ON THE SUBGENUS *ALLEDOYA* HINCKS, 1950 (COLEOPTERA: CHRYSOMELIDAE: CASSIDINAE)

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ABSTRACT: The paper presents remarks on the validity of the subgenus *Alledoya* Hicks, 1950 of the genus *Cassida* Linnaeus, 1758 (Coleoptera: Chrysomelidae: Cassidinae). The subgenus *Alledoya* Hicks, 1950 is redefined and reviewed. Some diagnostic characters for the species of *Alledoya* Hicks, 1950 are introduced. The subgenus is distributed in the western part of Palaearctic Region. Accordingly, a key for identification of the species of subgenus *Alledoya* Hincks, 1950 and the closely related subgenus *Lasiocassis* Gressitt, 1952 is also given.

KEY WORDS: *Cassida, Alledoya, Lasiocassis*, Cassidinae, Chrysomelidae, Turkey

The genus *Cassida* Linnaeus, 1758 includes a large number of species distributed whole world (Palaearctic, Nearctic, Oriental, Afro-tropical, Madagascar and Australian Regions). The genus is divided into many subgenera for the species distributed in Palaearctic and Oriental Regions. According to Borowiec (2007), almost one half of the described species, especially from Africa, Madagascar and Australia, have never been classified in any proposed subgenera.

Hitherto, proposed and valid subgenera within the genus *Cassida* Linnaeus, 1758 are chronologically summarized on the base of Borowiec (2007) as follows:

Genus *Cassida* Linnaeus, 1758
Subgenus *Cassida* (*Cassida*) Linnaeus, 1758
Type sp.: *Cassida nebulosa* Linnaeus, 1758
= Subgenus *Cassida* (*Pseudocassis*) Steinhausen, 2002
Type sp.: *Cassida flaveola* Thunberg, 1794
= Subgenus *Cassida* (*Betacassida*) Steinhausen, 2002
Type sp.: *Cassida nebulosa* Linnaeus, 1758
Subgenus *Cassida* (*Alledoya*) Hincks, 1950
Type sp.: *Cassida seraphina* Ménétries, 1836
Subgenus *Cassida* (*Lasiocassis*) Gressitt, 1952
Type sp.: *Cassida vespertina* Boheman, 1862
Subgenus *Cassida* (*Cassidulella*) Strand, 1928
Type sp.: *Cassida nobilis* Linnaeus, 1758
Subgenus *Cassida* (*Pseudocassida*) Desbrochers, 1891
Type sp.: *Cassida murraea* Linnaeus, 1768
Subgenus *Cassida* (*Mionycha*) Weise, 1891
Type sp.: *Cassida azurea* Fabricius, 1801
Subgenus *Cassida* (*Odontionycha*) Weise, 1891
Type sp.: *Cassida viridis* Linnaeus, 1758
Subgenus *Cassida* (*Crepidaspis*) Spaeth, 1912
Type sp.: *Crepidaspis varicornis* Spaeth, 1912
= Subgenus *Cassida* (*Taiwania*) Spaeth, 1913
Type sp.: *Taiwania sauteri* Spaeth, 1913

= Subgenus *Cassida* (*Cyclocassida*) Spaeth, 1913
Type sp.: *Taiwania variabilis* Chen and Zia, 1961
= Subgenus *Cassida* (*Yunocassis*) Spaeth, 1913
Type sp.: *Cassida appluda* Spaeth, 1926
Subgenus *Cassida* (*Tylocentra*) Reitter in Spaeth & Reitter, 1926
Type sp.: *Cassida turcmenica* Weise, 1892
= Subgenus *Cassida* (*Eremocassis*) Spaeth in Spaeth & Reitter, 1926
Type sp.: *Eremocassis transcaspia* Spaeth, 1926 = *Cassida weisei* Jacobson, 1894
Subgenus *Cassida* (*Lordicassis*) Reitter in Spaeth & Reitter, 1926
Type sp.: *Cassida undecimnotata* Gebler, 1833
Subgenus *Cassida* (*Lordiconia*) Reitter in Spaeth & Reitter, 1926
Type sp.: *Cassida canaliculata* Gebler, 1833
Subgenus *Cassida* (*Onychocassis*) Spaeth in Spaeth & Reitter, 1926
Type sp.: *Cassida brevis* Weise, 1884
Subgenus *Cassida* (*Mionychella*) Spaeth in Hincks, 1952
Type sp.: *Cassida hemisphaerica* Herbst, 1799
Subgenus *Cassida* (*Cyrtonocassis*) Chen and Zia, 1961
Type sp.: *Cassida tumidicollis* Chen et Zia, 1961
Subgenus *Cassida* (*Dolichocassida*) Günther, 1958
Type sp.: *Cassida veselyi* Günther, 1958

