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INTERACTIONS BETWEEN BLACK-BILLED MAGPIE AND FALLOW DEER¹

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Abstract. Black-billed Magpies (*Pica pica*) were observed pecking on fallow deer (*Dama dama*) on 56 occasions. Ectoparasite removal was apparently the reason for this interaction. Birds preferred deer that were sitting to deer that were standing, and interacted preferentially with adult males over females or calves. Deer did not solicit cleaning and, on a few occasions, were observed to shake off birds. This interaction may be beneficial for magpies, because ectoparasites are a predictable source of food, but its effect on fallow deer remains to be investigated.

Key words: bird-ungulate interactions, Black-billed Magpie, fallow deer, *Pica pica*.

Several studies on large herbivore–bird interactions have described birds using ungulates as perches (Heat-

wole 1965), or removing their ectoparasites or fur (Isenhardt and DeSante 1985, Yosef and Yosef 1991, Fitzpatrick and Woolfenden 1996). The behavior of ungulates in response to birds landing on them ranges from adopting postures that facilitate parasite removal, to intolerant reactions. Black-tailed deer (*Odocoileus hemionus*) freeze when cleaned by Scrub-Jays (*Aphelocoma coerulescens*) (Isenhardt and DeSante 1985), whereas feral hogs and wild boar (both *Sus scrofa*) solicit cleaning by lying down when pecked by Common Crows (*Corvus brachyrhynchos*) and Black-billed Magpies (*Pica pica*) (Kilham 1982, Massei and Genov 1995). In contrast, oxpeckers sometimes induce horn-shaking by their hosts, possibly because oxpeckers prevent wound healing when removing ectoparasites (Watkins and Cassidy 1987).

Black-billed Magpies eat ticks from the back of elk (*Cervus canadensis*) (Linsdale 1946), but have not previously been described to interact with fallow deer (*Dama dama*). A significant number of opportunistic

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sightings of Black-billed Magpies landing on fallow deer led us to investigate this interaction.

METHODS

The study area was a 40 ha enclosure in the Maremma Natural Park, along the Thyrranean coastline, central Italy (42°39'N, 11°05'E). About 150 fallow deer live in this area which is dominated by *Quercus suber*, *Q. pubescens*, *Spartium junceum*, and *Cistus* spp. The fallow deer and the magpies were accustomed to human presence so that it was possible to watch their behavior from an average distance of 100 m using binoculars. Observations were carried out in 4-hr periods (3 or 4 periods each day, depending upon day length) distributed evenly throughout the day. Magpies frequently landed on deer, and for each such interaction the following data were recorded: date, time, behavior of the deer before and after the interaction (lying or standing), age and sex of the deer, number of birds interacting with one deer, number of pecks per unit time, position and direction of grooming of the magpie on the deer's body. Statistical tests were adjusted to take into account sex and age ratio of the deer population as well as the number of deer standing or lying.

RESULTS

Interactions between deer and magpies were observed on 56 occasions between 21 June 1993 and 15 January 1994. On three more occasions magpies jumped from the ground, without alighting on the deer, to peck the antler velvet. Of 56 interactions observed between birds and fallow deer, 50 involved single birds and 6 involved two birds pecking the same deer. On one occasion 14 birds were seen simultaneously, of which 7 interacted with several deer. As soon as a bird landed, it began to search the coat of the deer, and no fur taking was observed.

Birds cleaned more anterior (antlers, head, neck) than posterior parts of the deer body ($G_2 = 19.6$, $P < 0.001$) and, during the interaction, remained in the same place where they had landed, or moved towards the head of the deer. Interactions occurred more between 12:00 and 14:00 than in other parts of the day ($G_6 = 28.2$, $P < 0.01$). Magpies interacted more with male than female deer ($G_1 = 3.6$, $P < 0.05$), more with adult deer than with calves ($G_1 = 30.3$, $P < 0.001$) and more with lying than with standing deer ($G_1 = 12.4$, $P < 0.001$).

In 84% of the observations, fallow deer did not change their behavior after the interaction with the bird ($G_1 = 2.5$, $P > 0.1$). On nine occasions deer (eight males with antlers in velvet and one calf) evaded the attentions of the bird by antler-shaking and stotting. The number of pecks was correlated with the time spent on a deer ($r = 0.65$, $P < 0.05$). Magpies fed for an average (\pm SD) of 27.8 ± 20.9 sec on the body of their hosts, with a mean of 0.31 pecks sec^{-1} . In one case a magpie pecked 337 times in 590 sec on the antlers in velvet of a lying deer, and bleeding was observed after the bird flew off.

DISCUSSION

It is possible that some observations in the present study were repeated on the same bird, because individuals were not marked. However, observations were

made over 8 months, and it is possible that interchange of individuals occurred over this period. Furthermore, it is unlikely that this interaction was restricted only to birds observed in the present study, because the phenomenon has been recorded casually since 1975 (L. Bernardini, pers. comm.).

These results suggest that magpies use fallow deer for feeding. As the time spent on fallow deer was positively correlated with the number of pecks, and as the bird started to peck immediately after landing on the deer, the hypothesis that magpies use fallow deer as perches was discarded.

Fallow deer are host to a wide range of ectoparasites such as ticks (*Ixodes* sp.) and various flies (Putman 1988). Flies concentrate on the antlers, especially during the velvet shedding period (Chapman and Chapman 1975), whereas ticks are abundant around the ears, between the legs, and under the tail (pers. observ.). Birds landing on deer that are sitting or lying could easily peck only the anterior parts of the deer, and not between its legs or under the tail. Accordingly, magpies were seen pecking mainly this area of their hosts' bodies, but it was not possible to collect any direct evidence that magpies ate ectoparasites. Presumably, the cleaning behavior is beneficial to the birds, as ectoparasites on ungulates are likely to be a concentrated and predictable resource. Birkhead (1991), for example, reported that magpies are thought to remove ticks from ungulates.

It is possible that birds preferred to interact with adult male deer because they offer a larger body area for foraging (Olubayo et al. 1993) compared to females and calves, and their antlers in velvet attract flies. Preference for larger hosts also was found in oxpeckers (*Buphagus* spp.), possibly related to a greater number of ticks present (Koenig 1997).

The strong preference of magpies for deer that are lying down was similar to that described by Koenig (1997), who found that Red-billed Oxpeckers (*Buphagus erythrorhynchus*) were more likely to interact with common waterbucks (*Cobus ellipsiprymnus*) if their hosts were lying than if they were standing. This indicates that the behavior of the host influences a bird's choice, although the reason for this preference remains to be investigated.

Fallow deer did not solicit cleaning from magpies and, in a few cases, tried to avoid the birds; this suggests that pecking by magpies often may be neutral for the deer and, under certain circumstances, such as antlers in velvet, could be detrimental. Thus, the relationship between these two species could be classified as an occasional commensalism of the magpie on the fallow deer, although the significance of this interaction for the fallow deer remains to be clarified. More detailed observations are required to assess the importance of ectoparasite removal for the fallow deer, and to quantify the role of ectoparasites in the magpie's diet.

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