



## Key for identification of the ladybirds (Coleoptera: Coccinellidae) of European Russia and the Russian Caucasus (native and alien species)

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### Abstract

Although ladybirds of European Russia and the Caucasus have been the subject of numerous ecological and faunistic investigations, there is an evident lack of appropriate identification keys. New, original keys to subfamilies, tribes, genera, and species of ladybirds (Coccinellidae) of European Russia and the Russian Caucasus are presented here. The keys include all native species recorded in the region and all introduced alien species. Some species from adjacent regions are added. In total, 113 species are treated and illustrated with line drawings. Photographs of rare and endemic species are provided. Information on the distribution of species within the region under consideration is provided. *Chilocorus kuwanae* Silvestri, 1909 is recognized as a subjective junior synonym (**syn. nov.**) of *Ch. renipustulatus* (Scriba, 1791).

**Key words:** Lady beetles, Coccinellids, determination, aboriginal species, introduced species

### Introduction

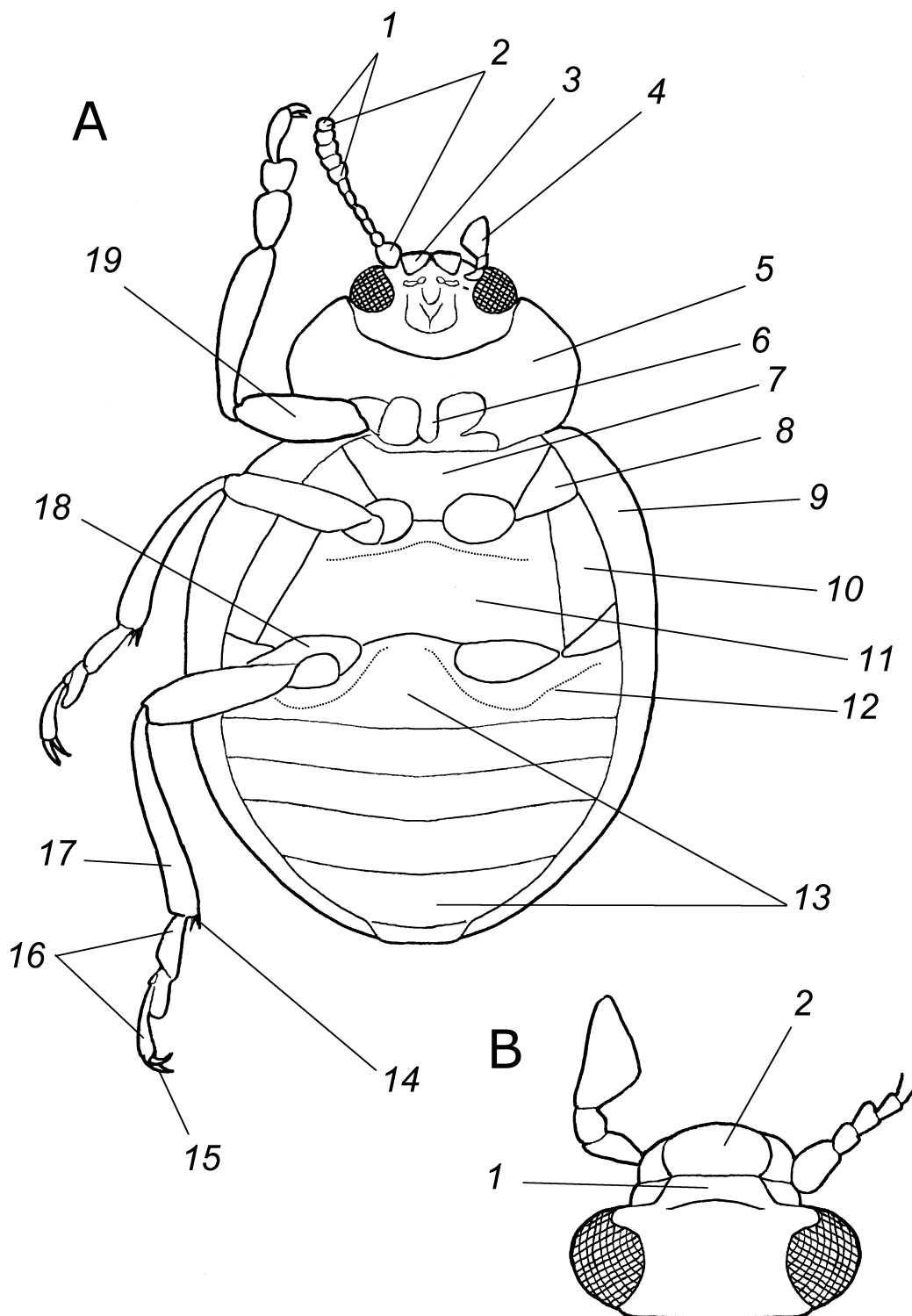
The family Coccinellidae Latreille (ladybird beetles, lady beetles, ladybug, lady-cow) includes more than 6000 species, distributed throughout the world (Vandenberg 2002). One hundred and five species have been recorded in European Russia and the Russian Caucasus (Krasnodar Krai, Stavropol Krai, Adygea, Kabardino-Balkaria, Karachay-Cherkessia, North Ossetia, Chechnya, Dagestan, Ingushetia) (Zaslavski 1965; Iablokoff-Khnzorian 1983; Savojskaja 1984; Kovář 2007; Korotyaev *et al.* 2012). Identification of Coccinellidae is important since this group is the subject of numerous ecological and faunistic investigations and because some species of ladybirds are used for biological control of pests (aphids, coccids, whiteflies). However, there is no comprehensive and contemporary identification guide for adult ladybirds of European Russia and the Russian Caucasus. At present, the main guide for this purpose is the key by Zaslavski (1965), but it includes only about 60% of the species known to occur in the region. Some native species of the genera *Tetrabrachys* Kapur, *Ceratomegilla* Crotch, *Exochomus* Redtenbacher, *Scymnus* Kugelann, *Nephus* Mulsant, *Hyperaspis* Chevrolat as well as all introduced species (Ukrainsky & Orlova-Bienkowskaja 2014; Orlova-Bienkowskaja & Bieńkowski 2017) are missing from the key. Since the publication of the Zaslavski key (1965) over 50 years ago, many changes in the nomenclature of ladybirds have been proposed, and new species have been described. Keys to adults of ladybirds of the whole territory of the USSR are included in publications by Savojskaja (1983; 1984). However, these keys also include only part of the species occurring in European Russia and the Russian Caucasus. All these keys have been published in Russian. The work by Kuznetsov (1997) on Coccinellidae of the Russian Far East was published in English, but the key only covers 42 of the 113 species treated in the present work (around 38%). Guides for identification of Coccinellidae of other countries (e.g. Lompe 2002; Nedvěd 2015) are not appropriate for European Russia, since they do not include many species occurring in the Caucasus and other regions.

