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Newly reported genera of Beetles (Coleoptera) from Pakistan

Muhammad Sajid[1], Arsalan Ali[2], Hamdullah Shah[3], Jamal Shah[4], Muhammad Abdullah[5], Syed Zaheer Abbas[6]

[1,3,4] Institute of Zoological Sciences, University of Peshawar, Khyber Pakhtunkhwa – Pakistan.
[2] Directorate of Non-Timber Forest Products, Forest Department, Khyber Pakhtunkhwa.
[5,6] Department of Entomology, The University of Agriculture Peshawar, Pakistan.
Corresponding Author E-mail: ento8305@gmail.com

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Abstract

The study was carried out to explore the fauna od beetles (Coleoptera) at district Charsadda, Khyber Pakhtunkhwa, Pakistan. Total 170 specimens were collected by using hand net and were identified with the help of available literature. Among the collected specimens, 3 genera via Cyclocephala, Entomoscelis and Limodromus were reported as new to the fauna of Pakistan. Diagnostic characters of the genera along with digital images were also provided.

Key Words: Coleoptera, Beetles, Identification key, Charsadda.

Introduction

Coleoptera is the biggest and utmost varied insects order on earth, which makeup about 40% of all insects. There are about 166 families and above 350,000 species of beetles worldwide. Beetles variable in shapes and colors and can range from 0.4 to about 80 mm in length. Members of order Coleoptera may consume animal and plant debris, flesh, waste material, fungi, pollen, flowers or fruits. Some types of beetles can harm agricultural crops while others consume harmful insects. Coleoptera is one of the most important order of insects represented on dead bodies of animal. Therefore, beetle have forensic importance. The different species of beetles increase innumber throughout progressive phases of decomposition outdoor and are less presented indoor (Almeida and Mise, 2009; Goff, 1991).

The diversity of Beetle is very large. They are present in main territories, excluding ocean and icy area. Beetles are present in all natural environments, like vegetative branches, plants, leaves, flowers and in soil near roots. They also found inside plant galls and tissue. They may be found in dead or rotting plants. (Gullan and Cranston, 2010). Certain species of beetle eat all kind of food. Scarabaeidae is the biggest family of Coleoptera having above thirty thousand speciesin the world (Fincher et al., 1981).

"Three fourths" of beetle species in both larval as well as adult stages areplant feeder. They are living on plants which are essential for farming, forest, anddomestic. Beetles become pest of wood, fungi, cereals, tobacco, and dried fruits (Gilliott, 1995). Many species of leaf beetle (Chrysomelidae**)** are serious pests. Adults feed on leaves while larvae feed on leaves and roots (Livia, 2006).

Beetles are also beneficial. Both adult and larvae feed on aphids. Other beetle (Coccinellidae) feed on Hemipteran like scale insects and mealybugs**.** If there is no diet, they eat plantbugs, small caterpillar, nectar and honeydew (Brown et al., 2010). For over a century Coccinellids were used in biological control

and practicallyno change occurs in using of these predators against pest. For natural control of pest species like whitefly, aphids, mealybugs, and mites Coccinellids are used (Obrycki and Kring., 1998).
Utmost jewel beetles (Buprestidae) and Longhorn beetles (Cerambycidae) are feeding and boring in to wood. Although a few buprestids produce mines in to plant leaves while some cerambycids feed on herbs root. A few species feeding on phloem and live completely inside bark, while some feed on xylem and feed in phloem and inside of wood. Majority species feed on dead trees, and contribute to degradation of dead wood. While some species have capability to attack fresh or damaged plants. Larvae start girdling of the phloem system due to which they feed intensively under bark. Therefore, they are considered to be harmful to living trees (Evans et al., 2007).
Due to the great importance of Coleoptera, the present study was initiated on identification of beetle from district Charsadda, Khyber Pakhtunkhwa.

Materials and Methods

The study weas based on Taxonomy of Coleopteran up to genera level. Specimen were collected from different areas of district Charsadda via Prang, Utmanzai, Tangi, Harichand, Nisata, Bahlole and Shabqadar. The specimens were collected by using hand net from tall grasses and shrubs. After collection, the specimens were identified with the help of available literature. Nikon microscope SMZ 745T was used for specimen observation. Measurements were taken by DSFi2 camera attached to Nikon SMZ 745T. Helicon focus 7.6.6 was used to add different layers of images into a single picture. Graphical software "CorelDraw 9" was used for important diagnostic character. All the identified specimens were deposited in research laboratory, Entomology Department, The University of Agriculture, Peshawar.

Results and Discussion

Genus Cyclocephala Dejean, 1821

1821, Cyclocephala Dejean, 51.

Diagnostic Characters: Clypeus quadrate, weakly emarginated, with sides parallel or convergent from the base; apex of the clypeus parabolic; maxillae visible; pronotum with anterior margin not produced anteriorly at middle; fore leg with claw and tarsomere enlarged in males while in females simple; metatibia in cross section simple; propygidium without long setae.

