



CHYSOMELINAE LATREILLE, 1802 (COLEOPTERA: CHYSOMELIDAE) FROM POTHOHAR TRACT OF PUNJAB

Mirza Waqar Ahmad Azad, Muhammad Naeem and 'Imran Bodlah

Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan

ARTICLE INFORMATION

Received: August 12, 2013

Received in revised form: December 20, 2013

Accepted: December 22, 2013

*Corresponding Author:

Imran Bodlah

Email: imranchodlah@gmail.com

ABSTRACT

Beetles belonging to Chrysomelinae Latreille, 1802 (Coleoptera: Chrysomelidae) are the pests of various weeds trees, vegetables, ornaments plants etc. They were collected from various localities of Pothowar region during 2011-2012 from various host plants. All specimens of leaf beetles were properly preserved and identified using updated keys. Six species belonging to 5 genera have been reported for the first time from Pothohar tract of Punjab Province of Pakistan. The main identification characters along distribution range supported by micrographs have been given for future field and research identification.

Keywords: Chrysomelinae, Coleoptera, Pakistan, Pothohar

INTRODUCTION

Phytophagous beetles (Chrysomelidae) are distributed worldwide with 50000 species and over 2000 genera (Booth *et al.*, 1990; Gruev, 1992; Warchałowski, 1994). Leaf beetles of the subfamily Chrysomelinae are pests of cultivated plants (Kryzhanovskij, 1974) and distributed throughout the world with more than 130 genera and approximately 3000 species (Lopatin, 1977). Leaf beetles are of much economic value as they feed on leaves, flowers and other parts of plants, so some of them are regarded as agricultural and forest pests (Jolivet and Hawkeswood, 1995; Özdikmen and Aslan, 2009; Ghahari and Hawkeswood, 2011). Chrysomelinae beetles can be distinguished from other subfamilies by the following combination of characters: thorax with distinct lateral margins (rarely without); head not produced; eyes not prominent; prosternum broad; last joint of tarsi not bilobed; entire front coxae transverse (Aston, 2009).

A lot of work on faunal composition of Chrysomelinae have been done currently in various parts of the world like 9 species from Iran (Ghahari and Jędryczkowski, 2012); 13 species from Latvian region (Bukejs, 2009); 110 species from Poland (Borowiec *et al.*, 2011); 43 species from Pirin Mountain (Bulgaria)(Gruev, 2006); 13 species from Malaysia 50 species from Nepal and Bhutan (Kimoto, 2005); 51 species from South Urals (Gus'kova, 2010) etc. In comparison to these extensive works, no comprehensive studies except Ahmad *et al.* (2013) have been done in Pothohar tract of

Punjab. Chrysomelinae beetles being the pests of various vegetables, weeds, trees as reported by foreign experts like Maulik, (1926), there was a need to update the fauna so that local field workers can identify and manage these beetles on various host plants. Keeping in view this situation, various surveys were done in various localities of Pothohar with the aim to catalogue Chrysomelinae beetles of this region. Current studies will help the extension workers of Pothohar tract to develop managements tools against these beetles in future.

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 5 localities: Islamabad, Murree, Chakwal, Taxilla and Attcock. Different plants, especially the 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 level under stereo-microscope by using the taxonomic keys of Maulik, (1926), Kasap (1988); Mcclay (1980) and Aston (2009). The photographs were taken using EICA MS-5 stereomicroscope attached with Samsung digital camera. The identified specimens have been deposited in Biosystematics Laboratory, Department of Entomology, PMAS-Arid Agriculture University (Pakistan).

