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Amblyomma sp. (Ixodida: Ixodidae): First record of male, female and nymph ticks of *Elaphe hodgsonii* (Squamata: Colubridae) from Nepal

Pun Shyam K.* **and Maharjan Mahendra**
Central Department of Zoology, Tribhuvan University, Kirtipur, Kathmandu, Nepal
rauyan.pun2@gmail.com

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Abstract

Amblyomma is the hard tick of Ixodidae family, found on all terrestrial vertebrates. The ticks were collected from snake (Elaphe hodgsonii) of Kirtipur, Nepal and preserved in 70% ethanol. The identification of ticks was carried out using various published keys. The three stages of tick found on snakes includes adult male, adult female and nymph of Amblyomma sp. The present findings revealed the first country record of Amblyomma sp. from Elaphe hodgsonii of Nepal.

Keywords: *Amblyomma* sp., *Elaphe hodgsonii,* Kirtipur, ectoparasites.

Introduction

Elaphe hodgsonii (Figure-1) is non- venomous snake present in Colubridae family and this family is the largest among other snake family; the snake has been identified with their morphological characters such as olive brown above, many of the scales edged with black, yellow below, the outer margins of the ventral edged with black, males are longer than females and longer tails; commonly found in Nepal[1].

Taxonomic studies on animal parasites are very few in Nepal, which are primarily focused on endoparasites[2-4]. Ticks are hematophagous ectoparasites that invade all sorts of terrestrial vertebrate. Till now, 130 species of *Amblyomma* has been reported from all classes of vertebrate[5].

Nymph of *A. humerale* and *A. dissimile* has been collected on birds from Canada[6,7]. *A. naponense* and *A. tapirellum* were reported from mammals[8,9]. Adults of *A. americanum* and *A. triste* feed on human[10-12]. Both amphibians and reptiles are infested by *A. dissimile*[13-19]. *A. rotundatum, A. gervaisi, A. veranense* and *A. helvolum* occur on most of the snakes[20-23]. Most of the other *Amblyomma* species has been described from various vertebrate[24-26]. In this current paper as *Amblyomma* sp. identified from *Elaphe hodgsonii* stands first record as far as our present knowledge concerned.

Materials and Methods

We encountered ticks infested on *Elaphe hodgsonii* from Kirtipur, Nepal. The ticks were collected and preserved in vails containing 70% ethanol. The photographs were taken using mounted as well as non-mounted tick specimens. All the ticks were identified using the taxonomic keys[27,28]. Measurements of specimen are in millimeter (mm) indicated otherwise.

Results and Discussion

Hard ticks invades all classes of vertebrate[8]. Snakes are cold blooded animals and they are infested with several type of disease due to hard ticks[9,10,14,18]. *A. americanum, A. dissimile, A. maculatum* and *A. tuberculatum* has been reported on reptiles, domestic and wild animals from East of Mississippi River[14]. The snakes were affected from *A. rotundatum* in Brazil[20]. In India, two snakes species *Naja naja* and *Ptyas mucosa* were infested by *A. gervaisi*[21,22]. Molecular detection of *Rickettsia* species in *Amblyomma* species (*A. helvolum* and *A. varanense*) from snakes in Thailand[23]. *A. tapirellum* has been reported from Costa Rica[9]. The common hard tick (*A.dissimile*) of Nearctic and Neotropical region, which suck blood from all type of vertebrates[7,12,15,16,17,19].

A total of 896 species of ticks has been identified till date and classified under three families: only one species belongs to family Nuttalliellidae (monotype), 193 species belongs to family Argasidae (soft ticks) and 702 species belongs to family Ixodidae (hard ticks)[5]. Nuttalliellidae showing intermediate characters of both hard and soft ticks such as lack of setae, fenestrated plates, strongly folded integument and stigma position[29]; *Nuttalliella namque*[30] is only species found in this family[31]. Argasidae lack scutum, porose areas in both sexes, capitulum in adults and nymphs either terminal or some distance from the anterior margin[27]; rapid feeder a few minutes, female lay few eggs than hard ticks, lair or nest inhabitants and some argasids survive long periods of starvation up to several years[28]. Ixodidae contain 14 genera[5] and have characters like dorsal scutum at all life stages, capitulum anteriorly, porose areas present on basic capituli of female[27]; feed blood meal for long time to become engorges, female lays thousand eggs before dying and no nest inhibitant[28]. *Amblyomma* sp. is one of the hard ticks of Ixodidae family and it contains 130 species of *Amblyomma*[5]. The diagnostic characteristics of these ticks

includes very long mouth parts with second palpi three times longer than wide, capitulum long in relation to width, eyes and festoons present, anal groove distinct but never surrounding the anus anteriorly, males without adanal plates[28].