### Materials and methods

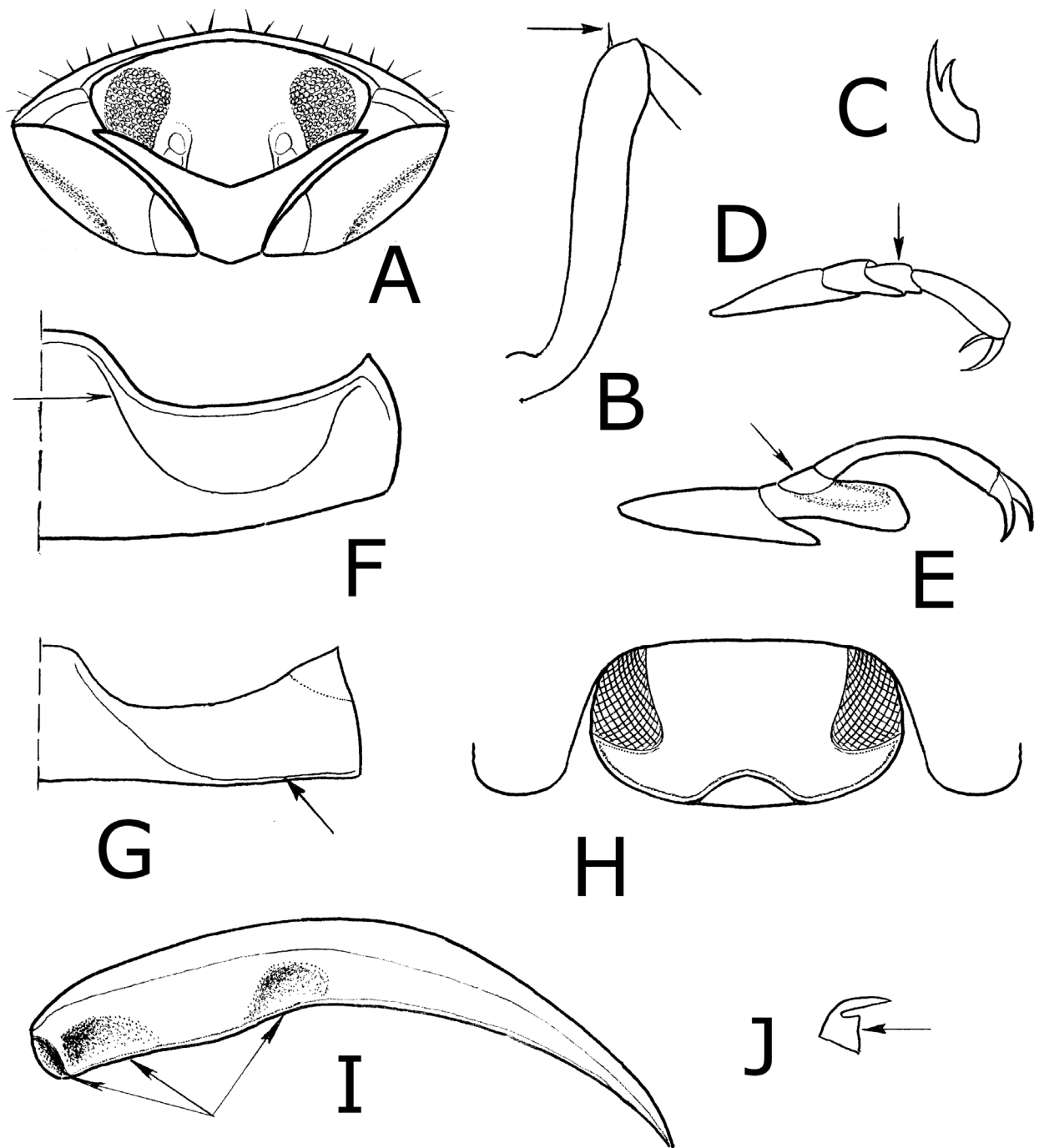
The present key was compiled based on examination of about 2000 specimens from the collections of the

Zoological Institute of Russian Academy of Sciences (ZIN), the Zoological Museum of Moscow State University (ZMMU), the Department of Entomology of the Moscow State University (MSU), the All-Russian Plant Quarantine Center (VNIKR), the private collections of A.S. Ukrainsky and M.N. Tsurikov, and the author's collection.

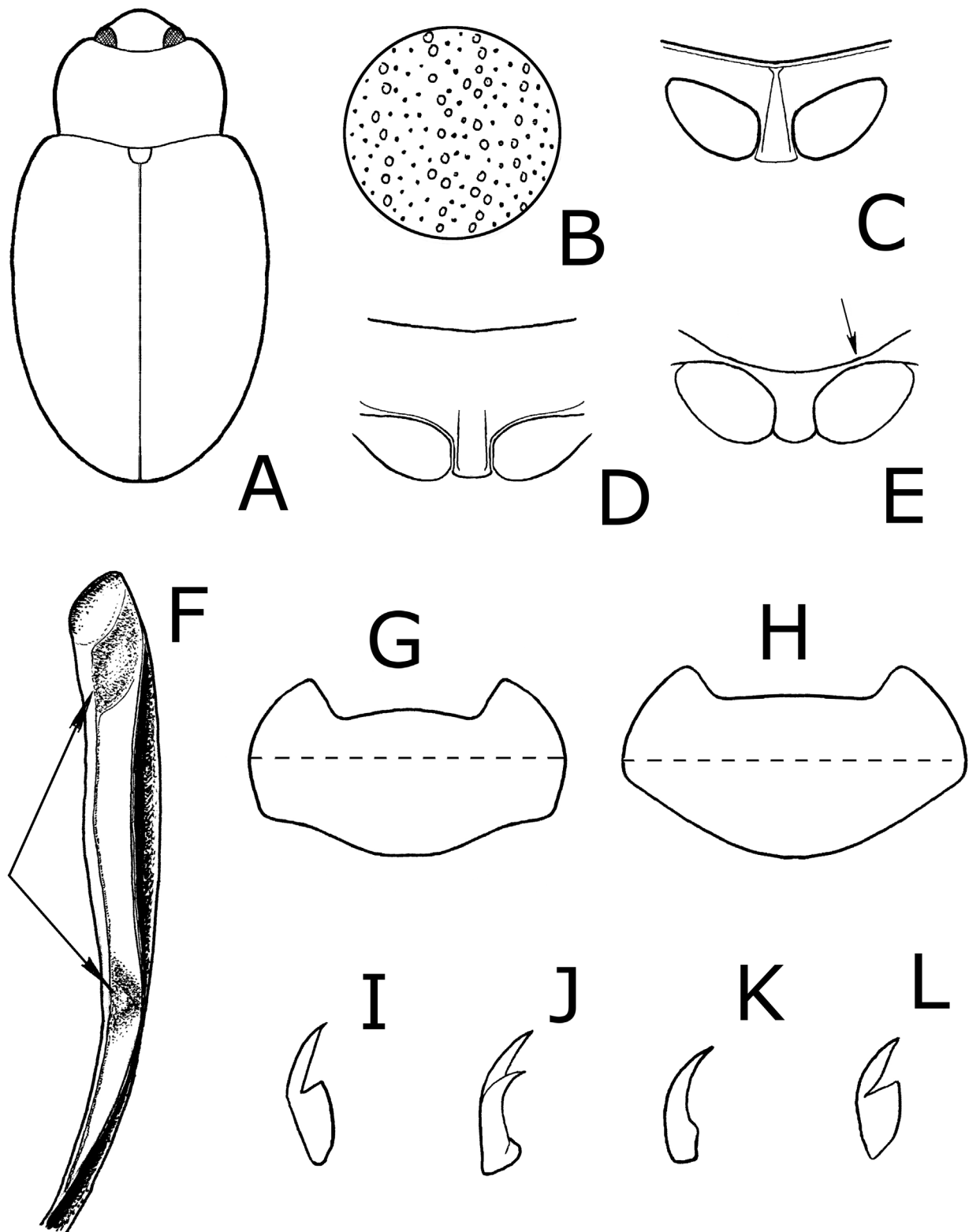
The characters used in identification of genera and species of Coccinellidae are shown in Fig. 1.