Species of Subfamily Chrysomelinae reported from Pothowar

Name of Genus	Name of species	Host plants	Localities
<i>Chrysomela</i>	<i>Chrysomela populi</i>	Popular tree	Attock, Murree
<i>Chrysolina</i>	<i>Chrysolina exanthematica</i>	Mint plants	Rawalpindi, Attock, Chakwal
<i>Chrysolina</i>	<i>Chrysolina bella</i>	Mint plants	Rawalpindi, Attock, Chakwal, Jhelum
<i>Entomoscelis</i>	<i>Entomoscelis adonis</i>	Turnip and <i>Brassica</i> (mustard)	Rawalpindi, Attock, Chakwal, Jhelum
<i>Plagiodera</i>	<i>Plagiodera versicolora</i>	Willow and Eucalyptus trees	Rawalpindi, Attock, Chakwal, Jhelum
<i>Zygogramma</i>	<i>Zygogramma bicolorata</i>	<i>Parthenium</i> sp.	Rawalpindi, Attock, Taxila:

RESULTS AND DISCUSSION

A total of 6 species from 5 genera of subfamily Chrysomelinae were collected from Pothowar tract of Punjab. The list of species is provided below.

SUBFAMILY CHYSOMELINAELATREILLE, 1802

GENUS *CHYSOMELA* LINNAEUS, 1758*Chrysomela populi* Linnaeus, 1758

Melasoma populi Stephens, 1834; *Lina populi* Lin. (Fig. 1, A to H)

Head

Head is as wide as the front border of the pronotum, having a deep Y-shaped marking on the higher surface, which is strictly punctuate.

Antennae

Antennae are 11 segmented. The five basal segments are smooth and shining while the upper six are enclosed with fine hairs. The upper six antennal segments are thickened.

Thorax

Prothorax is quadrate, wider than long and basal margin widely curved. Sides increasingly rounded and somewhat bent forwards at the frontal lateral angles; the pronotum is usually convex sideways and delicately punctuate in the central part.

Scutellum

Scutellum is blue-black, triangular in shape with the top surface rounded and impunctate.

Elytra

Elytra are wider than the prothorax. Reddish brown. The surface of each elytron entirely punctated.

Abdomen

Abdominal segments 4-5. Underside is blue-black and shining. Segments are delicately punctured.

Body Size

Length 9-10 mm
Breadth: 5.5-6 mm

Habitat

Specimens of this species were collected from the leaves of Popular tree.

Material Examined

Attock: 1♂, 17.iv.2012, Murree: 1♀ 24.vi.2012

Comments

The specimens collected during survey were compared with the published description of *Chrysomela populi* given by Maulik (1926). This species is different on the basis of abdominal segments having no punctures (Fig. 1F).

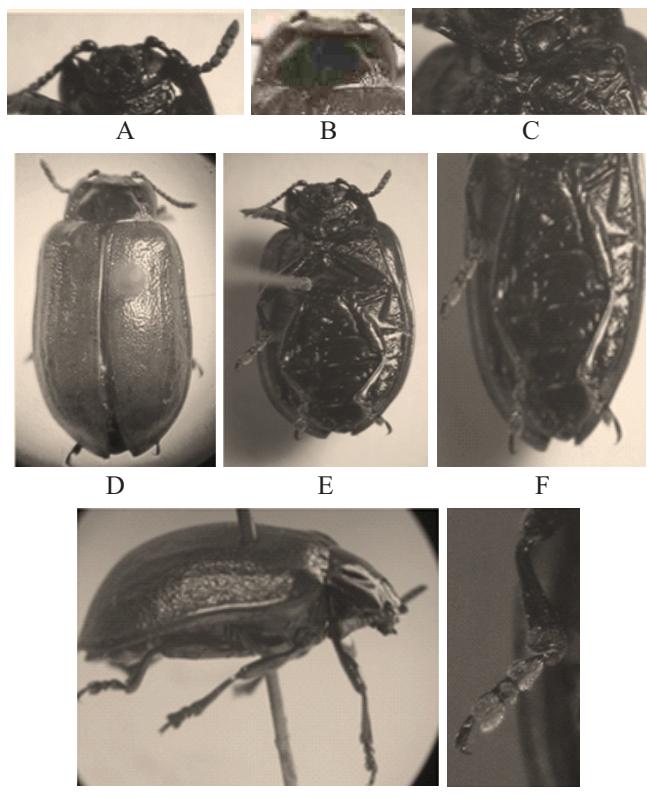


Fig. 1

A: Antennae and Mouth parts, B: Pronotum and Scutellum, C: Coxal cavity, D: Dorsal view, E: Ventral view, F: Abdominal segments, G: Lateral view, H: Hind tarsus of *Chrysomela populi*

GENUS *CHRY SOLINA* MOTSCHULSKY, 1860***Chrysolina exanthematica* Wiedemann, 1821**

(Fig. 2, A-G)

Chrysomela exanthematica, Wied., 1821; *Ch. consimilis*, Baly 1874; *Lithoptera subanea*, Motsch., 1860

Head

Head is strongly punctuate and marked with a Y-shaped weakly impressed mark.