Consequently, the subgenus *Cassida* (*Lasiocassis*) Gressitt, 1952 for two Eastern Palaearctic species as *Cassida vespertina* Boheman, 1862 and *Cassida koreana* Borowiec & Cho, 2011, and the subgenus *Cassida* (*Alledoya*) Hincks, 1950 for two Western Palaearctic species as *Cassida seraphina* Ménétries, 1836 and *Cassida hablitziae* Motschulsky, 1838 was firstly accepted by Borowiec & Cho (2011) as separate subgenera. We agree with the acception of Borowiec & Cho (2011).

Genus *Cassida* Linnaeus, 1758

The Cassidinae fauna of Turkey includes 51 species of 6 genera. The genus *Cassida* Linnaeus, 1758 numbers 41 species (Ekiz et al., 2013; Özdikmen et al., 2014; Özdikmen & Kaya, 2014).

Subgenus *Alledoya* Hincks, 1950

The Western Palaearctic subgenus *Alledoya* Hincks, 1950 numbers only two species. It includes both species in Turkey as *Cassida seraphina* Ménétries, 1836 and *Cassida hablitziae* Motschulsky, 1838 (Ekiz et al., 2013; Özdikmen et al., 2014; Özdikmen & Kaya, 2014). We had the opportunity to study some material (a total of 125 specimens) of both species from north-western part of Anatolia of Turkey. Below we redefine the subgenus *Alledoya* Hincks, 1950 on the base of the material from Turkey. Distribution patterns of the species for the provinces in Turkey are given in figures 5 and 6.

Remarks on the validity of the subgenus *Alledoya* Hincks, 1950:

A new subgenus name *Deloyala* of the genus *Cassida* L. was proposed by Redtenbacher (1858) for two western Palaearctic species as *Cassida seraphina*

Ménétries, 1836 and *Cassida hablitziae* Motschulsky, 1838, but did not designated the type species.

However, the subgeneric name *Deloyala* Redtenbacher, 1858 was a junior homonym of *Deloyala* Dejean, 1837. As a consequence, Hincks (1950) proposed a new name *Alledoya* for *Deloyala* Redtenbacher (1858) not Dejean (1837) with the type species *C. seraphina* Ménétries, 1836 (Western Palaearctic species).

Also, a new subgenus *Lasiocassis* for *Deloyala* Redtenbacher (1858) not Dejean (1837) was proposed by Gressitt (1952) with the type species *Cassida vespertina* Boheman, 1862 (Eastern Palaearctic species). The new subgenus included also two Western Palaearctic species as *Cassida seraphina* Ménétries, 1836 and *Cassida hablitziae* Motschulsky, 1838. Finaly, a new Eastern Palaearctic species, *Cassida koreana* Borowiec & Cho, 2011 was also placed in the subgenus *Lasiocassis* Gressitt, 1952 by Borowiec & Cho (2011).

Subgeneric classification of the genus *Cassida* Linnaeus was reviewed and discussed by Borowiec (2007). He concluded and suggested that most of subgeneric names proposed in the genus *Cassida* Linnaeus are artificial.

However, Borowiec (2007) and Borowiec & Cho (2011) also suggested that both Western Palaearctic species (*C. seraphina* and *C. hablitziae*) form a distinct lineage from two Eastern Palearctic species (*C. vespertina* and *C. koreana*).