Morphological characters of *Amblyomma* sp.: Male: Length from apices of scapulae to posterior scutal margin 3.2, width 2.43 (Figure-2A and 2B). Outline oval, long spiracular plate (Figure-2C). Scutum brown, goldish-red with green patches (Figure-2D). Deep cervical grooves long and festoons narrow (Figure-2A). Eyes large, flat. Length of capitulum from palpal apices to cornua apices 0.83, width 0.53 (Figure-2E). Length of palpi 0.50, width 0.1; Length of II palpi article 0.3, Length of III palpi article 0.15 (Figure-2E-G). Fourth palpi article short, bulging on ventral (Figure-2I). Length of hypostome 0.53 (Figure-2H). Dental formula 3/3 (Figure-2I). Legs brown, tarsus length 0.18, width 0.13; metatarsus 0.4, width 0.15; tibia 0.43, width 0.2; femur 0.43, width 0.18, tronchanter 0.25, width 0.15 and coxa triangular, sharply rounded spurs (Figure-2J and 2K). Genital aperture situated between coxae II-III and anal groove without surrounding of anus anteriorly (Figure-2J and 2L).

Female: Length from apices of scapulae to posterior scutal margin 4.25, width 3.25 (Figure-3A). Spiracular plate oval (Figure-3I). Length of scutum 1.38, width 1.8 (Figure-3B). Deep cervical grooves (Figure-3B). Festoons broad evident (Figure-3J). Eyes large, flat. Length of capitulum from palpal apices to cornua apices 0.88, width 0.6 (Figure-3C-3E). Length of palpi 0.7, width 0.1, Length of II palpi article 0.33, Length of III palpi article 0.18 (Figure-3F-3H). Fourth palpi article short, bulging on ventral (Figure-3E). Length of hypostome 0.55 (Figure-3C-3E). Dental formula 3/3. Legs brown, tarsus length 0.33, width 0.0.13; metatarsus 0.38, width 0.2; tibia 0.5, width 0.2; femur 0.5, width 0.23, tronchanter 0.35, width 0.23 and coxa triangular, sharply rounded spurs (Figure-3F-3H). Genital aperture 'U' shaped placed coxae II and anal groove without surrounding of anus anteriorly (Figure-3I).

Nymph: Length from apices of scapulae posterior scutal margin 2.5, width 2.13 (Figure-4A). Length of scutum 1.25, width 1.13, brown, inornate, metallic, goldish-red with green pathches (Figure-4A). Deep, short and converging of cervical grooves (Figure-4A). Eleven explicit broad festoons present (Figure-4A). Four pairs of legs (Figure-4B). Anal groove absent or indistinct (Figure-4B).

Conclusion

As compared with *Amblyomma* species reported earlier from various vertebrate of different countries. It is found that the present hard tick belongs to genus *Amblyomma*, which is the first record from snake of Nepal.