Antennae

Antennae are 11-segmented, passing away from the pronotum to a certain level, moderately thickened. 6th or 7th initial segment is shining and the last 4th or 5th segment is hairy.

Scutellum

Scutellum is oval in shape and impunctate.

Thorax

The width of prothorax is twice of its length, sides curved and tapering interiorly.

Elytra

Elytra are wider at the bottom than the prothorax, having more or less parallel sides. Upper exterior of elytra is very strictly and unevenly punctuate. Each elytron has areas in circles with five arranged patterns.

Abdomen

Abdominal segments are 4-5. The underside is thinly and delicately punctuate.

Body Size

Length: 9-10 mm

Breadth: 4-4.5 mm

Habitat

The specimens of this species were collected from mint plants.

Material Examined

Rawalpindi: 11♂ 17♀ 13.vi.2011, Attock: 1♂ 4♀, 17.v.2012, Chakwal: 1♀, 21.vi.2012

Comments

The specimens collected during survey were compared with the published literature by Maulik (1926). This species is different on the basis of the shallow punctures present on black circular areas of elytra (Fig. 2D).

***Chrysolina bella* Jacoby, 1890**

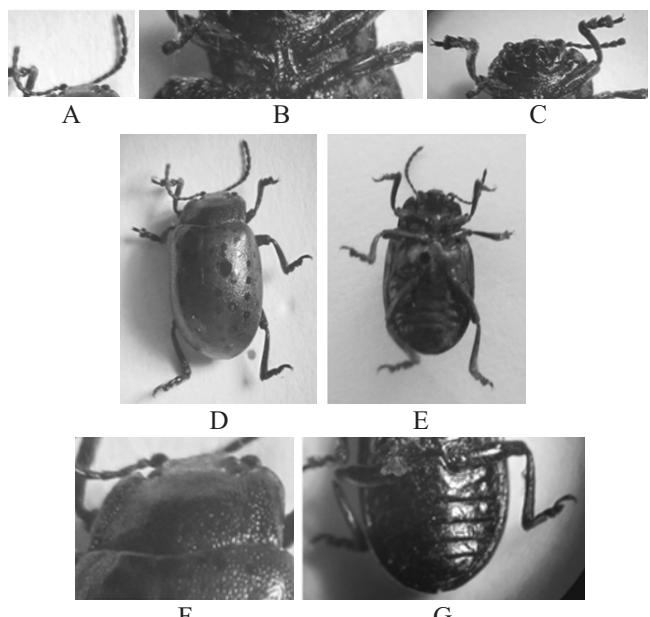
(Fig. 3, A-F)

Synonyms: *Chrysomelabella*, Jac., 1890; *Ch. Angelica*

Baly, 1878

Head

Head is lightly and delicately punctuate; clypeus is surrounded by a deep crosswise arched line on the higher surface which further links to an impressed perpendicular central line.

**Fig. 2**

A: Head and Antennae, B: Coxal cavity, C: Mouth parts, D: Dorsal view, E: Ventral view, F: Pronotum and Scutellum, G: Abdominal segments of *Chrysolina exanthematica*

Antennae

Antennae are 11-segmented. A larger part around the roots of the antennae is convex. The 5th or 6th apical antennal segment is black.

Scutellum

Scutellum is triangular with the top portion widely rounded; flat and impunctate.

Thorax

The breadth of prothorax is twice of the length; sides steadily curved anteriorly. Posterior is somewhat greater than right angles, basal edges are slightly sinuate. The exterior surface is regularly and finely punctuate. Pronotum is greenish with a tinge of purple colour.