Both groups differ in the morphology as well as the host preferences. According to Borowiec & Cho (2011), members of the subgenus *Lasiocassis* are at first glance very similar to members of the subgenus *Alledoya*, especially in coloration of elytra with spots on explanate margin, distinct elytral hump and irregular elytral surface. *Alledoya* differs in body more circular in outline, pronotum distinctly wider with narrowly rounded sides, clypeal plate flat and shorter antennae with segments 9 and 10 slightly wider than long. *Lasiocassis* feeds on Ranunculaceae (genus *Clematis* L.) and Convolvulaceae (genus *Calystegia* R. Br.) whereas *Alledoya* feeds on Chenopodiaceae (genera *Beta* L., *Chenopodium* L., *Hablitzia* M. Bieb., *Niedzwedzkia* B. Fedsch., *Spinacia* L.). Both groups were firstly treated by Borowiec & Cho (2011) as valid subgenera. Accordingly, the subgenus *Lasiocassis* Gressitt, 1952 including *Cassida vespertina* Boheman, 1862 and *Cassida koreana* Borowiec & Cho, 2011 and *Alledoya* Hincks, 1950 including *Cassida seraphina* Ménétries, 1836 and *Cassida hablitziae* Motschulsky, 1838.

Diagnosis of *Alledoya* Hincks, 1950

Small cassids with length 4.50–6.00 mm, body almost circular with sides more or less converging posterad. Dorsal coloration with distinct humeral, posterolateral and sutural spots on explanate margin, ventrites partly black or rusty-brown. Pronotum elliptical with more or less narrowly rounded sides, no basal corners, dorsal surface partly dull with sparse punctures. Elytra with large dorsal hump, surface of elytra irregular, with large folds and tubercles. Clypeus flat, clypeal lines indistinct, clypeal plate with coarse, moderately dense punctures. Prosternal process moderately broad between coxae, approximately as wide as 3/5 width of mid coxa, in mid part forms a shallow gutter, strongly expanded apically in rhomboidal plate. Expanded apex of prosternum coarsely punctate. Claws simple, last segment of tarsi not expanded apically. Antennae moderately short, segment 3 approximately 1.5 times as long as segment 2 and slightly longer than segment 4. Segment 9 and 10 slightly wider than long.

Members of the subgenus *Alledoya* are at first glance very similar to members of the subgenus *Lasiocassis*, especially in coloration of elytra with spots on explanate margin, distinct elytral hump and irregular elytral surface.

Alledoya differs in body more circular in outline; pronotum distinctly wider with narrowly rounded sides; prosternal process narrower between coxae, approximately as wide as 3/5 width of mid coxa; clypeal lines indistinct, clypeal plate flat and shorter antennae with segments 9 and 10 slightly wider than long.

As mentioned above, the subgenus *Alledoya* Hincks, 1950 includes only two species as *Cassida seraphina* Ménétries, 1836 and *Cassida hablitziae* Motschulsky, 1838. *Cassida seraphina* Ménétries, 1836 morphologically differs from closely related species *Cassida hablitziae* Motschulsky, 1838 with regard to rusty-brown ground color of upper side (groud color of upper side black in *C. hablitziae*), more sharpened humeral angles (humeral angles more obtuse in *C. hablitziae*) and more or less reddish-yellow clypeal plate (clypeal plate completely black in *C. hablitziae*) chiefly (Figs. 1-4).

A key to identification for the species of the subgenera *Alledoya* Hincks, 1950 and *Lasiocassis* Gressitt, 1952

1. Body subpentagonal in outline; pronotum elliptical with broadly rounded sides; prosternal process moderately broad between coxae, approximately as wide as 2/3 width of mid coxa; clypeal lines distinct, clypeal plate slightly convex and antennae moderately long with segments 9 and 10 slightly longer than wide.....
.....**Subgenus *Lasiocassis* Gressitt, 1952**.....**2**
- Body more circular in outline; pronotum distinctly wider with narrowly rounded sides; prosternal process narrower between coxae, approximately as wide as 3/5 width of mid coxa; clypeal lines indistinct, clypeal plate flat and shorter antennae with segments 9 and 10 slightly wider than long.....
.....**Subgenus *Alledoya* Hincks, 1950**.....**3**

