



## Crop contents of Phthirapteran Ectoparasites Infesting Helmeted Guinea Fowl, *Numida meleagris* (Linnaeus, 1758) (Galliformes: Numidae)

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**ABSTRACT:** By analysis the crop contents, the two phthirapteran species that infest helmeted guinea fowls, *Numida meleagris* (Linnaeus, 1758), *Lipeurus tropicalis* Peters, 1931 (Ischnocera) and *Menopon gallinae* (Linnaeus, 1758) (Amblycera) have been investigated. 83% of the *M. gallinae* (Linnaeus, 1758) specimens in the crop had crimson contents that were consistent with host blood, while 87% of the *L. tropicalis* Peters, 1931 specimens in all stages had feather barbules. There were no signs of any triturating agents, dead skin pieces, or body parts of other lice or insects.

**Keywords:** Amblycera, Crop contents, Ischnocera, Lice, *Lipeurus tropicalis*, *Menopon gallinae*, *Numida meleagris*, Phthiraptera.

### INTRODUCTION

The crop of mallophaga is consistently a prominent structure that serves as a reservoir for food. It plays a crucial role in the grinding of feather barbs and barbules (Saxena *et al.*, 1995). Phthirapteran ectoparasites have a wide variety of feeding habits. Some species only eat feathers, others occasionally such the blood of their hosts, and are hematophagous by habit. There are still more species of biting lice that only consume blood (Khan *et al.*, 2021). Researchers such as Waterhouse (1953); Kalamarz (1963); Brown (1970); Nelson and Murray (1971); Derylo (1975); Seager *et al.*, (1976); Agarwal and Saxena (1980); Agarwal *et al.* (1982, 1983), Saxena *et al.* (1985, 1995) have documented the feeding behaviors of various avian lice. Work done on these aspects has been reviewed from time to time (Eichler, 1963; Nelson *et al.*, 1975; Marshall, 1981; Price and Graham 1997; Ahmad *et al.*, 2014; Kumar *et al.*, 2016, 2018, 2019; Khan *et al.*, 2021). The studies on ootaxonomy of *Penenirmus pici* infesting *Dinopium benghalense*, occurrence of *Goniocotes gallinae* on *Gallus sonneratti*, population characteristics of Phthiraptera on helmeted guinea fowl and first report of *Goniocotes gallinae* parasitizing *Gallus gallus domesticus* were conducted by Ahmad and Sharma (2023 a, b, c); Ahmad and Sharma (2025).

The present study made modest attempt to provides details on the crop contents of two phthirapteran species, *Lipeurus tropicalis* Peters, 1931 (Ischnocera)

and *Menopon gallinae* (Linnaeus, 1758) (Amblycera) infesting helmeted guinea fowls, *Numida meleagris* (Linnaeus, 1758).

### MATERIALS AND METHODS

Adults of both sexes and three nymphal instars were collected from infested helmeted guinea fowl, *Numida meleagris* (Linnaeus, 1758) and were dissected in Insect Ringer's solution under Stereozoom Trinocular Microscope. The crop of different stages were taken out, dehydrated, stained and teased out on glass slide with the help of extremely fine entomological pins and the crops contents examined critically under the research microscope. Attempts were also made to record the feeding habits of lice by direct examination in *in vitro*, under Stereozoom Trinocular Microscope with the help of magnifying lens and light source.

### RESULT AND DISCUSSION

An examination of the crop of *Menopon gallinae* (Linnaeus, 1758), 83% of the examined of all stages contained red contents compatible the host blood in their crop. The percentage of red contents carrying adults female (90%, n=27) was having higher than male (83 %, n= 25). Comparatively the III<sup>rd</sup> instar nymphs was higher percentage of red contents (83%, n= 25) followed by II<sup>nd</sup> instar (80%, n= 24) and I<sup>st</sup> instar (77%, n= 23). Thus the younger nymphs seem to be less haematophagous in case of *Menopon gallinae* (Linnaeus, 1758). Only feather barbules were present in 87% of specimens of *Lipeurus tropicalis* Peters, 1931

