

Genus	Vol. 12 (1): 63-79	Wrocław, 10 IV 2001
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Cassida undecimnotata - a species complex (Coleoptera: Chrysomelidae: Cassidinae)

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ABSTRACT. The *Cassida undecimnotata* group is revised. The group comprises five species. *C. moori* BOHEMAN, 1856 is removed from synonymy of *C. undecimnotata* GEBLER, 1834. *C. transcaucasica* from Transcaucasia and Iran, and *C. tianshanica* from Tian Shan Mts., new to the science, are described. Intraspecific variability of each species is discussed. *Cassida undecimnotata* is probably a superspecies with 5 semispecies of various stage of their speciation.

Key words: entomology, taxonomy, new species, variability, *Coleoptera*, *Chrysomelidae*, *Cassidinae*, *Cassida undecimnotata* group, Caucasus, Middle Asia.

Cassida undecimnotata GEBLER, 1841 was described from Loktevsk in E Kazakhstan. All catalogues and monographs published hitherto cited 1834 as the year of publication for the species - the first part of GEBLER's "Notae and addidamenta ad catalogum Siberiae..." (SPAETH 1914 b, LOPATIN 1977, BOROWIEC 1999). Actually, it was described in the second note, published in 1841. BOHEMAN (1856) described *Cassida moori* from "India orientalis". SPAETH and REITTER (1926) reduced *C. moori* to a subspecies of *C. undecimnotata* GEBLER. REITTER (1890) described from Turkmenia a new variety of *C. undecimnotata* (in his paper the species is misnamed *undecimpunctata*!) under the name *undecimguttata*. The same variety was also described by WEISE (1894) under the name *C. undecimnotata* var. *impicticollis*. Finally, LOPATIN (1965) described from Tadzhikistan a new species, *C. medvedevi*, very close to *C. undecimnotata*. This group of related forms is well characterised by the structure of tarsi, with an elongated last segment, distinctly reaching beyond marginal setae of the third segment, and the setae of sole reduced to narrow groups along sides of each tarsal segment. As a

result, the ventral part of tarsi has a glabrous, unpubescent median line. The character is common in many chrysomelid genera associated with desert and semidesert habitats. Based on this character REITTER (in SPAETH and REITTER 1926) placed *C. undecimnotata* in a new subgenus *Lordicassis*. CHEN and ZIA (1984) described in the subgenus another new species - *C. alticola* from W Sichuan, but according to the original description it is not close to *C. undecimnotata* and probably belongs to a different group. Thus, BOROWIEC (1999) included in the subgenus *Lordicassis* only two species - *Cassida undecimnotata* with *undecimguttata*, *impicticollis* and *moori* as synonyms, and *C. medvedevi*.

We had an opportunity to examine a large material of *C. undecimnotata* group from various parts of its range. After analysis of infraspecific and geographic variability we have concluded that *C. undecimnotata* group is classical superspecies with five semispecies at various stages of speciation. We have treated all as valid species-level taxa. Three of them were named earlier - *C. undecimnotata* GEBLER, 1841, *C. moori* BOHEMAN, 1856, and *C. medvedevi* LOPATIN, 1965; and we describe two - *C. transcaucasica* and *C. tianshanica* - as new to the science. All these species are very close, with variability ranges partly overlapping (fig. 38), but they are mostly separated geographically. Their description, with comments on infraspecific variability, is given below.

We had to possibility to examine types of only three nominal taxa - *C. moori* BOH., *C. undecimnotata* var. *undecimguttata* REITT., and *C. undecimnotata* var. *impicticollis* WEISE. Type of *C. undecimnotata* GEB. was probably lost, but its locus typicus is within the distribution range of the form treated recently as true *C. undecimnotata*. Unfortunately, GEBLER's description was based on specimen representing a very rare aberration of *C. undecimnotata* with black pronotal disc. The recent material demonstrated that the aberration comprises not more than 6 % of examined specimens. We did not examine the type of *C. medvedevi* LOP. but by courtesy of Prof. I.K. LOPATIN we have had a possibility to examine a series of specimens compared by him with the holotype.

Abbreviations fo collections

- DS - coll. D. SASSI, Castelmarte, Italy;
- FK - coll. F. KANTNER, Lipi, Czech Republic;
- IL - coll. I. K. LOPATIN, Minsk, Belarus;
- IRSN - Institut Royal des Sciences Naturelles, Bruxelles, Belgium;
- IZAS - Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland;
- LB - Department of Systematic Zoology and Zoogeography, Wrocław University, Wrocław, Poland;
- NMP - coll. National Museum Prague, Czech Republic.

KEY TO THE SPECIES

1. Pronotal and elytral disc strongly convex. Pronotum regularly semicircular, with maximum width at base, disc always black, usually glabrous to slightly dull, with fine and sparse puncturation. Transcaucasus and mountains of NW Iran *transcaucasica*
- Pronotal and elytral disc moderately convex. Pronotum usually less regularly semicircular, with maximum width slightly before base and with more or less angulate sides, disc from uniformly reddish to black, often dull, microreticulate, its puncturation coarser and denser. Middle Asia and NE Iran 2.
2. Large and stout species, length usually exceeding 8 mm (mean 8.31), L/W ratio below 1.45 (mean 1.42). Base of elytra usually distinctly wider than pronotum. Anterior margin of each elytron almost straight, with very small black teeth. Explanate margin of elytra very broad, also in posterior half, in anterior part has tendency to form a shallow gutter. Mountains of E Kazakhstan and Kirgizstan. *moori*
- Smaller and slimmer species, length usually below 8.0 mm, L/W ratio usually above 1.45 3.
3. Base of each elytron straight, with very small basal teeth. Pronotal disc always with black. Medium-sized species, mean length 7.15 mm. Mountains of E Kazakhstan and Kirgizstan. *tianshanica*
- Base of each elytron shallowly emarginate, with very prominent basal teeth. Pronotal disc varies from uniformly yellowish-red to black 4.
4. Very small, the smallest species of the group, mean length 6.49 mm. Usually darker coloured, pronotal disc often black. Surface of pronotal disc usually distinctly microreticulate, dull. Sides of elytra behind humeral angle usually shallowly emarginate. Only mountains above 1400 m of E Kazakhstan, Kirgizstan, Tadijkistan and Uzbekistann. *medvedevi*
- Larger species, mean length 7.73 mm. Usually paler coloured, pronotal disc usually yellowish-red. Surface of pronotal disc usually indistinctly microreticulate, glabrous. Sides of elytra behind humeral angle usually straight, without emargination. Widespread in Central Asia, mostly lowland and midland species, up to 1200 m. *undecimnotata*

