Egg Laying Site and Oviposition Pattern of Two Phthirapteran Species Parasitizing Red Whiskered Bulbul (*Pycnonotus jocosus*)

Kırmızı Bıyıklı Bülbül'de (*Pycnonotus jocosus*) Parazitlenen İki Phthirapteran Türünün Yumurtlama Paterni ve Yumurta Bırakma Bölgeleri

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ABSTRACT

Objective: Present study was performed to record the oviposition and egg laying pattern of two phthirapteran species infesting red whiskered Bulbul.
Methods: The number of egg laid by each species on different parts of body was recorded by direct observation under stereozoom binocular microscope. Feathers bearing egg were subjected to SEM to observe the pattern of egg laying.
Results: The maximum percentage of egg of the ischnoceran louse, *Brueelia guldum* were recorded on feather of back region, followed by neck and breast. The amblyceran louse, *Menacanthus eurysternus* prefers to lay eggs mainly on neck, head and nape feathers.
Conclusion: The ischnoceran louse, *Brueelia guldum* exhibits widespread oviposition sites while amblyceran louse, *Menacanthus eurysternus* shows restricted oviposition sites on the host body. *(Turkiye Parazitol Derg 2012; 36: 166-8)*

Key Words: Oviposition, phthiraptera, lice, amblycera, ischnocera

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ÖZET

Amaç: Bu çalışma kırmızı-bıyıklı Bülbül'ü enfeste eden iki *phthirapteran* türünün yumurtlama ve yumurta bırakma biçimlerini kaydetmek için yapıldı.
Yöntemler: Her bir tür tarafından vücudun farklı bölgelerine bırakılan yumurta sayısı stereo-zum binoküler mikroskop altında doğrudan gözlem yolu ile kaydedildi. Yumurta taşıyan kuş tüyleri yumurta bırakma biçimini gözlemek için SEM'e tabi tutuldu.
Bulgular: *Ischnocera* alttakımından bir bit olan *Brueelia guldum*'un yumurtaları en fazla oranda sırt bölgesi tüylerinde, takiben boyun ve göğüs belgesindeki tüylerde kaydedildi. Amblycera alttakımından bir bit olan *Menacanthus eurysternus* başlıca boyun, baş ve ense tüylerine yumurta bırakmayı tercih etmekteydi.
Sonuç: Ischnocera alttakımından bir bit olan Brueelia guldum konakçı vücutta yaygın yumurtlama bölgesi göstermekte iken amblycera alttakımından bir bit olan Menacanthus eurysternus kısıtlı yumurtlama bölgesi göstermektedir. *(Turkiye Parazitol Derg 2012; 36: 166-8)*

Anahtar Sözcükler: Yumurtlama, *phthiraptera*, bitler, *amblycera*, *ischnocera*

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INTRODUCTION

Phthirapteran ectoparasites exhibit variations with respect to oviposition sites. The oviposition sites and the egg laying pattern of Phthiraptera on selected avian hosts viz. domestic fowl (*Gallus gallus domesticus*), black bird (*Turdus m. merula*), mallard duck (*Anas platyrhynchos*), polygnous peacock (*Pavo cristatus*), domestic pigeon (*Columba livia*) and Indian cattle egret (*Bubulcus ibis*) have been indicated from time to time by certain workers (1-8). In the present report, an attempt has been made to record the egg laying sites and patterns of oviposition of two phthirapteran species (*Brueelia guldum* and *Menacanthus eurysternus*) parasitizing red whiskered Bulbul (*Pycnonotus jocosus*).

METHODS

The bodies of five infested birds were arbitrarily divided into nine regions (head, neck, nape, breast, abdomen, back, tail, leg and wings) and examined under a stereozoom trinocular microscope (Magnus MSZ-TR), to record the number of eggs of each species in tabular manner. The number of eggs found laid in each region of the bird was summated and divided by the total number of eggs encountered on five birds (to derive clue relating the popular oviposition sites). A few feathers bearing eggs were gently cut from the host body, arranged on aluminum stubs, covered with double sided cellotape, gold coated, and examined under SEM (Mode Leo 435 VP SEM), to record the patterns of oviposition.