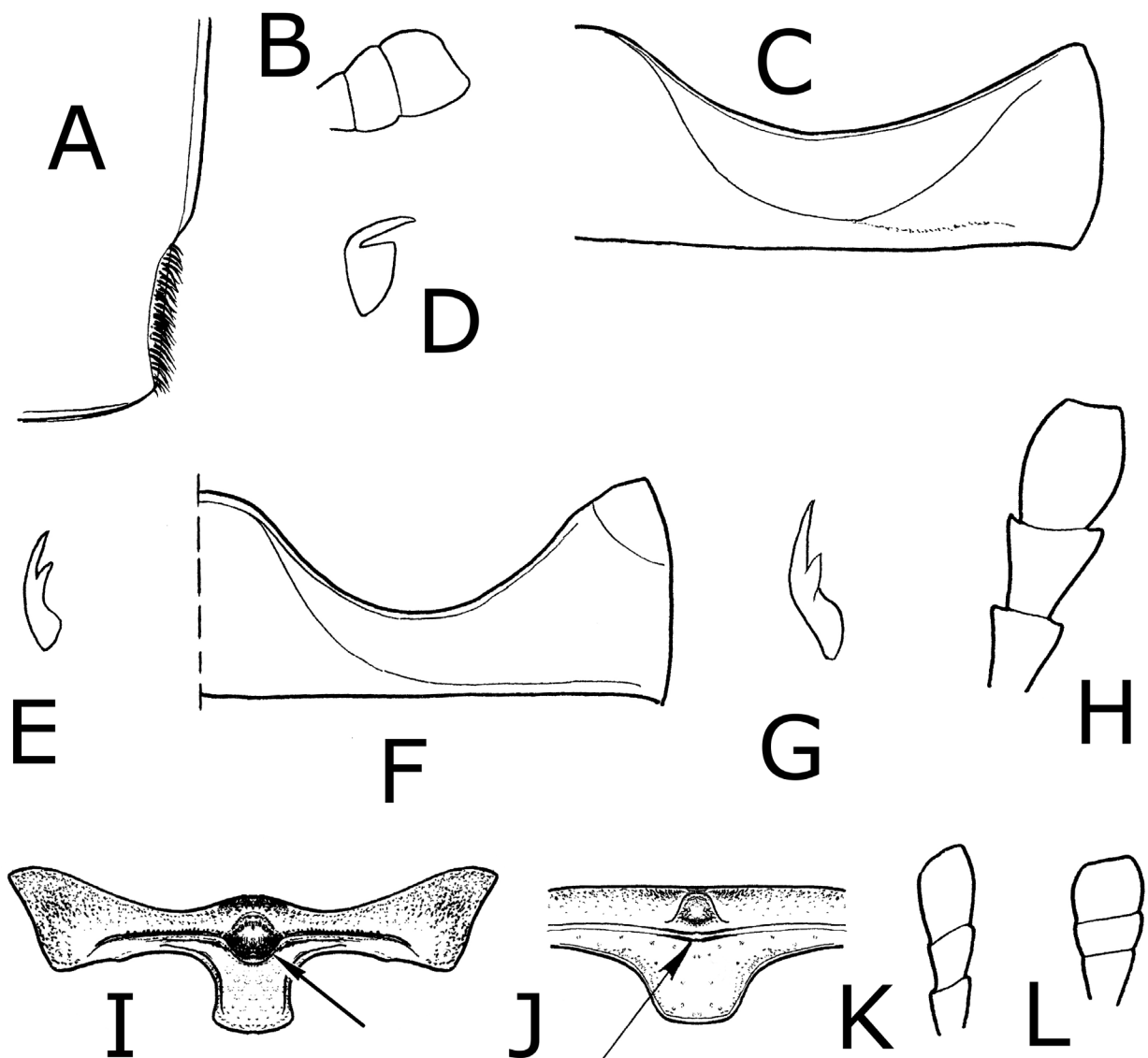
**FIGURE 1.** *Ceratomegilla notata* (Laicharting) taxonomic characters. (A) Total ventral view: 1, antennal club, 2, antenna, 3, mandible, 4, maxillary palpus, 5, prothoracic hypomeron, 6, prosternal process, 7, mesoventrite, 8, epimera of mesothorax, 9, elytral epipleura, 10, episterna of metathorax, 11, metaventrite, 12, postcoxal line, 13, abdominal ventrites, 14, tibial spur, 15, tarsal claw, 16, tarsus, 17, tibia, 18, coxa, 19, femur. (B) Head, dorsal view: 1, clypeus, 2, labrum. (Illustrations by author).



**FIGURE 2.** Details of different species of ladybirds. (A) *Serangium montazerii* Fürsch, head and prothorax, ventral view. (B–C) *Subcoccinella vigintiquatuorpunktata* (Linnaeus): (B) Fore tibia, arrow shows spur, (C) Tarsal claw. (D–E) Hind-tarsus, arrow shows 3rd tarsomere: (D) *Tetrabrachys connatus* (Creutzer), (E) *Anatis ocellata* (Linnaeus). (F–G) 1st abdominal ventrite, left half, arrow shows postcoxal line: (F) *Exochomus quadripustulatus* (Linnaeus), (G) *Chilocorus renipustulatus* (Scriba). (H) *Ch. renipustulatus*, head, front view. (I–J) *Cynegetis impunctata* (Linnaeus): (I) Elytral epipleura, ventral view, arrows show impressions, (J) Tarsal claw, arrow shows basal denticle. (Illustrations by author).



**FIGURE 3.** Details of different species of ladybirds. (A–B) *Coccidula rufa* (Herbst): (A) Total dorsal view, (B) elytral punctation. (C–E) Prothorax, arrow shows a part of prothorax in front of coxa: (C) *Scymnus nderihensis* Mulsant, (D) *Cryptolaemus montrouzieri* Mulsant, (E) *Clitostethus arcuatus* (Rossi). (F) *Hyperaspis reppensis* (Herbst), elytral epipleura, arrows show impressions. (G–H) Pronotum, dotted line shows a maximum width position: (G) *Anisosticta novemdecimpunctata* (Linnaeus), (H) *Bulaea lichatschovi* (Hummel). (I–L) Tarsal claw: (I) *Ceratomegilla notata* (Laicharting), (J) *Hippodamia variegata* (Goeze), (K) *Bulaea lichatschovi*, (L) *Anatis ocellata* (Linnaeus). (Illustrations by author).



**FIGURE 4.** Details of different species of ladybirds. (A) *Anatis ocellata* (Linnaeus), apex of elytral suture. (B–D) *Adalia bipunctata* (Linnaeus): (B) Apex of antenna, (C) 1st abdominal ventrite, left half, (D) Tarsal claw. (E) *Hippodamia arctica* (Schneider), tarsal claw. (F) *Calvia decemguttata* (Linnaeus), 1st abdominal ventrite, left half. (G–H) *Myzia oblongoguttata* (Linnaeus): (G) Tarsal claw, (H) Apex of antenna. (I–J) Mesoventrite, ventral view, arrow shows anterior border: (I) *Calvia decemguttata*, (J) *Harmonia quadripunctata* (Pontoppidan). (K–L) Apex of antenna: (K) *Vibidia duodecimguttata* (Poda), (L) *Coccinula quatuordecimpustulata* (Linnaeus). (Illustrations by author).

For each genus the number of species occurring in European Russia and the Russian Caucasus is indicated. References to the taxonomic literature used when compiling the key for species of each genus are provided before the key. The valid names of genera and species are supplied with some invalid names in parentheses: first, the names used as valid by Zaslavski (1965), and secondly, other important synonyms.

Two asterisks (\*\*) after the name of the species indicate that specimens from European Russia and the Russian Caucasus have been examined, one asterisk (\*) indicate that specimens from outside the region have been examined. The specific names in square brackets mean that these species have not been found in European Russia and in the Russian Caucasus (5 species). The reason for the inclusion of them is indicated in each case.

Distribution of species within the region under consideration is indicated. Subdivision of European Russia into the north, middle belt, and south is adopted according to the most recent Palearctic catalog (Kovář 2007). The

border between the north and middle belt is roughly along a line connecting St. Petersburg-Vologda-Syktvykar, and between the middle belt and the south a line connecting Kursk-Voronezh-Saratov-Orenburg (Fig. 12).

A number of different classification systems are currently being utilized by various authors (e.g., Lompe 2002; Kovář 2007). In the present work, the names of genera, tribes and subfamilies are given according to Nedvěd (2015).