***Cassida undecimnotata* group**

Medium sized species, length 5.6-8.8 mm. Ground colour of pronotum and elytra yellowish-red to red. Pronotum often with disc partly to completely black, occasionally also explanate margin of pronotum partly black. Elytra usually with 11 black spots (1 in anterior part of suture, 4 across base, 4 across middle, and two on slope), also apex of suture black. Spots can be increased, connected and occupy most of elytral disc, also apical sutural spot can be elongated and extends to half length of elytra. Clypeus, thorax, abdomen and legs black, only lateral

margins of abdominal sternites yellowish. Antennal segments 2 to 6 partly to completely yellowish, remainder black. Body oval to elongate oval. Pronotum more or less semicircular, with maximum width close to base. Pronotal disc punctate. Base of elytra equal to or moderately wider than base of pronotum, disc regularly, moderately convex, without tubercles or impressions, but usually each elytron with indistinct two elongate elevations. Puncturation mostly irregular, only punctures close to suture tend to form more or less regular rows. Marginal row distinct. Explanate margin of elytra narrow, in its widest part narrower than half width of elytron disc. Clypeus dull, microreticulate and punctate, clypeal lines fine but distinct, converging in arch (fig. 3). Labrum shallowly emarginate. Venter of pronotum without antennal grooves, only around apical half of head slightly impressed. Prosternal process strongly expanded apically, punctate on sides and apex. Tarsi slim, last segment elongate, distinctly reaching behind marginal setae of third segment. Sole of tarsi reduced to groups of setae on lateral margins of each tarsal segment, thus ventral side of tarsi with longitudinal glabrous line. Antennae moderately elongate, distal segments from slightly wider than long to slightly longer than wide. Aedeagus typical for the genus, uniform within the group, in stout species slightly stouter than in slimmer species (figs 36, 37). Spermatheca uniform, with very long, spiral duct (fig. 35), spermathecal capsule infusate on ventral side of apical vesicle and ventral side of basal pedicle.

DISTRIBUTION

Transcaucasia, Iran, Middle Asia east to W China and W Mongolia.

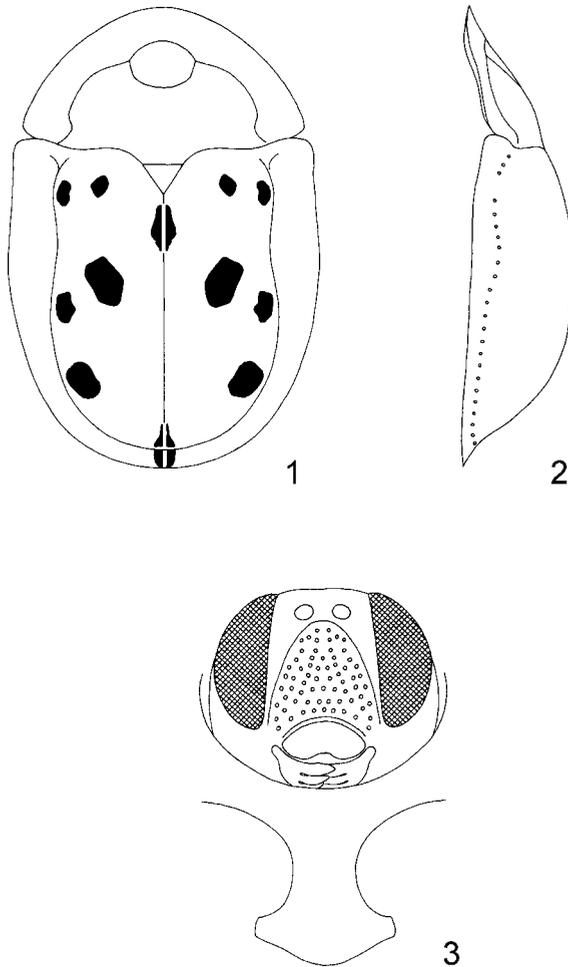
Species of the group have been placed in the subgenus *Lordicassis* REITTER. In our opinion the subgeneric division of the large and heterogenous genus *Cassida* L. is artificial. Based on our studies (we examined in detail c. 80 % of 370 described species) the subgeneric system proposed by SPAETH and REITTER (1926) and developed in SPAETH's posthumous work published by HINCKS (1952) needs a revision. It was based mostly on quite uniform Palaearctic and partly Oriental fauna, but the genus is the most diverse in Africa and Madagascar and many tropical species are impossible to place in subgenera. The subgenus *Lordicassis* was established based on a simple homoplastic character - the structure of tarsi with reduced sole. The character evolved independently not only in the genera of *Cassidinae* (i.e. *Chiridula* WEISE, 1899) but also in many other chrysomelids (i.e. *Crosita* MOTSCHULSKY, 1860), probably as a result of adaptation to desert and semidesert habitats. Because phylogenetic relationships between various species of *Cassida* are unclear, we treat *Cassida undecimnotata* and its relatives as natural group within the genus, without subgeneric placement. At first glance, the closest species is *Cassida murraea*, with very similar habitus and colouration, association with *Asteraceae* but with normal tarsi; except that *C. murraea* is associated with wet habitats.

