International Journal of Theoretical & Applied Sciences, 15(2): 99-102(2023)

ISSN No. (Print): 0975-1718
ISSN No. (Online): 2249-3247

Population characteristics of Phthiraptera on helmeted guinea fowl, *Numida meleagris* (Linnaeus, 1758) (Galliformes: Numididae)

Aftab Ahmad* and Gaurav Sharma
Zoological Survey of India, Northern Regional Centre,
Kaulagarh Road, Dehradun, Uttarakhand-248195, India.

(Corresponding author: Aftab Ahmad)*
(Received 21 September 2023; Accepted 01 November 2023)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758) was examined for the presence of phthirapteran ectoparasites. Three phthirapteran species *i.e. Menopon gallinae* (Linnaeus, 1758), *Goniocotes maculatus* Taschenberg, 1882 and *Lipeurus tropicalis* Peters, 1931 were recorded during the study from the fifteen aforesaid hosts. The prevalence of all these three species *i.e. M. gallinae, G. maculatus,* and *L. tropicalis,* on helmeted guineafowl, *Numida meleagris,* was 60.0, 33.3, and 46.7%, respectively. The mean and median intensity of the aforesaid species were recorded at 51.67, 45.0 (range 24-94); 33.20, 29.0 (range 16-72); and 43.57, 48.0 (range 19-72). The females were found to out number the males (M: F ratios 1:1.31, 1:1.17 and 1:1.54) and the nymph population was also found to exceed the adult population (A: N ratios 1:1.26, 1:1.55 and 1:1.31).

Keywords: Phthiraptera, Lice, Prevalence, Mean intensity, Median intensity, *Numida meleagris.*

INTRODUCTION

Population characteristics of phthirapteran ectoparasites of common Indian birds *i.e.* bank myna (Rajput *et al.*, 2009), cattle egret (Ahmad *et al.*, 2010), common baya (Arya *et al.,* 2011), common hoopoe (Agarwal *et al.*, 2011), common myna (Chandra *et al.,* 1990), finches (Saxena *et al.,* 2011), green pigeon (Ahmad *et al.,* 2012a), house crows (Beg *et al.,* 2008), Indian parakeets, house sparrows, common myna and white breasted kingfisher (Saxena *et al.,* 2007), pigeons (Singh *et al.,* 1998; Khan *et al.,* 2009), poultry (Khan *et al.,* 2008, Saxena *et al.,*1996), red avadavats (Gupta *et al.,* 2007), snipe (Ahmad *et al.,* 2012b), striated babblers (Ahmad *et al.,* 2011), ducks (Ahmad *et al.,* 2013) and grey leg goose (Kumar *et al.,* 2013) have been studied by workers during the past two decades. Marshall (1981) have reviewed the population ecology of phthirapteran ectoparasites. Based on the reviewed literature, it was revealed that the population characteristics of phthirapteran ectoparasites on the helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758), deserved investigation. During the present study modest attempt has been made to provide information on the prevalence and population structure of three phthirapteran species occurring on the guinea fowl, *Numida meleagris* (Linnaeus, 1758).

MATERIALS AND METHODS

Fifteen helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758), were sampled in district Ganjam, Odisha, India for phthirapteran ectoparasites during 2020-21. The un-infested birds were released in their respective palaces, and the infested birds were subjected to delousing by the modified Fair Isle method (Gupta *et al.,* 2007). Entire louse lead was obtained and transferred in 70% ethyl alcohol and separated species-wise, stage-wise, and sex-wise. The data were used for recording the population characteristics, *i.e.* prevalence, mean intensity, median intensity, sample mean abundance, range of infestation, sex ratios, adult nymph ratios, and ratios of first, second, and third instar nymphs.

RESULT AND DISCUSSION

Three phthirapteran species *i.e. Menopon gallinae* (Linnaeus, 1758), *Goniocotes maculatus* Taschenberg, 1882 and *Lipeurus tropicalis* Peters, 1931 were recovered from the fifteen helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758) sampled in district Ganjam, Odisha, India. The prevalence of *M. gallinae* on helmeted guineafowl, *N. meleagris,* was 60% (n = 15). A total of 465 specimens of all stages were collected from the infested birds. The mean intensity of 51.67 lice per bird, the median intensity of 45.0 lice per bird, and the sample mean abundance of 31 lice per bird (range of infestation: 24-94, n = 15) were observed, respectively. The overall male-female ratio was observed at 1:1.31; the adult nymph ratio was 1:1.26; and the ratio of the first, second, and third nymphal instars remained at 1:0.62:0.38. The prevalence of *G. maculatus* on helmeted guineafowl, *N. meleagris,* was 33.3% (n = 15). A total of 166 specimens of all stages were collected from the infested birds. The mean intensity of 33.20 lice per bird, the median intensity of 29.0 lice per bird, and the sample mean abundance of 11.07 lice per bird (range of infestation: 16-72, n = 15) were observed, respectively. The overall male-female ratio was observed at 1:1.17; the adult nymph ratio was 1:1.55; and the ratio of the first, second, and third nymphal instars remained at 1:0.64:0.51. The prevalence

