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NEW LOCALITY RECORDS OF CHRYSOMELIDAE (COLEOPTERA) FROM POTHOWAR TRACT OF THE PUNJAB

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ABSTRACT

Four species of *Chrysomelidae* belonging to 4 genera have been reported for the first time from different localities of Pothowar tract of the Punjab Province of Pakistan. The main identification characters, distribution range supported by GPS positions and micrographs have been given for future field and research identification.
Keywords: Coleoptera, Chrysomelidae, Pothowar, Pakistan

INTRODUCTION

Chrysomelidae is one of the richest and diverse families of herbivorous insects, comprising either monophagous or oligophagous species, has long been used to study the evolution of host specification in phytophagous insects (Jolivet, 1986). They are distributed worldwide with 50 000 species and over 2000 genera (Booth et al., 1990; Gruev, 1992; Warchalowski, 1994; Hangay and Zborowski, 2010). Chrysomelidae family comprise of both beneficial and harmful beetle species. Numerous Chrysomelidae beetles are commercial agricultural pests, and are therefore considered to be important economic species. The adults and grubs of many species pose significant threat to crops, tree and hedge plant plantations, medicinal herbs and animal fodder (Mirzoeva, 2001). For example bean Leaf beetle, *Cerotoma trifurcate* is threat to leguminous crops all through the United States (Kogan et al., 1980). It can also play role as a disseminator of mosaic viruses in cowpea and southern bean and mottle virus in bean pod (Walters, 1969).

Leaf beetles are also used as beneficial insects as they are used for weed control in many areas of the world. In North America, two tortoise beetles e.g., Thistle tortoise beetle (*Cassida rubiginosa*) and Golden tortoise beetle (*Metriona bicolour*) are utilized for biological control of weeds i.e., musk thistle and bindweeds respectively. Sometimes these beetles are also taken as pests due to their feeding on tomato, potato, brinjal and a number of hardwood trees. Another leaf beetle, *Diorhabda elongata* (China origin) was launched in Utah State for the control of tamarisk. Both forms (adult and grub) are beneficial and successful in feeding on tamarisk vegetation (Hodgson and Patterson, 2007).

Chrysomelidae beetles can be distinguished by the combination of following characters: tarsi 4 segmented (Pseudotetramerous), antennae longer than papls, elytra always covering abdomen only occasionally exposing pygidium (Aston, 2009).

A lot of work on faunal composition of Chrysomelidae have been done currently in various parts of the world like 59 species from Iran (Western Iran and Northwestern Iran) (Ghahari and Hawkeswood, 2011; Ghahari and Jędryczkowski, 2012); 289 species from Pirin Mountain (Bulgaria) (Gruev, 2006); 285 species from South Urals (Gus'kova, 2010), 35 species from UAE (Lopatin, 2008); 2000 species (6% of the total known fauna of the world) from Australia (Hawkeswood, 1994); 569 species from Canada, with 181 reported from British Columbia (Scudder and Cannings, 2005); European fauna 1532 leaf beetles species (Beenen and Roques, 2010); 607 Chrysomelids from Taiwan (Bezdek and Lee, (2009); 213 species from Macedonian region (Istvan and Gyorgy, 2008) etc. In comparison to these extensive works, no comprehensive faunistic studies excepting Ahmed et al. (2013); Azad et al. (2013) have been done in Pothowar tract of Punjab. Keeping in view this situation, various surveys were done in various localities of Pothowar with the aim to catalogue Chrysomelidae beetles of this region.

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MATERIALS AND METHODS

Several field trips were done throughout the growing seasons from various vegetations using hand, sweep net and aspirator during 2011 to 2012. The sampled regions include 4 localities: Murree, Jhelum, Taxilla and Attcok. Different host plants with damaged leaves were also examined carefully and the beetles on them were collected. In the laboratory, specimens were pinned, dried, labeled and kept in collection boxes. The specimens were identified to species under stereomicroscope using the taxonomic keys of Maulik (1936) and Aston (2009). The photographs were taken using *LEICA* MS-5 stereomicroscope attached with Samsung digital camera. The identified specimens have been deposited for future reference studies in Biosystematics Laboratory, Department of Entomology, PMAS- Arid Agriculture University (Pakistan).