REVIEW OF SPECIES

***Cassida medvedevi* LOPATIN, 1965**

Cassida (Lordicassis) medvedevi LOPATIN, 1965: 40; GRUEV, 1988: 167; BOROWIEC, 1999: 264.

The smallest species of the group. Length: 5.6-7.2 mm (mean 6.49, n = 14), width: 3.7-4.8 mm (mean 4.27, n = 14), length of pronotum: 2.1-2.5 mm, width of pronotum: 3.3-4.3 mm, length/width ratio: 1.50-1.58 (mean 1.52, n = 14), width/length of pronotum ratio: 1.57-1.73 (mean 1.67, n = 14).



1-3. *Cassida medvedevi*: 1 - dorsal, 2 - lateral, 3 - head and prosternum

It is well characterised by its small body, only the smallest specimens of *C. undecimnotata* and *C. tianshanica* are of a similar size. It is slim, like *C. undecimnotata* (fig. 1). Its dorsal pattern is very much variable, pronotum from uniformly yellowish-red to mostly black, elytral spots isolated to mostly connected (figs 27-29). Pronotal and elytral disc slightly depressed (fig. 2). Pronotal surface mostly microreticulate and dull, only one of the examined specimens has pronotal disc mostly glabrous. Puncturation of pronotum moderately coarse but dense. Pronotum in most specimens broad, almost regularly semicircular, with maximum width almost at base. Basal margin of elytron shallowly emarginate, with distinct basal teeth, distinctly larger than in similar *C. tianshanica*. Elytral surface slightly dull to slightly glabrous, longitudinal elevations well marked. Base of elytra usually only slightly wider than pronotum, especially in specimens with much rounded pronotal sides. Elytral margin behind humeral angle usually shallowly emarginate. Explanate margin moderately broad, without tendency to form a shallow gutter. Distal antennal segments slightly wider than long (fig. 30).

Host plant: *Asteraceae*: *Scorzonera acanthoclada* (LOPATIN 1977).

Terra typica: **Tadzhikistan: Darvazskij hrebet, Chobu-Rabat.**

MATERIAL EXAMINED

KAZAKHSTAN: Koksuiskiy hr., per. Aljam, 2000 m, 3 VI 1997, 1, I. KABAK (IL).

KIRGIZSTAN: Cickau vall., 1400 m, 3-4 VII 1999, 1, V. DOLIN (LB); inn. Tian-Shan, nr. Sary-Bulak, 2500 m, 13 VI 1993, 1, I. LOPATIN (IL).

TADIIKISTAN: Chili-dag, 12 V 1988, 1, I. LOPATIN (IL); S slope of Gissar hr., nr. Ruidasht, 2600 m, 11 IX 1947, 1, I. LOPATIN (IL); Vrnenskiy nad., usch. r. Malo-Almatinskoj, 10 VI 1907, 1, W. NEDZVECKIJ (IL).

UZBEKISTAN: Kuraminski rg., W Tian-Shan, Kamchik pass, VI 1996, 6 (DS, LB); Pskemskij hr., ber. Pskema, 2400 m, 4 V 1990, 1, BELOUSOV (IL).

Cassida moori BOHEMAN, 1856

Cassida Moori BOHEMAN, 1856: 124, 1862: 299; GEMMINGER and HAROLD, 1876: 3655; MAULIK, 1919: 368 (incl. fig.); BOROWIEC, 1999: 290 (under synonyms of *C. undecimnotata*).

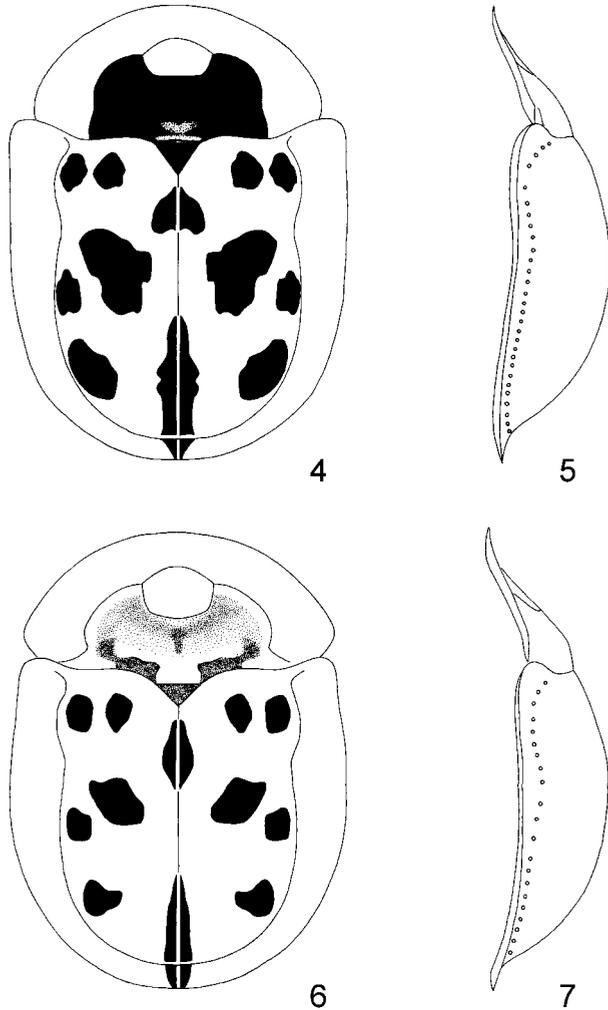
Cassida (Cassida) Moori: SPAETH, 1914 b: 114.

