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**STUDY OF JEWEL BUGS (HEMIPTERA: SCUTELLERIDAE)
OF HILLY REGIONS OF NEPAL**

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ABSTRACT

A survey of jewel bugs (Hemiptera: Scutelleridae) was conducted in three hilly districts of Nepal viz. Tanahun, Lamjung and Kaski, over a period of 13 months (April 2017-May 2018). The prime purpose of the research was to find out the Scutelleridae diversity in these districts which hasn't been done before. Raipur village of Tanahun, Sundarbazar, Kunchha and Dura Daanda areas of Lamjung and Hemja and Sarangkot areas of Kaski were explored for this purpose. A total of 31 specimens of Scutelleridae were collected at localities with altitude varying from 700-1600 masl. Four different species of jewel bugs from 1 subfamily, 1 tribe and 3 genera were recorded. All the species fell under single subfamily Scutellerinae Leach, 1815 and tribe Scutellerini Leach. The recorded species are *Chrysocoris patricius*, *Chrysocoris pulchellus*, *Eucorysses grandis* and *Poecilocoris nepalensis*. All species were recorded for the first time from the studied areas.

Key words: Diversity, Jewel bugs, Kaski, Lamjung, Tanahun

INTRODUCTION

Scutelleridae is a small family of the suborder Heteroptera within the infraorder Pentatomorpha. It lies within the superfamily Pentatomoidea along with prominent families like Pentatomidae, Cydnidae, Plataspidae and several other minor families. It contains about 80 genera and 500 described species worldwide (Tsai *et al.*, 2011). They are found mainly in the fields, shrubs and forest sides.

Being formerly placed in the family Pentatomidae, they share similar characteristics with them. However, their scutellum is greatly enlarged and completely covers the wings and abdomen like a shield (hence sometimes called shield bugs). They have shiny appearance, hence also called jewel bugs. The color and color pattern differs greatly often differing within the same species as well. Polymorphism is usually related to sex; adult males are frequently monochromatic while adult females are polychromatic (Santos *et al.*, 2005). All the species are phytophagous however, some species otherwise phytophagous are also

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sometimes attracted to carrion (Cherot *et al.*, 1998; Eger *et al.*, 2015b). They overwinter as adults. Size is typically 5-20 mm (Javahery *et al.*, 2000).

Joshi and Manadhar (2001) listed four genera viz. *Chrysocoris*, *Poecilocoris*, *Cantao* and *Solenostethium* and eight species viz. *Chrysocoris grandis* (now *Eucorysses grandis*), *C. patricius*, *C. stollii*, *Poecilocoris interruptus*, *P. nepalensis*, *P. purpurascens* and *Soleostethium rubropunctatum* studying the species most of which were collected during 1962-1985. Likewise, V.K. Thapa (2000) listed 12 species from Nepal viz. *Calliphara excellens*, *Chrysocoris grandis*, *Lamprocoris roylii*, *Poecilocoris childreni*, *P. crowleyi*, *P. hardwickii*, *P. heissi*, *P. interruptus*, *P. nepalensis*, *P. orientalis*, *P. ornatus* and *P. purpurascens* under 4 genera viz. *Calliphara*, *Chrysocoris*, *Lamprocoris* and *Poecilocoris*. According to a study by S. Parveen (2013), 21 species of *Chrysocoris* are distributed in the oriental region making it the largest genus under Scutelleridae. In a study by Distant (1902), 14 of the species are known from India. Fourteen species of the genus *Poecilocoris* from IndoPakistan subcontinent were described by I. Ahmad and S. Kamaluddin (1982). Out of 14, 3 were new species from Bangladesh and Nepal viz. *heiolisi*, *orimtatis* and *pseudolatus*.

The present study was undertaken to investigate the species composition of Scutelleridae within the hilly domains of the Nepal. The study would further encourage the researchers to undertake and explore the jewel bugs from various parts of these regions.

