

# GROUND AND DARKLING BEETLES (COLEOPTERA: CARABIDAE, TENEBRIONIDAE) FROM KARGIL, J AND K

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## KEY WORDS

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## ABSTRACT

Kargil district of J and K state was surveyed during the year 2007-2008 to record the insect fauna belonging to family Carabidae and Tenebrionidae (Coleoptera). A total of seven identified genera viz., *Lebia* sp., *Amara*, sp., *Bembidion* spp., *Calosoma* sp. (Carabidae) and *Gonocephalum* sp., *Blaps* sp. and *Cyphogenia* sp. (Tenebrionidae) within these two families belonging to two suborders, two superfamilies and five sub families were recorded. Besides their records their distribution in the area and diagnostic features are also incorporated in this communication.

## INTRODUCTION

Insects are a major component of the world's biodiversity. By virtue of their vast numbers of both species and individuals, they are vital determinants of terrestrial ecological processes. Over one and a half million living and about 12,000 species of fossil insects have been identified and described all over the world (Uniyal, 2001). Several species are believed to become extinct without even being identified. We live in the age of Coleopterans, the beetles. This group of insect contains some 3,50,000 (Gavin, 2001) described species which is the highest number of the species known within any order of animals and plants, thus forms the largest order of class Insecta with great diversity. Family Carabidae commonly known as ground beetles feed on other insects, is well represented all over the world from arctic tundra (Chernov et al., 2000, 2001) to high altitudes of Himalaya (Mani, 1962). Family Tenebrionidae commonly known as darkling beetles is also represented worldwide (Chujo, 1973; Sanchez-Pinero and Gomez, 1995; Medvedev, 2002; Lillig, 2006; Iwan and Lobl, 2007) mostly phytophagous but also feed on detritus.

The studies on various aspects of Beetle diversity in high altitudes of Ladakh have not attracted sufficient attention which it actually deserves. Von Hugel was the first to record the presence of insects in Himalaya during the first half of the last century (Singh, 1983). Subsequent workers like Mani (1954, 1956, 1962); Mani and Singh (1955, 1962); Khan and Sahni (1978); Kulshrestha (1978); Singh (1983); Maheshwari (1989); Uniyal, (2001) and Feroz (2008) have contributed significantly on high altitude entomology. The present study helps in predicting insect diversity of Kargil.

## MATERIALS AND METHODS

The study area (Fig. 1a, b) located in Ladakh region of the J and K State at an altitudinal range of 2,636 meter above sea level lying in between 34°36' North Latitude and 76°06' East Longitude. Topography variable, ranging from 2,636 meter upto 7,135 meter, comprises of a maze of valleys. Most of the area is barren with high slopes ranging from 60-80%. Only areas with water sources and human habitation are seen with good amount of vegetation. Average rain fall is very low and mostly in the form of snow during winter months. The study area experienced both arctic and desert climate and commonly known as "Cold Desert" of the country.

For detail investigation of these families, data was gathered fortnightly at 3 different areas viz., Poyen (2,636.36 - 2,727.27 m asl), Kurbathang (2,757.57 - 2,878.78 m asl) and Goma-Kargil (Goma-Kargil 2,909.09 - 3,030.30 m asl) of the Kargil town within Kargil district. Poyen was having thick vegetation comprising of agricultural crops, trees, shrubs, herbs and grasses etc., Kurbathang was having mostly alfalfa as main vegetation and Goma-kargil was with very sparse vegetation in its upper reaches.

Beetles belonging to different species were collected from the area under investigation by traditional methods like hand picking, using hand net and some times also by stem beating. After collection the insects were killed by using ethyl acetate either in the killing bottle or by introducing cotton balls dipped and subsequently squeezed in ethyl acetate in closed polythene bags. After killing the beetles were pinned/ cardened, stretched and dried in oven. For population studies fortnightly surveys were made from March, 2007 to February,

2008 regularly for the presence of adult beetles at five different study plots of 5 square meter area in each of the three stations and the relative abundance of each species were determined using the formula:

$$\text{Relative Abundance (RA) of a species} = \frac{\text{No. of individuals of the species}}{\text{No. of individuals of all species}} \times 100$$

**RESULTS AND DISCUSSION**

The present authors have recorded 07 genera within these two families (Table 1). The details of which are as under.

**Family: Carabidae (Ground beetles)**

***Amara Bonelli, 1810, (Fig. 2)***

**Habit and Habitat:** Typically found in dry soil under stones in agricultural and alfalfa fields. However, Majka (2005) recorded from lowland meadows, forests feeding on plant seeds.

**Distribution:** During the present study it has been recorded from Poyen and Kurbathang areas at an altitudinal range of 2,636.36 m to 2,878.78 m. This genus was found in abundance under stones during October. Uniyal, 2001 recorded this genus from Nyoma and Diskit areas of Leh district.

**Size:** Length varies from 7.0 to 8.0 mm and breadth 3.0 to 3.5 mm.

**Diagnostic features:** Black, shining with brown antennae. Head triangular, narrower than pronotum. Eyes prominent, bulged. Antenna 10 segmented arising laterally in between eyes and base of mandible. Pronotum smooth, convex marginally with a median longitudinal groove. Elytra finely striate. Legs dark brown.

