

## Egg laying pattern and the egg morphology of an ischnoceran louse, *Goniocotes jirufti* (Ansari, 1947) parasitizing black partridges, *Francolinus francolinus* (Phthiraptera: Ischnocera)

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### Abstract

The present report furnishes information on the egg laying sites, the pattern of egg laying and the nature of egg shells of an ischnoceran louse *Goniocotes jirufti* parasitizing black partridges, *Francolinus francolinus*. The louse prefers to lay eggs on the feathers belonging to back and breast region of the host. The eggs are laid on lateral plumulaceous portion of the vane. The egg shell is ovoid in shape and the egg chorion is free from sculpturing and apophyses.

**Keywords:** *Goniocotes*, Ischnocera, Lice, Mallophaga, Oviposition, Phthiraptera

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## INTRODUCTION

Phthirapteran ectoparasites are oviparous insects. They glue their eggs to the feathers/ hairs of the host with a kind of cementing material secreted by the glands incorporated in their lateral oviducts. The hatched eggs remain permanently glued to the feathers/hair of host throughout lifetime. Since certain avian lice have tendency to lay their eggs in protected areas of host body (in order to escape the destruction from preening/grooming by the host) information about the egg laying site and the oviposition pattern of lice are necessary to facilitate the collection of eggs for recording their *in vitro* biology. Specific studies on the subject have rarely been made. Workers like, Foster (1969), Nelson and Murray (1971), Nelson (1972), Surman *et al.* (1998), Saxena *et al.* (2000), Tyagi *et al.*, 2009, Kumar *et al.* (2003 and 2006), Gupta *et al.* (2004), Ahmad *et al.* (2010), Rajput *et al.* (2010), Agarwal *et al.* (2011), Saxena *et al.* (2012), Ahmad *et al.* (2016) and Rana *et al.* (2018) have commented on the sites of oviposition and egg laying patterns of phthirapteran ectoparasites infesting selected avian hosts. In the present study an attempt has been made to provide information on egg laying sites and oviposition patterns of an ischnoceran louse, *Goniocotes jirufti* infesting black partridges, *Francolinus francolinus*.

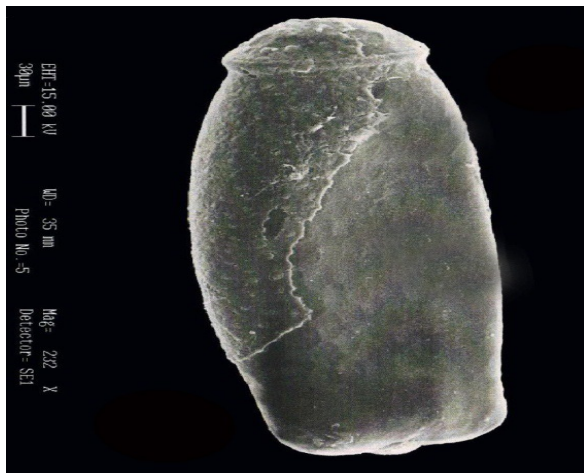
## MATERIALS AND METHODS

Four infested birds (Black Teeter, *F.s francolinus*)

were examined under Magnascope (six inches diameter lens, fitted with circular light) after tying the legs. The body of bird was arbitrarily divided into nine regions. The number of eggs of *G. jirufti* observed in each region was recorded in tabular manner. Total number of eggs found in each region was divided by the grand total of eggs to determine the percentage of eggs laid region wise (on the lines adopted by Kumar *et al.* 2006). Feathers bearing fresh eggs were examined under Stereozoom Trinocular Microscope to record the egg laying pattern. Few eggs were gently teased out of feather for Scanning Electron Microscopy. For Scanning Electron Microscopic studies, fresh eggs were fixed in a 2.5% Glutaraldehyde, passed in Phosphate buffer, critically dried and mounted on double sided tape, gold coated and viewed under SEM (Mode Leo VPP 435).

## RESULTS AND DISCUSSION

The egg of *G. jirufti* is ovoid in shape (Fig.1). Its opercular disc bear faint hexagonal marks but egg chorion is devoid of sculpturing or apophyses. The egg shell remains glued to the feather through its basal end (stigma) with the help of cementing material. *G. jirufti* exhibits wide spread oviposition sites on the host body. Maximum percentage of eggs were found on feathers belonging to back (50 %), followed by breast (36 %). Thus, above two regions carried 86 % of the total eggs. The percentage of eggs found on abdomen (6%), neck (4%), nape (2%), legs (1%) and tail (1%) was too



**Fig.1.** SEM photograph of the entire eggshell of *G. Jirufti*.

low. Feathers belonging to head and wings were found completely devoid of eggs. Eggs of *G. jirufti* are laid on the lateral plumulaceous portion of the vane. Eggs remain scattered irregularly and are inclined at 20 -30°. Maximum numbers of eggs on single feather has been noted as 08.

Information on the egg laying sites and egg laying pattern of three phthirapteran species infesting orange crowned warbler, *Vermivora ocelata* (Foster, 1969), four species occurring on domestic pigeon, *Columba livia* (Nelson and Murray 1971, Saxena *et al.*, 2000), one species parasitizing mallard duck, *Anas platyrhynchos* (Kumar *et al.*, 2003), two species occurring on red avadavat, *Amandava amandava* (Gupta *et al.*, 2004), eight species occurring on domestic fowl, *Gallus gallus domesticus* (Kumar *et al.*, 2006), two species parasitizing cattle egret, *Bubulcus ibis* (Ahmad *et al.*, 2010) and two species found on red whiskered bulbul, *Pycnonotus jocosus* (Saxena *et al.*, 2012) have been provided by the workers. Marshall (1981) has indicated that few species prefer to lay eggs on those areas of body which the host finds relating difficult to preen. Some species lay eggs on restricted oviposition sites while other exhibit wide spread oviposition sites. The phenomenon of site shift in the egg laying sites as a result of competition between simultaneously occurring species has also been indicated by Nelson (1972). A look on literature indicates that there is no published information on the egg laying pattern and egg morphology of any lice occurring on partridges. *G. jirufti* lays most of the eggs on the feathers of back and breast region (on the lateral plumulaceous portion of the vane). The egg chorion is quite smooth and devoid of sculpturing or apophysis.

### Conclusion

There is no published information on the egg laying pattern and egg morphology of any lice occurring on partridges. The present report provides

first information on the egg laying sites, oviposition pattern and the egg shell architecture of the egg of an ischnoceran louse *Goniocotes jirufti* infesting black teeter *Francolinus francolinus*.

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