in various states. Females (97%, n = 29) had a higher proportion of feather barbules than males (90%, n = 27). In contrast, the proportion of feather barbules in the crops of nymphs in their third instar was significantly higher (87%, n = 26), followed by those in their second instar (83%, n = 25) and their first instar (77%, n = 23) (Table 1). No triturating agents, such as granules, quartz, mica, sand grain were observed. Furthermore, no evidence of lice's egg cases, cast skins, or other body parts was found. Therefore, it appears that neither *Lipeurus tropicalis* Peters, 1931 nor *Menopon gallinae* (Linnaeus, 1758) engage in cannibalism or predation. Any differences in feeding habits related to sex or stage were also not determined based on crop content.

Haematophagous species do not only affect the vitality and productivity of their hosts and often act as reservoir and transmitter of the strains of infectious diseases among the hosts. Some avian lice, especially the amblyceran species, have the capacity to harbor and spread pathogens. It has previously been reported that two species of poultry lice, *M. stramineus* and *M. gallinae*, spread harmful strains of *Salmonella gallinarum*, *Pasteurella multocida*, *Escherichia coli*, and *Streptococcus* species among poultry birds (Derylo, 1969, 70, 72, 75; Derylo and Jarosz 1972). *M. Stramineus* spread the virus of *eastern equine encephalomyelites* (Howitt *et al.*, 1948), and *M. gallinae* has been found to harbor *Ornithosis bedsoniae* (Eddie *et al.*, 1962). Certain mallophagan species can serve as intermediate hosts for filarial worms *i.e.* *Trinoton anserinum*, can serve as an intermediate host for *Sarconema eurycerca* (Seager *et al.*, 1976), *Heterodoxus spiniger*, harbors *Dipetalonema reconditum* (Nelson, 1962; Pennington and Phelps 1969), and *Dennyssus hirudinis* harbors, *Filaria cypseli* (Dutton, 1905). *Trichodectes canis*, is the host of the cestode *Dipetalonema caninum*, according to Nelson (1972). A thorough review of the literature on

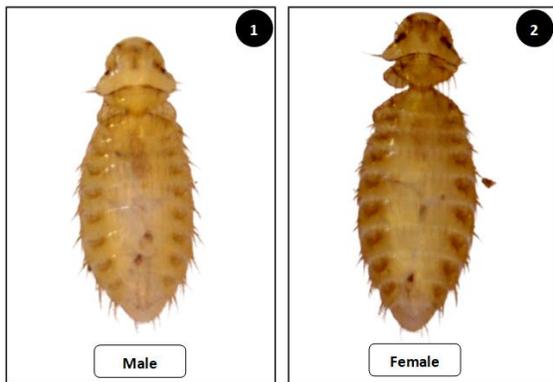
mallophaga's pathogenic involvement reveals that their hematophagous nature appears to be a crucial prerequisite for their involvement.

