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SELECTION OF HORSE DUNG PATS BY FORAGING HOUSE SPARROWS

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Abstract.—House Sparrows (*Passer domesticus*) preferred to forage on dung pats located in open areas as opposed to dung pats located in taller vegetation. This choice probably related to the increased ability of sparrows to detect terrestrial predators at the open sites. When foraging on dung pats in open areas, sparrows avoided unoccupied dung pats, preferring pats where small groups of sparrows were already present.

SELECCIÓN DE ACUMULACIONES DE EXCREMENTOS DE CABALLOS POR PARTE DE *PASSER DOMESTICUS* PARA ALIMENTARSE

Resumen.—*Passer domesticus* prefiere forrajear en acumulaciones de excrementos de caballos que se encuentran en áreas abiertas, que en aquellos localizados en vegetación alta. La selección posiblemente este relacionada con la mayor probabilidad que tienen las aves para detectar depredadores en estas áreas abiertas. Cuando estos gorriones forrajean en áreas abiertas, evitan hacerlo en acumulaciones de heces en donde no hay otras aves, prefiriendo acumulaciones en donde otras aves se estan alimentando.

An individual faces many choices in deciding where to forage. Food availability, the suitability of cover, and the presence or absence of conspecifics all affect foraging decisions (e.g., Goss-Custard 1970, Krebs 1980, Schneider 1984). House Sparrows (*Passer domesticus*) in rural areas frequently forage on horse dung pats, from which they remove grain and other vegetative materials. As each dung pat is a discrete foraging site, the pats provide an opportunity to determine what factors affect a sparrow's choice of foraging sites. In this study, I examined how the amount of available cover and the number of sparrows already present on a dung pat affected the sparrow's choice of horse dung pats.

METHODS

House Sparrows were observed foraging at a farm in the town of Lyndon, Sheboygan County, Wisconsin, from June through September 1986 and from May through July 1987. From five to seven horses were kept in three interconnecting pastures covering 0.8 ha. The pastures consisted of heavily grazed, grassy areas (mostly rye and brome grass) and smaller ungrazed patches of weeds, comprised mostly of common burdock (*Arctium minus*), Canada thistle (*Cirsium arvense*) and wild parsnip (*Pastinaca sativa*). The grassy areas had been grazed to within 5 cm of the ground. Visibility was good for sparrows foraging on dung pats in this area. In the weeds, many of the plants were over 0.5 m in height and visibility was poor.

At the start of each observation period, I selected five dung pats in the grassy area and five in the weeds for observation. Observation periods

were 15 min long and were begun between 1400 and 1800 CST. Only one observation period was performed per day. The pats selected were less than 24 h old and were between 20 and 30 m from my observation spot. I was not in a blind during observations. My presence may have affected the behavior of the sparrows in some way (i.e., made them more wary). People were, however, quite frequently in the pasture area, so it was not unusual for the sparrows to forage under these conditions.

During observations the number of sparrows arriving at each pat were noted. For sparrows arriving at pats in the grassy area, the number of birds already present on each pat was also noted. From this information I determined the proportion of pats having no sparrows, one sparrow, two to four sparrows, and five or more when each sparrow landed. These proportions were combined to generate expected frequencies (the frequency that a sparrow, by chance, should land on a pat with specified number of sparrows present). Observations were made between 0600 and 0900 CDT and between 1600 and 1900 CDT. Data were combined for males and females after no differences were found between the sexes. All statistical tests were goodness of fit tests using the G-statistics.

RESULTS

In both 1986 and 1987, House Sparrows preferred to forage on dung pats in the open grassy areas, rather than in the weeds. In 1986, 88.7% of visits were made to grassy locations, significantly more than predicted by chance ($n = 106$, $G = 71.7$, $P < 0.001$). During 1987, 92.2% of visits were to grassy sites ($n = 51$, $G = 42.2$, $P < 0.001$). The preference for grassy sites was also supported by the fact that pats in grassy sites were quickly broken apart by the sparrows, but pats in the weeds remained intact for long periods.

When foraging at grassy sites, the House Sparrows preferred to forage at dung pats where small groups of sparrows were already present. In both years sparrows approached pats with 2–4 birds on them much more than predicted by chance and approached unoccupied pats less than expected (Fig. 1). Sparrows landed on pats with one bird present and ones with five or more sparrows present as frequently as expected (Fig. 1).