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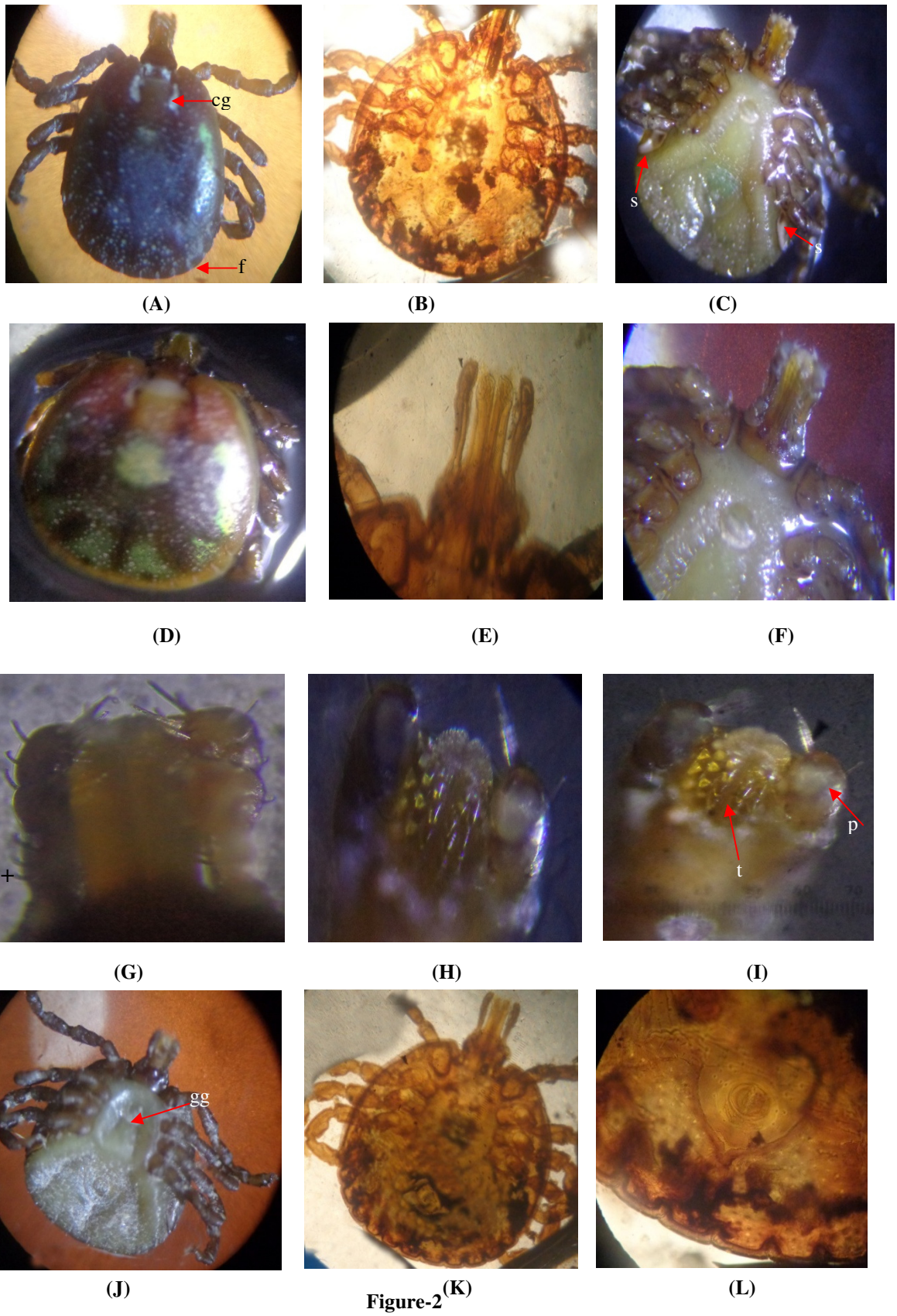
Figure-1
Elaphe hodgsonii