## Key to genera

1. Last maxillary palpomere elongate-oval or elongate conical, distinctly narrowing towards apex. Body small (length ~2mm). Subfamily Microweiseinae Leng ..... 2
- Last maxillary palpomere securiform, or cylindrical and obliquely truncate. Last antennomere not longer than two previous combined. Head not drawn into prothorax. Body usually larger (length >2mm). Subfamily Coccinellinae Latreille ..... 3
2. Last antennomere very large, oval, as long as seven previous combined. Head entirely drawn into prothorax, bent down (Fig. 2A). Body very convex, hemispherical, shining. Head, pronotum and elytra covered by long sparse setation. Femora may be embedded in impressions on underside of thorax and first abdominal ventrite, concealing tibiae and tarsi. .... *Serangium* Blackburn (1 species introduced from India).
- Last antennomere small. Antennae short, reaching anterior margin of pronotum. Head not drawn into prothorax, not bent down. Body moderately convex, weakly shining. Head, pronotum and elytra with short dense white setation. Femora usually not embedded in impressions on underside of thorax and 1st abdominal ventrite. .... *Pharoscymnus* Bedel (1 species)
3. Tarsi distinctly tetramerous, third tarsomere slightly smaller than second (Fig. 2D). Tribe Coccidulini Mulsant (in part). .... *Tetrabrachys* Kapur (*Lithophilus* Frölich) (4 species).
- Tarsi pseudotrimerous, 2nd tarsomere enlarged below and projecting under 3rd one, 3rd tarsomere small, attached on upper side of 2nd one at its base and often poorly visible (Fig. 2E); or tarsi trimerous (in *Nephus* Mulsant and *Scymniscus* Dobzhansky) ..... 4
4. Fore tibiae with apical spur (Fig. 2B). Dorsum always pubescent. Mandibles with more than three large teeth. Antennae inserted dorsally. Tribe Epilachnini Mulsant. .... 5
- Fore tibiae without apical spur. Dorsum glabrous or pubescent ..... 6
5. Tarsal claw with denticle at mid-length (Fig. 2C). Elytral epipleura without impressions. Elytra covered with punctures of same size ..... *Subcoccinella* Guerin-Meneville (1 species).
- Tarsal claw with denticle at base (Fig. 2J). Elytral epipleura with impressions, in which apices of femora can be inserted (Fig. 2I). Elytra with both intermixed small- dense and large-sparse punctation. .... *Cynegetis* Dejean (1 species).
6. Clypeus very broad, forming large transverse plate in front of eyes (Fig. 2H) ..... 7
- Clypeus narrow, not projecting in front of eyes (Fig. 1B). [Note: Be careful not to confuse with the narrow lateral parts of frons behind antennal bases, which may project onto eyes] ..... 10
7. Elytra glabrous (with only fine, poorly visible setae near lateral margins). Eyes lacking interfacetal setae. Tribe Chilocorini Mulsant ..... 8
- Elytra entirely covered with dense setation. Eyes with interfacetal setae (more distinct at sides). Tribe Platynaspidini Mulsant ..... *Platynaspis* Redtenbacher (1 species).
8. Clypeus with raised anterior border. Postcoxal line reaching posterior margin of ventrite, then running along the latter to outer margin (Fig. 2G) ..... *Chilocorus* Leach (3 species: two native and one introduced from the Far East).
- Clypeus without raised anterior border. Postcoxal line forming ½ circle and reaching anterior margin of ventrite externally (Fig. 2F) ..... 9
9. Elytra spotted, dark with pale spots or rufous with black spots ..... *Exochomus* Redtenbacher (*Brumus* Mulsant) (3 species).
- Elytra entirely black. Pronotum black medially and yellow laterally ..... *Parexochomus* Barovsky (2 species).
10. Pronotum and elytra covered with dense setation. .... 11
- Pronotum and elytra glabrous ..... 21
11. Antennae long, reaching mid-length of pronotal lateral margins or extending further. Tribe Coccidulini (in part). .... 12
- Antennae short, generally not reaching mid-length of pronotal lateral carinae, if slightly projecting behind mid-length, then body very small, 1.5–1.6mm long (see couplet 27) ..... 14
12. Body oblong or elongate oval, 1.6-1.9× as long as wide ..... 13
- Body short-oval, 1.4× as long as wide. Elytral punctures similar in size. Elytra entirely blackish bronze ..... *Lindorus* Casey (1 species introduced from Australia).
13. Body oblong, 1.9× as long as wide, elytra almost parallel-sided at mid-length (Fig. 3A). Elytral punctation double, consisting of small and large punctures; large punctures arranged in irregular rows (Fig. 3B). Pronotal base not marginate ..... *Coccidula* Kugelann (2 species).
- Body elongate oval, 1.6× as long as wide. Elytral punctation double, consisting of small and large punctures; large punctures irregularly placed. Pronotal base marginate ..... *Rhizophobius* Stephens (1 species).
14. Length of prosternum in front of coxa much less than length of coxa (Fig. 3E) ..... 15
- Length of prosternum in front of coxae not so short (Fig. 3C, D). Elytra lacking whitish horseshoe shaped mark ..... 16
15. Setae of elytral declivity directed parallel to suture. Elytra with whitish horseshoe shaped mark at center (Fig. 8J). Tribe Scymnini Mulsant (in part) ..... *Clitostethus* Weise (1 species).