Elytra

Elytra are just about broader than the base of prothorax. Elytral surface punctuate with irregular rows of fine punctures. Colour is bright metallic green with cuperous longitudinal bands on the elytra.

Abdomen

Abdominal segments are 4-5. Underside is punctate; epipleuron of the elytra wider at the bottom and significantly lessened behind the center. Interior margin at the top has a fine border of hairs; tarsal claws are separated and simple.

Body Size

Length: 6.5-7 mm

Breadth: 4.5-5mm

Habitat

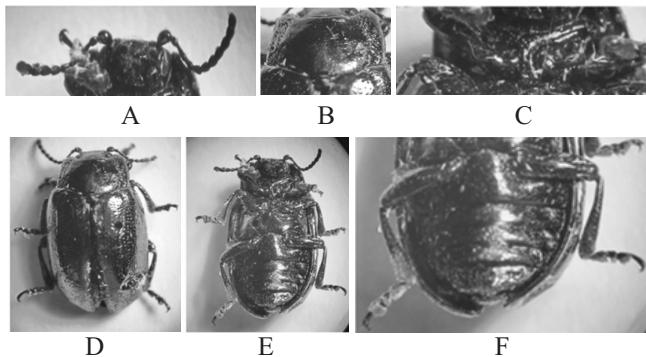
The specimens of this species were collected from mint plants.

Material Examined

Rawalpindi: 8♂ 6♀, 13.vi.2011, Attock: 4♂ 3♀, 17.v.2012, Chakwal, 1♀, 21.vi.2012, Jhelum 5♂ 3♀, 27.vi.2012

Comments

The specimens collected during survey were compared with the published explanation of *Chrysolina bella* given by Maulik (1926), species is distinct due to the lesser body length (Fig. 3D).

**Fig. 3**

A: Antennae and Mouth parts, B: Pronotum and Scutellum, C: Coxal cavity, D: Dorsal view, E: Ventral view, F: Abdominal segments of *Chrysolina bella*

TRIBE ENTOMOSCELINI**GENUS ENTOMOSCELIS PALLAS, 1771*****Entomoscelis adonidis* Pallas, 1771**

(Fig. 4, A-G)

Chrysomela sacra Linnaeus, 1758; *Ch. trilineata* Fabricius, 1777;

Ch. dorsalis Fabricius, 1777

Head

Head is porrect; yellowish-red with a black stripe in the middle and eyes are black. Labrum, clypeus and apex are slightly elongated.

Antennae

Antennae are 11-segmented. 7-8th antennal segments are slightly elongated.

Scutellum

Scutellum is triangular and black.

Thorax

Pronotum is yellowish-red with the middle portion black; the apical angles are curved and the basal ones are acute-angled.

Elytra

The suture and sideways of each elytron is black with horizontal stripes. Elytra punctuate with irregular punctures.

Abdomen

Abdominal segments 4-5. Body underside and legs are black. Forecoxal cavities are closed, upper side of tibia is flattened and claws are simple.

Body Size

Length: 7-8 mm
Breadth 3.5-4 mm

Habitat

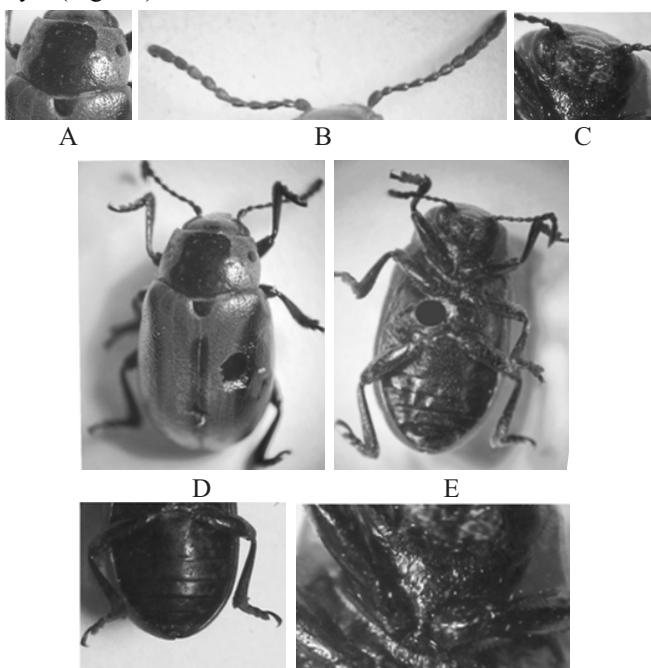
The specimens of this species were collected from turnip and *Brassica* sp. (mustard).

