is no evidence for this.

There is evidence that the "chipping" vocalizations of receptive females may attract males. If this is so, does it promote competition among males and therefore act as a selective influence ?

Some of the mysteries of these interactions may be clarified in future research using radio tracking.

What conditions favour mating systems like this ? It is more likely to develop in dense populations where breeding is synchronous and confined to a short period. In the case of one tropical species (Dusky Antbird) which is a non-synchronous breeder living in dispersed populations, there are no EPCs. Dr. Stutchbury will follow up on this observation by beginning a study of another tropical species (Clay-colored Robin) which is a synchronous breeder in Panama. Will there be any EPCs ?

Comments and Questions:

McNicholl: Does the "chipping" behaviour increase nest predation and parasitism ?

There is a fairly high parasitism by cowbirds (75% of nests). Cowbirds may be attracted by the "chipping".

Bendell: Is there a difference in survival of young produced by territorial pairs and by EPCs ?

Seems to be no difference but information is weak owing to low rate of recovery of banded young.

Bendell: Does territorial behaviour limit population density ?

About 5% of the males remain unmated. There seems to be surplus unoccupied habitat.

Bodsworth: What characterizes "successful" males (those fathering the most young) ?

No good evidence yet. Do females incite competition among males and then select a "winner" ?

Berton: Drew attention to dominance relationships among male and female children. Dominance is a matter of picking and choosing.

Bodsworth: Do males participate in caring for young on nearby territories ?

No.

Reynolds: How many copulations are required to produce a clutch of eggs ?

Very variable among bird species. Difficult to determine because of the ability of many species to store sperm for long periods.

Falls: How do resident males react to intruders ?

Chasing and "fights" have been observed.

Bodsworth: How many birds are known to engage in EPCs ?

Bee-eaters, martins, fulmars, murrees, white ibis, and razorbills among others.

Falls: Drew some comparisons with meadowlarks which have large open territories and are very aggressive towards intruders. EPCs would be more difficult.

McNicholl: Wondered if EPCs occur in the short breeding seasons in the far north.

Bodsworth: If EPCs are important in reproductive success, birds such as martins may congregate to maximize opportunity. Colony formation may be a response to the need for EPCs.

Dr. Stutchbury commented that Hooded Warblers may not choose to nest in small woodlands where there are only a few pairs and, hence, less opportunity for EPCs.

Speakman: What is the advantage of such a mating system ?

There seems to be a clear advantage to males who can father more young without having to care for them. Further research needed to find other advantages.

Thanks to the speaker: Harry Lumsden expressed the thanks of the Club for an unusually clear and engaging presentation. The lengthy discussion and many questions indicated the high level of interest. Dr. Stutchbury was warmly applauded.

Notes and observations:

Speakman: Out with Boissoneau on New Year's Day and had encountered two large flocks of Bohemian Waxwings.

DeMatteus: Reported a Northern Shrike.

Bendell: Reported a dead opossum on the road near the intersection of Dundas and Creditview on December 24. DeMatteus reported another recently seen on the Hart Lake Road.

Lumsden: Reported a pair of mature Wood Ducks at his pond in Aurora. They appeared several times and ate some of the grain provided for his Trumpeter Swans.

The Trumpeter Swans from Wye Marsh near Midland had been seen recently near Bronte on Lake Ontario and at LaSalle Park in Hamilton. Two other Trumpeters are on the lake at Liverpool Road.

Fowle: Noted that he had spent two rewarding weeks at the Asa Wright Nature Centre in northern Trinidad over the Christmas season. He offered to provide further information on the Centre for those who might be interested.

McNicholl: Said he had participated in the Christmas Bird Count in Vancouver and, in spite of being assigned "the worst area", had managed to find more birds than he had been able to find in Winnipeg in previous years.

Adjournment: The meeting adjourned for refreshments at 9:40 p.m.