RESULTS AND DISCUSSION

Four species belonging to 4 genera of family Chrysomelidae were recorded for the first time from Pothowar tract of Punjab.

Subfamily Galerucinae Latreille, 1802
Genus *Monolepta* Chevrolat, 1836
***Monolepta signata* (Olivier, 1808)**
(Figs. 1, A-G)

Identification characters:
Head (Fig. 1B) is reddish brown. Antennae (Fig. 1C) are extending almost to the apex of elytron. The antennal segments are blackish except the three basal segments which are brown. Pronotum reddish brown and scutellum black (Fig.1 A). Elytra pale yellow with black pattern as follows: margins all around narrowly stained, a stripe along suture, humerous completely covered, a median transverse band extended considerably in a horizontal direction (sometimes occupying a large portion of the elytral surface). Markings on elytra black. Legs and abdominal segments (Fig. 1G) are reddish brown. Posterior tarsus is very long (Fig. 1F).

Body Size
Length: 4 mm
Breadth 2.5-3 mm

Habitat
The specimens were collected from the fields of *Solanum tuberosum* and *Spinacia oleracea*.

Material Examined
Rawalpindi: 18♂ 3♀, 23.iv.2011, Taxila: 14♂ 3♀, 11.iii.2011, Attock: 7♂, 3♀, 19.iv.2012

Comments
The specimens collected during survey were compared with the published explanation of *Monolepta signata* given by Aston (2009). This species is different on the basis of body size (length and breadth). This species has not been recorded on Potato plant from Pakistan uptill now.

Subfamily Galerucinae Latreille, 1802.
Genus *Altica* Geoffroy, 1762
***Altica cyanea* Weber, 1801**
(Figs. 2, A-F)

Identification characters:
Head dark blue with apex impunctate, antennae 11 segmented, black; 2nd segment is half the length of the 3rd but 4th is longer than 3rd (Fig.2 A). Elytra are strongly punctuated. The punctures are more delicate on the upper part and the punctures can form rows. Scutellum is wide, triangular and nearly black (Fig.2 B). Prothorax is much wider than long with lateral margins gently curved. The surface has no punctures. Abdominal segments 4-5 and underside is shining blue-black (Fig.2 E).

Body Size
Length: 4.5-5 mm
Breadth: 2-2.5mm

Habitat
The specimens of this species were collected from leaves of wild spinach, rubus and apple trees.

Material Examined
Rawalpindi: 1♂ 3♀, 18.iii.2012, Attock: 8♂ 11 ♀, 17.iv.2012, Jhelum: 3♂ 5♀, 23.iv.2012, Taxila: 18♂ 11♀, 18.iii.2012, Murree: 27♂ 21♀, 26.v.2011

Comments
The specimens collected during survey were compared with the published explanation of *Altica cyanea* given by Aston (2009). This species is distinct on the basis of its dark and shiny abdomen.

Subfamily Cassidinae Gyllenhal, 1813
Genus *Dicladispa* Gestro, 1897
***Dicladispa pallescens* (Guérin Méneville, 1841)**
(Fig. 3, A-G)

Identification characters:
Head wrinkled with the deep horizontal grooves down the middle and heavily clothed with elongated yellowish hairs. Antennae 11-segmented, first antennal joint is the largest; the third is longer than the second and the sixth basal joint having rigid yellowish hairs (Fig.3C). Elytra punctuated, covered with lengthy rigid yellowish hairs and each elytron with 22-25 spikes on its higher surface (Fig.3D). Prothorax is quadrate, somewhat lessened in the front. Each side has a stem with a bunch of seven spines (Fig.3A). The exterior is thickly covered with lengthy yellowish hairs. Scutellum is triangular and granulose; the edges are black. Prosternum is black and shining; abdomen blackish in the center and pale on the sides (Fig.3 F). The tarsal joint of claw is the largest; the claws are well-built and prominent.

Body Size
Length: 3.5-4 mm
Breadth: 1.5-2mm

Habitat
The specimens of this species were collected from Pine tree (*Pinus roxburghii*).

Material Examined
Rawalpindi: 1♂ 1♀, 23.iv.2011, Attock: 1♂ 2♀, 19.iv.2012

Comments
The specimens collected during survey were compared with the published description of *Hispa pallescens* given by Maulik (1936). This species is distinct on the basis of the brown colour of abdomen (Fig. 3F).