- Setae at elytral apical declivity directed obliquely from suture. Elytra red with (or without) black pattern. Tribe Ortaliini Mulsant ..... *Rodolia* Mulsant (2 introduced species).
- 16. Length of prosternum in front of coxa subequal to length of coxa (Fig. 3C). Body smaller, 1–3mm long. Antennae shorter than head width. .... 17
- Prosternum very long in front of coxa, 2× length of coxa (Fig. 3D). Body larger, 4.3–4.6mm long. Antennae longer than head width. .... *Cryptolaemus* Mulsant (1 species introduced from Australia).
- 17. Setae at elytral declivity directed parallel to suture. Pronotum and elytra black. Antennae, tibiae, and tarsi yellow. Tribe Stethorini Dobzhansky ..... *Stethorus* Weise (2 species).
- Setae at elytral declivity directed obliquely from suture. Tribe Scymnini ..... 18
- 18. Prosternal process with two carinae (Fig. 3C) ..... 19
- Prosternal process without carinae ..... 20
- 19. Postcoxal line turned towards or reaching anterior border of ventrite ..... *Scymnus* Kugelann (in part) see also couplet 20. (25 species).
- Postcoxal line reaching and continuing along posterior margin of ventrite ..... *Diomus* Mulsant (1 species).
- 20. Postcoxal line forming half a circle and reaching anterior margin of ventrite with its outer end. .... *Scymnus* Kugelann (in part), see also couplet 19.
- Lateral part of postcoxal line running along posterior margin of ventrite, then curved forward, but not reaching anterior margin of ventrite ..... *Nephus* Mulsant (5 species: 4 native, 1 introduced from Reunion Isl.)
- Postcoxal line returning forward, reaching lateral margin of abdomen ..... *Scymniscus* Dobzhansky (1 species).
- 21. Elytral epipleura with impressions, in which apices of mid- and hind-femora can be inserted (Fig. 3F). Antennae shorter than head width. In male, head yellow, pronotum black with anterior and lateral margins yellow. In female, head black, pronotum black with lateral margins yellow. Tribe Hyperaspidini Mulsant (in part) ..... *Hyperaspis* Chevrolat (*Oxynychus* LeConte) (7 species).
- Elytral epipleura without impressions. Antennae longer than head width. Tribe Coccinellini Latreille ..... 22
- 22. Postcoxal lines absent. Body oblong. Elytra yellow, red or rufous, usually with 13 black spots, which sometimes partly fused to each other, some missing, rarely without spots ..... *Hippodamia* Chevrolat (in part) (4 species).
- Postcoxal lines present. Elytra variously colored. .... 23
- 23. Pronotal base marginate (in *Ceratomegilla* Crotch this border sometimes interrupted laterally). .... 24
- Pronotal base not marginate ..... 26
- 24. Mid- and hind-tibiae with two long apical spurs. .... 25
- Mid- and hind-tibiae without apical spurs. Tarsal claw with denticle at base. .... *Aphidecta* Weise (1 species).
- 25. Tarsal claws bifid at mid-length (Fig. 3J). Body oblong. .... *Hippodamia* Chevrolat (in part) (*Adonia* Mulsant) see also couplets 22 and 31 (4 species).
- Tarsal claws with large basal denticle reaching mid-length of claw (Fig. 3I). Body broadly oval ..... *Ceratomegilla* Crotch (*Semiadalia* Crotch) (4 species).
- 26. Tarsal claws without distinct denticle (claw sometimes broadened at inner edge near base) (Fig. 3K). In *Anisosticta* (couplet 27) very weak obtuse denticle sometimes present ..... 27
- Tarsal claws with distinct denticle (Figs. 3L; 4D, E, G) ..... 28
- 27. Body oblong-oval, weakly convex. Pronotum broadest at mid-length of lateral margin (Fig. 3G). Mid- and hind-tibiae with one spur ..... *Anisosticta* Chevrolat (2 species).
- Body short-oval, very convex. Pronotum broadest at base of lateral margin (Fig. 3H). Mid- and hind-tibiae with two spurs ... *Bulaea* Mulsant (1 species).
- 28. Elytral suture with pubescent excision near apex (Fig. 4A). Prosternum with tubercle anteriorly ... *Anatis* Mulsant (1 species).
- Elytral suture without excision near apex. Prosternum without tubercle ..... 29
- 29. Penultimate antennomere broader than long or as broad as long (Figs. 4B, H, K, L; 5I). .... 30
- Penultimate antennomere longer than broad (Fig. 5C). Dorsum orange-brown with white spots ..... 45
- 30. Postcoxal line forming even arc, with its outer end reaching anterior margin of ventrite (in *Adalia*, weakly developed posterior branch deviates from arc at angle, (Fig. 4C). .... 31
- Postcoxal line reaching posterior margin of ventrite (Fig. 4F) and usually bearing a branch directed forward and obliquely outside ..... 32
- 31. Tarsal claws with denticle at base (Fig. 4D). .... *Adalia* Mulsant (3 species).
- Tarsal claws bifid at mid-length (Fig. 4E). .... *Hippodamia* Chevrolat (in part) (*Adonia* Mulsant), see also couplet 25.
- 32. Anterior margin of horizontal plane of mesoventrite with deep emargination, limited by border (Fig. 4I). .... 33
- Anterior margin of horizontal plane of mesoventrite straight or weakly impressed, but always without deep triangular emargination (Fig. 4J). In some cases, mesoventrite bearing triangular emargination on its front vertical side (not at a horizontal plane) (Fig. 5E) ..... 34
- 33. Last antennomere broadly truncate at apex. Elytra mostly rufous with white spots, except one Caucasian species black with variable yellow pattern ..... *Calvia* Mulsant (4 species).
- Last antennomere rounded at apex. Elytra yellow with variable black pattern ..... *Propylea* Mulsant (*Propylaea* Mulsant) (1 species).
- 34. 1st antennomere not lobately broadened ..... 35
- 1st antennomere lobately broadened. (Fig. 5B) ..... *Aiolocaria* Crotch (1 species introduced in Ukraine and Georgia from E. Asia).
- 35. Tarsal claws with denticle at mid-length (Fig. 4G). .... *Myzia* Mulsant (*Neomysia* Casey) (1 species).

- Tarsal claws with denticle at base (apex of large denticle may reach mid-length of claw) . . . . . 36
- 36. Last antennomere oval, truncate apically, longer than wide (Fig. 4K) . . . . . 37
- Last antennomere as long as wide or wider than long (Fig. 4L) . . . . . 38
- 37. Body smaller, 3–4 mm long. Each elytron with six pale spots . . . . . 31. *Vibidia* Mulsant (1 species).
- Body larger, 5–6 mm long. Each elytron with 10 pale spots . . . . . *Sospita* Mulsant (1 species).
- 38. Episterna of metathorax pale . . . . . 39
- Episterna of metathorax entirely or mostly black or brown . . . . . 42
- 39. Elytra black, each with seven large yellow spots . . . . . *Coccinula* Dobzhansky (2 species).
- Elytra yellow or rufous, with black stripes or spots . . . . . 40
- 40. Elytral suture pale . . . . . 41
- Elytral suture black, besides that each elytron with black longitudinal discal stripe or with eight black spots, three lateral spots usually connected to each other . . . . . *Tytthaspis* Crotch (2 species).
- 41. Body larger, 5–10.0mm long. Pronotum with 11 black spots, in some cases these spots partly fused, or only one bilobed spot at base. Each elytron with seven-eight black spots or only two spots near lateral margin. . . . . *Harmonia* Mulsant (in part), see also couplet 43. (3 species: 1 native and 2 introduced from E. Asia).
- Body smaller, 3–4.5mm long. Pronotum with five black spots. Each elytron with 11 black spots . . . . . *Psyllobora* Dejean (*Thea* Mulsant) (1 species).
- 42. Mesoventrite bearing triangular emargination limited by raised borders on its front vertical side (Fig. 5E) . . . . . 43
- Mesoventrite without triangular emargination on its front vertical side . . . . . 44
- 43. Elytral base distinctly broader than pronotal base. Pronotal posterior corners broadly rounded. Elytral declivity mostly with transverse fold (Fig. 5A) . . . . . *Harmonia* Mulsant (in part), see also couplet 41.
- Elytral base slightly broader than pronotal base. Pronotal posterior corners more or less angulate. Elytral declivity without transverse fold . . . . . *Oenopia* Mulsant (*Synharmonia* Ganglbauer) (2 species).
- 44. Pronotal lateral margin distinctly rounded, immarginate (Fig. 5G). Elytra red, without spots . . . . . *Cycloneda* Crotch (1 species introduced from Cuba for pest control in greenhouses).
- Pronotal lateral margin sublinear and marginate (Fig. 5H). Elytra with black spots or stripes . . . . . *Coccinella* Linnaeus (7 species).
- 45. Prosternal process with two lateral furrows, separating narrow external strip (Fig. 5F). Body smaller, 3.5–4.6mm long. . . . . *Myrrha* Mulsant (1 species).
- Prosternal process marginate at very edge, without lateral furrows (Fig. 5D). Body larger, 5.8–6.4mm long. . . . . *Halysia* Mulsant (1 species).

## Key to species

### *Adalia* Mulsant

(Zaslavski 1965)