***Lebia Latreille, 1802, (Fig. 3)***

**Habit and Habitat:** The authors found adults under stones in the study area. Whereas Peck (2006) has observed the adults active on vegetation and the larvae as parasites on leaf feeding beetles.

**Distribution:** During the present observations it has been recorded from Kurbathang area at an altitudinal range of 2,757.57 m to 2,878.78 m.

**Size:** Length varies from 6.0 mm in length and 2.5 mm in breadth.

**Diagnostic features:** Elongated, dorso-ventrally flattened, reddish brown, shining thorax with black abdomen except for the pro-thoracic sternum. Head with prominent bulged eyes. Antenna filiform and 10 segmented. Mouth parts biting and chewing, mandibles large, sharp and curved. Pronotum heart shaped. Elytra short, pygidium visible, three prominent



Figure 1a: Panoramic view of Area of Study



Figure 1b: Satellite view of area of study

spots one being on the suture therefore 1½ on each elytron towards the posterior end. Abdomen black. Legs almost similar in shape, tarsi 5-5-5.

***Bembidion Latreille, 1802, (Fig. 4)***

**Habit and Habitat:** Found on moist clay and shady places near water source also from under stones in moist soil in the area of the investigator. Majka (2005) recorded along river banks in gravel also found in clay pits along road sides and in

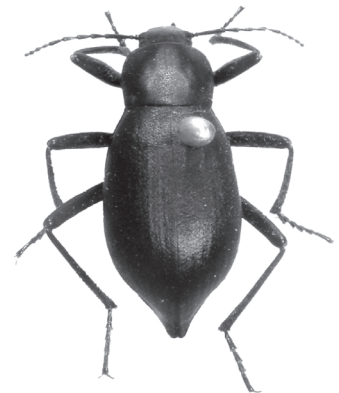
Table 1: Showing the taxonomic status of the collected genera.

Order	Sub Order	Super Family	Family	Sub Family	Tribe	Genus
Coleoptera	Adephaga	Caraboidea	Carabidae	Harpalinae	Lebiini	<i>Lebia</i>
				Trechinae	Zabriini	<i>Amara</i>
					Bembidiini	<i>Bembidion</i>
	Carabinae	Carabiini	<i>Calosoma</i>			
	Polyphaga	Cucujoidea	Tenebrionidae	Tenebrioninae	Tenebrionini	<i>Gonocephalum</i>
				Pimelinae	Blaptini	<i>Blaps</i>
			Akidini		<i>Cyphogenia</i>	

**Table 2: The table shows the population dynamics and Relative Abundance of the collected species.**

S.N.	Family	Genus	Mar.	Apr.	May	June	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Total	*R.A
1.	Carabidae	<i>Lebia</i>	-	1	-	-	-	-	-	-	-	-	-	-	1	0.19
2.		<i>Amara</i>	-	3	-	7	-	21	8	14	-	-	-	-	53	10.17
3.		<i>Bembidion</i>	-	5	11	10	112	68	73	63	-	-	-	-	342	65.64
4.		<i>Calosoma</i>	-	2	-	-	-	-	-	-	-	-	-	-	2	0.38
5.	Tenebrionidae	<i>Blaps</i>	-	1	-	1	1	6	2	-	-	-	-	-	11	2.11
6.		<i>Cyphogenia</i>	1	3	1	1	8	12	7	8	-	-	-	-	41	7.86
7.		<i>Gonocephalum</i>	1	3	-	6	10	8	8	35	-	-	-	-	71	13.62
Total			2	18	12	25	131	115	98	120	0	0	0	0	521	

\*R.A = Relative Abundance

Figure 2 and 3: *Amara* sp.; *Lebia* spp.Figure 6 and 7: *Gonocephalum* sp.; *Blaps* sp.Figure 4 and 5: *Bembidion* spp.; *Calosoma* sp.Figure 8: *Cyphogenia* sp.

cultivated fields.

**Distribution:** During the present observation recorded from Poyen and Kurbathang area at altitude ranging from 2,636.36 m to 2,878.78 m. Also recorded from Tso Moriri and Tso Kar of Leh district by Uniyal (2001).

**Size:** Length varies from 4.5 to 5.0 mm and breadth from 1.8 to 1.9 mm.

**Diagnostic features:** Generally dorso-ventrally flattened, blackish with brownish spots on elytra. Head narrower than pronotum, with curved mandibles. Eyes prominent and bulged. Antenna 10 segmented brown at the base (2-3 segments) and remaining segments dark brown. Elytra striate, margined. Two diagonal light brown patches present, one at the anterior and other at the posterior end of each elytra. The elytron does not meet posteriorly. Legs brown.