of *L. tropicalis* on helmeted guineafowl, *N. meleagris*, was 46.7% (n = 15). A total of 305 specimens of all stages were collected from the infested birds. The mean intensity of 43.57 lice per bird, the median intensity of 48.0 lice per bird, and the sample mean abundance of 20.33 lice per bird (range of infestation: 19-72, n = 15) were observed, respectively. The population composition of the species was also analyzed at different levels of infestation. The overall male-female ratio was observed at 1:1.54; the adult nymph ratio was 1:1.31; and the ratio of the first, second, and third nymphal instars remained at 1:0.65:0.43.

A survey of the literature shows that there are considerable variations in the frequency of several Phthiraptera species on common Indian birds, *viz.*, 29–61% on blue rock pigeons, 13–68% on common mynas, 14–31% on house sparrows, 17–34% on Indian parakeets, 40% on white-breasted kingfishers, 21–36% on red avadavats, 11–52% on house crows, 31–48% on bank myna, 17–41% on cattle egret, 74% on common baya, 40% on common hoopoe, 20% on finches, 40% on babblers, 50–75% on green pigeons, 62% on snipes, 16–31% on ducks, and 55% on geese (Chandra *et al.*, 1990; Singh *et al.*, 1998; Gupta *et al.*, 2007; Saxena *et al.*, 2007; Beg *et al.*, 2008; Khan *et al.*, 2009; Rajput *et al.*, 2009; Ahmad *et al.*, 2010, 2011; Agarwal *et al.*, 2011; Arya *et al.*, 2011; Saxena *et al.*, 2011; Kumar *et al.*, 2013). Thus, the prevalence of Phthiraptera on the helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758), examined during the present study (33–60%) was moderate compared to the other birds examined so far. The intensity of infestation of different species of Phthiraptera on Indian birds is reported to be 80.2 per bird on common myna (Chandra *et al.*, 1990); 18.4-182.5 per bird on domestic pigeons (Singh *et al.*, 1998); 1.5-3.4 per bird on red avadavats (Gupta *et al.*, 2007); 7.6-13.3 per bird on house sparrows, 13.8-21.8 per host on parakeets, 17.7 per bird on kingfishers (Saxena *et al.*, 2007); 11.0-27.0 per bird on house crows (Beg *et al.*, 2008); 6.8-16.6 per host on bank myna (Rajput *et al.*, 2009); 52.8-103.2 per host on cattle egret, 13.2-16.4 per host on green pigeon,13.4 per host on babblers, 220.2 per host on snipes, 18.10-22.89 per host on ducks (Ahmad *et al.*, 2010, 2011, 2012, 2013); 13.97 per host on common baya (Arya *et al.*, 2011) and 5.14 per host on geese (Kumar *et al.*, 2013).

Table 1: Population characteristics of phthiraperan ectoparasites on Helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758).

Sr. No.	Parameters	*M. gallinae*	*G. maculates*	*L. tropicalis*
1.	Sample size	15	15	15
2.	Prevalence (%)	60.0	33.3	46.7
3.	Mean intensity	51.67	33.20	43.57
4.	Median intensity	45.0	29.0	48.0
5.	Sample mean abundance	31.0	11.07	20.33
6.	Range of infestation	24-94	16-72	19-72
7.	Total specimen	465	166	305
8.	M:F	1:1.31	1:1.17	1:1.54
9.	A:N	1:1.26	1:1.55	1:1.31
10.	IN:IIN:IIIN	1:0.62:0.38	1:0.64:0.51	1:0.65:0.43