Subfamily Cassidinae Gyllenhal, 1813
Genus *Aspidimorpha* Hope, 1840
***Aspidimorpha miliaris* (Fabricius, 1775)**

Identification characters
Head small and concealed (Fig.4C). The clypeus of head is small depressed in the centre and granular. Antennae 11-segmented, last three joints of the antennae black (Fig.4A). Scutellum is small and triangular, anterior part covered with pronotum (Fig.4B). Prothorax is relatively uneven, smooth and without punctures and the bottom margin is approximately straight. Elytra are wider at the bottom than the prothorax. The sculpturing consists of fine punctures arranged in nine rows. The entire basal boundary is black. Borders of elytra with typical four black spots. Abdomen 4-5 segmented (Fig.4F).

Body Size
Length: 12.5-13 mm
Breadth: 11-12 mm

Habitat
The specimens of this species were collected from leaves of Morning Glory (*Ipomoea violacea*).

Material Examined
Rawalpindi: 2 ♂ 1 ♀, 21.ii.2011, Attock: 11 ♂ 13 ♀, 17.ii.2012, Jhelum 3♂ 7♀, 24.iv.2011

Comments
The specimens collected during survey were compared with the published description of *Aspidomorpha miliaris* given by Maulik (1936). This species is distinct on the basis of a specific pattern on the explanate margins of elytra. This pattern is transparent and cellular in appearance (Fig. 4D, E). Sultan et al. (2008) reported this species from Islamabad on *Ipomoea carnea sp. fistulosa* (Convolvulaceae).

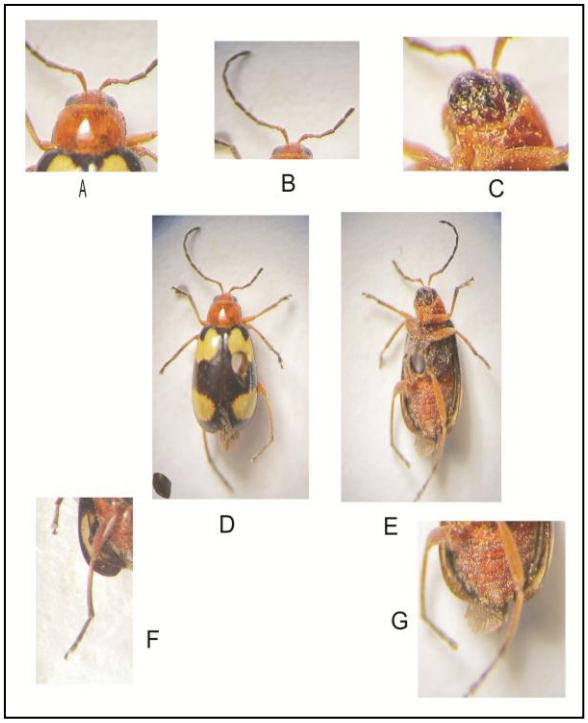

Fig. 1. A: Pronotum and Scutellum, B: Head and Antennae C: Mouth Parts, D: Dorsal View, E: Ventral View, F: Hind leg, G: Abdominal segments of *Monolepta signata*

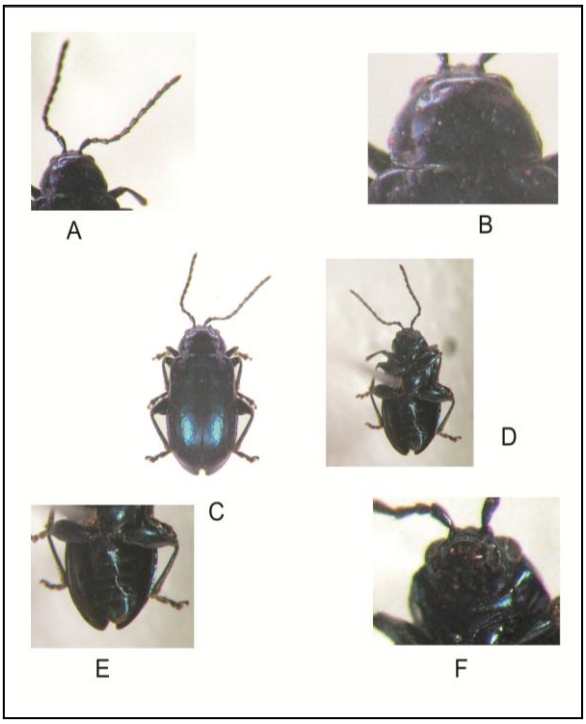

Fig. 2. A: Antennae and Head, B: Pronotum and Scutellum, C: Dorsal View, D: Ventral View, E: Meta leg and abdominal segments, F: Mouth Parts of *Altica cyanea*