2. Elytral disc mostly dark brown to almost black, humeral area sometimes slightly paler, brown but not in contrast with darkest part of disc; head almost completely reddish (except for black mouthparts); prosternal process completely black; body length 5.35-7.20 mm; distributed in Eastern Palaearctic region (China, Japan, Korea, Mongolia, Russian Far East and Taiwan).....
.....***Cassida vespertina* Boheman, 1862**
- Elytral disc in postscutellar area, and sides and top of elytral hump yellowish-red to reddish-brown in other parts of disc from reddish-brown to almost black; head completely reddish; prosternal process completely reddish to reddish-brown; body length 4.80-5.35 mm; distributed in Eastern Palaearctic region (Korea).....
.....***Cassida koreana* Borowiec & Cho, 2011**

3. Ground color of upper side rusty-brown; clypeal plate more or less reddish-yellow, not completely black; pronotum more narrowly rounded sides; humeral angles more sharpened; body length 4.5-5.5 mm; distributed in Western Palaearctic region (Armenia, Greece, South European Russia and Turkey).....
.....***Cassida seraphina* Ménétries, 1836**
- Ground color of upper side black; clypeal plate completely black; pronotum narrowly rounded sides; humeral angles more obtuse; body length 5.0-6.0 mm; distributed in Western Palaearctic region (Armenia, Georgia, South European Russia, Kazakhstan and Turkey).....***Cassida hablitziae* Motschulsky, 1838**

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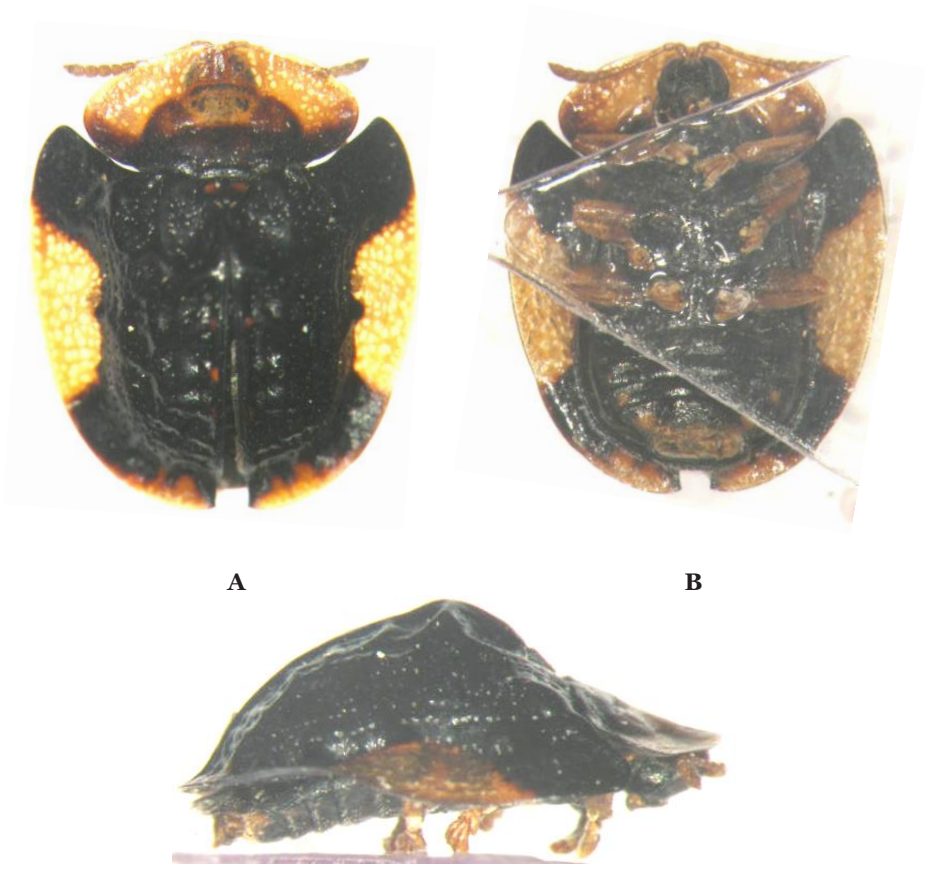


Figure 1. *Cassida hablitziae* Motschulsky, 1838 (A) habitus dorsal; (B) habitus ventral; (C) habitus lateral.

