



Synanthropic acarine population associated with bird nests

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Birds nests harbour a complex community of parasitic, predatory and saprophagous mite fauna which vary with the bird species and the nesting materials used by them. They feed on unfeathered nestlings, as well as on adult birds, fungal spores or hyphae growing on the putrefied faecal matters of the birds (Bhattacharyya 1988a). Large amounts of nesting materials including food, collected and consumed by birds provide the mites with an ideal environment in which they thrive well. Bird mites are an important cause of ill health in their hosts and their infestations result in decreased egg production, weakness, and susceptibility to infection. The damage is direct when they occur in large numbers, producing depilation and lesions, tumors, scaly legs, pneumonia, lameness, anaemia and even death (Zumpt 1961). Besides, they also act as vectors of several pathogens such as bacteria,

virus, protozoans, hepatozoan, spirochaetes, toxoplasma and rickettsial organisms (Yunker 1973; Moro et al. 2007).

So far as bird nest mites are concerned, substantial studies have been made by several workers throughout the world (Dobrosky 1925; Jellison & Philip 1933; Moreau 1942; Hicks 1953; Atyeo 1971; Delfinado 1976; Baker et al. 1976; Phillips et al. 1976; Philips et al. 1989; Morsy et al. 1999; Bochkov & Apanaskevich 2001; Shoker et al. 2001; Bochkov et al. 2004; Skoracki 2005; Skoracki et al. 2006; Bloszyk et al. 2006; Mironov & Gonzalez-Acuna 2009). In India, several workers like Alwar & Lalitha (1961), Alwar (1970), Rao & Rajagopalon (1970), Hedge et al. (1972), Lalitha & Alwar (1973) and Gupta & Chattopadhyay (1979) have made valuable contributions to the arthropod fauna of the nests of some common birds. Bhattacharyya (1988a, 1988b, 1990, 1995a, 1995b) through a series of published works explored the acarine fauna of bird nests in West Bengal. Besides, Putatunda et al. (1989) and Gupta & Paul (1985, 1986, 1989, 1992) contributed immensely in the exploration of mite fauna from bird nests in West Bengal. In a recent publication, Chaudhury et al. (2005) reported 18 species of bird nest mites belonging to 13 genera, nine families and three orders from Kolkata metropolis.

Materials and Methods: Thirty two different nests of birds, five each of Pigeon (*Columba* sp.), Crow (*Corvus* sp.), Sparrow (*Passer* sp.), Indian Tailor Bird (*Orthotomus sutorius*) and Weaver Bird (*Ploceus manyar flaviceps*) and seven of Red-vented Bulbul (*Pycnonotus* sp.) constructed within houses, varandah etc. were brought to the laboratory and were subjected to heat treatment in Tullgren Funnel apparatus using a 40w electric bulb as heat and light source. The mites were collected in the collecting vial containing 70% alcohol fitted with the stem of the funnel. The common nest building materials are plants, roots, barks, twigs, stems, leaves, straw, dry grass, garbage, slough, shells, cotton threads, strings, iron wires, feathers, cotton, jute fibres, fungus, tree fibres, various types of seeds, pollen, grains, partly eaten fruits etc.

Temporary mounting of collected mite specimen was done in lactic acid on micro slides covered with a broken piece of cover slip and then heated gently over an electric bulb (40w) for cleaning and stretching of

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appendages.

Permanent slides of mite species appearing as new or interesting were prepared as follows. The desired specimen was removed from the temporary mounted slides by flooding the slide with large quantities of lactic acid and the cover was carefully removed under a stereo-microscope. The desired specimen was carefully lifted with the help of a fine tipped camel hair brush and placed on a fresh slide and mounted using Heinze's medium (Evans & Till 1979). Taxonomic identification was done following the classification of Hughes (1976) and Krantz (1978) and in consultation with the available literature under a good research microscope and wherever necessary, illustrations of body parts of taxonomic importance were prepared.

Results: So far as thirty two bird nest samples were concerned, a total of 31 species, under 23 genera 12 families and three orders were identified (Table 1). Among these, *Lasioseius americanus*, *L. ometus*, *L. berlesei*, *Macrocheles indicus*, *Fuscuropoda marginata*, *Uroseius* sp., *Leiodinychus krameri*, *Pronematus elongatus*, *Tydeus cumini* were reported for the first time in India from bird nests. *Glycyphagus domesticus* was the most predominant one.