DISCUSSION

Sparrows showed a definite preference for foraging sites in open rather than concealed locations. There are at least two explanations for this preference. First, the concealed sites prevented the sparrows from detecting approaching predators. Second, the concealed sites were difficult for the sparrows to locate. The latter explanation is unlikely to be the complete answer. At the ground level, dung pats were concealed, but for a flying bird the pats would be easy to locate. Foraging on a dung pat in the weeds would, however, put the sparrow at risk of predation by terrestrial predators, such as domestic cats (present at the study site). A domestic cat could easily approach a pat in the weeds without detection, but would be easily visible to sparrows on dung pats in open areas.

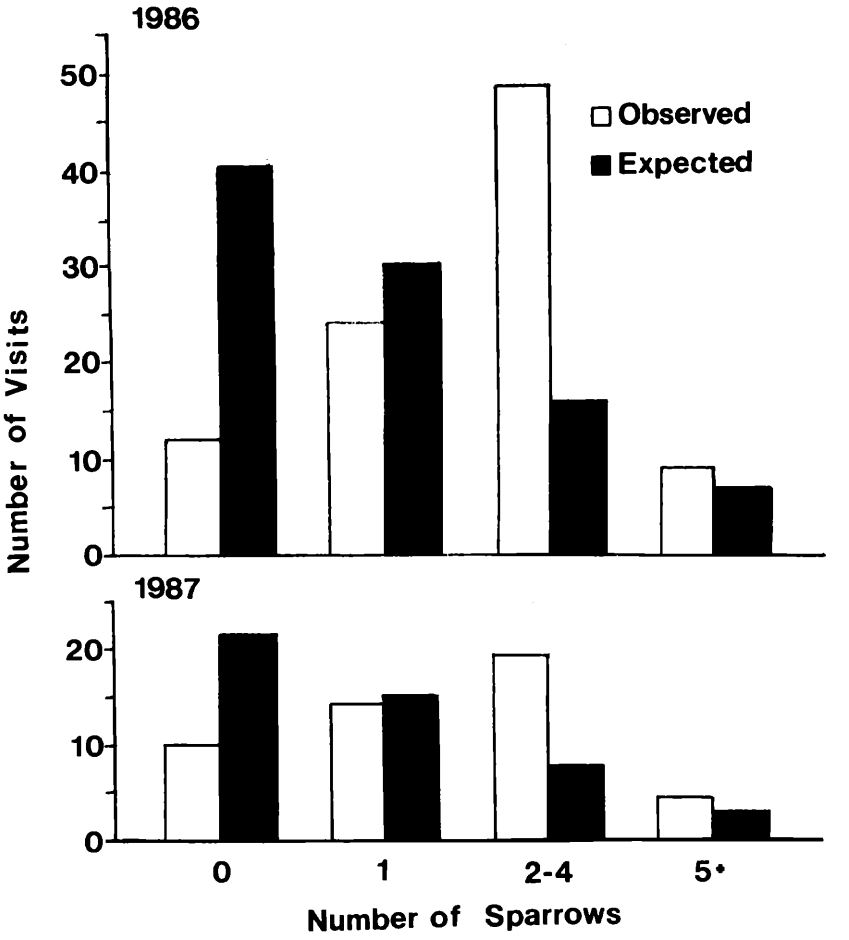

FIGURE 1. Observed and expected frequencies of visits by foraging House Sparrows to horse dung pats on which different numbers of sparrows were already present. Observed and expected values are significantly different in both years (1986: $G = 72.6$, df = 3, $P < 0.001$; 1987: $G = 20.2$, df = 3, $P < 0.001$).

House Sparrows showed a further preference for grassy pats on which small groups of sparrows were already present. Barnard (1980) has also shown that House Sparrows foraging on seeds in a shed were more likely to land near a conspecific than elsewhere. Joining a group could provide benefits from the selfish herd effect (Hamilton 1971) and from reduced vigilance rates (Pulliam et al. 1982). The presence of sparrows on a pat might also have indicated that the pat provided good foraging opportunities (Krebs 1974). Sparrows may not have preferred larger groups, because of a physical limit on the number of individuals who could

successfully forage on a dung pat because of space limitation. Aggression may have also been greater in larger groups because of the reduced distances between individuals.

Another possible explanation for the foraging patterns of the sparrows is that the sparrows were selecting dung pats based on the quality of the dung as a food source. Seed content of dung could vary depending on diet, degree of mastication and other factors. Although dung in the open area may have varied in quality, all dung pats in open areas were used as foraging sites. This use was demonstrated by the fact that all dung pats were broken apart (by sparrow foraging activity) within 24 h. Although horses do tend to select particular sites for defecation, these sites can cover a large area and horses do not always restrict themselves to defecating only at these sites. I observed no evidence that any one horse defecated only in open areas or only in taller vegetation. It is unlikely, therefore, that the preference of sparrows for dung in open areas was due to horses with high quality dung defecating only in open areas and horses with low quality dung only in taller vegetation.

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