



Records of Genus *Cassida* (Cassidini: Cassidinae: Chrysomelidae) from Pakistan

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Abstract

The study was conducted on genus *Cassida* Linnaeus, 1758 specimens were collected from various regions of Pakistan, in total three species of the genus are described; their habitus images and male genitalia is provided, *Cassida circumdata* Herbst, 1790, *Cassida exilis* Boheman, 1854 and *Cassida subtilis* Weise, 1897. Distributional map for each species is also provided.

Keywords: leaf beetles, cassidinae, tortoise beetles *Cassida*

Introduction

Members of genus *Cassida* Linnaeus, 1758 are commonly known as tortoise beetles and are ranked under subfamily Cassidinae enriched with 125 genera. Currently cassidinae consists of formerly Hispinae (leaf-mining beetles) and cassidinae (tortoise beetles). Previous grouping of Hispinae consisted 25 tribes and have body flattened slightly, bases of antennae very close, pronotum and elytra punctate and edges sometime with spines and the cassidini consisted 12 tribes, often have metallic colours, outline of the body round, pronotum and elytra expanded overhead and legs like umbrella, the cuticle is translucent and they have the ability to change the colours (Bottcher *et al.* 2009, Chaboo, 2007) [4, 5]. The genus *Cassida* Linnaeus, 1758: 362 (type species: *Cassida nebulosa* Linnaeus, 1758, designated by Spaeth, 1914) [8], it is the old-world genus and is enriched with 440 described species Worldwide, number of species are known to have status of agricultural pests (Boroweic, 1999) [3]. Some contributions on Caissidae from Pakistan are provided by some authors including; Maulik (1919) [6], Abdullah & Qureshi (1969) [1] and Sultan *et al.* (2008) [9].

Materials and Methods

Specimen collection sites: beetles were collected from various localities of Pakistan.

Method of collection: Chrysomelid beetles were collected through traditional hand net, pooter and on light traps. All standard protocol methods for the collection of Chrysomelid leaf beetles were followed.

Methods of Killing and preserving: For killing beetles were killed in a jar containing potassium cyanide and was mounted through entomological pins. Specimens were labeled containing the information of locality and date of collection, name of collector, and the host plant, if known, and was pinned beneath the specimen.

Method of imaging: Images were captured with the help of DSLR camera fitted on rail, several images were taken at various depth of fields, further were staged and processed on software control *z.p.*

Methods of identification: To identify the specimen up to the species level, keys for the region were collected from various publications.

Method of preparing distributional map: Map was prepared

on google earth online.

Method of preparing genitalia: "The male genitalia was dissected by removing and heating the pygophore in 10% KOH for 25-30 minutes, following the procedure of maceration described by Ahmad, (1986; Mcpherson and Ahmad, (2007) [7, 2].

Preparation of line drawing: For the preparation of drawing camera lucida was used and further converted on computer with Adobe illustrator CS6.

Cassida circumdata Herbst, 1790 (Plate, 1)

Description. Body colour yellowish brown, eyes black, abdominal segment brown, scutellum yellowish brown. Body shape ovate; or turtle like head hidden under pronotum, vertical area rough, pronotum appearance shiny and broader, laterally not toothed, sides prominent swelling with a distinct tooth. Mouth directed obliquely backwards and downwards (opistognathus). Antennae dark brown, brown or bicolor, filiform, size short, serration present, first segment club shaped or long, second segment short, third segment longer than second, fourth segment equal to third, fifth segment equal to fourth, antenna inserted closely. Elytra punctures present and coarse, colour yellowish brown, bands blackish brown or transverse. Prothorax size broader than long, punctuation coarse or sparse. Aedeagus apex dorsally obtuse, dorsally straight, gonopore semi round or below the apex and laterally curved moderately.

Measurement (mm). Total length 5.92, forewing length 4.37, pronotum width 3.6, pronotum length 1.6.

Material examined. *Cassida circumdata* Herbst, 1790, 4♂, 7♀, PAKISTAN, Sindh Province, Thatta District, Gharo environs, 17.VII.2015, Sohail Talpur leg., 24°47'18.99"N, 67°35'26.06"E, 23 ft. PAKISTAN, Sindh Province, Thatta District, Sujawal environs, 17.VII.2016, Sohail Talpur leg., 24°38'22.40"N, 68° 4'54.71"E, 23 ft. PAKISTAN, Sindh Province, Badin District, Golarchi environs, 18.VII.2015, Sohail Talpur leg., 24°39'28.98"N, 68°32'12.36"E, 30 ft. PAKISTAN, Sindh Province, Badin District, Matli environs, 01.VIII.2017, Sohail Talpur leg., 25° 5'1.41"N, 68°45'33.09"E,

Cassida exilis Boheman, 1854 (Plate, 2)

Description. Body colour yellowish brown, eyes black, mid

circular patch black. Scutellum yellowish brown. Body ovate or turtle like, hidden under pronotum. Pronotum broader, laterally not toothed, side evenly rounded and appearance shiny. Mouth directed obliquely backwards and downwards (opistognathus). Antennae brown, filiform, size short, serration present. Antenatal first segment club shaped; or long, second segment short, third segment equal to fourth, fourth segment equal to third, fifth segment shorter than fourth, antenna inserted closely, distal segment longer than broader. Elytra punctures present and course or aligned, colour yellowish brown. Prothorax size broader than long, punctuation course or sparse. Aedeagus apex dorsally obtuse, dorsally straight, laterally curved moderately, gonopore round or below the apex.