1. *Tyrophagus putrescentiae* (Schrank)

Collection records: 07.iv.2006, numerous of both sexes, Sparrow nest, Salt Lake, Kolkata District, West Bengal, India. 04.ix.2006, two females, West Bengal, North 24 Parganas, Bithary village, ex. Weaver Bird nest.

Remarks: In some samples, it was found to be present in astronomical numbers. It is a fungivorous mite and commonly known as mould mite.

2. *Suidasia medanensis* Oudemans

Collection records: 08.x.2003, two males, ex. Indian Tailor Bird nest, Swarup Nagar, North 24 Parganas, West Bengal, India.

Remarks: This is a common pest species of stored products. In bird nests it feeds on fungus.

3. *Glycyphagus domesticus* (De Geer)

Collection records: 12.vii.2005, four females and three males, ex. Sparrow nest, Salt Lake, Kolkata District, West Bengal, India.

Remarks: Most predominant mite species in bird nests and generally feed on fungus available abundantly in nests.

4. *Glycyphagus ornatus* Kramer

Collection records: 04.x.2010, two males, ex.

Weaver Bird nest, Swarup Nagar, North 24 Parganas, West Bengal.

Remarks: It has a wide variety of habitats. In stored product samples it is predominant along with *Tyrophagus putrescentiae*.

5. *Lepidoglyphus destructor* (Schrank)

Collection records: 14.iv.2006, two males, ex. Crow nest, Salt Lake, Kolkata District, India.

Remarks: It is known as fodder mite. It feeds on fungus in bird nests.

6. *Austroglycyphagus geniculatus* Vitzthum

Collection records: 03.iv.2006, two males and two females, ex. Red-vented Bulbul nest, Serampur, Hoogly District, West Bengal, India.

Remarks: Feeds on fungi.

7. *Dermatophagoides pteronyssinus* (Troussart)

Collection records: 09.v.2006, two males and one female, ex. Weaver Bird nest, Bithary Village, Swarup Nagar, North 24 Parganas, West Bengal.

Remarks: Saprophagous mite.

8. *Melichares* sp.

Collection records: 03.v.2003, one nymph, ex. Sparrow nest, Bithary Village, Swarup Nagar, North 24 Parganas, West Bengal, India.

Remarks: Predatory mite, found in association with hymenopterous insects inside bird nests.

9. *Lasioseius mcgregori* Chant

Collection records: 08.iv.2006, three females, ex. Indian Tailor Bird nest, Thakur Nagar, North 24 Parganas, West Bengal, India.

Remarks: The occurrence of this mite was earlier not known in India from bird nests as well as from cowsheds. It acts as the main predator on Acarid mites.

10. *Lasioseius americanus* Chant

Collection records: 06.iv.2006, two females, ex. Indian Tailor Bird nest, Bithary Village, Swarup Nagar, North 24 Parganas, West Bengal, India.

Remarks: It was reported for the first time in India from bird nests.

11. *Lasioseius ometus* Oudemans

Collection records: 06.vii.2003, two females, ex. Weaver Bird nest, Burdwan, Burdwan District, West Bengal, India.

Remarks: It is reported for the first time in India from bird nests.

12. *Lasioseius berlesei* Oudemans

Collection records: 06.iv.2006, two females, ex.

