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Tristram's grackles groom Nubian ibex.—There are relatively few species of birds that have been observed actively grooming cattle or other large animals, although Cattle Egrets (*Bubulcus ibis*) do occasionally perch on large herbivores and pluck insects from their hides (Heatwole 1965). Examples in Africa include the association between the Egyptian Plover (*Pluvianus aegyptius*) that has been observed to walk into the open jaws of the Nile crocodile and to glean food particles from between its teeth (Howell 1979). In the Galapagos Islands, one of Darwin's finches (*Geospiza fuliginosa*) removes parasites from the hides of marine iguanas (*Amblyrynchus cristatus*) (Amadon 1967). In sub-Saharan Africa, oxpeckers (*Buphagus* sp.) clean ectoparasites from the hides of zebra (*Equidae* sp.), giraffe (*Giraffa* sp.), impala (*Aepyceros melampus*) and cape buffalo (*Syncerus c. caffer*) (Breitwisch, pers. comm.). Individuals of the species always accompany large herds of animals and derive a large part of their diet from eating ectoparasites which they pick from their host's bodies (Mackworth-Praed and Grant 1955, Breitwisch, pers. comm.). In the United States, Scrub Jays (*Aphelocoma coerulescens*) which accompany black-tailed deer (*Odocoileus hemionus columbianus*) have been observed maintaining "grooming stations" (Isenhart and DeSante 1985). The phenomenon of "grooming stations" is very similar to that known to exist in fishes in coral reef communities (Fishelzon 1983).

In most cases, both parties profit. The cleaning individual is protected from predators and has a regular food resource at its disposal. The larger animal benefits by having otherwise unreachable parasites and other nuisances removed. It should be noted that oxpeckers have been observed pecking at wounds on their hosts. This behavior has been interpreted as keeping the wound unhealed and thus attracting flies and other insects which are then picked off by the oxpeckers. They have also been observed to tear off fragments of flesh and skin (Breitwisch, pers. comm.).

In Israel, along the western bank of the Great Rift valley (on the shores of the Dead Sea) is a spring called Ein-Gedi. To the north of it is Mount Yishay, on which an artificial basin was dug by the Nature Reserves Authority to collect water flowing from several tiny springs. This pool attracts a wide range of animals at all hours of the day and night. A toothbrush tree (*Salvadora persica*) serves as a perch for a flock of Tristram's grackles (*Onycognathus tristramii*) which can be found perching in this tree in the early morning. Tristram's Grackle resembles the Blackbird (*Turdus merula*) in size. Only Tristram's grackle has moved beyond the bounds of the African continent and has a limited distribution in Aden, Yemen, along the shores of western Saudi Arabia, eastern Sinai, and up the Rift valley as far north as Jericho (Paz 1986). It is gregarious at most times and usually is found in small groups comprised of parents and offspring. In winter, it forms flocks of 100–300 individuals (Paz 1987).

We started regular observations of the grackles' interactions with Nubian ibexes (*Capra ibex nubiana*) after a chance sighting, by RY, early one morning in mid-April 1988. We noticed that an approaching herd of ibexes elicited from the birds a greater cacophony of noise than is usual and that the grackles started hopping on the branches of the tree.

Upon arrival of the herd, an ibex would remain stationary and a single Tristram's Grackle would fly to it and land on its back. After an initial, mutual exchange of gestures—bowing and cooing by the bird and neck stretching by the ibex—the bird would move up toward the head area. Only then would it start to groom and peck at the hide of the ibex.

During two years, we visited the area at dawn on 17 occasions and observed grackle–ibex interactions on 14 of these. The average grackle flock size during our 17 visits was 28.8 ± 9.9 (SD). Ten visits were between the winter (non-breeding) months of September to March. The average flock size for these months was 36.3 ± 4.4. Seven visits occurred between the

summer (breeding) months of April and August and the average flock size was 18.0 ± 2.4. As implied from these data, flock size was larger during winter (Mann-Whitney U-test, $U_{7,10} = 70$, $P < 0.005$). We assume that during summer pairs were busy with nesting and that only juvenile or unpaired individuals were present at the station. During winter, the addition of all breeding adults and young from the previous breeding season accounted for the rise in flock size. Other possible explanations for changes in flock size over season may include migratory behavior or increased dependence on ibexes when other sources of food are scarce in winter.

The birds seemed to be capable of identifying herds of ibexes at distances of over 100 m. The approach of a herd caused them to whistle louder and more intensely and to hop about excitedly in the bush or tree.

The cleaning process usually began around the eyes, the ears, and even the horns. The ibexes assisted the grackles by stretching or moving appendages as needed. The grackles gave particular attention to the ears and the area adjacent to the sexual organs. Although we could not identify each individual, we noted that there was an idiosyncratic system characteristic of each bird in the manner in which it cleaned an ibex.

In all 74 instances of grackle–ibex interactions, the birds cleaned in the same direction: from the head toward the tail of the ibex. In all instances, only one bird at a time was seen to clean an ibex. No aggression or competition for the cleaning of an ibex was observed. It is of interest to note that the ibexes cleaned were either juvenile males or females. Adult males and kids were not gleaned, and they would usually graze in the immediate vicinity, waiting for the other members of the herd to finish being cleaned before continuing on their way.

