

Do Female Sharp-tailed Grouse, *Tympanuchus phasianellus*, Copulate Only Once During a Breeding Season?

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Tsuji, Leonard J. S. 1996. Do female Sharp-tailed Grouse, *Tympanuchus phasianellus*, copulate only once during a breeding season? *Canadian Field-Naturalist* 110(3): 535–536.

Fluid mixtures taken from the reproductive tracts of eight female Sharp-tailed Grouse (*Tympanuchus phasianellus*), as they entered the lek, did not contain sperm or sperm fragments. Although not definitive, this study adds further support to the assumption that female Sharp-tailed Grouse typically copulate only once during a breeding season.

Key Words: Sharp-tailed Grouse, *Tympanuchus phasianellus*, oviduct, sperm, copulation.

It has been assumed in classically lekking grouse species that females typically copulate only once during a breeding season (except for reneesting attempts). This perception was based initially on two types of field observations: (1) mating peaks at a lek closely correlated with hatching peaks of the young, 37 to 44 days later (Dalke et al. 1963; Svedarsky 1979); and (2) marked females observed copulating one day were not seen during subsequent display periods, at the same lek (Lumsden 1968; Kermott 1982). In recent studies by Hoglund et al. (1990) and Alatalo et al. (1991), female Black Grouse (*Tetrao tetrix*) were radio-marked and their copulatory behavior recorded. In the study by Alatalo et al. (1991), 79% of females (n=23) were known to have copulated only once at a given lek, while Hoglund et al. (1990) reported that 83% of the females (n=23) were known to have copulated only once at a given lek. Hoglund et al. (1990) also reported that females that copulated more than once were often individuals associated with a disturbed mating. This trend to remate after a disturbed mating was also observed for female Sharp-tailed Grouse (*Tympanuchus phasianellus*) (Gratson 1989). Thus, it appears that among classically lekking grouse species, females typically copulate only once during a breeding season, unless disturbed.

However, if one acknowledges that females can visit more than one lek during a breeding season (e.g. Kruijt et al. 1972), it becomes difficult to rule out multiple copulations because it would be difficult logistically, to observe all leks (during all morning and evening display periods) in a specified region for the entire breeding season, even if the females were marked. Another test of the assumption would be to collect females during the breeding season as they entered a lek, prior to copulation on that lek. Galliforms possess uterovaginal glands that store and constantly release sperm (Compton et al. 1978; Bakst 1981). Thus, female reproductive systems could be examined for the presence of sperm to establish whether or not prior copulation had occurred. If females typically copulate only once,

approximately 80% of the female reproductive tracts should be without sperm.

Eight female Sharp-tailed Grouse were "harvested" by native Canadians near Fort Albany, Ontario, 52°15'N; 81°35'W, as the birds entered leks during the 1992-1994 breeding seasons. Reproductive tracts were processed using a technique modified from Bakst (1981). Oviducts were removed and flushed by syringe with 15% buffered formalin (after the distal end of the oviduct was ligated with 3-0 gut suture). Individual fluid mixtures (containing 15% buffered formalin and the flushed oviduct contents) were then emptied into separate test tubes, centrifuged, and the sediment examined in wet mount (for 5 minutes) under a microscope (x 100, x 250 objectives) for either sperm or sperm fragments. No fluid mixture contained sperm or sperm fragments.

Although the results do not provide definitive evidence, they add further support for the assumption that female Sharp-tailed Grouse mate only once during a breeding season.

Acknowledgments

I thank the native hunters who allowed the salvaging of grouse remains. Comments on the manuscript from A. J. Erskine and an anonymous reviewer were appreciated. James Bay General Hospital kindly provided space and use of their equipment. Partial funding was provided by a Northern Scientific Training Grant (Department of Indian and Northern Affairs).

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Received 9 October 1995

Accepted 16 January 1996

Interactions of a White-winged Black Tern, *Chlidonias leucopterus*, with Arctic Terns, *Sterna paradisaea*, at Churchill, Manitoba

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Jehl, Joseph R., Jr. 1996. Interactions of a White-winged Black Tern, *Chlidonias leucopterus*, with Arctic Terns, *Sterna paradisaea*, at Churchill, Manitoba. *Canadian Field-Naturalist* 110(3): 536–537.

A White-winged Black Tern (*Chlidonias leucopterus*), a species of Eurasian provenance, appeared at Churchill, Manitoba, in June–July 1995, where it was persistently harassed by breeding Arctic Terns (*Sterna paradisaea*).

Key Words: White-winged Black Tern, *Chlidonias leucopterus*, Arctic Tern, *Sterna paradisaea*, agonistic behaviour.

On 24 June 1995, Arnet Sheppard of Ottawa, Ontario, videotaped an adult White-winged Black Tern (*Chlidonias leucopterus*) in alternate plumage at the mouth of the Churchill River, Manitoba. There are fewer than a dozen records for this temperate Eurasian species in Canada, and this was the first in central Canada and the subarctic. Sheppard's videotape and subsequent sightings and photographs confirmed his identification (R. Koes, personal communication).

During Sheppard's 5-minute observation period the tern's behavior was unremarkable. It flew along the shoreline, landed for a few minutes among a small flock of Arctic Terns (*Sterna paradisaea*) and Bonaparte's Gulls (*Larus philadelphia*), and then disappeared upriver toward the town of Churchill, after being attacked by a Parasitic Jaeger (*Stercorarius parasiticus*).

On 27 June, Jan van Gils and Irene Tieleman, researchers from The Netherlands, told me of a black tern whose characteristics fitted *C. leucopterus* that they had seen near the Arctic Tern colony at West Twin Lake, 26 km south-east of Churchill. That evening, Scott Yaeger and I visited the area for 15 minutes at dusk and photographed a single White-winged Black Tern (Figure 1) near a small, marshy island where 16 pairs of Arctic Terns were just start-

ing to lay. It seemed to be exploiting a major emergence of dragonflies and would fly 1 km from the island, either over the lake or to the edge of the forest, catch a flying insect, then return to the colony, where it repeatedly attempted to land. On each approach the Arctic Terns immediately left their nests and aggressively chased it (Figure 2). Although the White-winged Black Tern managed to land twice, the harassment never ceased entirely and its time on the ground was momentary. By the next morning the tern — and the dragonflies — had disappeared.

Although many observers visited the colony in the following days, the White-winged Black Tern never reappeared there, and it was not rediscovered until 13 July, when T. and B. Holcombe of Tonbridge, Kent, England, saw it back on the Churchill River near the townsite. During their 45 minutes of observation it was "savagely pursued" by Arctic Terns, which on one occasion literally knocked it into the river. The aggression was confined to flight periods, and ceased when the tern landed among Bonaparte's Gulls and Arctic Terns; interestingly, it was always the last bird in the flock to land. The following day, B. Chartier also saw Arctic Terns harassing the tern in the same region; again, chasing ceased when the tern landed. The Holcombes' and Chartiers' observa-



Tsuji, Leonard J. S. 1996. "Do female Sharp-tailed Grouse, *Tympanuchus phasianellus*, copulate only once during a breeding season?" *The Canadian field-naturalist* 110(3), 535–536. <https://doi.org/10.5962/p.357510>.

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