Table 1. List of acarine fauna collected from bird nests

Name of species	Pigeon	Crow	Sparrow	Indian Tailor Bird	Weaver Bird	Asiatic Bulbul
Astigmata Canestrini						
Acaridae Ewing and Nesbitt						
<i>Suidasia medanensis</i> Oudemans				+		
<i>Tyrophagus putrescentiae</i> (Schrank)					+	
Pyroglyphidae Cunliffe						
<i>Dermatophagoides farinae</i> (Trouessart)					+	
Glycyphagidae Oudemans						
<i>Glycyphagus ornatus</i> Kramer					+	
<i>Glycyphagus domesticus</i> De Geer			+			
<i>Austroglycyphagus geniculatus</i> Vitzthum						+
<i>Lepidoglyphus destructor</i> (Schrank)		+				
Mesostigmata Canestrini						
Ascidae Voigts and Oudemans						
<i>Melichares</i> sp.			+			
<i>Antennoseius deyi</i> Bhattacharyya						+
<i>Antennoseius</i> sp.						+
<i>Lasioseius mcgregori</i> Chant				+		
<i>Lasioseius americanus</i> Chant				+		
<i>Lasioseius ometus</i> Chant					+	
<i>Lasioseius berlesei</i> Chant				+		
Macrochelidae Vitzthum						
<i>Macrocheles indicus</i> Bhattacharyya			+			
Laelapidae Berlese						
<i>Hypoaspis vacua</i> (Michael)					+	
<i>Ololaelaps veneta</i> (Berlese)			+			
<i>Laelaps</i> sp.				+		
<i>Pseudolaelaps splendens</i>				+		
Uropodidae Zirngiebl-Nicol						
<i>Fuscuropoda marginata</i> (Koch)	+					
<i>Uroseius</i>				+		
<i>Leiodinychus krameri</i> (G and R Canestrini)						+
Prostigmata						
Tydeidae Kramer						
<i>Pronematus elongatus</i> Baker						+
<i>Pronematus</i> sp.						+
<i>Tydeus cumini</i> Gupta	+					
Stigmaeidae Oudemans						
<i>Cheylostigmaeus</i> sp.					+	
Cheyletidae Leach						
<i>Cheyletus malaccensis</i> oudemans		+				
<i>Cheyletus eruditus</i> (Schrank)	+					
<i>Acaropsia sollers</i> kuzin					+	
Cunaxidae Sig Thor						
<i>Cunaxa womersleyi</i> Baker and Hoffmann						+
Syringophilidae Lavoipierre						
<i>Syringophilus</i> sp.						+

Indian Tailor Bird nest, Bithary Village, Swarup Nagar, North 24 Parganas, West Bengal, India.

Remarks: It was reported for the first time in India from bird nests.

13. *Macrocheles indicus* Bhattacharyya

Collection records: 06.ix.2003, two females, ex. Sparrow nest, Bithary Village, Swarup Nagar, North 24 Parganas, West Bengal, India.

Remarks: It is a phoretic mite. Ornamentation is a characteristic of the species. It belongs to the glaber group, but dorsal chaetotaxy is different from those of other species of the glaber group.

14. *Antennoseius deyi* Bhattacharyya

Collection Records: 06.iv.2006, two females, ex. Weaver Bird nest, Narayanpur Village, Tarakeswar, Hoogly District, West Bengal, India.

Remarks: It was found in soil under grass or moss or in bird nests.

15. *Antennoseius* sp.

Collection records: 06.iv.2006, one nymph, ex. Weaver Bird nest, Narayanpur Village, Tarakeswar, Hoogly District, West Bengal, India. Further identification upto species level was not possible because of its nymphal condition.

Remarks: Predatory mite.

16. *Laelaps* sp.

Collection records: 24.iv.2006, one male, ex. Indian Tailor Bird nest, Bithary Village, Swarup Nagar, North 24 Parganas, West Bengal, India. In the present study no adult female specimen was available. So further identification up to species level was not possible.

Remarks: Ectoparasitic of rodents and birds.

17. *Ololaelaps veneta* (Berlese)

Collection records: 06.vii.2006, two females, ex. Sparrow nest, Salt Lake, Kolkata District, West Bengal, India.

Remarks: It is a parasitic mite.

18. *Hypoaspis vacua* (Michael)

Collection records: 23.viii.2006, two females, ex. Weaver Bird nest, Burdwan, Burdwan District, West Bengal, India. 05.viii.2005, one male and one female, ex. Passer nest, Salt Lake, Kolkata District, West Bengal, India.

Remarks: This parasitic mite has a wide variety of habitats including bird nests, ants nests, moss on tree stumps, cowsheds etc.

19. *Pseudolaelaps splendens* Chaudhury et al.

Collection records: 20.vi.2006, one female, ex.

Indian Tailor Bird nest, Salt Lake, Kolkata District, West Bengal, India.

Remarks: It was reported for the first time from Indian bird nests samples.

20. *Fuscuropoda marginata* (Koch)

Collection Records: 12.xi.2005, one female, ex. Pigeon nest, Thakur Nagar, North 24 Parganas, West Bengal, India.

Remarks: *F. marginata* is a scavenger, but it also feeds on fungal hyphae and spores and attacks nematodes, fly larvae, and the immature stages of various mites like *Caloglyphus mycophagus*, which are abundantly present in bird nests. This species is reported for the first time in India from bird nest samples.

21. *Uroseius* sp.

Collection records: 12.viii.2005, one larva, not identified up to species level, ex. Indian Tailor Bird nest, Kartikpur Village, North 24 Parganas District, West Bengal, India.