Description

Body Length: 14mm
Body Color: Brown

Head: Head less than half as wide as thorax, testaceous, often mottled with brown cloudings; ligula variable, slightly emarginate; clypeus flat; clypeal suture strongly indicated; clypeus apically rounded, truncated, or somewhat emarginated; mandibles extended beyond clypeal apex and very slender; frons without horns, generally with fine frontal suture.
Mesosoma: Pronotum with anterior margin not produced anteriorly at middle; protibiae with two or three teeth; protarsi strongly thickened in males and simple in female; in male, protarsomeres enlarged; external claws larger than internal; females with protarsomeres and claws simple; metatibia semicircular in cross section; elytra with four double rows of punctures.
Metasoma: Metasoma totally brown in colour; sternite round, smooth and not punctate; metasomal segments nearly same; metasoma with apical margin ovate; pygedium with hairs small; first metasomal segment reduce.

Distribution: The genus Cyclocephala is widely distrubted in Southeastern Canada to Argentina and Colombia (Alvarez and García, 2010), United State **(**Saylor, 1945) and South America **(**Goncalves et al., 2020).
Material Examined: Pakistan: KP, Charsadda, Sardheri. 9♀. 34.174279N, 71.872133 E. 4.V.2019.

Comments: This genus can be identified by: Length of clypeus subequal to or larger than length of frons; apex of clypeus parabolic, quadrate and weakly emarginated, or rounded; sides of Clypeus parallel or convergent from base; male with Protarsomeres enlarged, external claws larger than internal; protarsomeres and claws of female simple; metatibia semicircular in cross section; pronotum with anterior margin not produced anteriorly at middle; propygidium without long setae. In current study, the genus for the first time reported from Pakistan.

Genus Entomoscelis Chevrolat, 1836

1836, Entomoscelis Chevrolat, 402. Type species: Chrysomela adonidis Pallas, 1771, by subsequent designation of Chevrolat (1843).

Diagnostic Characters: Body elongate or ovate and dorsally not strongly convex; head broad; clypeus subquadrate; anterior margin of labrum notched; vertex convex; two apical segments of labial palpi subequal; antennae slender, extend to mid-length of elytra; pronotum with anterior margin slightly bordered, posterior margin not bordered; anterior angle rounded and slightly protruding; pronotum usually with setigerous pores; procoxal cavities elongate and closed; tibiae slender, lateral margin with tooth like spur; third tarsomere not bilobed; claws simple and separated; elytra convex with parallel sided which is tapering toward apex; elytra with puncturesconfused; epipleuron flat, broadened basally, slightly narrowed posteriorly, smooth and impunctate; prosternal process broadened and flat, apically wider.

Description
Body Length: 6 – 10 mm
Body Color: Black, Yellow

Head: Head broad, clypeus subquadrate; anterior margin of labrum notched; vertex convex; two apical segments of labial palpi subequal; antennae slender extend to mid-length of elytra.
Mesosoma: Pronotum with anterior margin slightly bordered, posterior margin not bordered; anterior angle rounded and slightly protruding; all corners of pronotum withsetigerous pores; procoxal cavities elongate and closed; mesoventrite narrow, posterior margin bordered; anterior margin of metaventrite bordered and truncate; tibiae slender, with tooth like spur; third tarsomere entire bilobed; claws simple and separated; elytra convex with parallel sided which is tapering toward apex; punctures of elytra confused.
Metasoma: Epipleuron flat, broadened basally, slightly narrowed posteriorly, smooth and impunctate; prosternal process broadened and flat, apically wider.
Distribution: This genus is widely distributed in Central and eastern Asia, Europe, North Africa, North America, China (Qin et al., 2009), Kazakhstan and Central Asia (Mikhailov, 2019).
Material Examined: Pakistan: KP, Charsadda, 10♀. 35.12N, 71.20 E.11. IV. 2019.
Comments: The genus has the following morphological characters: Body elongate or ovate and dorsally not strongly convex; head broad, clypeus subquadrate; anterior margin of labrum notched; vertex convex; two apical segments of labial palpi subequal; antennae slender extend to mid-length of elytra; pronotum with anterior margin slightly bordered, posterior margin not bordered; anterior angle

rounded and slightly protruding; all corners of pronotum with setigerous pores; procoxal cavities elongate and closed. In current study, the genus for the first time reported from Pakistan.

Genus Limodromus Motschulsky, 1850
1850, Limodromus Motschulsky, 37

Diagnostic Characters: Head totally black; large eyes which hemispherical; normal mandibles, not slender clearly; flagellum hairless with distal setae crown; mentum with simple tooth; pronotum cordate, broader than head, latero-basal angleslarge; laterobasal grooves broad with laterobasal seta; body with dorsal and ventral surfaces glabrous; elytra with discal seta anteriorly which connecting third stria; metacoxa with setae both sides.

Description

Body Length: 12 mm.
Body Color: Brownish black.