Material Examined

Rawalpindi: 10♂ 11♀, 11.iii.2012, Attock: 3♂ 8♀, 17.iv.2012, Chakwal: 7♀, 21.iv.2011, Jhelum: 21♂ 13♀, 08.iv.2012

Comments

The specimens collected during survey were compared with the published explanation of *Entomoscelis adonidis* by Kasap (1988), this species different on the basis of its black eyes (Fig. 4C).

**Fig. 4**

A: Pronotum and Scutellum, B: Antennae and Head, C: Mouth Parts, D: Dorsal view, E: Ventral view, F: Abdominal segments, G: Coxal cavity of *Entomoscelis adonidis*.

TRIBE CHRYSOMELINI**GENUS PLAGIODERA REDTENBUCHER, 1845*****Plagiodesma versicolora* Laicharting, 1781**

(Fig. 5, A-G)

Chrysomela versicolora Laichart., 1781; *Pl. similis* Herbst, 1783;

Pl. salicis Panzer, 1795

Head

Head is wide with apex depressed to some extent. Surface is evenly punctured and eyes prominent.

Antennae

Antennae are 11-segmented and passing a little away from the

base of pronotum. 1st segment is huge and condensed; 2nd is smaller but thicker than 3rd one.

Scutellum

Scutellum is triangular with top portion acute. Exterior is smooth having no punctures.

Thorax

Prothoraxis much wider than the length, wider at the bottom and a bit lessened anteriorly. The anterior and posterior angles are curved and quietly convex at sides. The surface is finely punctuate.

Elytra

Elytra are wider at the bottom than the prothorax. The upper side is metallic greenish blue. Humerous is prominent, convex and rounded at the angles. The entire surface is finely or more or less closely impunctate.

Abdomen

Abdominal segments 4-5, sternites punctuate. Elytral epipleura is wider and extremely concave at the bottom and narrowing towards the apex. The claws are simple expanding significantly ahead of the bilobed tarsal segment. The underside is blue-black.

Body Size

Length: 5mm
Breadth: 4mm

Habitat

The specimens of this species were collected from willow and eucalyptus trees.

Material Examined

Rawalpindi: 8♂ 3♀, 18.iv.2011, Attock: 4♂ 11♀, 17.iv.2012, Chakwal: 6♀, 24.v.2012, Jhelum 4♂ 7♀, 08.iv.2012

Comments

The specimens collected during survey were compared with the published description of *Plagiodesma versicolora* given by Aston (2009), species is distinct on the basis of last abdominal segment which is light brown in colour (Fig. 5G).

GENUS ZYGOGRAMMACHEVROLAT, 1837

Zyogramma bicolorata Pallister, 1953

(Figs. 6, A-G)

Head

Head is black.

Antennae

Antennae 11-segmented. 1st antennal segment is stout and last five segments forming a club.

Scutellum

Scutellum is triangular and black in colour.

Thorax

Ground colour of pronotum is creamy yellow with a pinkish tinge and pronotum has a median hat-shaped black marking

not covering the corners.