By means of local publications, we requested information and pictures of such chance observations. Twenty-six people responded to our request, 17 of whom reported on grackles cleaning ibexes, two of Fan-tailed Ravens (*Corvus rhipidurus*) perched on ibexes, and three of Hooded Wheatears (*Oenanthe monacha*) in the company of ibexes. This concurs with previous descriptions by Aharonson (1982) and Paz (1986). Four reports were from nomadic bedouin who reported the exact locations in which their camel herds go to get themselves cleaned by Tristram's Grackles.

This phenomenon of bird–mammal interactions still needs to be studied in detail and to be quantified. The study does raise questions about foraging patterns, symbiotic relationships, and individual recognition patterns. We are convinced that this interspecific behavior is more widespread than is appreciated and is only waiting to be discovered by ethologists.

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LITERATURE CITED

AHARONSON, L. 1982. Ibex—kings of the cliffs. Masada Publ., Inc., Givatayim, Israel.

AMADON, D. 1967. Galapagos Finches grooming marine Iguanas. Condor 113:96.

FISHELZON, L. 1983. Encyclopedia of the plants and animals of Israel. Vol. 4. Life in the water. Ministry of Defense Publ., Tel-Aviv, Israel.

HEATWOLE, H. 1965. Some aspects of the association of Cattle Egrets with cattle. Anim. Behav. 20:421–424.

HOWELL, T. R. 1979. Breeding biology of the Egyptian Plover, *Pluvianus aegyptus*. Univ. Calif. Publ. Zool. 113.

ISENHART, F. R. AND D. F. DESANTE. 1985. Observations of Scrub Jays cleaning ectoparasites from black-tailed deer. Condor 87:145–147.

MACKWORTH-PRAED, C. W. AND C. H. B. GRANT. 1955. Birds of Eastern and Northeastern Africa, Vol. II. Longmans Green and Co., London, England.

PAZ, U. 1986. Encyclopedia of the plants and animals of Israel. Vol. 6. Ministry of Defense Publ., Tel-Aviv, Israel.

———. 1987. The birds of Israel. Ministry of Defense Publ., Tel-Aviv, Israel.

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Two new host species for the parasitic blow fly *Protocalliphora braueri*.—Larvae of the parasitic bird blow fly *Protocalliphora braueri* (Diptera: Calliphoridae) are reported from two new host species, Brewer's Sparrows (*Spizella breweri*) and Sage Thrashers (*Oreoscoptes montanus*). Larvae were found on 57 nestlings in south central Idaho, 32 km north of Shoshone in Blaine county. The habitat in this area is dominated by big sagebrush (*Artemisia tridentata*) and a variety of grasses. Both bird species are sagebrush obligates (Braun et al. 1976) and are widely distributed throughout the shrub-steppe region of western North America during the nesting season (Wiens and Rotenberry 1981).

Protocalliphora braueri, a widespread species (synonym is *P. hirundo*), has been recorded attacking several North American bird species (Garrison et al. 1986, Halstead 1988, Eastman et al. 1989, Gold and Dahlsten 1989, Sabrosky et al. 1989). It is believed that the flies overwinter as adults and take advantage of early nesters. It is not known whether female flies oviposit in the nest material or directly on the nestlings (Sabrosky et al. 1989). Unlike most *Protocalliphora* larvae which live in nest material and feed intermittently on their hosts, *P. braueri* larvae produce myiasis by burrowing into the subcutaneous tissue of their host. They are hematophagous and require from one to three blood meals to mature. The myiasis-producing habit of *P. braueri* can lead to substantial host tissue damage. The larvae have been reported to burrow into the brain and pleural cavities of hosts (Sabrosky et al. 1989).

Brewer's Sparrows were infrequently parasitized by *P. braueri*, and I recorded larvae in only 4 of 68 (6%) nests. Sage Thrashers were more frequent blow fly hosts with 15 of 40 (38%) nests parasitized. In parasitized nests, 57% (8 of 14) of Brewer's Sparrow and 77% (49 of 64) of Sage Thrasher nestlings were afflicted. Early Sage Thrasher nests were more often parasitized by blow flies than later nests. The majority (87%) of parasitized Sage Thrasher nests were observed before the mean fledge date (9 June 1989, 10 June 1990). Shields and Crook (1987) reported an increase in parasitism of Barn Swallows (*Hirundo rustica*) through the nesting season, but Eastman et al. (1989) found no seasonal variation in parasitism of House Wrens (*Troglodytes aedon*). No seasonal patterns can be derived from the small sample of parasitized Brewer's Sparrow nests.

In this study, larvae were most often found on the wings (67% of 57 nestlings) and frequently at the base of developing primary feathers. Larvae were also found on the face (28%) and head (23%) as well as the body (19%), legs (12%), back (12%), neck (4%), and feet (4%) of nestlings. Individual nestlings frequently had *P. braueri* larvae at several locations. Larvae appeared to live on their hosts, i.e., they were visible, for at least four days.