Head: Head totally black without red spots, usually with distinct constriction towardsneck; eyes large hemispherical; mandibles normal, not slender clearly; mentum with simple tooth; flagellum glabrous with a crown of distal setae; mentum with setaesmall and inserted very close to each other.

Mesosoma: Mesosoma dorsal and ventral surfaces glabrous; pronotum wider from head and cordate with large laterobasal angles; laterobasal grooves broad with laterobasal seta; elytra with anterior discal seta joining third stria; metacoxa bisetose; fourth tarsomere with short ventral lobes.
Metasoma: Abdominal sternite brownish somewhat black; apical segment of abdomen round; metasoma smooth without hairs; abdominal segments easily visible.
Distribution: This genus is widely distributed in Northern Veitnam (Schmidt, 2015), Serbia (Curcic and Stankovic, 2011), South East Europe, South and Central Asia (Beitr, 2011).
Material Examined: Pakistan: KP, Charsadda, 4♀. 34.174279N, 71.872133 E. 4. V. 2019.
Comments: This genus can be identified by the characters: Head black with eyes hemispherical, large; mandible normal; body with dorsal and ventral surfaces glabrous; pronotum wide from headand cordate with large laterobasal angles; metacoxa bisetose and fourth tarsomerewith short ventral lobes; crown of distal setae presents on third antennomere; anterior discal seta on elytra which connecting third stria. In current study, the genus for the first time reported from Pakistan.

References

Almeida, L. M. & Mise, K. M. (2009). Diagnosis and key of the main families and species of South American Coleoptera of forensic importance. Revista Brasileira de Entomologia, 53(2), 227–244.

Alvarez, H. J. G. & Garcia, G. A. (2010). Synopsis and key to the genera of Dynastinae (Coleoptera, Scarabaeoidea, Scarabaeidae) of Colombia. ZooKeys, 34, 153–192.

Beitr, L. B. (2011). New and interesting records of Carabid Beetles from South-East Europe, South-West and Central Asia, with taxonomic notes on Pterostichini and Zabrini (Coleoptera, Carabidae), 43(1), 501-547.

Brown, J., Scholtz, C. H., Janeau, J. L., Grellier, S. & Podwojewski, P. (2010). Dung beetles (Coleoptera: Scarabaeidae) can improve soil hydrological properties. Applied Soil Ecology, 46(1), 9–16.

Curcic, S. & Stankovic, M. (2011). The ground beetles (coleoptera: carabidae) of the zasavica special nature reserve (serbia). Acta entomologica serbica, 16(1/2), 61- 79.

Evans, H. F., Moraal, L. G. & Pajares, J. A. (2007). Biology, Ecology and Economic Importance of Buprestidae and Cerambycidae. Bark and Wood Boring Insects in Living Trees in Europe. A Synthesis, 447-474.

Fincher, G. T., Monson, W. G. & Burton, G. W. (1981). Effect of cattle faeces rapidly buried by dung beetles on yield and quality of Bermudagrass, Agronomy Journal, 73, 775–779.

Gilliott, C. (1995). Entomology, Springer, New York, NY, USA. Springer Science. 798.

Goff, M. L. (1991). Comparison of insect species associated with decomposing remains recovered inside dwellings and outdoors on the island of Oahu, Hawaii. Journal of Forensic Science, 36, 748-753.

Goncalves, J. A., Grossi, P. C., Togni, P. H. B., Oliveira, C. M. & Frizzas, M. R. (2020). The genus Cyclocephala Dejean (Coleoptera: Scarabaeidae: Dynastinae) in Brazil: diversity and spatio-temporal distribution. Journal of Insect Conservation, 23, 45-50.

Gullan, P. J. & Cranston, P. S. (2010). The Insects: An Outline of Entomology, John Wiley & Sons, Oxford, UK. Wiley foundation. pp. 584.

Livia, C. (2006). Diversity and economic importance of the leaf beetles (Coleoptera, Chrysomelidae) in the republic of Moldova) Buletin Usamv – CN, 184-187.

Mikhailov, Y. E. (2019). Review of leaf beetles from the genus Entomoscelis (Coleoptera: Chrysomelidae) in Kazakhstan and Central Asia. Zootaxa, 4619(2), 285–296.

Obrycki, J. J. & Kring, T. J. (1998). Predaceous Coccinellidae in Biological Control. Annual review of entomology, 43, 295–321.

Saylor, L. W. (1945). Synoptic revision of the United States scarab beetles of the subfamily Dynastinae: Tribe Cyclocephalini. journal of the Washington academy of sciences, 35, 12.

Schmidt, J. (2015). On the Eocene age of Limodromus Motschulsky, 1850, with description of L. hoffeinsorum sp. n. from Baltic Amber (Coleoptera: Carabidae: Platynini). Zootaxa, 3974(4), 573–581.

Figures

Fig. 01. Clypeus, Cyclocephala

Fig. 02. Metasoma, Cyclocephala

Fig. 03. Head, Entomoscelis

Fig. 04. Pronotum, Entomoscelis

Fig. 05. Elytra, Limodromus

Fig.06. Head, Limodromus