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Systematic and diversity of ground beetles (Carabidae: Coleoptera) from district Haripur KPK, Pakistan

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Abstract

Present study was conducted during 2018 in order to explore the diversity of beetles fauna and study of their systematic from district Haripur KPK, Pakistan. We collected the Carabid beetles with the help of pitfall traps and up to specie level identified with the help of available literature. Five species were identified belonging to 3 sub-families under three genera. These sub families are Carabinae, Brachininae, Licininae, and the species are *Pheropsophus sobrinus*, *Chlaenius quadricolar*, *Carabus caschmirensis*, *Chlaenius hamifer*, *Chlaenius laticollis*, and *Carabus caschmirensis* was the most abundant species. It was followed by *Chlaenius quadricolar*, *Pheropsophus sobrinus*, *Chlaenius laticollis*, and *Chlenius hamifer*.

Keywords: Abundant, importance, Carabidae, Haripur, systematics

Introduction

One of the best known and most popular families of beetles The Carabidae, ground beetles, are as presently known, 40,000 species throughout the world the family Carabidae distributed Surveyed area hosts while an estimation of [1]. In vegetated lands, selected areas and field edges with in crop fields Ground beetles commonly occurred. Beetles are considered as important biological control agent indicators of environmental changes in agroecosystem and temperate zones [2], And are effective agents for indicating geographical changes such as fragmentation as they were highly sensitive to the effect of landscape changes [3]. The majority of species have been observed as primarily predatory feeding on related organisms and other insects. Pest status of family Carabidae have little importance feed on seeds of oats, barley, wheat, corn but damage is negligible [4]. Several ground beetle species are phytophagous and feed on the seeds of troublesome weeds species including common lamb's quarters, common ragweed, and giant fox tail [5], and thus help to regulate weed populations [6]. Some recent studies revealed by the accumulation of toxic metals that physiology of carabid beetles was adversely affected [7]. On population of carabid beetles Biotic and abiotic factors of environment such as soil moisture, soil type, and predation moisture have greater impact. From springtails, mollusks and aphids A few species have also been observed to detect chemical cues. They capture and consume a wide assortment of soil dwelling insect [8], including wireworms, caterpillars, maggots, ants, aphids and slugs. Systematics of carabid beetles is stable and they are taxonomically well known, their impact on agriculture is beneficial and their ecology has been widely studied. Exclusively on adults the taxonomy of the family Carabidae is based [9]. Based study of adults however carabid larvae possess good structural features and could be used to test phylogenetic hypotheses [10]. From all the areas of the world Carabidae because of their importance have been exposed [11], Belonging to 83 genera in south Dobrudzha, Bulgaria. Presented the distribution of 348 species of ground beetles form crops in Turkey recorded 57 species of Ground beetles [12]. From apple orchards and Alfalfa fields of Iran Listed 43 species of Carabid beetle. Beside the work done by [13]. The carabids have been largely neglected in Pakistan. Keeping in view such a great importance of carabid beetles as the bio indicators of the wellbeing of environment and their role in soil fertility and predators of the harmful insects this study was intended to investigate the systematics and diversity of the family Carabidae from district Haripur KPK Pakistan.

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Materials and Method

Study area

Study was conducted in the district Haripur KPk Pakistan. Haripur is the main city of the Haripur District in Hazara, Khyber Pakhtunkhwa in Pakistan, with Swabi and Buner to the west, some 65 km north of Islamabad and 35 km south of Abbottabad. It is in a hilly plain area at an altitude of 520 m. Having the 33.9946° N, 72.9106° E. With the pleasant weather and hilly areas with grasses and pine trees.

Collection Localities

Carabid beetles were collected fortnightly from ten localities of district Haripur. The localities visited include chhajjian, halli, Jabri, khanpur, seria maira, khalabat, nordi, chaprdha, saral, mankra. The localities were selected depending on the road links available and at least 10-15 kilometers apart from each other and the maximum area of each locality was covered during the sampling from mid April 2018 to mid-October 2018. In this way data for whole season was taken.