(A) **(B)** **(C)**

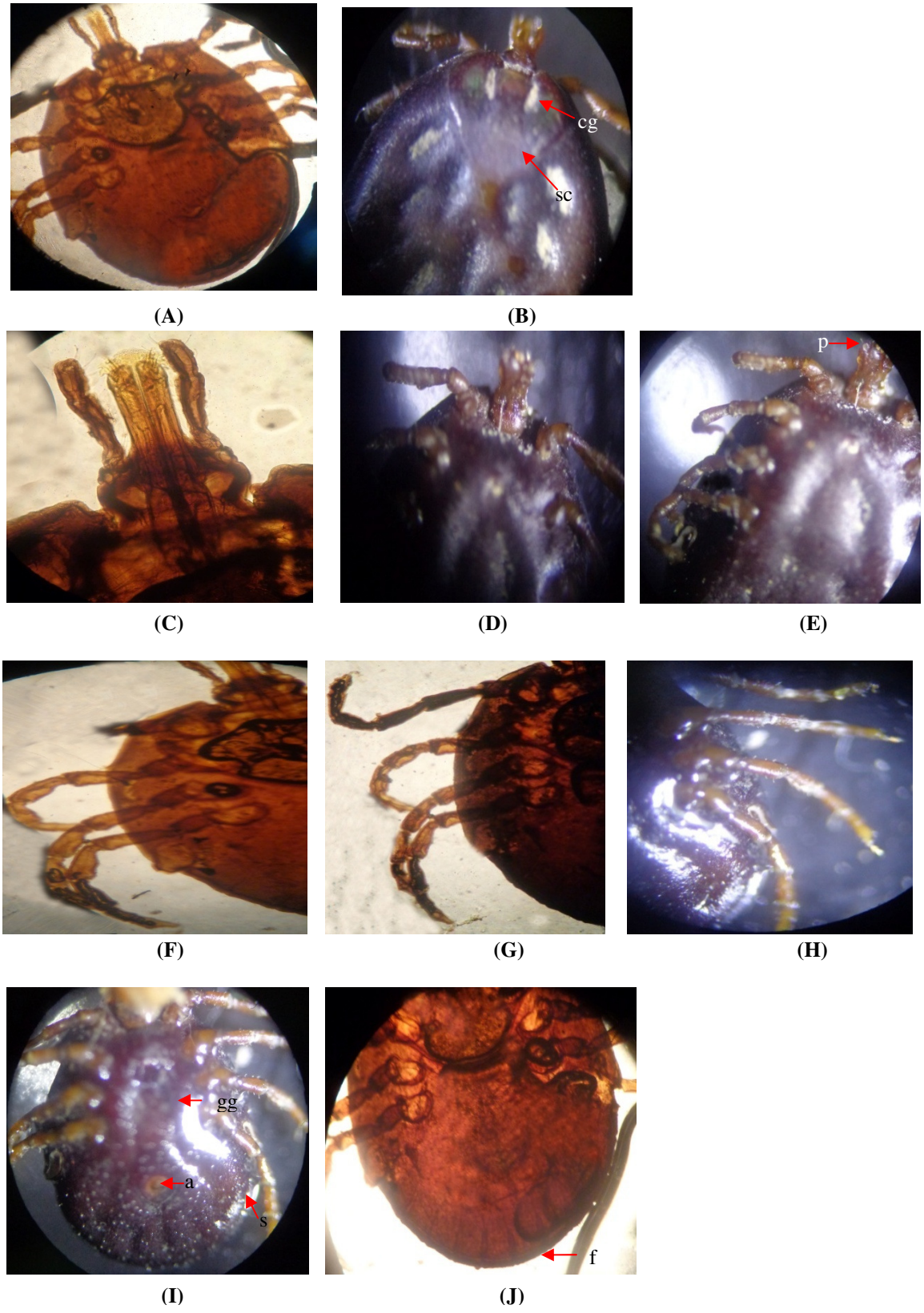
(D) **(E)** **(F)**

(G) **(H)** **(I)**

(J) **(K)** **(L)**

Figure-2

***Amblyomma* sp. male: A-B. Whole adult body- cervical groove (cg), festoon(f), C. Spiracular plate (s), D. Scutum, E-G. Dorsal and Ventral view of capitulum, H-I. Hypostome, teeth(t), 4th palpi article(p), J-K. Ventral view- Genital groove (gg), L. Anus and anal groove**



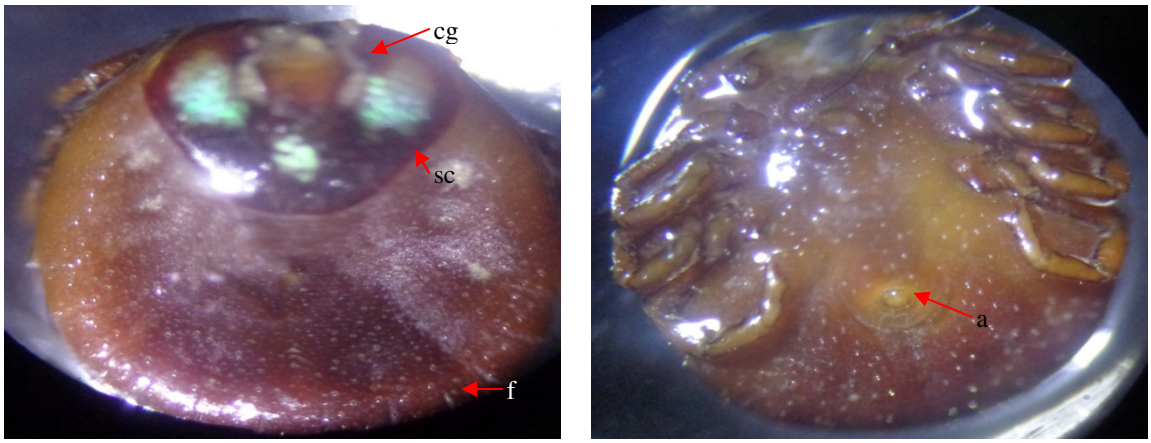
(A) **(B)**

(C) **(D)** **(E)**

(F) **(G)** **(H)**

(I) **(J)**

Figure-3
***Amblyomma* sp. female: A. Whole adult body, B. Scutum (sc), cervical groove (cg) D-E. Capitulum, 4th palpi article (p), F-H. Legs, I. Ventral view- Genital groove (gg), anus (a), spiracular plate(s), J. Festoons (f).**



(A) **(B)**

Figure-4
***Amblyomma* sp. nymph: A. Dorsal view- scutum(sc), cervical groove(cg), festoons(f), B. Ventral view- legs, anus (a).**

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