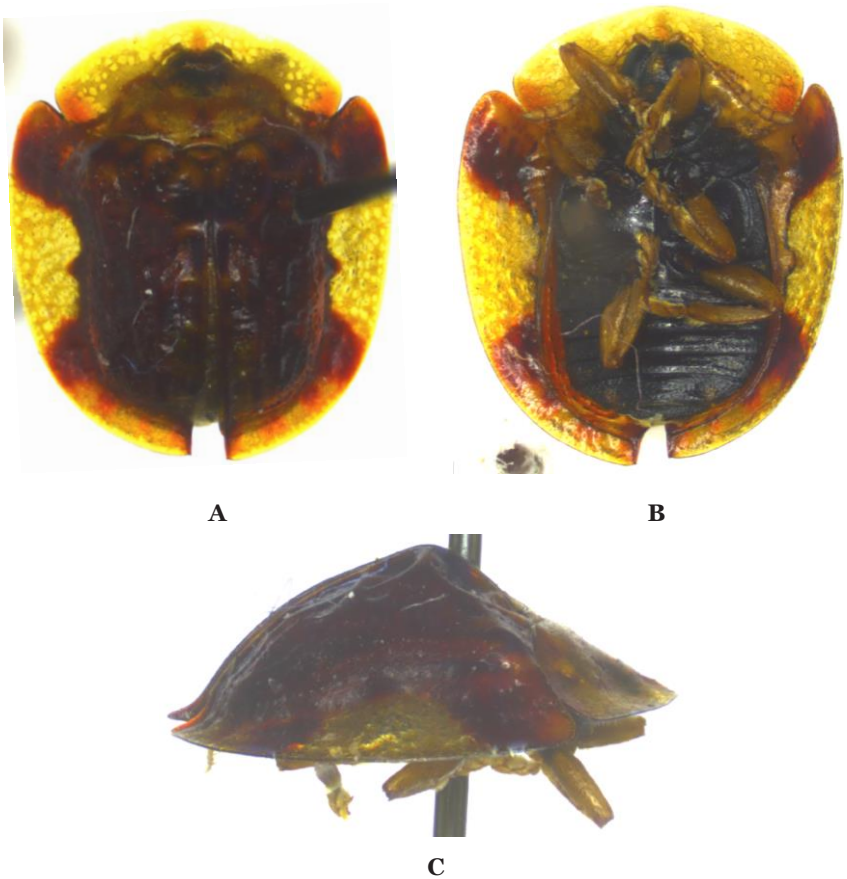
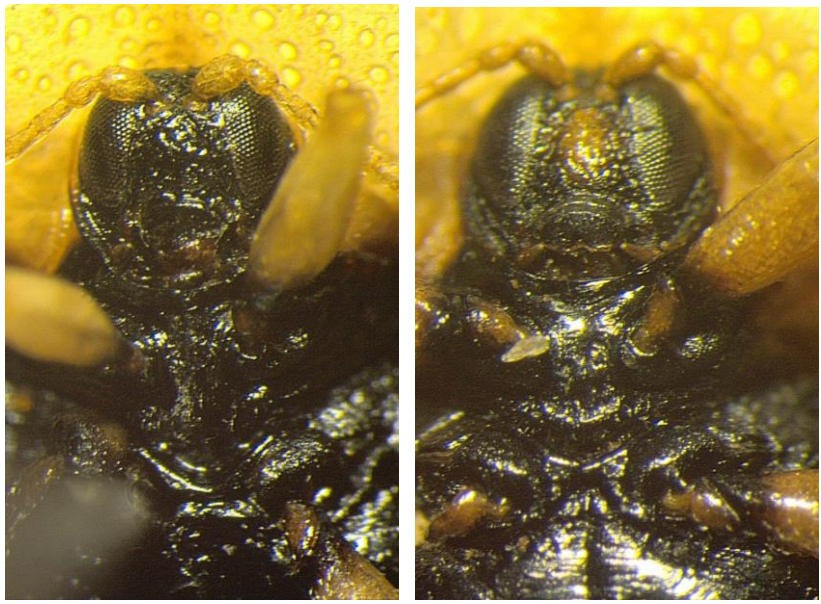