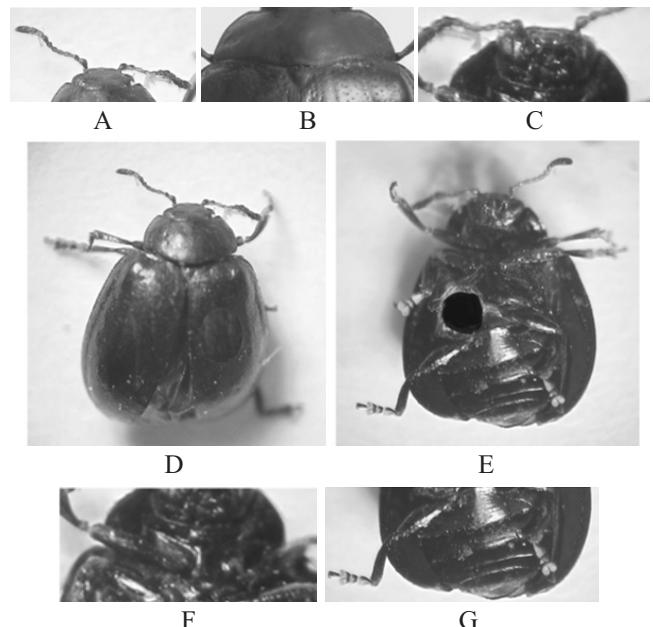


Fig. 5

A: Antennae and Head, B: Pronotum and Scutellum, C: Mouth Parts, D: Dorsal view, E: Ventral view, F: Coxal cavity, G: Abdominal segments of *Plagiodesma versicolora*.

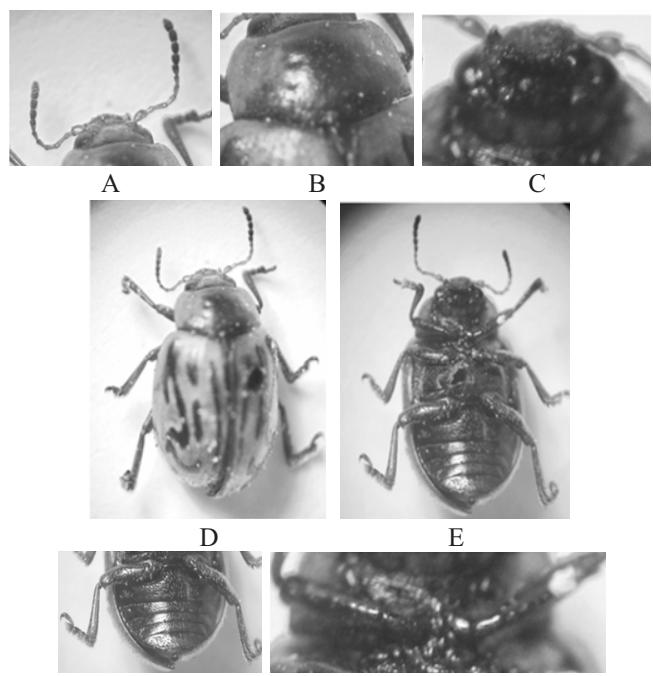


Fig. 6

A: Head and Antennae, B: Pronotum and Scutellum, C: Mouth Parts, D: Dorsal View, E: Ventral View, F: Abdominal segments, G: Coxal cavity of *Zyogramma bicolorata*.

Elytra

Elytra is yellowish and vittate, having the following pattern: a band adjoining to sutural line, two horizontal elongated spots, a hook like lengthened marking and two lesser, poster lateral spots; the blackish stripe along the suture which is wider in the semi-anterior portion.

Abdomen

Tarsal claws are simple and adjoining at the base. Fore-coxal sockets are open behind.

Body Size

Length: 5.5-6 mm
Breadth: 2.5-3 mm

Habitat

Specimens of this species were collected from *Parthenium* weed.

Material Examined

Rawalpindi: 31♂ 17♀, 23.ii.2011, Attock: 27♂ 14♀, 19.iii.2012, Taxila: 14♂ 25♀, 11.ii.2011

Comments

The specimens collected during survey were compared with the published description of *Zygogramma bicolorata* given by McClay (1980), species is distinct on the basis of its black scutellum (Fig. 6B).

General discussion

As a whole six species were reported from various localities of Pothowar as pest of seven host plants. All species were found pests as reported by Maulik, (1926). In future these species can be monitored for other research for their biological control or toxicological studies for their management.