MATERIALS AND METHODS

The study was carried out during April 2017-May 2018. Collection trips to the nearby forest areas and various other crop fields were made in several sites of Tanahun, Lamjung and Kaski viz. Raipur in Tanahun, Sundarbazar, Kunchha and Dura Daanda in Lamjung and Hemja and Sarangkot in Kaski. The sightings were recorded capturing photos in Gionee P5W smartphone with a 5 MP camera. The date of sightings and the location with latitude, longitude could be extracted from the photo details. The specimens were collected using Sweep Net and Hand Picking Method. Collected specimens were killed in killing jar containing a cotton plug soaked with ethyl acetate. The captured specimens were taken to the Entomology laboratory of Lamjung Campus (Sundarbazar, Lamjung). Nymphs were taken and reared with proper host plants (i.e. the same plant on which they were found on/feeding on) till adults emerged which were then identified.

The identified specimens were pinned slightly toward the right of anterior scutellum with black enameled insect pins of Sphinx®, Pin Size 6. Labels were handwritten, cut into 14mmx5mm pieces. The first label indicated collection locality, collection date and collector's name, the second label indicated the host plant while the insect ID was written on the third label. The identified specimens were preserved in a sealed box containing Naphthalene balls.

Identification Methodology

Identification was done referring to the available databases, dichotomous keys, various published literatures, comparison with authentic images and illustrations and senior scientists' help—Photographs of various parts of the specimens were taken with Gionee P5W smartphone fitted with macro camera lens. The photographs were sent to two Heteroptera specialists familiar with asian species (Dr. DávidRédei and Mr. Shankaraman H.) along with all other important details (location, host plant, specimen size etc.). While genitalia study is the most reliable method for species identification, it was not possible due to lack of required equipment in the laboratory. However, externally they can be identified mainly on the basis of body size, extension of labium, presence of strigils on pygophore etc. (Parveen *et al.*, 2013).

Locations and altitude of collection sites

S.N.	District	Location	Altitude (masl)
1.	Tanahun	Raipur 28° 3'N, 83° 58'E	1000
2.	Kaski	Sarangkot 28° 14'N, 83° 56' E	1100-1600
		Hemja 28° 16'N, 83° 56'E	1120
3.	Lamjung	Sundarbazar 28° 7'N, 83° 24'E	700
		Kunchha 28° 8'N, 84° 20'E	930
		Dura Daanda 28° 9'N, 84° 21'E	1100

RESULTS

The following jewel bugs collected from the study areas were identified and are taxonomically arranged:

Systematic List

Order: Hemiptera

Suborder: Heteroptera

Superfamily: Pentatomoidea

Family: Scutelleridae

Subfamily: Scutellerinae

Tribe: Scutellerini Leach

Genus: *Chrysocoris* Hahn, 1834

1. Species: *Chrysocoris patricius* (Fabricius, 1798)

2. Species: *C. pulchellus* (Dallas, 1851)

Genus: *Eucorysses* Amyot & Serville, 1843

3. Species: *Eucorysses grandis* (Thunberg, 1783)

Genus: *Poecilocoris* Dallas

4. Species: *Poecilocoris nepalensis* (Herrich-Schaeffer, 1837)

Legend:

V.K. Thapa (2000) hinted the rarity of the identified species on the basis of the number of specimens collected or that available for study.

Rare: Only 1 specimen collected

Uncommon: Only 2 specimens collected

Less common: 3-5 specimens collected

Rather common: 6-10 specimens collected

Common: 10-50 specimens collected

Quite common: More than 50 specimens collected

Systematic Account:

Genus: *Chrysocoris* Hahn, 1834

Diagnostic Characters: Abdomen is completely covered with scutellum except at the base. Body is metallic to brassy green. First antennal segment never exceeds the head apex. Second antennal segment is the shortest.