Worker *i.e.* Wilson (1933); Crutchfield and Hixson (1943) have studied the feeding behaviour of Menoponid species. Kalamarz (1963) used the Fe59 isotope in contact autoradiography and the Teichman method of crystals to detect hemoglobin, confirming the blood-feeding habits of two species. The studies of haematophagous nature of some species *e.g.* *Menacanthus eurysternus*, (Agarwal *et al.*, 1983), *Trinoton anserinum* (Seegar *et al.*, 1976), *Trinoton querquedula* (Saxena *et al.*, 1985), *Heterodoxus spiniger* (Agarwal *et al.*, 1982), *Ardeicola expellidus* and *Ciconiphilus decimfasciatus* (Ahmad *et al.*, 2014), *Menopon gallinae* (Kumar *et al.*, 2016), *Menacanthus kalatitar* (Kumar *et al.*, 2019)' *Menacanthus gonophaeus* and *Myrsidea baktitar* (Khan *et al.*, 2021) have been observed by the workers. Nature of crop contents of four pigeon lice (*Columbicola columbae*, *Companulotes bidentatus compar*, *Colpocephalum turbinatum* and *Hohostiella lata*) have been studied by Rana and Bhardwaj (2017). However, it has been reported that Gyropidae members consume liquid eye secretions (Rothschild and Clay 1952). *Piagetiella* sp., which feeds on blood, mucus, and skin debris, inhabits Pelecaniformes pauches and only visits feathers to lay eggs (Dubinin, 1947). According to Marshall (1981), *Gyropus ovalis* and *Gliricola* sp. depend on their hosts' serum and secretions. Although Nelson and Murray (1971) reported that *C. turbinatum* feeds on the fluffy zone of the vent region's feathers and engages in cannibalism, they were unable to detect the presence of host blood, as was the case with amblyceran louse, *Hohorstiella lata* on the same host. In the present study *Lipeurus tropicalis* Peters, 1931 was identified as a feather feeder, while *Menopon gallinae* (Linnaeus, 1758) was recognized as a blood feather.

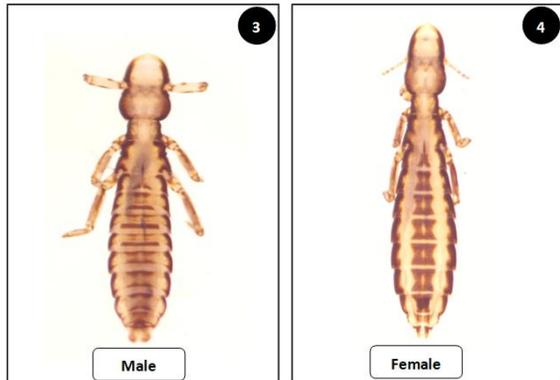
**Table 1: Showing the percentage of specimens of phthirapteran ectoparasites infesting helmeted guinea fowl, *Numida meleagris* (Linnaeus, 1758) carrying crops contents.**

Species	Stage	Nos. of lice examined	Nature of crop contents	Nos. of lice with crop contents	Percentage of lice with crop contents (%)
<i>Menopon gallinae</i> (Linnaeus, 1758)	M	30	B	25	83
	F	30	B	27	90
	NI	30	B	23	77
	NII	30	B	24	80
	NIII	30	B	25	83
	T	150	B	124	83
<i>Lipeurus tropicalis</i> Peters, 1931	M	30	Fb	27	90
	F	30	Fb	29	97
	NI	30	Fb	23	77
	NII	30	Fb	25	83
	NIII	30	Fb	26	87
T	150	Fb	130	87	

**Abbreviations:** M-Male, F-Female, NIII-Third instar nymph, NII- Second instar nymph, NI-First instar nymph, Fb- Feather barbules, B- Red content compatible with host blood, T-Total.



**Fig. 1-2.** *Menopon gallinae* (Linnaeus, 1758).



**Fig. 3-4.** *Lipeurus tropicalis* Peters, 1931.

## CONCLUSIONS

The examination of the crop contents from two phthirapteran species, *Menopon gallinae* (Linnaeus, 1758) and *Lipeurus tropicalis* Peters, 1931, infesting helmeted guinea fowl, *Numida meleagris* (Linnaeus, 1758), yielded noteworthy findings. Consistent with expectations, *Lipeurus tropicalis* Peters, 1931 was identified as a feather feeder, while *Menopon gallinae* (Linnaeus, 1758) was recognized as a blood feeder. However, no triturating agents such as granules, quartz, mica, sand grains, seed coats, or cuticular processes commonly observed in other species were detected.

## FUTURE SCOPE

The examination of the feeding behavior of phthirapteran ectoparasites presents several challenges that have not yet been fully addressed. As a result, there exists a considerable gap in our comprehension of this aspect, which could prove advantageous to both the scientific community and veterinarians.

There is no conflict of interest.

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**Conflict of Interest.** None.

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