Measurement (mm). Total length 7.13, forewing length 5.15, pronotum width 4.26, pronotum length 1.82.

Material examined. *Cassida exilis* Boheman, 1854, 6♂, 17♀, PAKISTAN, Sindh Province, Thatta District, Gharo environs, 17.VII.2016, Sohail Talpur leg., 24°47'18.99"N, 67°35'26.06"E, 23 ft. PAKISTAN, Sindh Province, Badin District, Golarchi environs, 18.VII.2015, Sohail Talpur leg., 24°39'28.98"N, 68°32'12.36"E, 30 ft. PAKISTAN, Islamabad, NIH environs, 01.VI.2017, Sohail Talpur leg., 33°39'34.79"N, 73° 9'34.99"E, 1,857 ft. PAKISTAN, Kashmir, Muzaffarabad District, Panjokt Neelam Valley environ., 04.VI.2017, Sohail Talpur leg., 34°22'19.04"N, 73°26'16.61"E, 5029 ft. PAKISTAN, Khyber Pakhtunkhwa Province, Swat Mingora District, Malam Jabba environs, 10.VI.2017, Sohail Talpur leg., 34°49'9.65"N, 72°35'5.87"E, 9199 ft. PAKISTAN, Khyber Pakhtunkhwa Province, Swat Mingora District, Bahren environs, 18.VII.2017, Sohail Talpur leg., 35°12'43.84"N, 72°33'55.52"E, 4213 ft.

***Cassida subtilis* Weise, 1897 (Plate, 3)**

Description. Body colour brown, eyes yellowish, abdominal segment brown, scutellum brown. Body shape ovate or turtle like, head hidden under pronotum, punctuation sparse or fine, vertical area rough. Vertex normal, Pronotum broader, laterally not toothed, sides evenly rounded with dull appearance. Mouth directed obliquely backwards and downwards (opistognathus). Clypeus covered with sparse fine hairs. Antennal color brown, filiform, size short. Antenatal first segment club shaped, second segment short, third segment shorter than fourth, fourth segment longer than third, fifth segment shorter than fourth, antenna inserted closely, distal segment of antennae longer than broad. Elytra punctures present and course or aligned. Elytra brown. Prothorax size broader than long, punctuation fine or sparse. Posterior femur swollen, tarsal claw bifid or not toothed internally, third tarsal segment emarginated. Aedeagus apex dorsally obtuse, dorsally convex, laterally slightly curved, gonopore round or below the apex.

Measurement (mm). Total length 7.17, forewing length 5.24, pronotum width 4.17, pronotum length 1.89.

Material examined. *Cassida subtilis* Weise, 1897, 18♂, 47♀, Pakistan, Sindh Province, Tharparkar District, Nagarparkar environs, 03.VII.2015, Sohail Talpur leg., 24°23'20.16"N, 70°48'52.82"E, 896 ft. PAKISTAN, Sindh Province, Tharparkar District, Mithi environs, 07.VII.2013, Sohail Talpur leg., 24°46'55.22"N, 69°46'6.20"E, 138 ft.

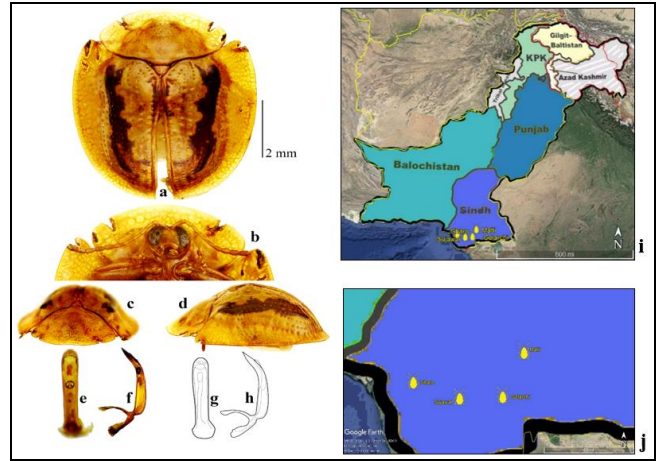


Plate 1: *Cassida circumdata* Herbst, 1790: a) habitus, b) face dorsal view c) frontal view d) lateral view e, g) aedeagus dorsal view g, h) lateral view i) distributional map j) Distributional map close up