Figure 2. *Cassida seraphina* Ménétries, 1836 (A) habitus dorsal; (B) habitus ventral; (C) habitus lateral.



A **B**

Figure 3. Head and prosternum. (A) *Cassida hablitziae* Motschulsky, 1838; (B) *Cassida seraphina* Ménétries, 1836.

Figure 4. Head and prosternum of *Cassida seraphina* Ménétries, 1836.

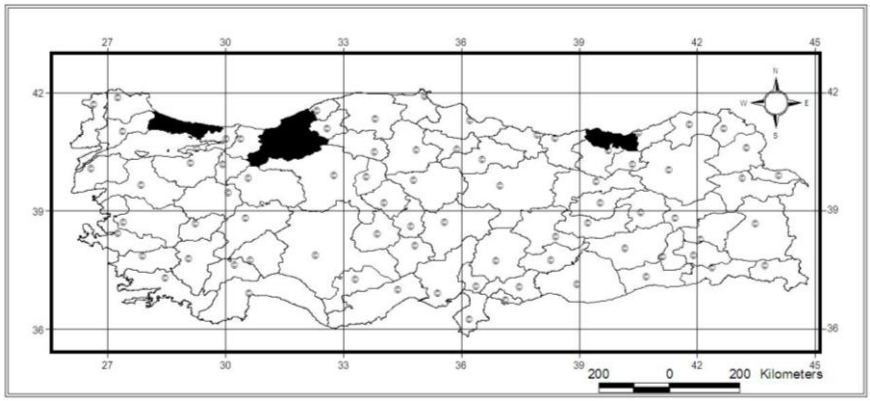


Figure 4. Distribution patterns of *Cassida hablitziae* Motschulsky, 1838 in Turkey (Bolu, Düzce, İstanbul, Trabzon and Zonguldak provinces).

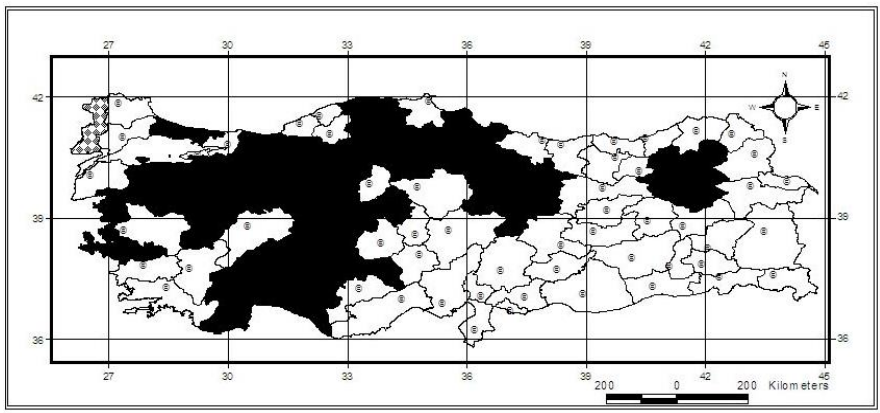


Figure 5. Distribution patterns of *Cassida seraphina* Ménétries, 1836 in Turkey (Amasya, Ankara, Antalya, Balıkesir, Bilecik, Bolu, Burdur, Bursa, Çankırı, Çorum, Düzce, Erzurum, Eskişehir, Isparta, İstanbul, İzmir, Kastamonu, Kırşehir, Konya, Kütahya, Sakarya, Samsun, Sivas, Tokat and Uşak provinces).