RESULTS

The ischnoceran louse *B. guldum* showed widespread egg laying sites on the host. The maximum percentage of eggs (79% of total eggs, n=5) were found on the feathers from the back region (32%), followed by neck (26%) and breast (21%). Feathers belonging to the abdomen and nape carried 9.0% and 6.0% eggs, respectively. A small percentage of eggs were located on the wings and legs (3% and 2%) while a negligible percentage of eggs were noted on the tail region (1%). However, no eggs were found on the head (Figure 1). All eggs remain glued vertically parallel to the axis of rachis (angle nearly 5°-30°). The eggs were laid vertically with the postero-lateral end near the rachis in an irregular order (Figure 2A). As many as three eggs have been found on a single feather.

The amblyceran louse *M. eurysternus* exhibited restricted oviposition sites. Seventy three percent of the total eggs (n=5) were found on the feathers from the foreparts of the body (neck, 31%; head, 25% and nape, 17%). The breast appeared to be the next favorite site (11%). The feathers belonging to the back and abdomen carried 10% eggs of the aforesaid louse (6% and 4%, respectively). A very small percentage of eggs were located on the wings (3%), legs (2%) and tail (1%) (Figure 1). Eggs were found laid on the base of small feathers, close to rachis and remain glued vertically parallel to the axis of the rachis (angle nearly 30°-40°). Eggs were glued to the rachis through the lateral side and the rear end of the egg remains exposed (Figure 2B). A maximum of four eggs have been found on a single feather.

DISCUSSION

Some avian lice are known to exhibit protective features with respect to oviposition and prefer to lay eggs in those areas of the body which the host finds comparatively difficult to preen e.g. head and neck region (9). Certain phthirapterans lay their eggs in vulnerable sites and place their elongated eggs between the barbs of the feathers. In general, amblycerans show more site specificity than the ischnoceran species. An amblyceran louse, *Actornithophilus patellatus*, places its eggs inside the shafts of primary or secondary feathers (9). Different species occurring on the same host often exhibit differences in egg laying sites. For instance, in the case of pigeons, *Columbicola columbae* and *Colpocephalum turbinatum* prefer to lay eggs on the wing and tail feathers; *Companulotes bidentatus compar*

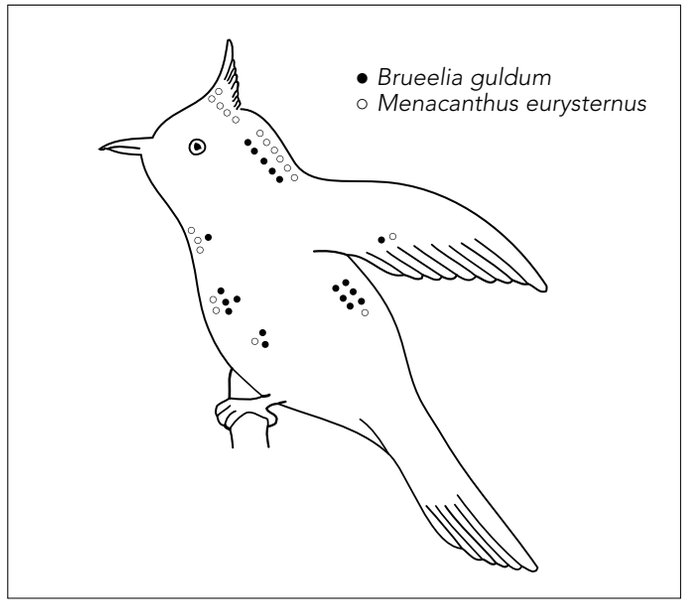

Figure 1. Showing the distribution pattern of the eggs of two types of lice occurring on the red whiskered Bulbul (one ○/●= 5% of total eggs)

Table 1. Egg laying sites of ischnoceran louse

B. guldum			
Body Parts	**% Egg laid**	**Symbol (●)**	**Loss in round off (●)**
Head	Nil	Nil	Nil
Neck	26	5	(-1%)
Nape	06	1	(-1%)
Breast	21	4	(-1%)
Abdomen	09	2	(+1%)
Beak	32	6	(-2%)
Tail	01	Nil	(-1%)
Leg	02	Nil	(-2%)
Wings	03	1	(+2%)
	100%	**19**	**-5%= 1 ● (5% lost in round off)**