Cassida (Loricassis) undecimnotata Moori: SPAETH and REITTER, 1926: 27; WINKLER, 1932: 1356; LOPATIN, 1977: 252.

The largest species of the group. Length: 7.9-8.8 mm (mean 8.31, n = 11), width: 5.5-6.2 mm (mean 5.86, n = 11), length of pronotum: 2.7-2.9 mm, width of pronotum: 4.8-5.4 mm, length/width ratio: 1.33-1.53 (mean 1.42, n = 11), width/length of pronotum ratio: 1.75-1.86 (mean 1.79, n = 11).

It is well characterised by its large and stout body. It is the stoutest species of the group. Its dorsal pattern is variable, holotype has large black spot at pronotum

and large, partly connected elytral spots, but most specimens have immaculate pronotum and moderately large, isolated elytral spots (figs 12-16). Pronotal and elytral disc slightly depressed, distinctly less convex than in similar *C. transcaucasica* (figs 5, 7). Pronotal surface mostly microreticulate and dull, its puncturation moderately coarse but dense. Pronotum in most specimens very broad, not regularly semicircular, with more or less angulate sides (fig. 6), but in two of the examined specimens pronotum is almost regularly semicircular, widest at base but not as long as in *C. transcaucasica* (fig. 4). Basal margin of elytron almost straight, with very small basal teeth, only slightly larger than in *C. tian-*



4-7. *Cassida moori*: 4, 6 - dorsal, 5, 7 - lateral; 4, 5 - rare form from Narynkolsk, 6, 7 - typical form from Transilijsk Alatau

shanica but distinctly smaller than in other species. Elytral surface slightly dull to slightly glabrous, longitudinal elevations well marked. Base of elytra usually distinctly wider than pronotum, especially in specimens with much rounded pronotal sides (fig. 4). Elytral margin behind humeral angle usually shallowly emarginate. Explanate margin broad, the widest within the group, has a tendency to form a shallow gutter. Distal antennal segments c. as wide as long (fig. 31).

Terra typica: **India orientalis.**

MATERIAL EXAMINED

KAZAKHSTAN: okr. Alma Ata, 18 V 1958, 1, SKOPIN (IL); Narynkolsk rn., Baiankol, hr. Kungei, 25 VI 1958, 1, SKOPIN (IL); Transilijsk Alatau, n. Alma Ata, 22 IV 1982, 1 (IL).

KIRGIZSTAN: Aleksandrovsk hr. [now Kirgiz Mts.], Dogut-Tau, 8 V 1901, 1 (IL); Chatkal Range, Sary-Chelek L., 5 VII 1996, 4 (DS, LB); env. Frunze, 8 V 1986, 3, BIELOUSOV (IL, LB).

***Cassida tianshanica* n. sp.**

Small species, slightly larger and stouter than *C. medvedevi* but smaller than *C. moori* and *C. transcaucasica*, and smaller than most specimens of *C. undecimnotata*. Length: 6.5-7.7 mm (mean 7.15, n = 11), width: 4.2-5.1 mm (mean 4.80, n = 11), length of pronotum: 2.3-2.5 mm, width of pronotum: 3.9-4.6 mm, length/width ratio: 1.46-1.57 (mean 1.49, n = 11), width/length of pronotum ratio: 1.75-1.86 (mean 1.77, n = 11).

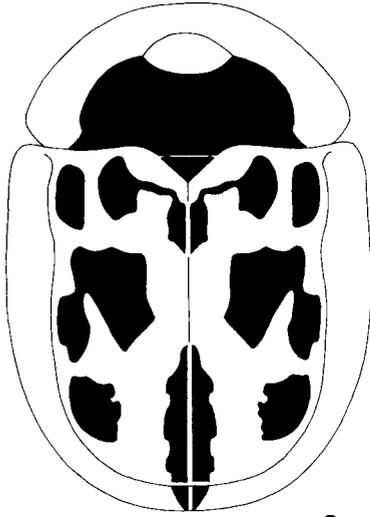
It is intermediate between *C. moori* and *C. medvedevi*. Its dorsal pattern is quite constant, but in the species predominate forms with large elytral spots, often partly connected (figs 17-21). Pronotum always with black. Pronotal and elytral disc slightly depressed (fig. 9). Pronotal surface mostly microreticulate and dull, but usually less so than in *C. medvedevi*, its puncturation moderately coarse and moderately dense. Pronotum very broad, distinctly wider than in *C. medvedevi*, not regularly semicircular, with more or less angulate sides (fig. 8). Basal margin of elytron straight, with very small basal teeth, the smallest within the group, like in *C. moori*. Elytral surface slightly dull to slightly glabrous, longitudinal elevations lower than in *C. medvedevi*, but visible. Base of elytra only slightly wider than pronotum. Elytral margin behind humeral angle usually shallowly emarginate. Explanate margin moderately broad, without or only in anterior part with a tendency to form a shallow gutter. Distal antennal segments c. as wide as long (fig. 33).

Terra typica: **Kirgizstan: Tian-Shan Mts.**

MATERIAL EXAMINED

KAZAKHSTAN: paratypes: Transili Alatau n. Alma Ata, Pochodnaja n. Alma-Arasan, 2600-2800 m, 25 VI 1979, 5 (LB).

