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DOES WINTER BIRD FEEDING PROMOTE DEPENDENCY?

MARGARET C. BRITTINGHAM[1] AND STANLEY A. TEMPLE
Department of Wildlife Ecology
University of Wisconsin
Madison, Wisconsin 53706 USA

Abstract.—Winter bird feeding is generally assumed to benefit the birds using this food source, but there are some potential risks associated with bird feeding. One is the risk that individuals using feeders may become overly dependent on this supplemental food supply and either fail to develop or lose the skills needed to forage efficiently on natural food when feeders are not available. Survival rates of a resident population of Black-capped Chickadees (*Parus atricapillus*) that were regular feeder users, and thus potentially dependent, were compared with those of a resident population of chickadees that had never been exposed to a bird feeder, during a winter when feeders were not available to either group. No difference was found between the average (±SD) monthly survival rates of chickadees that had used feeders in the past (0.84 ± 0.13) and those that had never used feeders (0.85 ± 0.12). There was no evidence that bird feeding promotes dependency.

¿PROMUEVE DEPENDENCIA LA ALIMENTACIÓN DE AVES DURANTE EL INVIERNO?

Sinopsis.—El alimentar aves en el invierno supuestamente beneficia a los pájaros que utilizan este recurso, aunque existen algunos riezgos asociados con tal alimentación. Uno es el riezgo de que el ave que utiliza comederos pueda crear dependencia de estos y pierda o no desarrolle adecuadamente las habilidades para forrajear eficientemente en el estado silvestre cuando no haya comederos. En este trabajo se compara una población residente de *Parus atricapillus* que regularmente utilizaba comederos (y que potencialmente había creado dependencia) con una población residente que nunca había estado expuesta a comederos, durante un invierno en que no hubo disponible para ninguno de los dos grupos comederos. No se encontró diferencia en la tasa promedio (±DE) de sobrevivencia mensual entre grupos que habían utilizado comederos (0.84 ± 0.13) y los que no lo habían utilizado nunca (0.85 ± 0.12). No se encontró evidencia que tienda a indicar que los comederos artificiales promuevan dependencia.

Over 82 million people in the United States feed birds (U.S. Fish and Wildlife Service 1988). Feeding birds is a popular form of recreation for people of all ages, and the benefits of bird feeding to people are numerous. Bird feeding also benefits some species that use this supplemental food source, particularly during extended periods of cold weather (Brittingham and Temple 1988). There are, however, some potential risks associated with this practice. One is the risk that individuals using feeders may become overly dependent on them and less able to survive when these supplemental food sources are no longer available.

Two types of dependency may occur. On a short term scale, birds visiting a feeder on a regular basis may expect that particular location to provide food, and may be adversely affected if the feeder is removed or left empty. On a long term scale, individuals that continuously use feeders

[1] *Current address: School of Forest Resources, Ferguson Building, The Pennsylvania State University, University Park, Pennsylvania 16802 USA. Address all correspondence to Margaret C. Brittingham.*

may forage less efficiently on natural food items resulting in reduced survival rates when feeders are not available (Deis 1982). These "dependent" individuals may either not recognize different natural food items or, because they have spent so much time at feeders, they may not have acquired the skills necessary to forage efficiently on natural foods. We focused our research on the latter type of dependency.

In Wisconsin and throughout the northern United States, the Black-capped Chickadee (*Parus atricapillus*) is one of the species most frequently reported at winter bird feeders (Brittingham and Temple 1989, Dennis 1975, Dunn 1989) and can, therefore, be considered a representative feeder species. The chickadee is also one of the smallest birds to remain in northern areas during the winter. As a result of its small body size and high metabolic rate, the chickadee is faced with high energetic demands. Chickadees have several strategies for survival during the winter. To increase energy intake, they spend a large percentage of the daylight hours foraging; to reduce energy loss overnight, they roost in cavities and other protected locations and become hypothermic (Chaplin 1974, Odum 1942). Even with these strategies, chickadees may lose up to 10% of their body weight overnight (Chaplin 1974, 1976). As a result, even minor reductions in foraging efficiency could reduce the probability of survival.

We tested whether a resident population of Black-capped Chickadees that had used a bird feeder in the past, thus potentially making members of the population into dependent individuals, experienced lower survival rates than a resident population of chickadees that had never been exposed to a bird feeder, during a winter when feeders were not available to either group.

STUDY AREAS AND METHODS

We conducted this experiment from October through April 1984–1985, the last year of a 3-yr study on the impact of supplemental feeding on wild birds. For a more complete description of the study sites, field techniques, and methods, see Brittingham and Temple (1988, 1992).

Our two study sites were in Sauk County, Wisconsin. Both were approximately 2000 ha and in comparable rural areas composed primarily of deciduous woods with intermittent openings. During the winter of 1984–1985, no bird feeders were available on either site. In addition, both sites were at least 2 km from any other bird feeder, a distance greater than most chickadees travel during the winter (Brittingham and Temple 1988). Although no supplemental food was available on either the control or experimental sites, the histories of bird feeding on the two sites were different. There had never been any bird feeders on the control site, but a bird feeder had been present on the experimental site every winter during the previous 25 yr.