1. *Chrysocoris patricius* (Fabricius, 1798)

- Material Examined: 2017.viii.13, Sundarbazar, Lamjung, Nepal, Coll: Sajan K.C.
- Found on: Rice
- Collected from: Sundarbazar, Kunchha
- Rather common (6 specimens collected)

Description: Adult has 9mm long and 4mm wide body. Body is shiny green with bluish hue. A bluish line running from distal juga to base of head. 10 shiny black spots on pronotum. 2 in the central column are larger and bolder. 8 spots in scutellum, the central one is large and shield shaped surrounded by other smaller ones. Connexivum pinkish. Legs pubescent. Coxae and femurs (except apices) brownish, apices of femurs and rest of the parts black. Ventrums of head ochraceous. Sternum black. Abdominal sternites ochraceous with black patches sideward. Center of III, IV and last abdominal sternites black.

Remarks: Seen as a minor pest in rice fields. Two of the species turned bluish on storage.

Distribution: Nepal (Joshi, 2001); India, Myanmar (Parveen, 2011)

2. *Chrysocoris pulchellus* (Dallas, 1851)

- Material Examined: 2017.v.10, Raipur, Tanahun, Nepal, Coll: Sajan K.C.
- Found on: *Jatropha curcas*
- Collected from: Raipur
- Rare (1 specimen collected)

Description: Adult has body 13.5mm long and 5.5mm wide. Body is brassy green. Antennae black, eyes brownish. Tylose has bluish longitudinal line reaching down to ocelli. Pronotum has 11 bluish black spots. Anterior margin has 3 transverse spots, posterior

pronotum has 8 spots; 1 at each margins, 2 longitudinally arranged in pairs on both discs and 2 longitudinal in the center. Scutellum has 8 such spots. 1 longitudinal in the center surrounded by 2 transverse in anterior portion, 2 in shorter ones from the sides and 2 from downward. 1 remaining sinuate transverse patch in the posteriormost part. Connexivum pinkish. Legs pubescent. Coxae, femurs (except apices) brownish, apices of femurs, tibiae, tarsi and claws shiny black. Rostrum black extended up to II abdominal segment. Sternum black with margins brassy green. Abdominal sternites ochraceous with brassy green patches sideward. Center of III, IV and last abdominal sternites black.

Distribution: India, Sri Lanka (Parveen, 2011)

Genus: *Eucorysses* Amyot&Serville, 1843

Diagnostic characters: Similar to *Chrysocoris* but differs from it in its tibiae, with basal halves cylindrical and with a longitudinal furrow dorsally in their apical halves.

3. *Eucorysses grandis* (Thunberg, 1783)

- Material examined: 2017.vi.08, Sundarbazar, Lamjung, Nepal, Coll: Sajan K.C.
- Found on: *Jatropha curcas* (Also the host plant for nymphs)
- Collected from: All Locations
- Common (23 specimens collected)

Description: Adult has dorsally convex body 25mm long and 13mm wide. Body color orange. A longitudinal line arising from posterior part of tylose runs to the base of head diffusing to ocelli and compound eyes. Antennae five segmented black. II segment is very short. Base of I segment luteous. Junction of pronotum and scutellum with black transverse region. A bold black spot in the anterior end of scutellum. Center of scutellum has two transverse black lines touching the margins but not reaching the apex. Connexivum is pinkish with black markings in the segments persisting from ventral side. Coxae brownish, base of coxae ochraceous. Sternum black except for region near coxae. Abdominal sternites orange with black bands at margins except for segment II. Segments II, III, IV, VII have central region black as well. Legs shiny bearing purplish hue with inner margins pubescent. Remarks: Some specimens had bold black spot on center of the anterior pronotum suffused with black patch on base of the head. Although the white form of this species is also available, none were seen in the studied areas.

Distribution: Nepal (Joshi, 2001); India, Myanmar(Parveen, 2011); China, Formosa, the Ryukyus and Japan (Syoyiti,1965)

Genus: *Poecilocoris* Dallas

Diagnostic Characters: Body is orange or brownish with black spots. Basal segments of antennae usually distinctly shorter than head apex. Labium usually passing 2nd abdominal sternum; Apex of scutellum is rounded, sometimes narrowed.