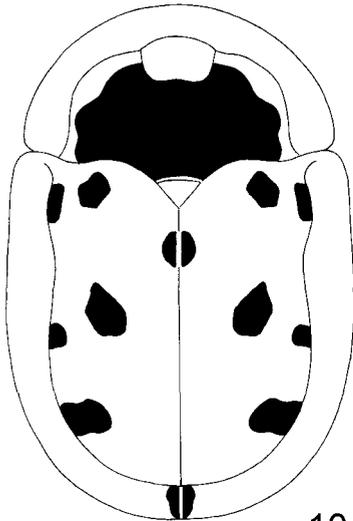
KIRGIZSTAN: holotype: Kirgizstan, Tian-Shan Mts., Mt. Chan Tengri, 1 (LB); paratypes: the same data, 1 (LB); W slope of Kungea, 3000 m, 21 VI 1962, 1 (IL); S slope of Kungea, Bierkut, 18 VI 1962, 1 (IL); Terskej Alatau, Bierkut, 18 VI 1962, 1 (IL).



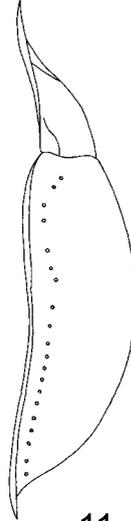
8



9



10

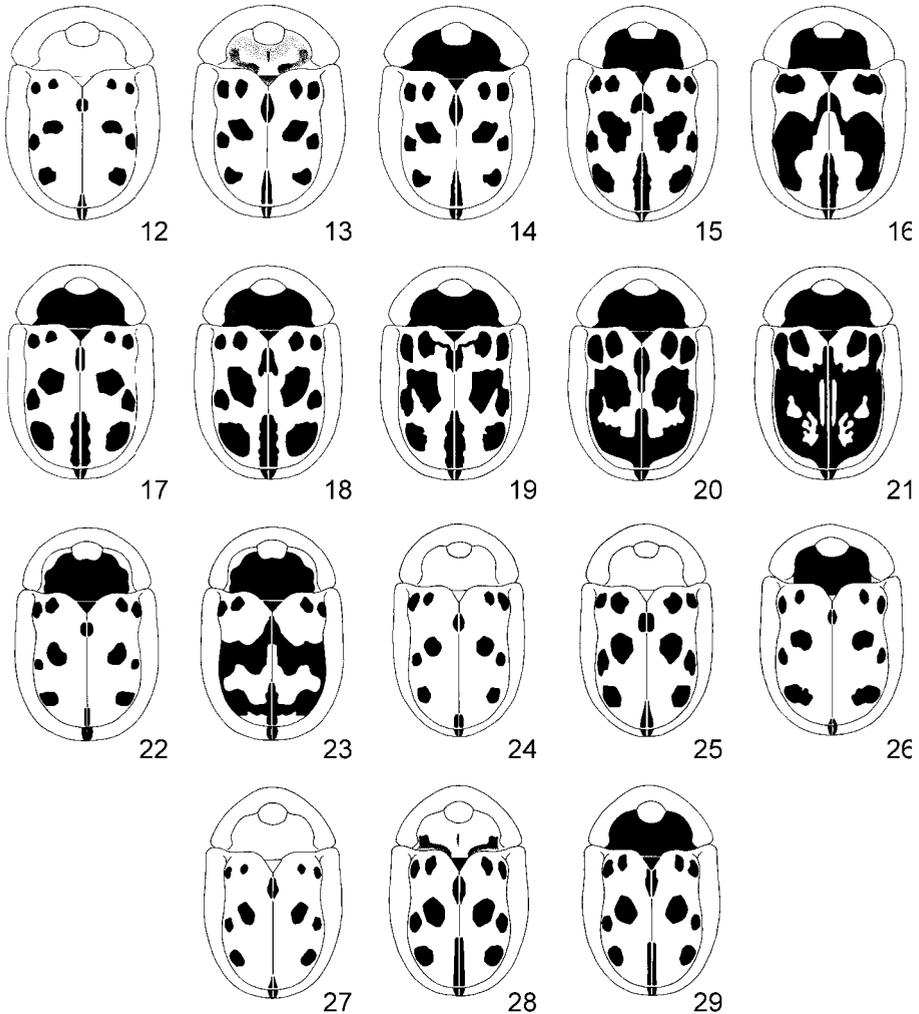


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8, 9. *Cassida tianshanica*, 10, 11 - *C. transcaucasica*: 8, 10 - dorsal, 9, 11 - lateral

Cassida transcaucasica n. sp.

Large species, larger than *C. medvedevi* and *C. tianshanica*, only slightly smaller than *C. moori* and as large as but distinctly stouter than the largest specimens of *C. undecimnotata*. Length: 7.2-8.8 mm (mean 8.09, n = 16), width: 4.95-6.1 mm (mean 5.56, n = 16), length of pronotum: 2.7-3.0 mm, width of pronotum: 4.5-5.3 mm, length/width ratio: 1.38-1.55 (mean 1.45, n = 16), width/length of pronotum ratio: 1.60-1.77 (mean 1.68, n = 16).



12-29. Variation of dorsal pattern: 12-16 - *Cassida moori*, 17-21 - *C. tianshanica*, 22, 23 - *C. transcaucasica*, 24-26 - *C. undecimnotata*, 27-29 - *C. medvedevi*

It is well characterised by its regularly semicircular pronotum, with maximum width at base (fig. 10). It is stouter than *C. undecimnotata*, *C. tianshanica* and *C. medvedevi*, and only slightly slimmer than *C. moori*. Its dorsal pattern is quite constant, all specimens have pronotal disc with black spot (figs 22, 23). Elytral spots moderate to large but only one specimen has spots partly connected. Pronotal and elytral disc the most convex in the group (fig. 11). Pronotal surface usually glabrous or only finely microreticulate, only in two of examined specimens surface was distinctly microreticulate and dull, but not as dull as in some specimens of *C. medvedevi* or *C. tianshanica*. Pronotal puncturation fine and sparse. Basal margin of elytron distinctly emarginate, with large basal teeth, the largest within the group. Elytral surface glabrous, longitudinal elevations short and very low, the lowest within the group, second elevation usually hardly marked or absent. Elytral margin behind humeral angle shallowly but distinctly emarginate. Explanate margin distinctly narrower than in *C. moori* but slightly wider than in *C. undecimnotata*, extreme margin of explanate margin of elytra has a tendency to bend upwards, thus the margin usually forms a shallow gutter. Distal antennal segments c. slightly longer than wide (fig. 32).

