

Feeding habits of dog louse *Heterodoxus spiniger* (End.) (Mallophaga, Amblycera)

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Abstract

Haematophagous mallophagan species not only affect the vitality and growth of the hosts but are also convicted for reservoiring and transmitting pathogens among them. Dog louse, *Heterodoxus spiniger* exclusively feeds upon the host blood. As many as 84 % of lice were found containing the host blood and not much difference is found in the feeding habits of different instars and adults of both the sexes. This species does not harbour any trituration agent and is also not involved in cannibalism or predation.

1 Introduction

There is much controversy over the feeding habits of Mallophaga. WATERSTON, as early as in 1926, stated that nothing seems to be amiss to Mallophaga as food and found protecting sheaths of growing feathers, feather fibers, skin scrabs, scurf, granules of quartz, mica, sand, grain, seed coat, fungus spores, cuticular processes and blood (if accessible) from the crop of Mallophaga, like *Esthioternum monile*. But, many of the mallophagan species specially Ischnocera, are able to digest feather keratin and have been cultured *in vitro* for longer periods, on feather diet. However, some species mostly Amblycera occasionally or regularly take host blood, in addition to feather or hair derivatives.

The haematophagous nature of such mallophagan species has always been a matter of great concern. Members of Ricinidae (e. g., *Ricinus* sp.) feed entirely on host blood and feathers have never been found in their crop (CLAY 1949; BLAGOVESHCHENSKY 1959 and NELSON 1972). Similarly, *Menacanthus stramineus* exclusively feeds upon the host (poultry birds) blood (WILSON 1933; CRUTCHFIELD and HIXON 1943; KALAMARZ 1963a and b) and the haematophagous nature of another poultry louse *Menopon gallinae*, has also been confirmed (KALAMARZ 1963a and b). Host blood has been found in crop of 50 % individuals of dog louse, *Trichodectes canis* (BOUVIER 1945) and in 66 % specimens of *Trinoton anserium* infesting African swift (SEAGER et al. 1976). *Piagetiella* sp. lives attached to the inner wall (mucous membrane) of throat of pelicans, where the diet must consist of blood, serum and epidermal debris, as no feather is found there (DUBININ 1947; ROTHSCHILD and CLAY 1952). Members of Gyropidae are believed to eat upon the secretion of subaceous gland and take the blood in excess (ASKEW 1971). Nymphal stages of *Dennyus* are said to live upon the liquid secretions of the eye of the host (ROTHSCHILD and CLAY 1952).

This communication furnishes information regarding the feeding habits of *Heterodoxus spiniger*, infesting dogs.

2 Materials and method

Fresh lice were collected from the street dogs as well as from pets, within the campus of Banaras Hindu University and examined within 3 hours of their collection, as they could not be reared *in vitro*. They were dissected in Insect Ringer's solution under stereozoom binocular microscope and entire alimentary canal was taken out from each of them in order to examine the crop contents microscopically.

3 Results

In total 744 individuals, both adults and nymphs were examined out of which 84 % were found containing host blood in their gut (table). There was no difference in the blood feeding incidence in adults and nymphs as the percentage of blood containing individuals of different instars and adults is found to be more or less the same. Similar is the case in the feeding habits of the two sexes. This is quite different from the finding of SRIVASTAVA (1974), who found that females and nymphs of *Laemobothrion percnopteri* take blood meal and males are not haematophagous. In most of specimens of *Heterodoxus spiniger* examined, the crop, midgut and rectum had dark brown contents which indicate the presence of the host blood. In addition to the host blood, solid irregularly shaped birefringent material was also detected in the crop which seems to be the skin and epithelial debris of host. The presence of host's hairs was not noticed in any case. These findings in crop contents reveal that this species of lice does not ingest any triturating agents, like granules of quartz, mica, sand, grain, seed coat, fungus spore or any other cuticular processes, as were found in *E. monile* by WATERSTON (1926). It also does not seem to act as predator on other species as no trace of body fragments of any other species was found there which were reported to be present in the *Ricinus* (NELSON 1972). The phenomenon of cannibalism is also not exhibited by this species as no trace of any egg case, cast skin or other body parts were found in gut contents, though the cannibalism in *Colpocephalum turbinatum* has been reported by NELSON (1971).

