

gested that the spatial distribution of African ungulates is influenced by the mineral content of vegetation.

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LITERATURE CITED

- DAMMAN, A. W. H. 1964. Some forest types of central Newfoundland and their relation to environmental factors. Forest Science Monograph 8. Society of American Foresters.
- FICKEN, M. S., R. W. FICKEN, AND S. R. WITKIN. 1978. Vocal repertoire of the Black-capped Chickadee. *Auk* 95: 34–48.
- KARE, M. R. 1965. The special senses. Pp. 406–446 in *Avian physiology* (P. D. Sturkie, ed.). Cornell Univ. Press, Ithaca, New York.
- KREBS, J. R., M. H. MACROBERTS, AND J. M. CULLEN. 1972. Flocking and feeding in the Great Tit (*Parus major*): an experimental study. *Ibis* 114:507–530.
- MCCAUGHTON, S. J. 1988. Mineral nutrition and spatial concentrations of African ungulates. *Nature* 334:343–345.
- PULLIAINEN, E., T. KALLIO, AND A.-M. HALLAKSELA. 1978. Eating of wood by Parrot Crossbills, *Loxia pytyopsittacus* and redpolls, *Carduelis flammea*. *Aquil. Ser. Zool.* 18: 23–27.
- SEASTEDT, T. R. AND S. F. MACLEAN, JR. 1971. Calcium supplements in the diet of nestling Lapland Longspurs *Calcarius lapponicus* near Barrow, Alaska. *Ibis* 119:531–533.
- SUSIC, G. 1981. Red Crossbill (*Loxia curvirostra* L. 1758) feeding on mortar in a wall. *Larus* 33–35:197–200.

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A case of polyandry in the Black-capped Chickadee.—Black-capped Chickadees (*Parus atricapillus*) have been studied extensively in the breeding season (e.g., Odum 1941, Smith 1967, Ficken et al. 1981) and all studies have reported the species to be monogamous, forming permanent pairbonds in winter. Here, we document the first reported case of polyandry in the Black-capped Chickadee.

We studied chickadees on a 500-ha area at the Meanook Biological Research Station of the University of Alberta, near Edmonton, Alberta, Canada, from March 1985 to September 1987. The area was a mosaic of poplar (*Populus tremuloides* and *P. balsamifera*) woodland interspersed with fields (20% of the area). One hundred fifty pairs were studied and the majority of nests were located; most individuals were captured with mist nets and nest box traps and were color banded.

In late winter 1987, male A was apparently paired with a banded female (they were frequently seen foraging together), and his neighbor, male B, was paired with an unbanded female. We saw the banded female on 7 April, but she was not seen thereafter. On 30 April and 2 May, male B was chased by male A off the latter's territory. Six days later, the unbanded female (presumably the mate of male B) was in male A's territory, and he was

engaged in courtship-feeding with her, indicating that they were paired. On that occasion, male B was foraging a few meters away. The "trio" was observed for 55 min. The two males were observed foraging together on 10 May; male A then visited the nest of the unbanded female located within his territory. On 16 May (a.m.) during incubation, male A fed the unbanded female at the nest. Fifteen min later, both males came near the nest with food, each giving "faint feebee" calls (Ficken et al. 1978). The males remained on their perches for a few minutes. They then dropped their food to the ground and left together. At 1200, the same day, male B fed the same female. On 21 May, male A was observed bringing food to the nest. On 29 May, the unbanded female and male B were feeding the nestlings. Four days later, after a severe windstorm, the nest tree was broken and the nest destroyed. The female was killed, and six dead nestlings, approximately 8–10 days old, were found in the cavity. Male A was singing nearby; male B was not seen after 29 May.

Thus, although we did not observe actual copulations, the behavior of the males suggested that they had both bred with the female. Because of the extensive natal dispersal in Black-capped Chickadees (Weise and Meyer 1979), the two males were probably not siblings. It is unlikely that either male was "cooperating" as a helper in the sociobiological sense (Emlen 1984). Polygyny has occasionally been reported in the genus *Parus* (Great Tit *P. major*: Gooch 1935, Saitou 1979; Blue Tit *P. caeruleus*: Dhondt et al. 1983). Polygyny is a common reproductive tactic in African Black Tits (*P. niger*) in which breeding units can include one to three helper males (Tarboton 1981). However, we found no case of polyandry in the literature on *Parus*, even though unpaired males have been reported occasionally on territories of Black-capped Chickadees (Ficken et al. 1981), suggesting a male-biased sex-ratio in the breeding season. Over the 30 months of our study, we have observed 14 non-breeders: nine yearling males, three adult males, one male of unknown age, and one female. However, none of these non-breeders was seen approaching active nests.

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LITERATURE CITED

- DHONDT, A. A., R. EYCKERMAN, AND J. SCHILLEMANS. 1983. Polygyny by Blue Tits. *Br. Birds* 76:34–37.
- EMLEN, S. T. 1984. Cooperative breeding in birds and mammals. Pp. 305–339 in *Behavioural ecology: an evolutionary approach*, 2nd ed. (J. R. Krebs and N. B. Davies, eds.). Blackwell, Oxford.
- FICKEN, M. S., R. W. FICKEN, AND S. R. WITKIN. 1978. Vocal repertoire of the Black-capped Chickadee. *Auk* 95:34–48.
- , S. R. WITKIN, AND C. M. WEISE. 1981. Associations among members of a Black-capped Chickadee flock. *Behav. Ecol. Sociobiol.* 8:245–249.
- GOOCH, G. B. 1935. A great tit triangle. *Br. Birds* 29:78–79.
- ODUM, E. P. 1941. Annual cycle of the Black-capped Chickadee—1. *Auk* 58:314–333.
- SAITOU, T. 1979. Ecological study of social organization in the Great Tit, *Parus major* L. IV. Pair formation and establishment of territory in the members of basic flocks. *J. Yamashina Inst. Ornith.* 11:172–188.
- SMITH, S. M. 1967. Seasonal changes in the survival of the Black-capped Chickadee. *Condor* 69:344–359.
- TARBOTON, W. R. 1981. Cooperative breeding and group territoriality in the Black Tit. *Ostrich* 52:216–225.

WEISE, C. M. AND J. R. MEYER. 1979. Juvenile dispersal and development of site-fidelity in the Black-capped Chickadee. *Auk* 96:40-55.

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CORRECTION

Recently (Scott, *Wilson Bull.* 100:323-324, 1988), I erred in omitting a record of a female House Sparrow (*Passer domesticus*) feeding two juvenile Brown-headed Cowbirds (*Molothrus ater*). This record (Dexter, *Bird-banding* 25: 112, 1954) was kindly brought to my attention by the observer. It is missing from the important papers on cowbird hosts written by Herbert Friedmann (e.g. Friedmann et al., *Smithsonian Contr. Zool.*, 235: 1-75, 1977.—DAVID M. SCOTT, *Dept. Zoology, Univ. Western Ontario, London, Ontario, N6A 5B7, Canada*.