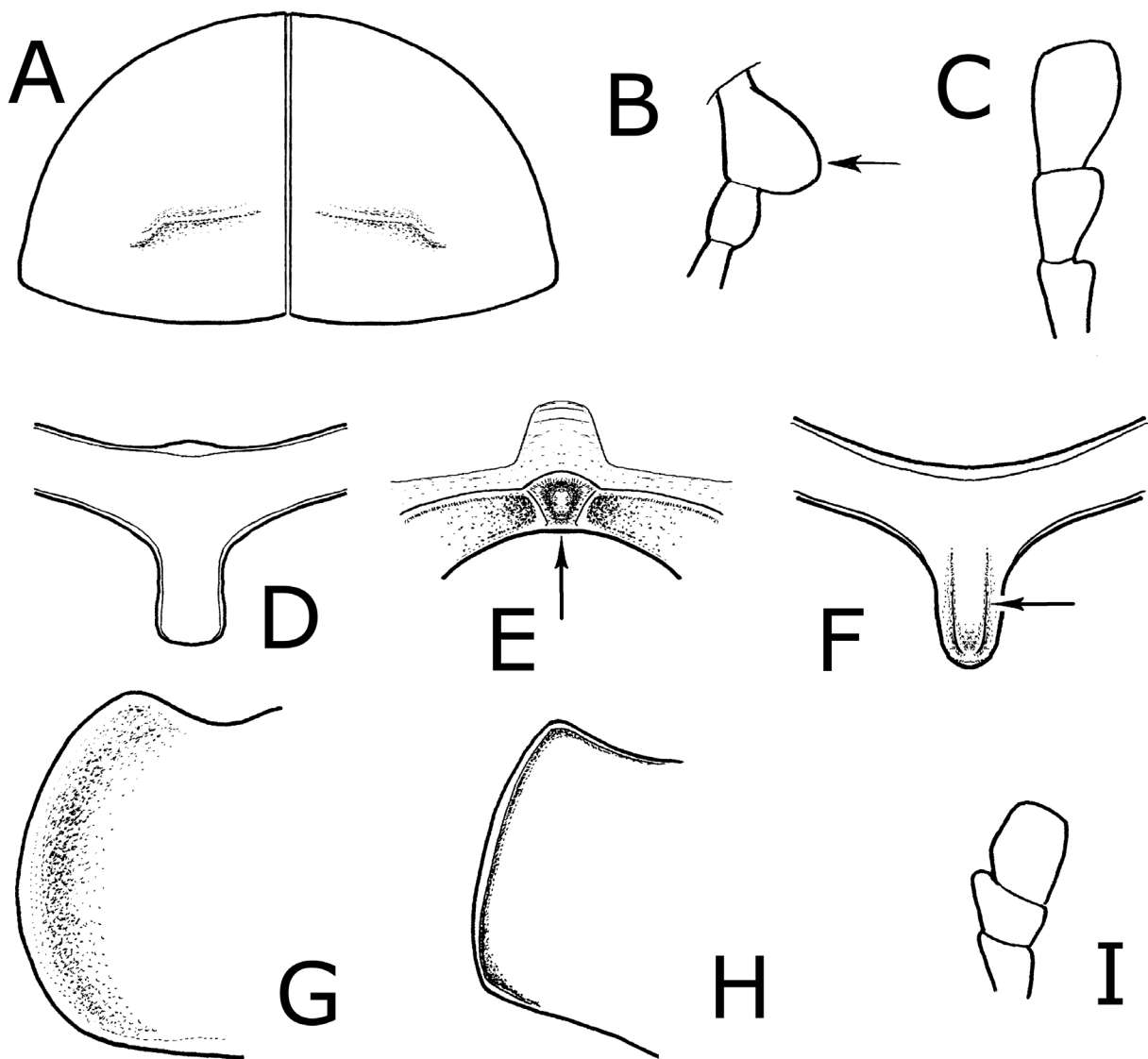
1. Epimera of mesothorax white. Elytra usually with transverse fold at apical declivity. Dorsal coloration very variable. Head usually pale yellow with two black spots. Pronotum pale yellow or white with five black or brown spots. Elytra differently colored: 1) light (yellow to orange), each with five–seven black spots, sometimes connected to each other (Fig. 8D), 2) dark (rufous to black), each with five white (light yellow) spots (Fig. 8C), 3) dark (rufous to black) with one humeral spot. Length 3.5–5.0mm. Middle belt (north to taiga), south (Crimea, Saratov reg., Krasnodar Krai) . . . . . *A. decempunctata* (Linnaeus) \*\*
- Epimera of mesothorax black. Elytra without transverse fold at apical declivity. . . . . 2
2. Tarsal claw with very small acute denticle at base (Fig. 9C). Elytra yellow, with narrow black sutural stripe, each with five black spots. Pronotum pale yellow with M-shaped pattern. Length 3.0–4.5mm. North, middle belt (south to forest-steppe), Crimea . . . . . *A. conglomerata* (Linnaeus) \*\*
- Tarsal claw with large rectangular denticle at base (Fig. 9D). Coloration variable: two color forms predominate: 1) pronotum white with black M-shaped pattern, elytra red or orange, each with 1 black spot, suture not blackened; 2) pronotum black with narrow white lateral stripe, elytra black, each with two–three red spots: on humeral callus, near suture behind mid-length, and near apex (sometimes absent). In the north, color form with rufous elytra bearing two black transverse bands inhabits. Length 3.5–5.4mm. Widely distributed. . . . . *A. bipunctata* (Linnaeus) (*A. frigida* Schneider) \*\*

### *Aiolocaria* Crotch

(Kuznetsov 1992)

1. Pronotum black with yellow or orange lateral sides. Elytra black with four orange or red spots, forming characteristic pattern: two elongate spots along lateral margin (posterior spot sometimes divided in two parts) and two spots along suture: anterior one horseshoe shaped (sometimes divided in two parts) and posterior one oval or triangular. Length 7.3–12.0mm. Attempts were made to introduce this species in Ukraine, Georgia, and Kazakhstan . . . . . [*A. hexaspilota* (Hope)] \*





**FIGURE 5.** Details of different species of ladybirds. (A) *Harmonia axyridis* (Pallas), elytral apical declivity from behind. (B) *Aiolocaria hexaspilota* (Hope), base of antenna, arrow shows lobe of 1st antennomere. (C–D) *Halyzia sedecimguttata* (Linnaeus): (C) Apex of antenna, (D) Prosternal process. (E) *H. axyridis*, mesoventrite, front view, arrow shows impression. (F) *Myrrha octodecimguttata* (Linnaeus), process of prosternum, arrow shows lateral furrow. (G–H) Pronotum, left side: (G) *Cycloneda sanguinea limbifer* Casey, (H) *Coccinella septempunctata* Linnaeus. (I) *Calvia quatuordecimguttata* (Linnaeus), apex of antenna. (Illustrations by author)

**Anatis Mulsant**  
(Zaslavski 1965)

1. Head black with two yellow spots on vertex. Pronotum black with yellow pattern: narrow anterior and broad lateral stripes, two spots at base, lateral stripe including black spot. Elytra yellow to red-brown, with narrow lateral stripe and one, five, eight or 10 spots black. Each elytral spot usually surrounded by light yellow ring; sometimes black spots absent, and only light yellow traces of spots present. Length 7.6–9.3mm. North, middle belt, south (Saratov reg.). . . . . *A. ocellata* (Linnaeus) \*\*

### **Anisosticta Chevrolat**

(Zaslavski 1965)

1. Dorsum yellow in autumn, orange in spring. Head with two black spots on vertex. Pronotum with six, each elytron with 10 black spots. Length 3.4–4.4mm. North, middle belt, south (Crimea, the Caucasus) . . . . *A. novemdecimpunctata* (Linnaeus) \*\*
- Head black for most part. Pronotum yellow with two large black spots, elytra yellow with black pattern: joint undulate sutural stripe, each with longitudinal discal undulate stripe and rounded spot at apical declivity. Length 2.5–3.2mm. (Fig. 10A). North . . . . . *A. strigata* (Thunberg) \*\*

### **Aphidecta Weise**

(Zaslavski 1965)

1. Dorsum yellow or ochraceous. Pronotum with black M-shaped mark. Elytra with black suture, usually without spots, rarely with black spots, or entirely dark. Length 3.5–5.0mm. Widely distributed . . . . . *A. obliterated* (Linnaeus) \*\*

### **Bulaea Mulsant**

(Zaslavski 1965)

1. Head and pronotum pale yellow, elytra pink or pale rufous. Head with two spots, pronotum with one small spot at middle of base (sometimes absent) and six large spots black. Elytra with joint spot near scutellum and each with nine spots black. Length 3.5–5.5mm. South . . . . . *B. lichatschovi* (Hummel) \*\*

### **Calvia Mulsant**

(Weise 1891; Zaslavski 1965)

1. Elytra rufous with white or light yellow spots. Body always without black pattern on upper and lower sides . . . . . 2
- Dorsal and ventral sides of body with developed black pattern. Pronotum rufous with two large black spots of irregular shape. Elytra yellow with black pattern: sutural stripe, slightly broadened near scutellum and largely angularly broadened at mid-length, one spot on humeral callus, two spots laterally, or elytra black with very narrow rufous lateral stripe, each with seven rounded light yellow spots (1, 3, 2, 1). Underside rufous with light yellow epimera of meso- and metathorax and with black mesoventrite, metaventricle, and middle of 1st-3rd abdominal ventrites. Length 5.5–5.9mm. Originally described from the W. Caucasus, found in the N. Caucasus (Kabardino-Balkaria) and the Black Sea coast of the Caucasus. . . . . *C. rosti* (Weise) \*\*

**Remark.** *Calvia rosti* is considered to be a junior synonym of *C. quatuordecimguttata* in the recent Palearctic Catalog (Kovář 2007). However, Iablokoff-Khznorian (1983) elevated *C. rosti* from synonymy, which differs from *C. quatuordecimguttata* by the structure of female spermatheca, among other differences. Korotyayev *et al.* (2012) also consider *C. rosti* as a separate species. The classification of the latter two authors is followed here.

