FACTORS AFFECTING FEEDING RATES OF ANIS

BY A. L. RAND

THE Groove-billed Ani, *Crotophaga sulcirostris*, is a black cuckoo of tropical America. Its habitat is brush and the adjacent grassland and open country. There, usually in small parties, it spends much time walking on the ground, or crawling through the brush looking for its food. This, according to Bent (Life Histories of North American Cuckoos, . . . , U. S. Natl. Mus. Bull. 176: 31, 1940), is largely insects, and to a smaller extent fruit and berries. Frequently anis accompany cattle and mules for the insects these animals frighten into activity. The extent to which anis perch on cattle and pick ticks from them is questioned by Skutch (*in* Bent, *loc. cit.*) who suggests the popular belief to this effect is due to confusing the ani with cowbirds which are also black. The ani has also been recorded as following army ants for the insects and other small animals driven from hiding by the ants. They also feed on winged termites, catching them in flycatcher fashion.

When in El Salvador from February to July, 1951, working at the Instituto Tropical de Investigaciones Cientificas of the Universidad Autonoma de El Salvador, at San Salvador, I made observations on the feeding rate of the Groove-billed Anis, which demonstrated quantitatively, first, the advantage in their habit of accompanying cows for the insects the cows scared up and, secondly, the increased abundance of their insect food in the wet season. Many of the data that are used below were collected by my son, A. Stanley Rand, who was my assistant in the field. That his data and mine are strictly comparable we demonstrated a number of times by both of us watching and recording the activities of the same bird.

Anis often feed in shrubbery and about tall grass clumps, where they are difficult to observe, but about San Salvador they also came out onto the grazed open pastures where they were easy to watch. There they had two main methods of feeding. One was by walking about looking for and snapping up insects sitting on the grass. Often the birds would stop and peer, as though near-sighted, at a tuft of grass or at a leaf. Sometimes as insects flew up ahead of a bird they were pursued; sometimes one bird would attempt to take the food from another bird or to seize an insect the other bird had flushed. The second method of feeding on insects in pastures was for the birds to accompany cattle, keeping either by the head or a foot of the grazing beast, and pursuing the insects frightened into activity by the cow.

The observations were planned to watch anis feeding without cows for several hours and then with cows for several hours, and to compare

the number of catches per hour under each set of conditions. But this proved to be more difficult than expected. Though the birds were tame, and we watched them through six-power glasses, even in the most open terrain it was difficult to keep an ani under continuous observation for many minutes. It would go behind a tussock or a shrub, or if with a cow, perhaps behind the cow's head. Sometimes after feeding actively for a few moments an ani would sit quietly, preening, or as if dozing, and when I was about to give up watching it, it would sometimes reach out and seize an insect. There was the question as to how long to wait before stopping observations on a resting ani. Sometimes anis fed much more actively than at other times, possibly due to difference in hunger. Finally, after considerable observation I decided that three minutes of active looking for food in normal habitat was the shortest time I would record, and the data recorded consist of many short observations of three minutes or more. I soon found that many of the anis' catches were of small insects and that I could not be sure whether or not a particular sortie had yielded an insect. It seemed advisable to record "trys" or attempts to catch prey rather than actual "catches." An exception was where more than one "try" was made in the same place in rapid succession. These were assumed to be made at the same insect and counted as one try. Sometimes an ani accompanied a cow on a dry, bare road where insects were almost absent. Such data were not included. The same criteria applied to each set of observations, and these are all comparable. When observations were started, it was thought enough data could be gathered in a few days, but it was necessary to gather scattered observations in the dry season, when the grass was short and slow-growing, and to continue them on into the wet season. Then the anis' feeding rate increased, and it became necessary to compare feeding rates seasonally. A summary of the data is presented in Table 1.

Feeding rate in relation to cows.—In the dry season when food is scarcer, an ani hunting alone and seizing the insects it finds sitting quietly on the grass or flushing ahead of it, finds only one-third as many insects as it does if it accompanies a cow and seizes the insects the cow startles into activity. In the wet season, when insect food is much more plentiful, there is still a difference in the results of the two methods of hunting, but it is much less. When insects were plentiful, it was noted that an ani might make a number of "trys" at prey in very rapid succession and then there might be a pause in its activities. Perhaps at higher levels of food abundance there is a slackening of the feeding rate due to "inclination" of the bird rather than to availability of food.

When anis hunted by themselves they covered a surprisingly large amount of ground, though their legs are short and their tails and even their bellies often seemed to drag on the grass. When with grazing cattle they moved about much less. Thus not only in greater returns for the time spent, but also in lesser energy expended, the habit of attending cattle is economical.