Blood sucking of *H. spiniger* and its developmental stages

	Number of lice examined	Number of lice having host blood	% of lice having host blood in their gut
Adult Male	137	110	80.29 %
Adult Female	253	220	86.95 %
IIIrd Instar nymph	107	87	81.30 %
IIInd Instar nymph	91	78	85.71 %
Ist Instar nymph	156	130	83.33 %
Total	744	625	84.00 %

4 Discussion

It is evident from above report that dog louse, *Heterodoxus spiniger* preferably feeds upon the host blood. However, it is not clear whether the lice punctured the skin or fed the blood exuding from lacerations or due to other cause. Since, the mouth parts of this louse are of modified biting type and the mallophagans

are telmophages (LOVOPIERRE 1967), hence, they are unable to cannulate the small vessels of skin and must lacerate it to form blood pool, from which the meal is ingested.

The haematophagous nature of Mallophaga, is of great concern and such species are often convicted to act as reservoir and transmitters of pathogens among the host. NELSON (1962) and PENNINGTON and PHELPS (1969) have already convicted *H. spiniger* to act as intermediate host of filarial worm *Dipetalonema reconditum*. The virus of eastern equine encephalomyelitis has been isolated from *Menacanthus stramineus* (by HOWITT et al. 1948) and has also been reported from *Menopon gallinae* (by OLITSKY and Casals 1959). The latter species also harbours *Bedsonia* organisms (EDDIE et al. 1962). The role played by these species in reservoiring and transmitting bacterial strains of *Pausteuella multocida*, *Escherichia coli*, *Solomonella gallinarum*, *Toxoplasma gondii* and *Streptococcus equinus*, among poultry birds has been reported by DERYLO (1970, 1972, 1975) and DERYLO and JAROSZ (1972). Similarly, *Trinoton ansernium* parasitizing water fowls has been reported to act as cyclodevelopmental vector of filarial heartworm, *Sarconema eurycera* (by SEAGER et al. 1976) and *Dennyus* infesting African swift acts as intermediate host of filarial worm, *Filaria cypseli* (by DUTTON 1905). *Trichodectes canis* has been incriminated as intermediate host of a cestode *Diphylidium caninum* (NELSON 1972). Furthermore, blood feeding by *Laemobothrion vulturis danecki* leading to sensible skin injury and ultimately to death of host (Lämmergeier) has been reported by ZLOTORZYCKA and DANECKI (1969) and cases of haemorrhagic ulcerative stomatitis leading to death of host (white pelicans), due to heavy infestation of *Piagetiella* sp. are demonstrated by WOBESER et al. (1974).

These reports suggest that the attention should be paid to those mallophagan species having a tendency to obtain host blood occasionally or regularly. Such species not only affect the vitality and health of host but are also able to act as transmitter of pathogens of various diseases and as intermediate host of helminths and nematodes. The lesions made by them might cause significant blood loss and would provide a potential site for entry of other pathogens.

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Zusammenfassung

Zur Ernährung des Hundehaarlings *Heterodoxus spiniger* (End.) (Mallophaga, Amblycera)

Blutfressende Haarlinge beeinträchtigen nicht nur die Vitalität und das Wachstum der Wirte, sondern bilden auch Reservoir und sind Überträger von Krankheiten. Der Hundehaarling *Heterodoxus spiniger* saugt ausschließlich Blut. Etwa 84 % der Individuen enthielten Wirtsblut. Hinsichtlich der Ernährungsweise der verschiedenen Stadien der beiden Geschlechter bestehen keine Unterschiede. Dieser Mallophage nimmt keine festen Teile auf und ist weder kannibalistisch noch räuberisch.

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