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February / février 2010

Nigerian Ornithologists' Society Bulletin

Vol. 12 No. 42 , October 1976

ON THE FUNCTION OF RICTAL BRISTLES, WITH REFERENCE TO NIGERIAN BIRDS

by M. Dyer

Received 19 March 1976

The variation in size and shape of the rictal bristles of birds raises some obvious questions as to their function. Many aerial insectivorous species have rather long and conspicuous rictal bristles, suggesting to Mayaud (1950) that for nightjars, they might help catching insects by acting as a 'net' on either side of the bird's gape. In crepuscular, nocturnal and hole-nesting species, rictal bristles may have tactile functions like those of mammalian vibrissae (Klüster 1905). Lederer (1972) analysed film of tyrant-flycatchers catching insects, but was unable to draw any conclusions about the role of rictal bristles in prey capture by these birds. In a review of avian bristles Stettenheim (1974) pointed out some inconsistencies in the pattern of occurrence of rictal bristles in several Orders and Families.

From detailed observations of a captive Black-headed Bush-shrike Tchagra senegala, it became evident to me that rictal bristles might function to protect the eyes of birds that feed on potentially harmful insects. In December 1974 I had the opportunity to watch at very close range at Zaria, Nigeria, an injured Black-headed Bush-shrike feeding on large acridid grasshoppers. Several times I fed the shrike live specimens 6 cm long of Acanthacris, which possess formidable-looking tibial spines on the hind legs. When one of these grasshoppers was taken by the shrike, the insect would strike at the bird's face with its legs. However, the kicking hind legs of Acanthacris were deflected away from the shrike's eyes by the stiff rictal bristles along the bird's gape, and I was impressed by the way these bristles had diverted possible injury to the shrike.

If species of large-billed insectivorous bird incorporate into their diets insects capable of inflicting injury on the eyes, then it is reasonable to suppose that selection would favour the evolution of rictal bristles of a type which, among other functions, would reduce such injuries. To see if there was any relationship between birds' rictal bristles and diets, I examined skins of several species of large-billed insectivorous birds, chosen on the basis of my having observed them in the field feeding on large-bodied insects.

The more conspicuous large-billed insectivorous birds whose feeding habits are readily observable, at least in northern Guinea savanna, are the Grasshopper-Buzzard Butastur rufipennis, Abyssinian Roller Coracias abyssinica, two or three species of bee-eaters Merops, and several of shrikes (particularly the Yellow-billed Shrike Corvinella corvina).

The Grasshopper-Buzzard commonly attends bush fires and at such times becomes quite gregarious. If the fire is by a road, the birds will often sit and wait on the asphalt and pounce on any grasshopper, cricket or mantid that happens to land nearby (personal observation). Presumably this tactic allows the Grasshopper-Buzzards to feed on insects which have little chance of escaping by taking cover in vegetation.

The rictal bristles of Butastur are relatively fine and short, and would hardly seem effective in preventing a grasshopper's hind legs from striking the bird's eyes. However, the method of insect-capture by Grasshopper-Buzzards reveals that rictal bristles need not have evolved to function as "eye protectors". Like most, if not all, insectivorous falconiforms, Butastur catches prey with its feet (Brown 1970). This means that large, potentially harmful insects can be immobilized before they come near the facial region of the bird. For birds of prey, Chandler (1904) suggested that bristles in the facial (loral) region were modified to prevent wearing or soiling of otherwise conventional feathers.

In common with its congeners, the Abyssinian Roller is a sit-and-wait hunting strategist. The coraciiform foot is not adapted for grasping prey, and prey catching is done with the bill. From its vantage point a roller will swoop down to the ground to pick up prey, often landing beside an insect before actually seizing it. Rollers seem to specialise on large bugs and beetles (Orthoptera, Coleoptera) (Mackworth-Praed & Grant 1970), and their relatively large heads and bills seem well suited to the task.

In contrast with Butastur, the rictal bristles of C. abyssinica are quite thick and stiff, and in the manner that they curve away from the eyes are similar to the bristles of Tchagra senegala. Thus it is reasonable to assume that the rictal bristles of C. abyssinica and T. senegala perform similar functions.

Bee-eaters catch insects on the wing and bring each item caught to a perch where it is usually immobilized before being swallowed. Fry (1973) analysed the diets of savanna living species and found that the Carmine Bee-eater Merops nubicus shows a predilection for acridid grasshoppers. Since large insects are immobilized, and since the bills of bee-eaters are long and can thus keep harmful insects away from the facial region, it is interesting to speculate as to the function of bee-eater rictal bristles. Fry (ibid) provided circumstantial evidence that some bee-eaters, including M. nubicus, catch and swallow venomous Hymenoptera on the wing. It is not known how these insects are caught, but if they were caught in the bill near the gape, there is serious risk of the bird being stung in or around the eye. I suggest that the rictal bristles of the Carmine and other aerially feeding bee-eaters serve to protect the eyes from venomous insects during flight, as well as having an equally important function in directing food into the gape.

The Yellow-billed Shrike Corvinella corvina possesses rather long and stiff rictal bristles, but not curved as in T. senegala. Mackworth-Praed & Grant (1973) state that its diet includes fruit and lizards in addition to insects. As with Coracias abyssinica, shrikes normally catch their prey with their bills. The fruit and flesh in the diet of Corvinella may explain the relatively long rictal bristles of this species in that they protect the feathers of the face from becoming soiled or worn (as well as protecting the eyes).

The interpretation of the above findings must be viewed with extreme caution. I have examined only a few species of large-billed insectivorous bird, and there are few substantive data to support my view that rictal bristles may function to protect eyes. However it does appear that the inconsistent pattern of occurrence of rictal bristles in birds may reflect variation in feeding methods as well as in diet, even within the same Family.

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