Chickadees on both the control and experimental sites were exposed to identical weather conditions, an important consideration in view of the large impact of weather on survival (Brittingham and Temple 1988). We obtained temperature data from the National Oceanic and Atmospheric

Administration weather station in Baraboo, Wisconsin for the period October–April 1984–1985. The mean ± SD monthly average temperature was 1.3 C ± 8.5, and the mean ± SD monthly low temperature was −4.5 C ± 8.0. During 1 mon, the temperature fell below −18 C on 13 d and below −29 C on 1 d. During a second month, the temperature fell below −18 C on 8 d and below −29 C on 3 d.

Chickadees on both sites were captured (banding permit number 20953-I) with mist nets and banded with a U.S. Fish and Wildlife Service aluminum band and a unique combination of color-bands so that individuals could be identified by both recapture and reobservation. On the control site, we had 35 color marked chickadees (25 after-hatching-year and 10 hatching-year). Twenty-one of these birds had been banded during the previous two winters. We had 49 color marked individuals (all after-hatching year) on the experimental site. All banded individuals on the experimental site had been captured at the bird feeder during the previous two winters when a feeder was present on that site, and they visited the feeder on a regular basis. We were, therefore, certain that these individuals had actually been past users of the feeder.

We quantified dependency in terms of a reduction in survival rates. In order to calculate survival rates, we visited both sites at least 1 d per week from October through April and recorded observations of marked birds. We also mist-netted at each site at least 1 d per month. Using the Jolly-Seber method of estimating survival rates (Jolly 1965, Seber 1965), we calculated five monthly survival rates (October–February) from 300 recaptures and reobservations of 35 color-banded birds on the control site and five monthly survival rates from 331 recaptures and reobservations of 49 color banded birds on the experimental site. We used a t-test to determine whether average monthly survival rates differed between the two groups of birds. The survival rates we estimated describe continued presence on the study sites; the compliment of these rates includes both mortality and emigration. Chickadees are year-round residents in Wisconsin, however, and remain in the same area throughout the winter. Winter dispersal movements rarely occur (Brittingham and Temple 1988, Weise and Meyer 1979). Therefore, we interpreted loss from our population to be a consequence of mortality instead of emigration.

RESULTS

There was no difference ($t = 0.13$, $P > 0.5$) between the average (±SD) monthly survival rates of chickadees on the control site (0.85 ± 0.12) and chickadees on the experimental site (0.84 ± 0.13). Individuals that had used bird feeders in the past were no less able to survive on a natural food supply than individuals that had never used a bird feeder.

DISCUSSION

Chickadees in winter are opportunistic, feeding on a wide range of food items and using a variety of foraging techniques. The winter diet of chickadees away from bird feeders includes insect eggs and larvae, mites

and other arthropods, seeds and carcass remains (Howitz 1981, Odum 1942). We also observed chickadees picking grain and insects out of horse manure. For a species with such a potentially broad diet, learning could be important. Numerous studies have shown how experience influences foraging behavior and success. Through direct experience and observations of conspecifics, birds learn to recognize which items can be eaten, which ones are unpalatable and new foraging techniques (Kamil and Yoerg 1982, Suboski 1989).

We did not find chickadees that used feeders in the past, and therefore had spent less time foraging away from feeders, were less able to survive on a diet of natural food than chickadees that had spent all their time foraging away from feeders with conspecifics who also foraged solely on natural food items. During the previous two winters, when feeders were available on the experimental site, chickadees obtained approximately 21% of their daily energy requirements from the feeder. The remaining 79% was obtained from natural food sources (Brittingham and Temple 1992). Although sunflower seeds were always available at our feeders, chickadees relied primarily on natural food sources to meet their energy requirements. As a result, it is not surprising that these chickadees had not lost their ability to utilize natural food efficiently.

Some caution should be taken when interpreting these data. We conducted this experiment in relatively undisturbed rural habitats. In urban or suburban areas, where natural food resources may be less abundant, individuals may be more dependent on feeders. As so many people in urban and suburban areas feed birds, however, dependency on any one feeder site would probably still be low. Caution should also be taken in generalizing our results beyond the chickadee or other resident species. Migratory species may become more dependent on feeders because of unfamiliarity with the wintering area.

We did not test what happens when feeders are removed unexpectedly from a site in the middle of winter, but we suspect that this would not be as detrimental as is typically thought. In winter, a natural food patch may disappear suddenly as a result of a winter snow or ice storm or the foraging activities of other flock members. As a result, chickadees apparently track a number of food patches at all times and sample a number of areas continuously no matter how abundant food is in any one patch (Brittingham and Temple 1992, Smith and Sweatman 1974). This strategy is necessary for surviving in an unpredictable and fluctuating environment. People consider bird feeders to be a very predictable food source, but in terms of evolutionary time, they have only been available for a very short time. For birds, they are probably no different than any other food patch.

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