sunflower and white proso millet. Dark-eyed Junco preferred sunflower, millet, and peanuts over peanut suet. European Starling showed a sequential food preference. Peanuts were the most preferred food followed by suet, and finally sunflower and millet. House Sparrow preferred sunflower and millet relative to peanuts, and peanuts relative to suet. The most favored foods of the American Crow were peanuts and suet, followed by sunflower, and finally millet. Black-capped Chickadee preferred black-oil sunflower and whole peanuts, followed by millet, and finally suet. Red-winged Blackbird had no seed preference.

We found no differences in the total number of individuals of all species combined, total number of species, and abundances of individual species when the temperature was <0 °C compared with >0 °C (and therefore, no table of confidence intervals is given). Figure 1 is representative of the relationships found between temperature and bird abundance. We also found no differences in food preference of all species combined, total number of species, and abundances of individual species when the temperature was <0 °C compared with >0 °C.

Discussion

Numerous studies have found increased whole-organism basal and summit metabolic rates of small birds during the winter compared with other seasons (Dawson and O'Connor 1996, Liknes et al. 2002). Because of the increased energetic demands required to maintain elevated metabolic rates (Williams and Tieleman 2000), we predicted that there would be greater activity at feeders during colder periods. However, we found no effect of temperature on abundance at feeders. We also predicted that birds would switch to foods with higher fat contents during colder periods, but we found no effect of temperature on food choice. One reason for our results may be that the winter of 2001-2002 was one of the warmest on record and had few days with snow cover. Perhaps birds had built up ample winter fat stores prior to cold spells (Dawson and O'Connor 1996), and thus, did not have to increase feeding visits.

In our study, six species preferred black-oil sunflower, five species preferred whole peanuts, three species preferred white proso millet, and one species preferred peanut suet. Thus, when providing seed on the ground, a mixture containing sunflower, peanuts, and millet may attract the greatest diversity of birds. The food preferences we observed are similar to those reported by Geis (1980) in Maryland, Horn et al. (2002) in Iowa, and Dunn and Tessaglia-Hymes (1999) in a summary of data from Project Feeder Watch, a continent-wide feeder survey. For eight species, food preferences in our study were considered favorite feeder foods in the study by Dunn and Tessaglia-Hymes (where a favorite feeder food was selected on >1/3 of feeder visits). Unlike our study, however, Dunn and Tessaglia-Hymes found suet to be an infrequent food choice by crows, and whole peanuts and black-oil sunflower to be infrequent choices of juncos (although, Horn et al. [2002] found a higher occurrence of juncos at houses with sunflower seed than those without). Easy access to suet may be one reason why it was the preferred food by crows.

One surprising result was the small number of species that preferred suet. Horn et al. (2002) found 12 of 22 species, including Black-capped Chickadee, European Starling, and House Sparrow, more likely to occur at houses where suet was offered. One reason why suet

Table 2:

Mean and 95% confidence intervals of the 10 most common bird species observed per monitoring session at feeders containing black-oil sunflower, white proso millet, whole peanuts, and peanut suet at six houses in northeastern Illinois during the winter of 2002.

	Black-oil sunflower			White proso millet			Whole peanuts			Peanut suet		
Species	UCL[A]	Mean	LCL[B]	UCL	Mean	LCL	UCL	Mean	LCL	UCL	Mean	LCL
Mourning Dove	1.2	1.0*C	0.7	2.0	1.6*	1.2	0.3	0.2	0.1	0.2	0.1	0.0
Blue Jay	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.4*	0.3	0.0	0.0	0.0
American Crow	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.2*	0.1	0.3	0.3*	0.2
Black-capped Chickadee	0.7	0.5*	0.4	0.2	0.1	0.0	0.4	0.3*	0.2	0.1	0.1	0.0
European Starling	1.4	1.0	0.6	0.6	0.4	0.2	21.5	18.7*	15.9	4.5	3.4	2.3
Northern Cardinal	0.4	0.3*	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Dark-eyed Junco	0.6	0.5*	0.3	0.7	0.5*	0.3	0.4	0.3*	0.2	0.2	0.1	0.0
Red-winged Blackbird	0.3	0.1	0.0	0.7	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0
House Finch	0.9	0.7*	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
House Sparrow	1.9	1.5*	1.1	2.1	1.6*	1.1	0.2	0.1	0.1	0.0	0.0	0.0

[A] 95% upper confidence limit; n = 188 monitoring sessions. [B] 95% lower confidence limit.
[C] * indicates preferred food(s).