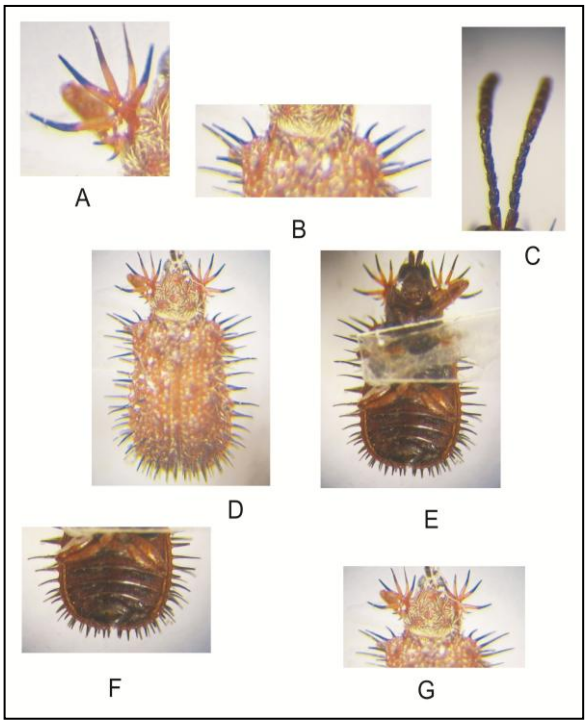

Fig. 3. A: Stem of 7 spines, B: Humerous and Scutellum, C: Antennae, D: Dorsal view, E: Ventral view, F: Abdominal segments, G: Pronotum of *Dicladispa pallescens*

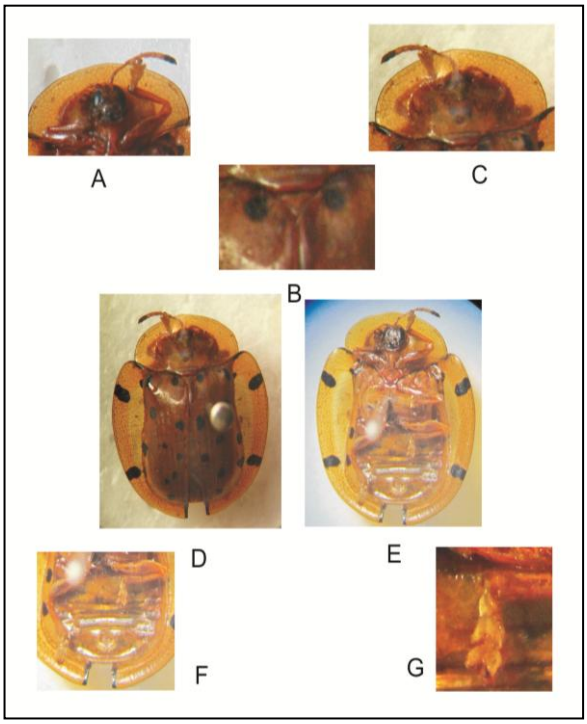

Fig. 4. A: Mouth Parts and Antennae, B: Scutellum, C: Pronotum and Head, D: Dorsal view, E: Ventral view, F: Abdominal segments, G: Hind Tarsus of *Aspidimorpha miliaris*

REFFRENCES

Aston P, 2009. Chrysomelidae of Hong Kong Part. 1: Introduction and key to subfamilies. Bull. Hong Kong Entomol. Soc., 1(2): 1-5.

Ahmed W, Naeem M and Bodlah I, 2013. Genus *Aulacophora* Chevrolat, 1836 (Coleoptera: Chrysomelidae) from Pothohar, Punjab, Pakistan. Pakistan J. Zool., 45(3), 868-871.