Collection

Different spots in visited localities were selected such as, orchards, field crops, grazing fields, residential areas, lawns of the houses, among rocks, under logs, valleys, mountain peaks. With the help of pitfall traps Carabid beetles were collected. With smooth steep sides large plastic pots of different sizes were used as traps. Holes were dugged in the soil in such a way that the rim of the pots remains at the ground surface level. In pitfall traps to attract and to catch the beetles, tomato ketchup was used fallen beetles were taken out and to clean them washed with warm water.

Killing and Preservation

By placing those in Cyanide bottle for 6 hours Beetles were thereafter killed. Collected specimens were brought to the entomological laboratory specially made non-corrosive insect pins, where they were stretched through after 24 hours dried specimens were transferred in the wooden entomological boxes and naphthalene balls and camphor crystals were mounted in them. Identified specimens are kept in Entomological laboratory, department of zoology hazara university Mansehra, Collection, stretching, pinning, labeling and preservation methods were performed.

Identification

Up to the species level the collected specimens were identified by following taxonomic literature of [14]. By comparing them with reference housed collection of National Insect Museum, National Agricultural Research Centre, Islamabad, Pakistan Identified specimens were further confirmed. For species of the family Relative percentage abundance was also calculated.

Results and Discussions

During the present study we collected five species belonging to the three genera of three subfamilies. The subfamilies explored were Brachininae and Licininae. In sub-family Carabinae and Brachininae one species under each genus *Carabus* and *Pheropsophus* was collected while of subfamily Licininae, three species belonging to one genus (*Chlaenius*) were collected, under sub-family the relative percentage abundance of the sub-families of Carabidae was calculated from each locality of the district Haripur (Table. I).

Sub-family Carabinae

Carabus cashmirensis Redtenbacher, 1844

Description

Having black in Colour black somewhat dull, head is in front and narrow and smooth, have finally wrinkled surface, prominent eyes, mentum tooth are triangular; slightly transverse pro thorax, wider than the head and convex, extending up to the tip of abdomen elytra oval and elongated in shape. protarsi undiluted Elytra with irregular pits apex not finely granulate,; average body length 35mm.

Sub-family Brachininae

Pheropsophus sobrinus Dejean, 1826

Description

hypognathous Mouth parts, normal tooth of the mentum, up to 11mm antennae length, prominent eyes, thorax and head of same size; with a median line prothorax widened interiorly, pro legs and meso legs are of same size, femur more stout and robust, with three yellow bands elytra is black, on elytra no pits, elytra reaching up to third last segment of the abdomen; average body length 19mm.

Sub-family Licininae Genus: *Chlaenius*

Chlaenius laticollis Say, 1823

Description

mentum Tooth of the triangular, 5.5 mm long antennae ; without median line thorax wider than head, yellow colour of legs, hind pair of leg larger than pro leg in size, with regular intervals elytra reaching up to the tip of abdomen; body flat, size ranging from 9-9.5 mm.

Chlaenius quadricolor Oliver, 1790

Description

3-3.5 mm long Antennae, hypognathous mouth parts, mentum tooth are triangular, prominent eyes, thorax large and wider than head, compared to tibia and tarsi femur robust as, with regular intervals elytra reaching to the tip of abdomen; black body colour , up to 14 mm body length ranging.

Chlaenius hamifer Chaudoir, 1856

Description

Mentum have triangular Tooth; then head wider and longer thorax, having pale yellow colouration femur wide and robust with legs, with regular intervals elytra reaching to the tip of abdomen, on the tip of both elytra yellow bands; bright green body colour observed, body size 19 mm.

During the present study the highest percentage was of the Sub-family Licininae, though sub-family Brachininae yielded lowest percentage. Relative percentage abundance of species from each locality was also enlisted, highest percentage was of *Carabus cashmirensis* and *Chlaenius hamifer* yielded lowest percentage. Among these species the most abundant species was *Carabus cashmirensis* (38%) followed by *Chlaenius quadricolor* (28%), *Pheropsophus sobrinus* (12%), *Chlaenius laticollis* (10%), and then *Chlaenius hamifer* (7%). In summer the Carabid species diversity was higher, found abundant in samples taken from litter and agricultural fields while lowest in areas near constructions. Of different crop Carabid beetles considered as bio control agent pests and polyphagus on wide variety of plants [15]. As potential control agent of economically important arthropods in forest and agricultural ecosystems

Intercropping enhance the beneficial role of carabid beetles [2].