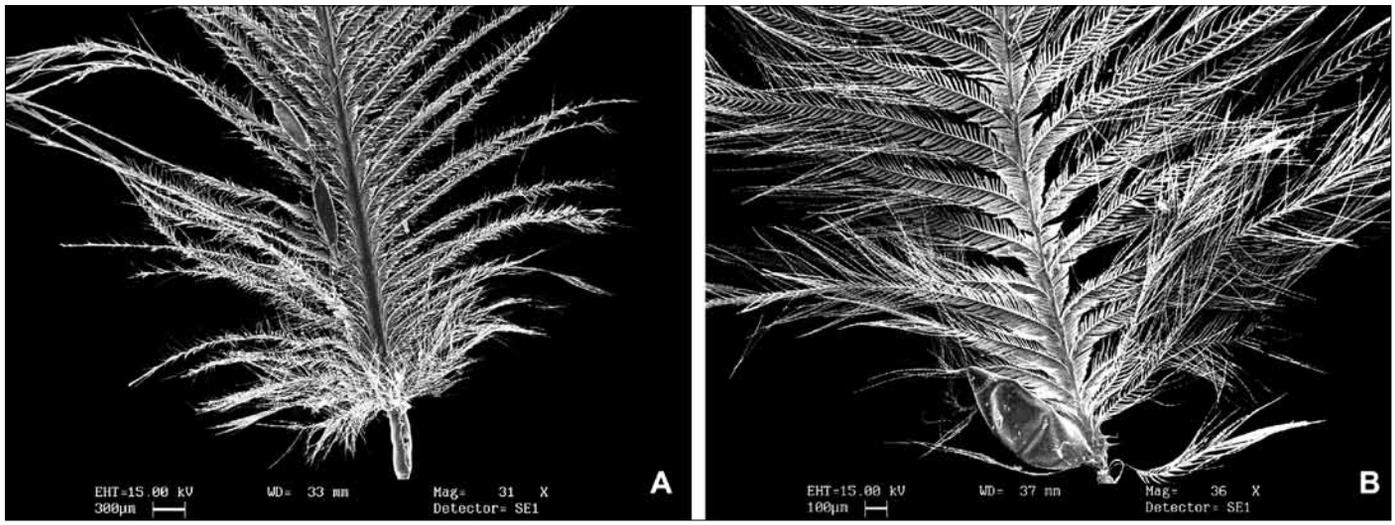

Figure 2. A) SEM photograph showing egg laying pattern of *Brueelia guldum* on 31x.B) SEM photograph showing egg laying pattern of *Menacanthus eurysternus* on 36x

Table 2. Egg laying sites of amblyceran louse

M. eurysternus			
Body Parts	**% Egg laid**	**Symbol (o)**	**Loss in round off (o)**
Head	25	5	(Nil)
Neck	31	6	(-1)
Nape	17	3	(-2)
Breast	11	2	(-1)
Abdomen	04	1	(+1)
Beak	06	1	(-1)
Tail	01	Nil	(-1)
Leg	02	Nil	(-2)
Wings	03	1	(+2)
	100%	**19**	**-5%= 1 o (5% lost in round off)**

exhibits widespread oviposition sites and *Hohorstiella lata* lays the egg on the forepart of the body (7, 10). In the case of the red avadavat, *Myrsidea* amandava oviposite on the breast, back and abdominal region, while *Brueelia* sp. exhibits widespread oviposition sites, as the eggs are found on feathers belonging to most parts of body (11). The phenomenon of shift in oviposition site (in the case of simultaneous infestation by different species) has been also noted by Nelson (12). In the case of the red whiskered Bulbul, more than 78% eggs of ischnoceran lice, *B. guldum,* were present upon feathers of the back, neck and breast region, while the amblyceran, *M. eurysternus* lays 73% of its eggs on the forepart of the host body. Thus, like other avian lice, the phthirapterns occurring on the red whiskered Bulbul also exhibit marked differences in the pattern of oviposition.

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Conflict of Interest
No conflict of interest was declared by the authors.

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