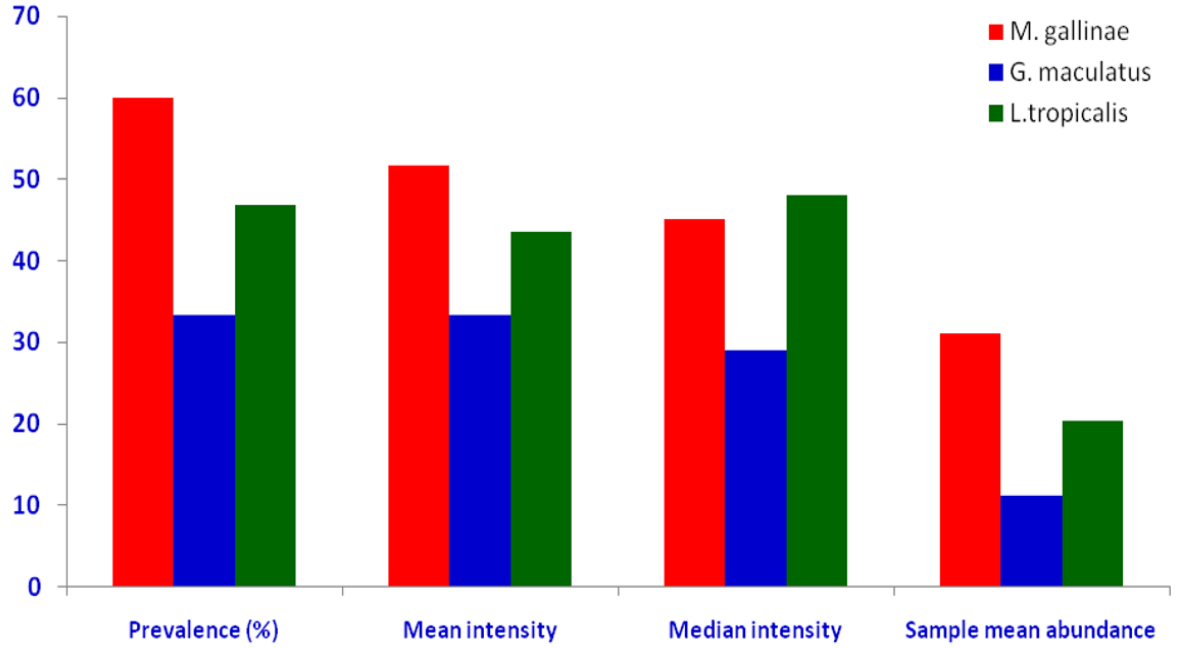

Fig. 1. Showing population composition of Phthiraptera on Helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758).

In the present study, the mean number of lice on fifteen helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758), was 51.67 (*M. gallinae*), 33.20 (*G. maculatus),* and 43.57 (*L. tropicalis*) were recovered. Maximum number of lice collected on any bird remained 94 for *M. gallinae*, 72 for *G. maculatus*, and 72 for *L. tropicalis,* respectively. Further survey of literature indicates that in the case of avian lice, the nymphal population generally outnumbers the adults and females usually outnumber the males in the natural population (Eveleigh and Threlfall 1976; Chandra *et al.,* 1990; Trivedi *et al.,* 1991; Kristofik *et al.,* 1996; Saxena *et al.,* 1996; Singh *et al.,* 1998; Arya *et al.,* 2011; Ahmad *et al.,* 2010; Kumar *et al.,* 2013). However, in the case of mammalian lice, the ratio is more skewed, and in certain species, males are rare in the natural population (Marshall, 1981). The present observations also indicated that the female outnumbered the males, and the nymphal population was dominated over the adult in all three species of helmeted guineafowl, *Numida meleagris* (Linnaeus, 1758).

CONCLUSIONS

The prevalence, mean intensity, and sample mean abundance of *M. gallinae* were comparatively higher (60.0 %, 51.67, 31.0 range-24-94) than those of *L. tropicalis* (46.7 %, 43.57, 20.33 range-19-72) and *G. maculatus* (33.3 %, 33.20, 11.07 range-16-72). However, the median intensity of *L. tropicalis* (48.0) remained higher than the other two species, *M. gallinae* (45.0) and *G. maculatus* (29.0). The sex ratios of all three species were dominant in all three species (*M. gallinae*-1:1.31, *G. maculates*-1:1.17, and *L. tropicalis*-1:1.54), and the nymphal population exceeded the adult population (*M. gallinae*-1:1.26, *G. maculatus*-1:1.55, and *L. tropicalis*-1:1.31).

Acknowledgements. We wish to express our sincere gratitude and thanks to Dr. Dhriti Banerjee, Director, Zoological Survey of India, Kolkata for providing the facilities and necessary permission for the execution of this work. We are also thankful to The Officer-in-Charge, Zoological Survey of India, Northern Regional Centre, Dehradun, Uttarakhand for providing laboratory facilities and equipment's.

REFERENCES

Agarwal, G. P., Ahmad, A., Rashmi, A., Arya, G., Bansal, N. and Saxena, A. K. (2011). Bio-ecology of the louse, *Upupicola upupae*, infesting the Common Hoopoe, *Upupa epops*. *J Insect Sci., 11*(46), 1-9.

Ahmad, A., Arya, G., Bansal, N., Sychra, O. & Saxena, A. K. (2012a). A note on phthirapteran ectoparasites infesting yellow-legged green pigeon *Treron phoenicoptera* (Columbiformes: Columbidae). *Turkish J. Vet. Animal Sci., 36*(6), 618-621.