Conclusion

We concluded from our Study that by using different sampling methods for the description of their ecological services as bio control agent and predatory status, their

feeding behavior and abundance of species from study area it is inferred that further entomological investigations of carabid beetles can be conducted.

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Table 1: Distributed species of beetles from different localities of district Haripur.

Name of The species	Abundance	Chhajjian	Halli	Jabri	Khanpur	Mnkra	Khalabat	Chaprdha	Saral	Nordi	Seria maira	Status
<i>Chlaenius hamifer</i>	27.5	1.378	4.156	6.15	2.727	3.482	4.116	4.166	4.891	1.388	4.761	Domonant
<i>Chlaenius laticollis</i>	37.77	1.368	3.462	2.727	4.166	3.432	1.388	6.25	1.388	2.183	1.368	M. Dominant
<i>Pheropsophus sobrinus</i>	12.88	1.348	0.684	0.664	2.023	2.737	1.338	2.073	1.388	2.083	0.684	Moderate
<i>Chlaenius quadricolar</i>	10.5	2.073	1.288	-	-	1.328	1.388	1.378	1.388	1.358	2.083	Low
<i>Carabus caschmirensis</i>	8.033	1.288	0.664	1.328	0.664	0.694	0.694	-	-	1.388	1.388	Low

Reference

- Lövei GL, Sunderland KD. Ecology and behavior of ground beetles (Coleoptera: Carabidae). Annual review of entomology. 1996; 41(1):231-256.
- Kromp B. Carabid beetles in sustainable agriculture: a review on pest control efficacy, cultivation impacts and enhancement, in Invertebrate biodiversity as bioindicators of sustainable landscapes. Elsevier. 1999, 187-228.
- Brook BW, Sodhi NS, Bradshaw CJ. Synergies among extinction drivers under global change. Trends in ecology & evolution. 2008; 23(8):453-460.
- Hill DS. Agricultural insect pests of temperate regions and their control. CUP Archive, 1987.
- Kulkarni SS, Dosedall LM, Willenborg CJ. The role of ground beetles (Coleoptera: Carabidae) in weed seed consumption: a review. Weed Science. 2015; 63(2):355-376.
- Keane RM, Crawley MJ. Exotic plant invasions and the enemy release hypothesis. Trends in ecology & evolution. 2002; 17(4):164-170.
- Lagisz M, Laskowski R. Evidence for between-generation effects in carabids exposed to heavy metals pollution. Ecotoxicology. 2008; 17(1):59-66.
- Kladivko EJ. Tillage systems and soil ecology. Soil and Tillage Research, 2001; 61(1, 2):61-76.
- Drosopoulos S, Claridge MF. Insect sounds and communication: physiology, behaviour, ecology, and evolution. CRC press. 2005.
- Maddison DR, MDB, Ober KA. Phylogeny of carabid beetles as inferred from 18S ribosomal DNA (Coleoptera: Carabidae). Systematic entomology, 1999; 24(2):103-138.
- Baudry J, Bunce R, Burel F. Hedgerows: an international perspective on their origin, function and management. Journal of environmental management, 2000; 60(1):7-22.
- Rahim J, Khan MR, Nazir N. Systematic and abundance of ground beetles (Carabidae: Coleoptera) from district Poonch Azad Kashmir, Pakistan. Journal of Agriculture and Veterinary Science. 2013; 6(2):24-29.
- Ghoneim K. Agronomic and biodiversity impacts of the blister beetles (Coleoptera: Meloidae) in the world: A review. Int J Agric Sci Res. 2013; 2(2):021-036.
- Pons J. *et al.* Sequence-based species delimitation for the DNA taxonomy of undescribed insects. Systematic biology, 2006; 55(4):595-609.
- Holland JM. Carabid beetles: their ecology, survival and use in agroecosystems. The agroecology of carabid beetles, 2002, 1-40.