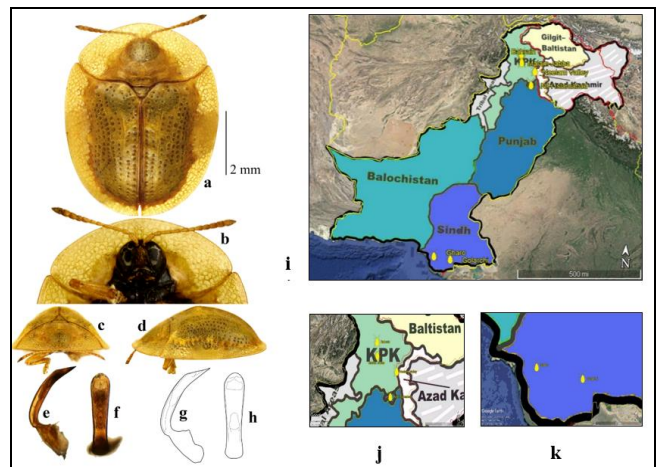


Plate 2: *Cassida exilis* Boheman, 1854: a) habitus, b) face dorsal view c) frontal view d) lateral view e, g) aedeagus dorsal view g, h) lateral view i) distributional map J, k) distributional map close up KPK and Sindh

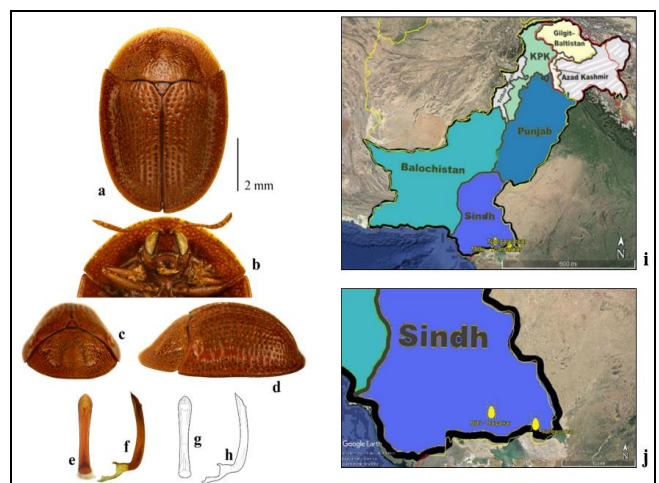


Plate 3: *Cassida subtilis* Weise, 1897: a) habitus, b) face dorsal view c) frontal view d) lateral view e, g) aedeagus dorsal view g, h) lateral view i) distributional map j) distributional map close up

References

1. Abdullah M, Qureshi SS. key to the Pakistani genera and species of the Hispinae and Cassidinae (Coleoptera: Chrysomelidae), with description of a new species from West Pakistan including the economic importance. Pakistan Journal of Science and Industrial Research, 1969; 12:95-104.
2. Ahmad I. A Fool Proof Technique for Inflation of Male Genitalia in Hemiptera (Insecta) Heteroptera. Newsletter, 4: 2-3 and Pakistan. Journal of Entomology, Karachi. 1986; 1(2):111-112.
3. Borowiec L. A world catalogue of the Cassidinae (Coleoptera: Chrysomelidae). Biologica Silesiae. 1999.
4. Bottcher A., Zolin J.P., Nogueira-de-Sá F., and Trigo J.R. Faecal shield chemical defence is not important in larvae of the tortoise beetle *Chelymorpha reimoseri* (Chrysomelidae: Cassidinae: Stolaini). Chemoecology. 2009; 19(1):63-66.
5. Chaboo CS. Biology and phylogeny of the Cassidinae Gyllenhal sensu lato (tortoise and leaf-mining beetles) (Coleoptera: Chrysomelidae). Bulletin of the American Museum of Natural History. 2007; 305:1-250.
6. Maulik S Chrysomelidae. Volume 2 Hispinae and Cassidinae: Taylor & Francis, London, 1919.
7. McPherson JE, Imtiaz A. Redescriptions of *Brochymena* and *Parabrochymena* (Hemiptera: Heteroptera: Pentatomidae), based primarily on male genitalia, with reclassification of three species and description of New World tribe (Halyini). Annals of the Entomological Society of America. 2007; 100(5):673-682.
8. Spaeth F. Chrysomelidae: 16. Cassidinae. In: Coleopterorum Catalogus, Pars (eds W Junk and S Schenkling) Berlin. 1914; 62:1-182
9. Sultan A, Borowiec L, Rafi MA, Ilyas M, Naz F, Shehzad A. *et al* Tortoise beetles of Rawalpindi-Islamabad, Pakistan and their host preferences (Coleoptera: Chrysomelidae: Cassidinae). Genus, Wrocław. 2008; 19(1):93-102.