4. *Poecilocoris nepalensis* (Herrich-Schaeffer, 1837)

- MaterialeExamined: 2017.vii.31, Sundarbazar, Lamjung, Nepal, Coll: Anjali Khadka
- Found on: Wild

- Collected from: Sundarbazar
- Rare (1 specimen collected)

Description: Adult has 19 mm long and 11 mm wide body. Head, antennae and anterior portion of pronotum black with vioscent hue. Lateral margins of pronotum sinuate. 2 discoidal black spots on center of posterior pronotum. Scutellum covering entire wings except for the margins. Anterior end of scutellum with 3 black spots, 1 in the center (triangular) and 2 in the margins (semi-circular) joined to each other at the base. Two small black spots on either sides in line with the apex of triangular spot. Base of scutellum has 4 spots in arch fashion. 2 in the center are large and 2 at margins are small. Total 9 patches on scutellum. Reddish orange body color. Sternum and legs black with vioscent hue. Legs pubescent. Abdominal sternites down to IV segments have black lateral margins, rest are all reddish orange with last segment vioscent black.

Distribution: Nepal (Joshi, 2001); India, Myanmar (Parveen, 2011)

Plate 1:

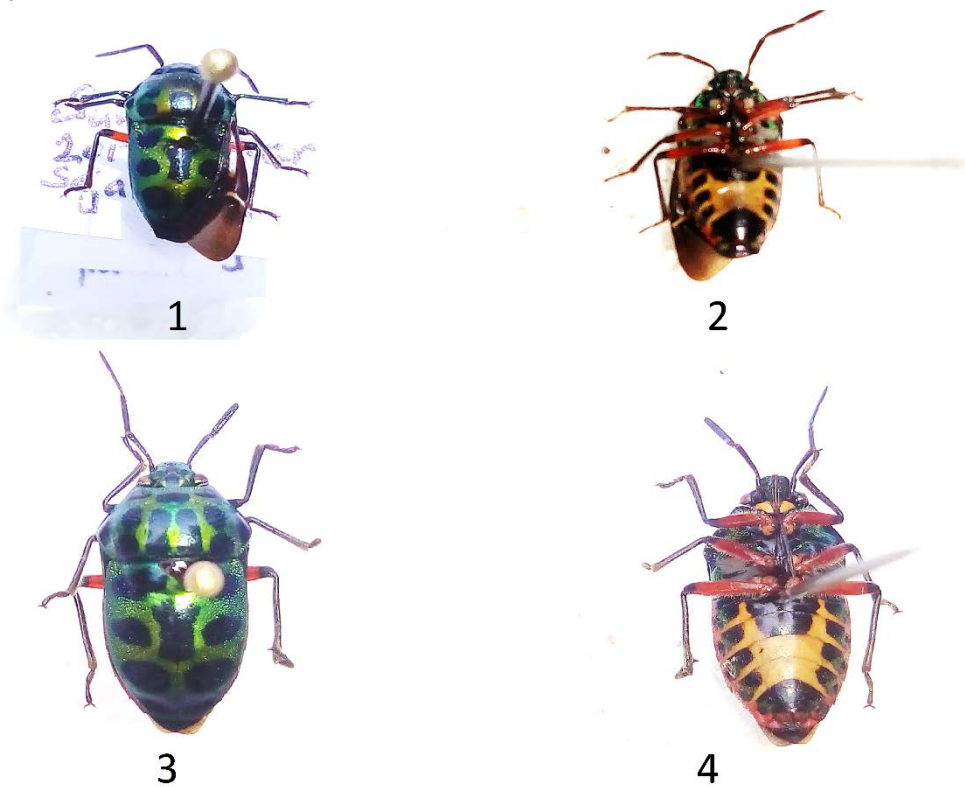


Fig: 1. *Chrysocoris patricius* (Dorsal View) **2.** *Chrysocoris patricius* (Ventral View)
3. *Chrysocoris pulchellus* (Dorsal View) **4.** *Chrysocoris pulchellus* (Ventral View)

Plate 2:

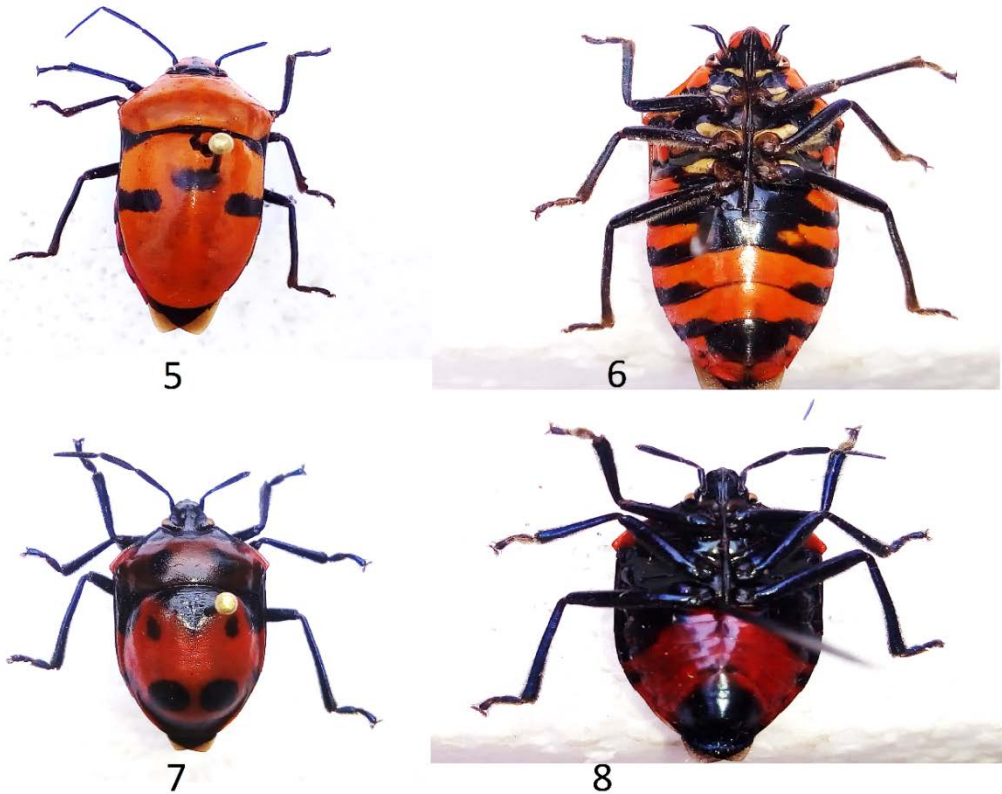


Fig: 5. *Eucorysyes grandis* (Dorsal View) **6.** *Eucorysyes sgrandis* (Ventral View)
7. *Poecilocoris nepalensis* (Dorsal View) **8.** *Poecilocoris nepalensis* (Ventral View)

DISCUSSION

Four species of Scutelleridae have been recorded and re-described regarding their external morphological characters. The re-described species are *Chrysocoris patricius* (Fabricius, 1798), *Chrysocoris pulchellus* (Dallas, 1851), *Eucorysyes grandis* (Thunberg, 1783) and *Poecilocoris nepalensis* (Herrich-Schaeffer, 1837). All of these species have been recorded by Thapa (2000) and Joshi (2001) except for *C. pulchellus* which was only recorded in the neighboring countries in the past i.e. from India, Sri Lanka (Parveen, 2011). These species are morphologically discussed by Distant (1902) while I. Ahmad and S. Kamaluddin re-described *Poecilocoris* in 2012 and S. Parveen re-described *Chrysocoris* in 2013 with further taxonomic details. Similarly, on the basis of rarity, among these species, *Eucorysyes grandis* was found to be the most common one followed by *Chrysocoris patricius*. Likewise, only 1 specimen of each *Chrysocoris pulchellus* and *Poecilocoris nepalensis* was found making them substantially rare.

The obtained results of this study are compliant to the available literature. Though not all of them have explicitly mentioned the documentation of these species from Nepal, various sightings from the neighboring countries have been recorded (Parveen, 2011; Distant, 1902). Further researches are necessary regarding the areas that were not covered in this study to fully explore the Scutelleridae fauna of these districts in larger scale.

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