REFERENCES

- Ahmad, W., M. Naeem and I. Bodlah, 2013. Genus *Aulacophora chebrolat*, 1836 (Coleoptera: Chrysomelidae) from Pothohar, Punjab, Pakistan. Pak. J. Zool., 45 (3): 886-871.
- Aston, P., 2009. Chrysomelidae of Hong Kong Part. 1: Introduction and key to subfamilies. Bulletin of Hong Kong Entomol. Soc., 1(2): 1-5.
- Borowiec, L., R. Ścibior and D. Kubisz, 2011. Critical checklist of the Polish Chrysomeloidea, excluding Cerambycidae (Coleoptera: Phytophaga). Genus, 22(4): 579-608.
- Bukejs, A., 2009. To the knowledge of Latvian Chrysomelinae (Coleoptera: Chrysomelidae). Acta Biol. Univ. Daugavp., 9 (2): 181-195.
- Boothr. G., M.L. Cox and R.B. Madge, 1990. The guides to insects of importance to man, 3. Coleoptera. Printed in the UK at the University Press, 384pp.
- Ghahari, H. and W.B. Jędryczkowski, 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.
- Ghahari, H. and T.J. Hawkeswood, 2011. A study on the Chrysomelidae (Coleoptera) from Kurdistan province and adjacent areas, western Iran. Calodema, 195: 1-6.
- Gus'kova, E.V., 2010. The Leaf-beetles (Coleoptera, Chrysomelidae) of the South Urals. Entomofauna ZeitschriftFür Entomologie, 14: 169-228.
- Gruev, B., 2006. The leaf beetles (Coleoptera: Chrysomelidae) of the Pirin Mountain (Bulgaria). Historia naturalis bulgarica, 17: 51-79.
- Gruev, B.A., 1992. Geographical distribution of Lamprosomatinae, Eumolpinae, Chrysomeliniae, Alticinae, Hispinae and Cassidinae (Coleoptera, Chrysomelidae) on the Balkan Peninsula. Plovdiv University Press, pp. 512.
- Jolivet, P. and T.J. Hawkeswood, 1995. Host-plants of Chrysomelidae of the World. Balogh Scientific Books: 1-281.
- Kryzhanovskij, O.L., 1974. Insects and ticks the pests of agricultural cultures. II. Coleoptera. Leningrad, Nauka, 1-336. [in Russian].
- Kimoto, S., 2005. Systematic Catalog of the Chrysomelidae (Coleoptera)from Nepal and Bhutan.Bull. Kitakyushu Mus. Nat. Hist. Hum. Hist., Ser. A., 3: 13-114.
- Kasap, H., 1988. A list of some Chrymelidae (Col., Chrysomelidae) form Turkey. Part II. Colaphellus, Gastroidea, Phaedon, Prasocuris, Plagiodesma, Melasoma, Phytodecta, Phyllodecta, Timarcha, Entomoscelis. Turk. Entomol. Derg., 12 (2): 85-95.
- Lopatin, I.K., 1977. Leaf-beetles (Chrysomelidae) of Central Asia and Kazakhstan. Leningrad, Nauka, 1-270. [in Russian].
- Maulik, S., 1926. The Fauna of British India including Ceylon and Burma. Coleoptera: Chrysomelidae (Chrysomelinae and Haliticinae). Taylor and Francis. London. pp. 442.
- McClay, A.S., 1980. Studies of some potential biocontrol agents for *Parthenium hysterophorus* in Mexico. In Proceedings of the 5th Int. Symposium on Biocontrol of Weeds. Brisbane. (Ed. ES. Delfosse). CSIRO. Canberra. pp.471-482.
- Özdikmen, H. and K. Aslan, 2009. First records of some leaf beetles for Mediterranean region in Turkey and south Turkey (Coleoptera: Chrysomelidae). Munis Entomology and Zoology, 4(1): 276-279.
- Warchałowski, A., 1994. Chrysomelidae. Stonkowate, Tom IV (Insecta, Coleoptera) (Fauna Polski). Polska Akademia Nauk, Muzeum i Instytut Zoologii, pp. 301.