TABLE 1

FEEDING RATES OF ANIS

	Season	*Dates*	*Periods of observation*			*"Trys" to capture insects*		
			Number	*Extreme lengths*	*Total time all periods, in minutes*	*Total number*	*Extreme variation in number per period*	*Average number per minute*
A. Feeding rate *without* cows	Dry season	March–April 9	7	3–5	24	14	1–3	0.5
	Beginning of rainy season	April 13–May 9	4	3–14	29.5	43	6–21	1.4
	Rainy season	June	20	3–6	74.5	257	4–21	3.4
B. Feeding rate *with* cows	Dry season	March 13–April 6	6	3–12	30	45	3–13	1.5
	Beginning of rainy season	April 21–May 4	3	4–6	15	28	4–18	1.8
	Rainy season	June 23–26	7	3–5	27.5	132	9–31	4.7

The habit of attending cattle may be so fixed that it can be carried on when it is not useful. On March 27, an ani followed a cow on a dry dusty road for six minutes. Such a place is naturally nearly devoid of insects, and it was surprising that in these six minutes the bird did make one try.

The data as a whole demonstrate very clearly the advantages of a bird's using an animal as a beater, and it is not surprising that a number of other species, of widely separated orders such as the cowbirds (Family Icteridae) of America and the cattle herons (Family Ardeidae) of Africa and Asia, as well as the anis (Family Cuculidae) of America have evolved this feeding relationship with cattle. Other relationships, such as those of a hornbill (Family Bucerotidae) with a monkey in Africa, and a drongo (Family Dicruridae) with a monkey in the Indo-Australian area may be similar. The big, mixed flocks of insectivorous birds that are so common in the tropics probably have mutual benefits of a similar kind at work.

Though anis in this area were much attached to cattle for feeding, the association ended there. We never saw an ani perch on a beast.

And when the anis finished feeding, they left to perch in bushes or trees without reference to the cows. In these respects the ani is much less attached to cattle than are the cattle herons and the cowbirds which may perch on the cattle or rest near them. The cattle-ani relationship seems to favor the ani almost entirely. The extent to which the ani benefits the cattle here in El Salvador by picking off ticks is probably very small (see also Bent, *loc. cit.*). But once A. S. Rand saw an ani pick a conspicuous tick off a beast. The cattle in Salvador completely disregard the ani. The ani is careful only to keep from being accidentally touched by the grazing beast, and sometimes, as a grazing cow swung its head, it seemed almost to brush an attending ani with its nose, without alarming the bird.

It is also interesting that a species that habitually travels in parties of six to eight or more birds and follows army ants and cattle should have no feeding organization within its own flocks. Many species, including certain starlings, ground hornbills, cormorants, and pelicans feed close enough together so that individuals act as beaters for each other. One bird may scare away a potential item of prey that will flee into the maw of a neighboring bird. A similar habit would seem of advantage to the ani. With the ani, sometimes one bird will rush up and try to get prey away from another bird; but in general in feeding by themselves they scatter out with little reference to each other (except when paired), and there is no organization that aids them as mutual beaters.

Feeding rate in relation to season.—In March the pastures had short grass, much of it brownish, and growth was evidently slow; insect life appeared relatively scarce. With the beginning of the rains in April, growth was soon evident and the fields assumed a greener, more luxuriant look. Casual inspection showed grasshoppers and other insects to be much more common. This is reflected in the feeding rate as shown in Table 1. In feeding without cows the feeding rate in the wet season increased nearly seven times over that in the dry season. Feeding with cows the rate increased only about three times, but was higher than the rate without cows. This graphically illustrates the increase in abundance of insects in the wet season, and the advantage to the bird of nesting in the rainy season when food for the young is more abundant. (In June the condition of the gonads showed the breeding season was approaching, and eggs have been recorded in July and August.) Perhaps, as Davis (Auk, 57: 202, 1940) has suggested for the Smooth-billed Ani, *Crotophaga ani*, this change in food availability initiates breeding.

In Cuba the Smooth-billed Ani is said (Davis, *loc. cit.*) to change its food habits with the seasons; during the dry season it subsists largely

on fruit; during the wet season little vegetable food is taken. A congregation of birds about streams during the dry season has also been noted. In the Groove-billed Ani no such change was noticeable. Occasionally, in both dry and wet seasons, anis were seen in fruit trees, apparently eating fruit, and throughout the period of observation a nettle bush with small, white, watery fruit was occasionally visited and a few berries eaten. A meal was never made of these berries, and the birds sometimes flew 30 to 40 yards from where they were catching insects to the bushes to eat a few berries. It seemed as though the berries were sparingly eaten as a supplement to the diet.

As one might expect, in the wet season when more food could be gathered in a shorter time, anis spent less time hunting and were seen less regularly with cows and for shorter periods. Indeed, anis were generally less conspicuous in the wet season than in the dry, possibly because the birds, having to hunt less, spent more time quietly perched in shrubs and trees, which during this season have denser foliage.

SUMMARY

Groove-billed Anis, *Crotophaga sulcirostris*, were watched feeding alone and with cows in open pastures in both the dry and the wet seasons, and the number of "trys" to catch insects was counted. The advantage to the ani of accompanying cows and of using them as beaters and the increase in the available insect food from the dry to the wet season are demonstrated.

Chicago Natural History Museum, Chicago, Illinois, November 6, 1951.