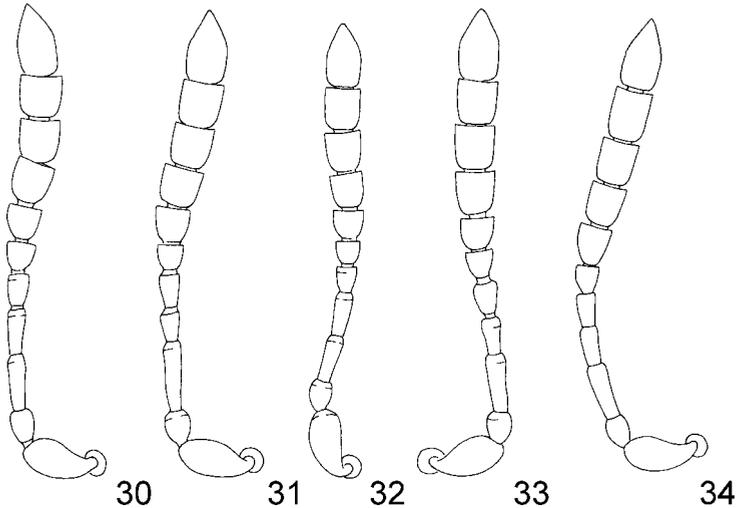
Terra typica: **Georgia: Borshomi.**

MATERIAL EXAMINED

ARMENIA: paratypes: Khosrov, 18 V 1988, 1, A. KONSTANTINOV (IL); Yerevan, Dzhrvezh, 10 V 1996, 1, M. KALASHIAN (DS).

AZERBAIJAN: paratype: Nakchitshevan, Džulfa, 19 V 1923, 1 (IL).

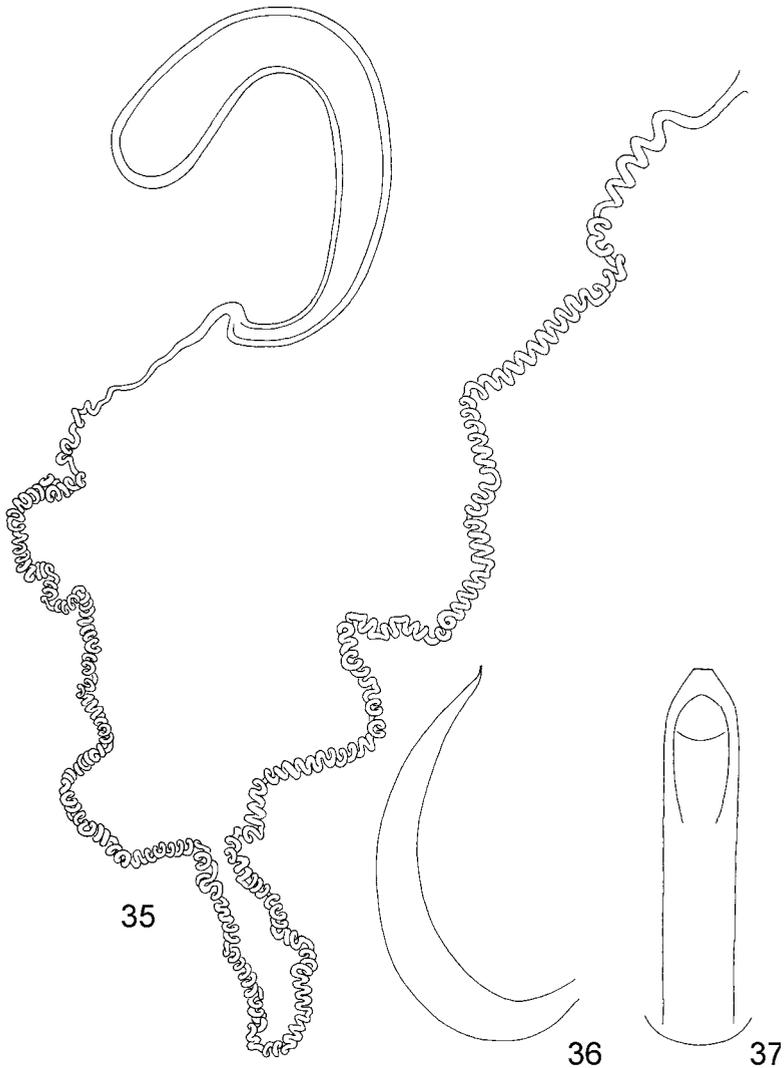
GEORGIA: holotype: Borshomi, 1 (LB); paratypes: the same data, 2 (LB).



30-34. Antennae: 30 - *Cassida medvedevi*, 31 - *C. moori*, 32 - *C. transcaucasica*, 33 - *C. tianshanica*, 34 - *C. undecimnotata*

IRAN: paratypes: Beludzhystan, c. Dezak, 9-10 II 1961, 1, ZARUDNYI (IL); 10 km W Teheran, predgor. Elburs, 9 IV 1955, 1, D. STACKELBERG (IL); not paratype material: Azaerbaigan-e Garbi, NW Orumiye, Serou env., 37.39 N 44.45 E, 1800 m, 9 VI 2000, 1, S. KADLEC (FK).