2. Each elytron with five spots. Length 4.9–6.5mm. Middle belt, south . . . . . *C. decemguttata* (Linnaeus) \*\*
- Each elytron with seven spots . . . . . 3
3. Elytral spots arranged in four transverse rows with 1, 3, 2, 1 spots, respectively. Length 4.5–6.0mm. Widely distributed . . . . . *C. quatuordecimguttata* (Linnaeus) (*C. duodecimmaculata* Gebler) \*\*
- Elytral spots arranged in four transverse rows with 2, 2, 2, 1 spots, respectively. Length 5.0–6.0mm. North, middle belt, south (Krasnodar Krai) . . . . . *C. quindecimguttata* (Fabricius) (*C. quinquedecimguttata* Fabricius) \*\*

### **Ceratomegilla Crotch**

(Dobzhansky 1927; Zaslavski 1965; Kuznetsov 1992)

1. Elytral background black. Each elytron with seven yellow spots: four along suture, and three at lateral side (Figs. 7H, 11C). Length 5.1mm. South . . . . . *C. schneideri* (Weise) \*\*
- Elytral background yellow, orange, or red . . . . . 2
2. Pronotum black with large white spots in anterior angles and sometimes with very narrow white stripe at anterior margin, bearing very small angular projection in middle. Elytra orange or red, with joint longitudinal or triangular black spot near scutellum, each elytron usually with three rounded black spots: one on humeral callus, two behind mid-length, sometimes with one

more very small spot at elytral lateral margin and very rarely with one spot at apical declivity. This species externally looks like *Coccinella septempunctata* and differs in the location of the anterior elytral spot: it is placed behind humeral callus at large distance in *C. septempunctata*, and directly on humeral callus in *C. undecimnotata*. Length 5.0–7.0mm. Penis guide with apical appendage elongate, 3–4× as long as wide. Widely distributed . . . . . *C. undecimnotata* (Schneider) \*\*

- Pronotum black with white or yellow stripe at anterior margin and anterior half of lateral sides. White (yellow) anterior stripe bearing three angular projections (if these projections weakly developed, then each elytron with six spots) . . . . . 3

3. Pronotal and elytral punctation not different in size and density . . . . . 4

- Elytra covered by much stronger and some denser punctures than pronotum. Elytra orange, with five–11 black spots; following spots always present: one spot on humerus and one large spot on disc, others (longitudinal stripe at suture behind scutellum, one spot at lateral slope behind middle and another one at apical declivity) much smaller than first two and sometimes absent. Penis guide with apical appendage short, 1.5× as long as wide. Length 4.9–5.9mm. This species externally looks like *C. undecimnotata* and differs in pattern on pronotum, shape of body (more elongate and less convex), stronger and denser elytral punctation, structure of male genitalia, and coloration of female head: black with broad yellow transverse band in *C. shelkovnikovi*, and black with rufous spots near eyes in *C. undecimnotata*. South [Kabardino-Balkaria, North Ossetia (Dobzhansky 1927), Kuban (Iablokoff-Khnzorian 1983)]. . . . . *C. shelkovnikovi* (Dobzhansky) \*

**Remark.** The name *C. shelkovnikovi* (Iablokoff-Khnzorian 1983; Kovář 2007) is an incorrect subsequent spelling of the name *C. shelkovnikovi*.

4. Fore-tibiae black with underside rufous. 1st hind-tarsomere black. Elytra yellow (rarely orange) with 11 black spots: joint bilobed spot near scutellum, each with five spots, of which two inner ones larger than three outer ones. Length 4.5–6.2mm. Penis guide with apical appendage elongate, 3–4× as long as wide. North, middle belt, south (Saratov reg.), S. Urals (Chelyabinsk reg.) . . . . . *C. notata* (Laicharting) \*\*
- Fore-tibiae and 1st hind-tarsomere rufous. Coloration as in previous species. Length 5.0–6.0mm. Penis guide not available for this study. South (Ciscaucasia, Daghestan) (Iablokoff-Khnzorian 1983). . . . . *C. apicalis* (Weise)

### **Chilocorus Leach**

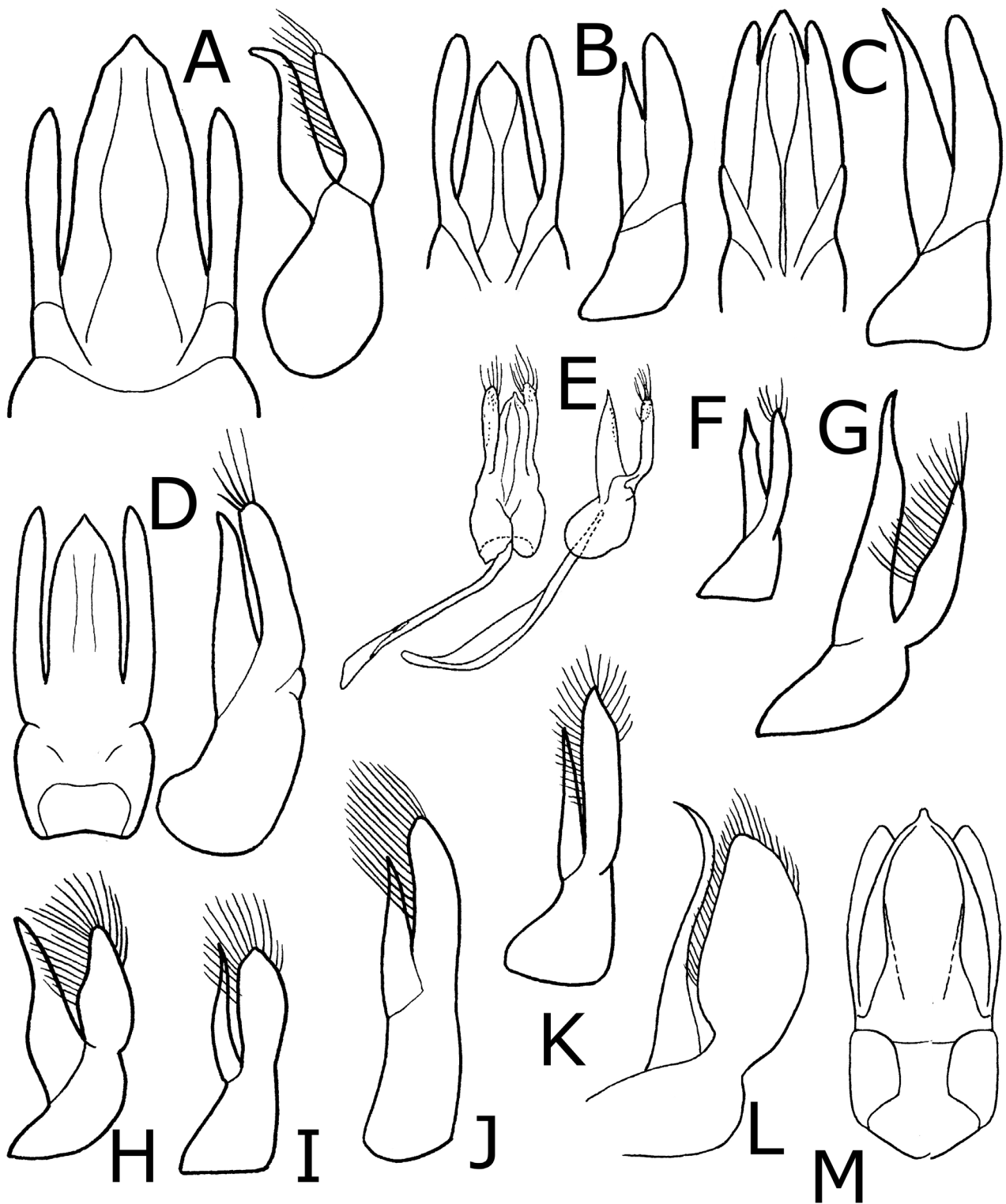
(Silvestri 1909; Kamiya 1959; Zaslavski 1965; Kuznetsov 1992)