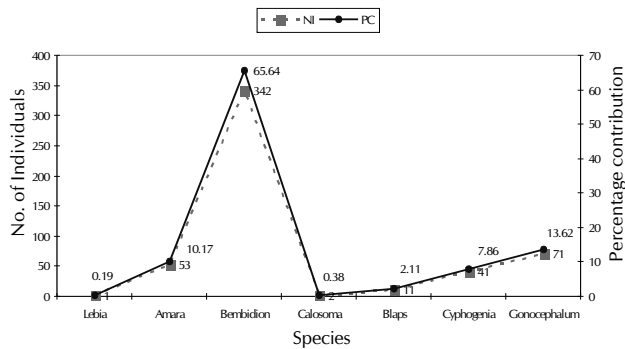
#### *Calosoma* Weber, 1801, (Fig. 5)

**Habit and Habitat:** Found running on ground in alfalfa field. It is a predator and predate on larvae of insects. One of the species of *Calosoma* i.e. *Calosoma sycophanata* L. as observed by Weseloh (1993) predate on Gypsy moth *Lymantria disper* L.

**Distribution:** During the present study the present authors recorded this genus from Kurbathang area at an altitude ranging from 2,757.57 m to 2,878.78 m. It has however also been reported from Pir Panjal range, Kashmir, Sonamarg 8,600 feet, Drass, Kargil and Leh by Singh *et al.* (1956).

**Size:** Length 19.0 mm and breadth 7.0 to 8.0 mm.

**Diagnostic features:** Generally elongated, dull black. Head roughly triangular, narrower than thorax with curved black mandibles. Eyes prominent and bulged. Antenna 10 segmented



**Figure 9:** Showing the no. of individuals and percentage contribution of each species.

NI: No. of Individuals, PC: Percentage Contribution

and black. Pronotum broader anteriorly with convex margins, anterior end of the pronotal margin slightly directed downwards. Elytra striate with three rows of golden yellow punctures being placed on 4th, 8th and 12th striae. Males smaller than females in body size. Tarsi in males broader than in females.

**Family: Tenebrionidae (Darkling beetles)**

***Gonocephalum* Solier, 1834, (Fig. 6)**

**Habit and Habitat:** Mostly found in litter under stones in the study area however population was found to be very high during October.

**Distribution:** From the area under investigation recorded from Poyen and Goma-Kargil at an altitude ranging from 2,626.26 m to 2,909.09 m. Besides this also recorded from Chutak, Akchamal and Pushkum area of Kargil district.

**Size:** Varies from 9.5 to 10.0 mm in length and 4.0 to 4.5 mm in breadth.

**Diagnostic features:** Elongate, slightly flattened dorsally, brown and dull greyish black. Head small, pubescent and broad. Eyes large, black and prominent. Antenna large, 11 segmented. Pronotum greyish black, large and transverse. Legs vary in size with heteromerous tarsi (5-5-4). Elytra striate and rough. Abdomen with 5 visible abdominal sternite, 1<sup>st</sup> three segments connate.

***Blaps* Fabricius, 1775, (Fig. 7)**

**Habit and Habitat:** Found resting under stones.

**Distribution:** During the present study recorded from Poyen and Kurbathang areas at altitude ranging from 2,636.36 m to 2,878.78 m.

**Size:** Varies from 21.5 to 22.0 mm in length and 7.0 to 8.0 mm in breadth.

**Diagnostic features:** Elongated with tapering posterior end, shining black and brown. Head small, prognathous, punctate with broad base. Eyes black and emarginated. Antenna 11 segmented. Pronotum large, black, punctate and roughly squarish. Legs similar in shape with 5-5-4 tarsi. Elytra elongate, punctate (punctures small and in rows), suture completely fused. Abdomen with 5 visible sternite and 1<sup>st</sup> three segments connate.

***Cyphogenia* Solier, 1836, (Fig. 8)**

**Habit and Habitat:** Nocturnal, found moving inside house or around human habitation.

**Distribution:** From the area of study reported from Kurbathang area of area of Kargil district at an altitude ranging from 2,757.57 m to 2,878.78 m.

**Size:** Varies from 17.5 to 19.0 mm in length and 6.0 to 7.0 mm in breadth.

**Diagnostic features:** Elongate, broad and tapering posteriorly, black dorsally, dark brown ventrally. Head small, punctate and raised posteriorly. Eyes emarginate laterally. Antenna 11 segmented, filiform, brown and punctate. Pronotum rectangular. Elytra rough, black with obtuse humeral angles. Abdomen roughly conical, dark brown and punctate. Legs with tarsi 5-5-4.

A look at the Table 2 reveals that a total of 512 individuals were collected within these 02 families which were further categorized into 07 genera, of these 07 genera minimum number of individuals collected was 01 for *Lebia* sp. and the maximum number of individuals collected was 342 for *Bembidion* spp. Relative abundance of the collected species shows that *Bembidion* spp. with 65.64 per cent was the dominant of all the species collected, whereas *Lebia* sp. with 0.19 per cent was the least dominant and the prevalence of the remaining species were as follows, *Gonocephalum* sp. 13.62 per cent > *Amara* sp. 10.17 per cent > *Cyphogenia* sp. 7.86 per cent > *Blaps* sp. 2.11 per cent > *Calosoma* sp. 0.38 per cent (Fig. 9). It was also observed that during November, December, January and February no individuals were observed due to low temperature and snow during these four months.

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