VARIA: paratypes: Caucasus, 1, REITTER (IRSN); Caucasus, Araxestal, 1 (NMP); Caucasus, Araxesthal, 1, LEDER & REITTER (IRSN); Kavkaz, 3 (NMP); Transcaucasus, 3 (IZAS, LB).



35-37. *Cassida undecimnotata*: 35 - spermatheca, 36 - aedeagus lateral, 37 - aedeagus dorsal

***Cassida undecimnotata* GEBLER, 1841**

Cassida undecim-notata GEBLER, 1841: 615, 1848: 10; BOHEMAN, 1854: 493, 1856: 147, 1862: 296; GEMMINGER and HAROLD, 1876: 3659; SPAETH, 1914 a: 133, 146; LOPATIN and TADJIBAEV, 1972: 592; MEDVEDEV, 1985: 377; LOPATIN and KULENOVA, 1986: 181; DUBESHKO and MEDVEDEV, 1989: 208; BOROWIEC, 1996: 29, 1999: 290; MOHAMEDSAID, 2000: 376.

Cassida (Cassida) undecim-notata: SPAETH, 1914 b: 112.

Cassida (Lordicassis) undecim-notata: SPAETH and REITTER, 1926: 27; WINKLER, 1932: 1356; MEDVEDEV and MATYS, 1975: 137 (larva); LOPATIN, 1977 a: 251; MEDVEDEV, 1982: 201 (larva, p. 197, 202: fig.), 284; CHEN and al., 1986: 463, 625; GRUEV, 1988: 168.

Chiridula undecimnotata: WEISE, 1893: 1071, 1894: 96 (*11-notata*).

Cassida undecimpunctata [sic] var. *undecimguttata* REITTER, 1890: 265.

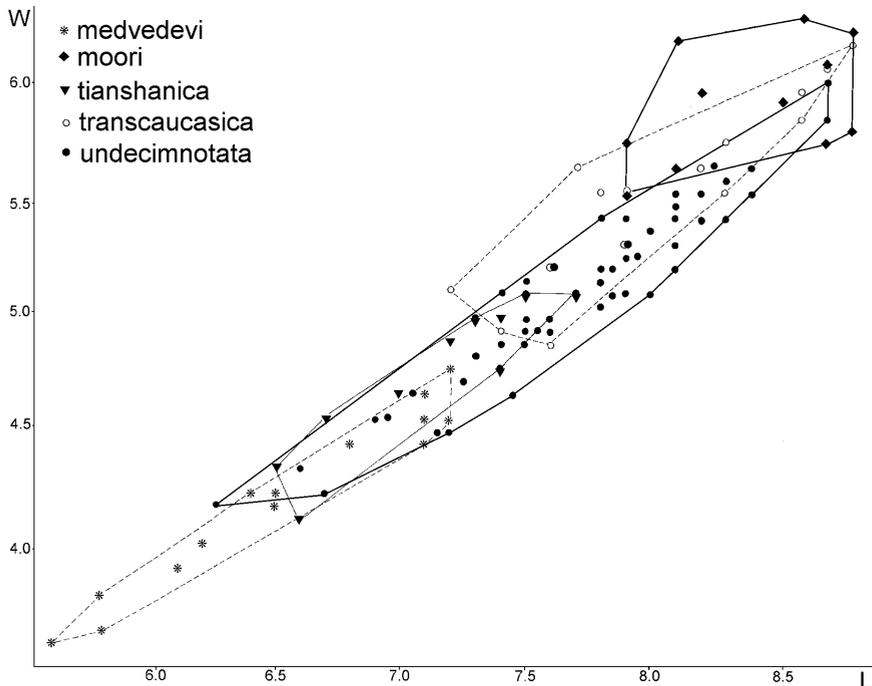
Chiridula undecimnotata ssp. *undecimguttata*: SPAETH, 1914 b: 112; WINKLER, 1932: 1356.

Cassida 11-notata ssp. *11-guttata*: SPAETH, 1914 a: 134, 146.

Cassida (Lordicassis) undecim-notata ssp. *undecim-guttata*: SPAETH and REITTER, 1926: 28.

Chiridula 11-notata var. *impicticollis* WEISE, 1894: 96; SPAETH, 1914 a: 134 (as syn. of *undecim-guttata*).

The most variable species, usually larger than *C. medvedevi* but smaller than *C. moori* and slimmer than *C. transcaucasica*. Length: 6.25-8.7 mm (mean 7.73, n = 63), width: 4.25-5.95 mm (mean 5.14, n = 63), length of pronotum: 2.3-3.05 mm, width of pronotum: 3.8-5.1 mm, length/width ratio: 1.44-1.58 (mean 1.52, n = 63), width/length of pronotum ratio: 1.64-1.78 (mean 1.70, n = 63).



38. Diagram of dispersion of body length and width

It is well characterised by its slim body and narrow explanate margin of elytra (figs 39, 41). It is the slimmest species of the group. Its dorsal pattern is variable, the specimen described by Gebler (1841) has large pronotal black spot (figs 26, 39), but in the species predominate specimens with immaculate pronotum and moderately large, isolated elytral spots (figs 24, 25). Pronotal and elytral disc slightly depressed, but slightly more convex than in *C. tianshanica* and *C. medvedevi* and distinctly less convex than in *C. transcaucasica* (figs 40, 42). Pronotal surface usually slightly microreticulate or glabrous, but sometimes distinctly microreticulate and dull, its puncturation moderately coarse and dense. Pronotum in most specimens broad, not regularly semicircular, with more or less angulate sides, only occasionally pronotum almost regularly semicircular, widest at base, but not as long as in *C. transcaucasica*. Basal margin of elytron shallowly emarginate, with moderately large basal teeth, distinctly larger than in *C. moori* and *C. tianshanica*, and as large as or slightly smaller than in *C. transcaucasica*. Elytral surface usually glabrous or only slightly dull, longitudinal elevations well marked. Base of elytra usually not or only slightly wider than pronotum. Elytral margin behind humeral angle usually straight. Explanate margin narrow, the narrowest within the group, without tendency to form a shallow gutter. Distal antennal segments slightly longer than wide (fig. 34).