Azad AW, Naeem M and Bodlah I, 2013. Chrysomelinae Latreille, 1802 (Coleoptera: Chrysomelidae) from Pothowar tract of Punjab. Pak. Entomol., 35(2): 109-114.

Booth G, Cox ML and Madge R B, 1990. The guides to insects of importance to man, 3. Coleoptera. Printed in the UK at the University Press, 384 pp.

Bezdek J and Lee CF, 2009. *Apophylia kaoi* sp. nov. from Taiwan (Coleoptera: Chrysomelidae: Galerucinae). Genus. 20 (3): 429-434.

Beenen R and Roques A, 2010. Leaf and Seed Beetles (Coleoptera, Chrysomelidae). Bio Risk, 4(1): 267-292.

Gruev B A, 1992. Geographical distribution of Lamprosomatinae, Eumolpinae, Chrysomelinae, Alticinae, Hispinae and Cassidinae (Coleoptera, Chrysomelidae) on the Balkan Peninsula. Plovdiv University Press, 512 pp.

Gruev B, 2006. The leaf beetles (Coleoptera: Chrysomelidae) of the Pirin Mountain (Bulgaria). Historia naturalis bulgarica, 17: 51-79.

Gus'kova EV, 2010.The Leaf-beetles (Coleoptera, Chrysomelidae) of the South Urals. Entomofauna Zeitschrift Für Entomologie., 31: 14: 169-228.

Ghahari H and Hawkeswood TJ, 2011. A study on the Chrysomelidae (Coleoptera) from Kurdistan province and adjacent areas, western Iran. Calodema, 195: 1-6.

Ghahari H and Jędryczkowski WB, 2012. A Contribution to the Knowledge of Leaf Beetles (Coleoptera: Chrysomelidae) from Arasbaran Biosphere Reserve and its Neighboring Areas (Northwestern Iran). Acta Zool. Bulg., 64 (4): 347-352.

Hawkeswood T J, 1994. Review of the biology and host plants of Australian Chrysomelidae (Coleoptera) associated with *Acacia* (Mimosaceae). Kluwer Academic Publishers. Netherlands. 191-204.

Hodgson EW and Patterson R, 2007. Beneficial insects: beetles. Utah Pests Fact Sheet. Utah State Univ. Extension and Utah Plant Pest Diagonistic Lab. 1-4.

Hangay G and Zbrorowski P, 2010. A guide to the beetles of Australia. CSIRO Publishing. 197.

Istvan R and Gyorgy R, 2008. Data to the leaf-beetle fauna of Macedonia (Coleoptera, Chrysomelidae). Natura Somogyiensis., 12: 111-131.

Jolivet P, 1986. Insects and plants: parallel evolution and adaptations. Flora and Fauna Handbook # 2. E. J. Brill. Flora and Fauna Publications. N. Y.

Kogan M, Waldbauer GP, Boiteau G and Eastman CE, 1980. Sampling bean Leaf beetle in soybeans. Sampling Methods in Soybean Entomology. Springer-Verlag, New York. 201-236.

Maulik S, 1936. The Fauna of British India including Ceylon and Burma. Coleoptera: Chrysomelidae (Chrysomelinae and Haliticinae). Taylor and Francis. London. 442pp.

Mirzoeva N, 2001. A study of the ecofaunal complexes of the leaf eating beetles (Coleoptera, Chrysomelidae) in Azerbaijan. Turkish J. Zool., 25: 41-52.

Scudder GGE and Cannings R A, 2005. The Coleoptera families of British Columbia. 88-89.

Sultan A, Borowiec L, Rafi MA, Ilyas M., Naz F and Shehzad A, 2008. Tortoise beetles of Rawalpindi-Islamabad, Pakistan and their host preferences (Coleoptera: Chrysomelidae: Cassidinae). Genus, Vol. 19(1): 93-102.

Walters HJ, 1969. Beetle transmission of plant viruses. Advances in Virus Research, 15: 339-363.

Warchalowski A, 1994. Chrysomelidae. Stonkowate, Tom IV (Insecta: Coleoptera) (Fauna Polski). Polska Akademia Nauk, Muzeum i Instytut Zoologii, 301 pp.