

Wilson Bull., 93(3), 1981, pp. 393–394

Food finding in Black-capped Chickadees: altruistic communication?—Intra-specific flocking may increase an individual's fitness by facilitating food finding and decreasing predation. An interesting problem is whether a social bird finding a rich food source behaves selfishly or altruistically. An altruist decreases its own fitness by aiding another. A non-altruist would presumably eat without announcing the presence of food to the flock. Here I report behavior of Black-capped Chickadees (*Parus atricapillus*) on finding an especially rich food source.

From July–April in Wisconsin, Black-capped Chickadees live in flocks of 4–8 individuals of both sexes. The flocks are evidently not composed of close kin, because juveniles disperse from their natal area in July and join flocks with adults other than the parents (Weise and Meyer, *Auk* 96:40–55, 1979). Chickadees utter frequently the *chick-a-dee* call which may facilitate cohesion of the flock during movements (Ficken et al., *Auk* 95:34–48, 1978). Playback of these calls is known to attract chickadees.

This study was conducted at The University of Wisconsin–Milwaukee Field Station, Ozaukee Co., Wisconsin, over a 6-year period (1971–1977). Six feeders stocked with sunflower seeds and suet are open from mid-November–May. A total of 25 experiments was conducted (not all feeders being used each year). Most of the feeders were sufficiently spaced so that a different flock used each feeder. The birds were individually color banded; ages and sex for most birds were known. The feeders were removed each spring and replaced a day or two before being stocked with food. The chickadees did not show any attraction to the feeder site before the feeders were stocked with food. Chickadee behavior was observed as birds approached feeders stocked for the first time that season (13–17 November, depending on the year). After determining that there were no chickadees in the area, sunflower seeds were placed in the feeder. While in a blind we recorded the activities of the first chickadee to find the newly stocked feeder. If no chickadees approached the feeder within 2 h, we moved to another feeder. Observations and vocalizations were recorded with a Nagra IV tape recorder and Sennheiser MKH 104 omni-directional microphone. Vocalizations were analyzed with a Kay Elemetrics 6061B Sona-Graph.

Table 1 summarizes the results. Most birds called on finding the feeder. In 4 experiments, we were able to identify the color band code of the first bird recruited (i.e., the second bird to land on the feeder); in all cases it was the mate of the bird that called. In addition, several other flock members often accompanied the mate to the feeder. In most cases, recruitment was probably achieved through the *chick-a-dee* vocalizations. The calls given by birds finding the feeder were those typical of flocking situations, and there were no special types of calls associated with food finding. The average latency between calling and recruitment was 128 sec (± 41 sec). In 2 cases, the bird finding the feeder did not call, but others were with the first bird when it arrived at the feeder and all soon began feeding. In only 1 case did a lone bird finding the feeder fail to call.

Chickadees, on finding an abundant food source, often vocalize and frequently others, particularly the mate, come to the site very quickly. Why should a chickadee attract others to a food source even if food is abundant? There would probably be costs to calling, such as decreased feeding rate if several individuals were present.

The normal winter food of chickadees is probably distributed in small packets. Chickadees show no evidence of altruism in their winter feeding away from feeders. Since chickadee flocks are not composed of close kin, a kin selection explanation of food advertisement seems unlikely. The chickadees did not cache the seeds, so a communal cache site was improbable. Reciprocal altruism (Trivers, *Quart. Rev. Biol.* 46:35–57, 1971) seems unlikely because membership of flocks is not very stable and the possibility of cheating is high.

The most likely hypotheses for this behavior appear to be the following: (1) It is advan-

TABLE 1
FINDING A RECENTLY STOCKED FEEDER BY BLACK-CAPPED CHICKADEES

Outcome	Frequency
No chickadees came within 2 h	15
Chickadees came within 2 h	11
Did not call within 1 min of finding feeder	3
Did call within 1 min of finding feeder	8
Another individual came within 3 min of first call-recruitment	6
No recruitment	2

tageous for an individual chickadee to be in a flock for reasons not directly related to feeding efficiency, as the flock is an effective anti-predator strategy (Ficken and Witkin, *Auk* 94:156–157, 1977). Therefore, it may be beneficial to share food to keep other flock members alive. (2) Chickadees are monogamous and the mate is usually in the same winter flock. It may be advantageous to be altruistic toward the mate under some circumstances (Witkin and Ficken, *Anim. Behav.* 27:1275–1276, 1979). (3) The cost of vocalizing on finding food may be so small compared to the advantages of this vocalization in more common contexts that natural selection has not acted to silence chickadees that discover locally abundant food (W. J. Smith, pers. comm.). Hypotheses other than kin selection to explain apparent altruism need to be tested further for the chickadee as well as other social species.

I thank R. Ficken, J. Hailman, W. J. Smith, C. Weise and S. Witkin for their criticisms of the manuscript. R. Ficken, J. Ingold, M. Plonczynski, C. Weise and S. Witkin aided in obtaining the data, and C. Weise made available data on the color banded birds. Supported by NSF grant BMS 74–19474. Publ. No. 25 of The University of Wisconsin–Milwaukee Field Station.—MILLICENT S. FICKEN, *Dept. Zool., Univ. Wisconsin–Milwaukee, Milwaukee, Wisconsin 53211. Accepted 3 June 1980.*

Wilson Bull., 93(3), 1981, pp. 394–395

The sentinel crow as an extension of parental care.—In bands of feeding Common Crows (*Corvus brachyrhynchos*), some crows sit as sentinels and apparently warn feeding conspecifics of oncoming danger (Bent, *U.S. Natl. Mus. Bull.* 191, 1946). Other species as well make use of sentinels (Conner, *Condor* 77:517, 1975). Goodwin (*Crows of the World*, Cornell Univ. Press, Ithaca, New York, 1976) disagrees with the guardian function of the sentinel crows, citing personal contradictory observations of sentinel corvids fleeing an area before all of the feeding individuals are warned. A pair of nesting crows that we studied in the spring of 1978 may provide further insight into the actual function of the sentinel crow.

A pair of crows nested in one of a group of 14 spruce (*Picea* sp.) trees on the St. Bonaventure University campus, Cattaraugus Co., St. Bonaventure, New York. This pair was observed from hatching 4 May to fledging on 7 June. The family unit, recognizable because of aluminum leg bands on the young, was also observed in the vicinity from 7 June–7 July.

During the nesting stage, the crows were observed for 30 observation periods of 30 min each. Three main forms of antipredator behavior were observed: chasing, mobbing and nest guarding. During chasing 1 parent would fly at an intruder giving a low pitched call until the animal left the area. When the crow exhibited more intense mobbing behavior, it gave a