Remarks: It is mainly mycophagous mite. It is recorded for the first time from Indian bird nests samples.

22. *Leiodynychus krameri* (G. and R Canestrini)

Collection records: 12.vi.2005, two females, ex. Asiatic Bulbul nest, Habra, North 24 Parganas District, West Bengal, India.

Remarks: Predatory mite, It was reported for the first time from Indian bird nests samples.

23. *Pronematus* sp.

Collection records: 28.vi.2003, two females, ex. Asiatic Bulbul nests, Swarup Nagar, North 24 Parganas District, West Bengal, India.

Remarks: Predatory mite, mostly feeding upon eggs of phytophagous mites.

24. *Pronematus elongatus* Baker

Collection records: 25.vi.2003, four females, ex. Asiatic Bulbul nests, Swarup Nagar, North 24 Parganas District, West Bengal, India.

Remarks: Predatory mite, mostly feeding upon eggs of phytophagous mites.

25. *Tydeus cumini* Gupta

Collection Records: 14.vii.2003, two females, Pigeon nest, Hoogly District, West Bengal, India.

Remarks: Predator of some phytophagous mite.

26. *Cheyletus eruditus* (Schrank)

Collection records: 08.v.2003, one female and one male, ex. Pigeon nest, Salt Lake, Kolkata District,

West Bengal, India.

Remarks: This is a good predatory mite, generally feeds upon Acarids, Glycyphagids and phytophagous mites.

27. *Cheyletus malaccensis* Oudemans

Collection Records: 25.iii.2006, three females and two males, ex. Crow nest, Nager Bazar, Dum Dum, West Bengal, India.

Remarks: This is a good predator in house dusts, bird nests, stored products and also in roof garden plants.

28. *Acaropsis sollers* Rohdendorf

Collection Records: 06.iv.2006, two females, ex. Weaver Bird nest, Burdwan, Burdwan District, West Bengal, India.

Remarks: This is a predatory mite, feeds upon Acarid mites and their eggs.

29. *Cunaxa womersleyi* Baker and Hoffmann

Collection records: 04.v.2003, three females, ex. Asiatic Bulbul nest, Serampur, Hoogly District, West Bengal, India.

Remarks: It is a predatory mite of psocids insects, found abundantly in bird nests.

30. *Cheyllostigmaeus* sp.

Collection records: 23.ix.2004, two females, ex. Weaver Bird nest, Swarup Nagar, North 24 Parganas, West Bengal, India.

Remarks: The damaged condition of those two specimens made it difficult to identify up to species level.

31. *Syringophilus* sp.

Collection records: 31.i.2004, one female, unidentified up to species level due to damaged condition, ex. Asiatic Bulbul nest, Ballygunge, Kolkata District, West Bengal, India.

Remarks: The damaged condition of the specimen made it difficult to determine up to species level. It is a phytophagous mite. It is commonly known as quill mite.

Discussion: Among the 31 species recorded from bird nests, during the course of the present study, the occurrence of *Suidasia medanensis*, *Cunaxa womersleyi*, *Pronematus elongatus*, *Lasioseius mcgregori*, *L. ometus*, *L. americanus* and *Macrocheles indicus* were earlier not known from bird nests in India. Nest dwelling mites, reported in this study were of parasitic, predatory, saprophagous, fungivorous or phoretic in nature. Bird nests mites parasitize a wide

variety of domestic and wild birds, including poultry, pigeons, starlings, sparrows, crows, *Ploceus* sp., bulbul (*Pycnonotus* sp.), *Orthonotus sutorius* and robins. The occurrence of Macrochelidae in the nest could be explained by the fact that these mites entered into the nests through flies, on whose body the Macrochelids attached themselves for dispersal. Mites of the family Ascidae were dominant. The other families of mites like Tydeidae, Cunaxidae, Cheyletidae, Stigmaeidae, Ascidae which were common predators of Psocids insects and mites, were available abundantly in the nests. The sole species of Laelapidae occurring in a nest was an ectoparasitic species and got detached from the bird's body while fluttering the wings. Only three specimens of *Dermatophagoides pteronyssinus* of family Pyroglyphidae were found. This might be an incidental occurrence because where they normally occur, they are usually represented by many specimens. Mites of family Glycyphagidae and Acaridae were fungus feeders. The number of species of different orders as was seen in this study was Astigmata (7 spp.), Prostigmata (9 spp.) and Mesostigmata (15 spp.) indicating the dominance of Mesostigmata in the habitat.

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