Ahmad, A., Arya, G., Saxena, R., Bansal, N. & Saxena, A. K. (2011). Prevalence of *Myrsidea salimalii* (Amblycera: Phthiraptera) on striated babblers (*Turdoides earlei*) (Timaliidae: Passeriformes: Aves). *J. Parasit Dis., 35*(2), 207-209.

Ahmad, A., Gupta, N., Saxena, A. K. & Gupta D. K. (2013). Population levels of Phthiraptera on domestic ducks (*Anas platyrhynchos*) (Anseriformes: Anatidae). *J. Parasit. Dis.,*

Ahmad, A., Khan, V., Badola, S., Arya, G., Bansal, N. and Saxena, A. K. (2010). Population characteristics and the nature of egg shells of two phthirapteran species parasitizing Indian cattle egrets. *J Insect Sci., 10*(163), 1-7.

Ahmad, A., Saxena, A. K. & Gupta, N. (2012b). Population characteristics of *Austromenopon durisetosum* on common Snipe (*Gallinago gallinago*) (Scolopacidae: Charadriiformes: Aves). *Nat. J. Life Sci., 9*(1), 69-71.

Arya, G., Bansal, N., Ahmad, A. & Saxena, A. K. (2011). Population ecology of phthirapteran ectoparasites infesting common Baya (*Ploceus philippinus*) (Phthiraptera: Insecta). *Turkish J. Vet. Animal Sci., 35*(1), 183-185.

Beg, S., Gupta, N., Kumar, S., Khan, V., Bhatnagar, S. & Saxena, A. K. (2008). Occurrence of Phthiraptera on the house crow, *Corvus splendens* (Passeriformes: Corvidae). *Entomon, 33*, 75-78.

Chandra, S., Agarwal, G. P., Singh. S. P. N. & Saxena, A. K. (1990). Seasonal changes in a population of *Menacanthus eurysternus* (Mallophaga: Amblycera) on the common Myna, *Acridotheres tristis. Int J Parasitol., 20*, 1063-1065.

Eveleigh, E. S. & Threlfall, W. (1976). Population dynamics of lice (Mallophaga) on auks (Alcidae) from Newfoundland. *Can. J. Zool., 54*, 1694-1711.

Gupta, N., Kumar, S. & Saxena, A. K. (2007). Prevalence population structure of lice (Phthiraptera) on the Indian Red Avadavat. *Zool. Sci., 24*, 381-383.

Khan, V., Kumar, S., Gupta, N., Ahmad, A. & Saxena, A. K. (2008). Prevalence of phthirapteran ectoparasites on selected poultry in the district, Rampur (U.P.). *Indian Vet. J., 85*, 447-448.

Khan, V., Kumar, S., Gupta, N., Ahmad, A. & Saxena, A. K. (2009). Prevalence of lice in pigeons. *Indian Vet J., 86*, 531-532.

Kristofik, J., Manas, P. & Sustek, K. (1996). Ectoparasites of bee-eater (*Merops apiaster*) and arthropods in its nests. *Biologic, 51*(5), 557-570.

Kumar, V., Hasan, S. S., Saxena. A. K., Arya, G. & Ahmed, Z. (2013). Population levels of Phthiraptera on Greylag Goose, *Anser anser* (L.). *Turkiye Parazitol. Derg, 37*, 273-6.

Marshall, A. G. (1981). The ecology of ectoparasitic insects. Academic Press, London.

Rajput, S., Joshi, V. D., Gupta, N., Khan, V. & Saxena, A. K. (2009). Population dynamics of Phthiraptera on infesting Bank Myna *Acridotheres ginginianus*. *Entomon, 34*(2), 25-57.

Saxena, A. K., Kumar, S., Gupta, N., Mitra, J. D., Ali, S. A. & Srivastava, R. (2007). Distribution pattern of phthirapteran infesting certain common Indian birds. *J. Parasitol., 93*(4), 113-115.

Saxena, A. K., Surman, Singh, S. K., Kumar, A. & Trivedi, M. C. (1996). Population composition of poultry shaft louse, *Menopon gallinae* (Insecta: Phthiraptera, Amblycera, Menoponidae). *Rudolstadter Nat. Hist. Schrift, 7*, 49-57.

Saxena, R., Sharma, H. B., Ahmad, A., Arya, G., Bansal, N., Rashmi, A. & Saxena, A. K. (2011). Population

characteristics of *Brueelia* sp on certain Indian finches. *J. App. Nat. Sci*, *3*(1), 90-92.

Singh, S. K., Surman, K. A., Saxena, A. K. (1998). Population composition of four phthirapterans infesting blue rock pigeon (*Columba livia*). *J. Parasit Dis.*, *22*(2), 144-148.

Trivedi, M. C., Rawat, B. S., Saxena, A. K. (1991) Distribution of lice (Phthiraptera) on poultry. *Int. J. Parasitol.*, *21*(2), 247-249.