Host plant: *Asteraceae*: *Carduus* sp. (MEDVEDEV and MATYS 1975); *Saussurea* sp., *Cousinia* sp. (MEDVEDEV 1982).

Terra typica: *undecimnotata*: **Loktewsk**; *undecimguttata*: **Turkmenien, Taschkent**; *impicticollis*: **Turkmenien**.

MATERIAL EXAMINED

AFGHANISTAN: Kataghan, 10-15 km E Kumduz, 400 m, 14 IV 1966, 1, J. SIMEK (IL).

IRAN: Chorassan, circ. Fairman, 25 X 1965, 1, A. WARCHALOWSKI (IL).

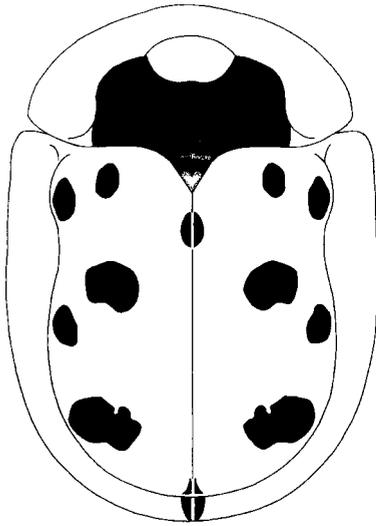
KAZAKHSTAN: Aksu, 1067 m, 2 (LB); Ili, 1, KOLTZE (LB); Kuldsha Prov., Ober Ili Tal, 2 (LB); Mujunkum, Bet-Pcik, 12 VI 1953, 1 (LB); Mujunkum desert, 60 km E Dzambal, Akirtobe, 1-9 V 1994, 3, CECHOVSKY (DS); Semipalatynsk, Makangijskij reg., VII 1959, 1 (IL).

KIRGIZSTAN: Aleksandergeb. [now Kirgiz Mts.], Tokmak, 1 (LB); Tian Shan, Sosnovka, 70 km W Bishkek, 1000 m, 9-11 V 1994, 1, R. CECHOVSKY (DS).

TADJIKISTAN: Aruk Tau, Obikiik, 1000 m, 22 IV 1989, 5 (DS); 5 km E Duschambe, 18 IV 1985, 2, KAPLER (LB); Kurgan tjube, 22 IV 1989, 2 (DS); Vose, 120 km SO Duschambe, 12-13 V 1991, 1, HALADA (DS).

TURKMENISTAN: Aschabad, 29 IV 1951, 1, DUNDA (DS), 10 V 1994, 35 (LB); Gandyrskoie ut., 1 (IL); Kerkinsk. r., Kurzhe, Gasnak, 22 IX 1985, 1, DOLIN (IL); Kopet Dag, 15 IV 1998, 1 (DS); Kopetdag, Chandyr, 4 (IL); Kopetdag, Garygala, V 1994, 1, J. MIATLENSKI (IL); Kopet Dag, Kara Kala, 450 m, 1 IV 1994, 3 (LB); Monzhukly Mts., n. Kara Kala, 30 IV 1992, 3, PLJUSHTOK (DS); Tschemeni-Bit, 25 km N Kushka, 30 III-6 IV 1992, 3, S. BECVAR (DS), 1 IV 1992, 4, M. SNIZEK (DS), 20-25 IV 1993, 3, M. SNIZEK (DS).

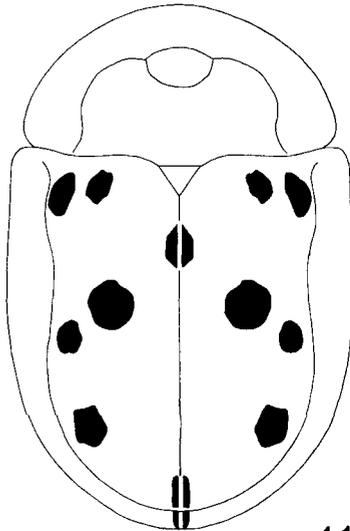
UZBEKISTAN: Buchara, 1 (LB), 1, ex coll. MADON (IRSN); Kammashi, 6 VI 1984, 1, I. LOPATIN (IL); Samarkanda, 1 (LB); Surenata Mts., Parkent, 12 V 1994, 2 (LB).



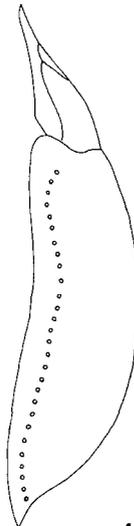
39



40



41



42

39-42. *Cassida undecimnotata*: 39, 41 - dorsal, 40, 42 - lateral; 39, 40 - nominotypical form from Semipalatynsk, 41, 42 - common form from Turkmenistan

ACKNOWLEDGEMENTS

We would like to express our sincere thanks to S. BILY (Prague), M. CLUDTS (Bruxelles), I.K. LOPATIN (Minsk), D. SASSI (Castelmarte), and S.A. ŚLIPIŃSKI (Warsaw) for the loan of specimens.

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