773. With Compliments of Miss T. Clay
M.A.R. Ansari

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Some Observations on Avicolous Mallophaga

While investigating the Avicolous Mallophaga of the Panjab [*Proc. Nat. Inst. Sci., India,* 1947, **13** (6)]: 253–303:), I had an opportunity to make certain observations on these loathsome insects. These observations present many features of interest, but the conclusions drawn must be considered tentative till the subject is thoroughly investigated. These are presented here with a view to arouse interest in Zoologists, Ornithologists, Field Naturalists and others who may periodically have considerable opportunities of obtaining material.

Degree of Parasitisation.—(1) If a particular bird-host is studied for variation in the intensity of population of a particular species of Mallophaga in a particular month, it may be found either abundant, normal, scarce or even absent in the same month.

(2) Land-birds, *viz.*, crows, sparrows, babblers, etc., were actually found swarming with parasites, while water-birds, *viz.*, ducks, teals, sand-pipers, ruff-and-reave, cattle egrets and herons were found to harbour only 4–25 parasites in all.

(3) The smaller land-birds, *viz.*, the Bengal Jungle Babbler (*Turdoides terricolor sindanus* Ticehurst), the House Sparrow (*Passer domesticus indicus* Jard. & Selby.), the Himalayan Starling (*Sturnus vulgaris humii* Brooks), and the Common Myna (*Acridotheres t. tristis* Linn.) were found to harbour as many as 135, 211, 280 and 210 individuals (of one species only) respectively; while the larger land-birds, *viz.*, the Common Pariah Kite (*Milvus migrans govinda,* Sykes), the Cinereous Vulture (*Aegypius monachus* Linn.), the Indian Great Horned Owl (*Bubo bubo bengalensis* Frankl.), and the Common Peacock (*Pavo cristatus* Linn.), had 43 parasites at the most.

The Common Domestic Hen (*Gallus g. domesticus* Linn.) was an exception and some birds had as many as 181–221 individuals of *Menopon pallidum* Nitzsch. Lawson and Manter recorded having counted over 35,000 individuals of *Eomenacanthus stramineus* (Nitzsch) on one chicken, which they thought was not half of what was actually present (Metcalf and Flint, 1939, *Destructive and Useful Insects,* p. 884).

Straggling from Host to Host.—It was observed that those different species of birds, which have any chance of feeding together, breeding in

close proximity or huddling together on perches are apt to transfer their parasites (*Proc. N. I. S. I.—quoted above*).

The Common Hawk Cuckoo (*Hierococcyx varius* Vahl.) and the Indian Pied Crested Cuckoo (*Clamator j. jacobines* Bodd.) are parasitic on other birds, laying their eggs in their nests and trusting to them to hatch the young ones. The former species deposits its eggs in the nests of different species of *Argya*, *Turdoides* and *Garrulax*, while species of *Trochalopterum* are the most common fosterers in the latter cuckoo. I examined the Mallophagan parasites of most of these birds except species of *garrulax*, and found that the Mallophagan species from *Cuculinae* were not at all allied to the Mallophagan species infesting the fosterers; in fact, the latter were found to be distinct and even to belong to different genera [Clay and Meinertzhagen, 1943, *Parasitology*, **35** (1, 2) 11–16]. It is strange that such an intimate connection did not induce the parasites to transfer themselves from one to the other and breed freely. It will not be out of place to mention the remarkable fact that *Heterodoxus longitarsus* Johnston and Harrison, belonging to a family characteristic of marsupials, has succeeded in becoming established as a permanent and vigorous canine parasite (McCulloch, 1933, *Agri. Gaz. N. S. Wales*, p. 67). This parasite has been reported as an important dog parasite from various countries and on the jackal from Africa. It is worthwhile to investigate, if it is the micro-chemical composition of feathers or any similar other factor which plays an important part in inducing certain species to establish themselves on certain birds and not on others.

Seasonal History.—Preliminary observations on nine different species, *viz.*, *Philopterus corvi* (Linn.) from *Corvus s. splendens* Vieill., *Penenirmus raji* Ansari from *Passer domesticus indicus* Jard. & Selby., *Bruelia varia* (Nitzsch) from *Corvus s. splendens* Vieill., *Painjunirmus iliaci* (Denny) from *Acridotheres t. tristis* Linn., *Painjunirmus cyclothorax* (Nitzsch) from *Passer domesticus indicus* Jard. & Sellby, *Columbicola columbae* (Linn.) from *Columba livia intermedia* Strick, *Cuclogaster heterographus* (Nitzsch) from *Gallus g. domesticus* Linn., *Menacanthus gonophoeus* (Burm.) from *Corvus corax laurencei* Hume and *Menopon gallinæ* Linn., from *Gallus g. domesticus* Linn., were made all the year round, and all stages were found present in each month of the year.

Irrespective of proper food, which is the first requisite, temperature and humidity are the two conditions which affect the activities of animals. Assisted by their non-conducting covering of feathers and other modifications, birds are well suited to keep body temperature (100–102° F. = 37·7–38° C.) almost normal in all climates. The Mallophagan parasites, there-

fore, live all the year round in constant optimum environmental factors of temperature and humidity. As climatic fluctuations have nothing to do with the life activities of the parasite, they are capable of carrying on breeding normally in all seasons, altitudes and latitudes.

Preliminary observations show that these insects have several generations in a year and breed actively throughout the year. Laboratory observations have been published elsewhere [*Ind. Jour. Ent.*, 1944, **5**, Pts. 1 & 2, 129–142].

Lahore. M. ATIQUR-RAHMAN ANSARI.