1. Head, pronotum, and elytra black. Each elytron with large, elongate, diffuse red spot, occupying most of disc. Usually larger than other species, 5.3–7.4mm long. Introduced in the W. Caucasus from the Far East (Iablokoff-Khnzorian 1983), no current information on the state of population . . . . . *Ch. rubidus* Hope\*
- Elytra with small spots distinctly limited, or elytra without spots. Usually smaller than previous species, 2.9–6.0mm long . . . . . 2
2. Each elytron with 2–3 spots arranged in transverse row. . . . . 3
- Pronotum and elytra black. Each elytron with one rounded or transverse red or rufous spot (Fig. 7D), or spot absent (ab. *inornatus* Weise). Head black. Length 3.3–4.8mm. Widely distributed . . . . . *Ch. renipustulatus* (Scriba) \*\* (*Ch. kuwanae* Silvestri **syn. nov.**)
3. Body broadly oval. Pronotum and elytra dark brown or black. Each elytron with transverse row of two–three very small spots sometimes fused to form transverse band. Head rufous. Length 3.0–4.2mm. Widely distributed . . . . . *Ch. bipustulatus* (Linnaeus) \*\*
- Body ovate, roundly tapered in elytral apical third (Fig. 7C). Pronotum and elytra black with weak greenish or bluish tint. Each elytron with transverse row of two large, rounded rufous spots. Head black. Length 2.9–6.0mm. Introduced in Georgia from the Far East (Maslyakov & Izhevsky 2011). . . . . [*Ch. infernalis* Mulsant (*Ch. bijugus* Mulsant)] \*

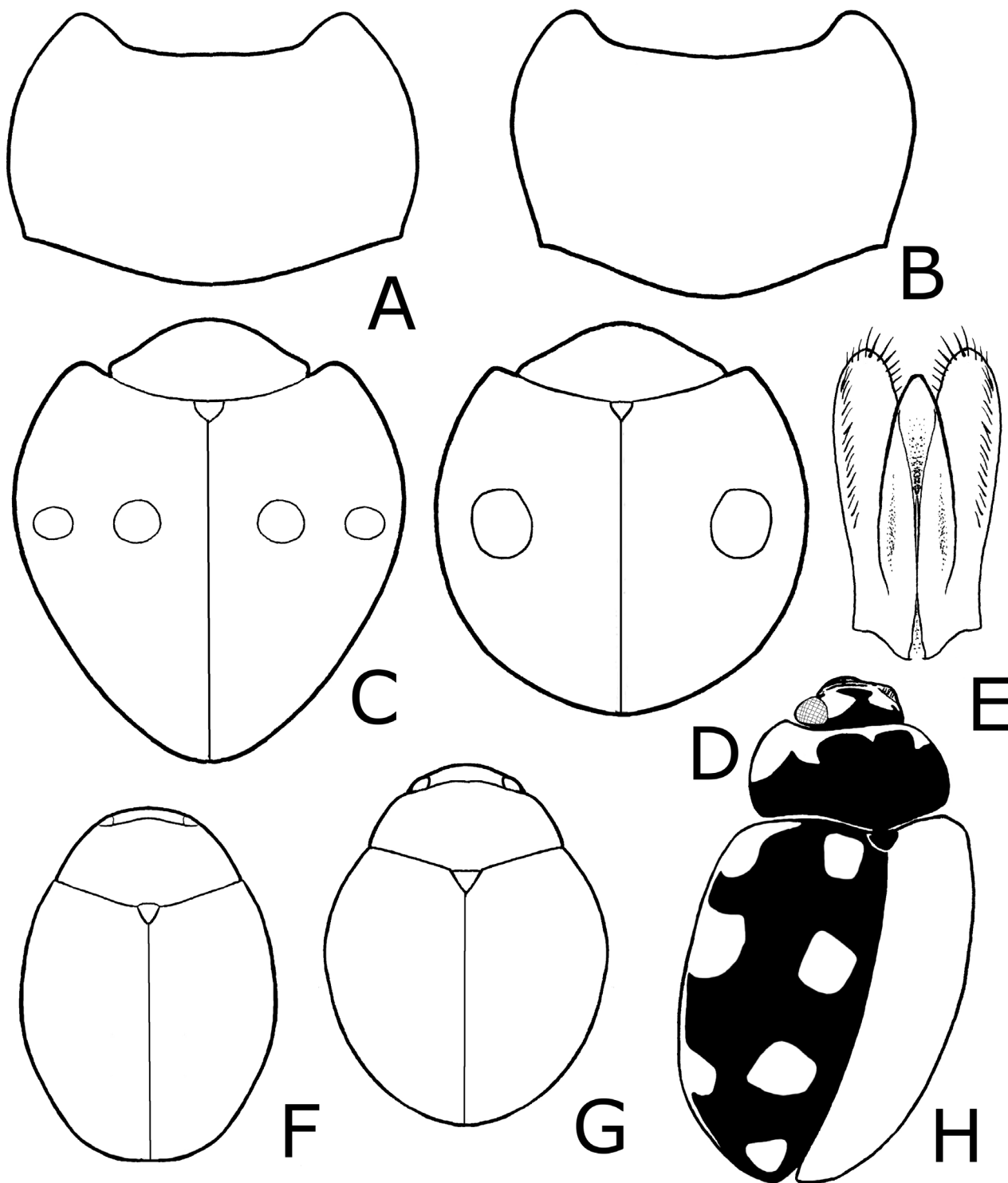
**Remark.** *Ch. renipustulatus* was originally described (Scriba 1791) without a specific type locality. However, it was probably collected in the environs of Darmstadt, Germany, where the author L.G. Scriba worked. *Ch. renipustulatus* is known to be widely distributed in Europe, Siberia, and the Far East (Kovář 2007). *Ch. kuwanae* was originally described by Silvestri (1909) based on specimens received from the Japanese scientist Sh.I. Kuwana for biological control of *Pseudaulacaspis pentagona* in Italy. Therefore, the type locality is probably Japan. Silvestri (1909) indicated the type locality as follows: "Cina e Giappone. Introdotta in Italia presso Acerra (Caserta)". The original description of *Ch. kuwanae* includes the following features of the new species to distinguish it from *Ch. renipustulatus*: body narrower and less convex, elytral spot smaller and less transverse, antennae longer, last maxillary palpomere narrower, punctation of body more distinct. However, Silvestri (1909) did not study any specimens of *Ch. renipustulatus*, but mentioned the characters of the latter after Ganglbauer (1899) and Mulsant (1846).

Kamiya (1959), in his revision of Chilocorinae from Japan, mentioned that *Ch. kuwanae* differs from both *Ch. renipustulatus* and *Ch. similis* in the punctation of head and shape of scutellum. This author noted the following features of *Ch. kuwanae*: head with strong and very close but not deep setigerous punctures; interspaces between

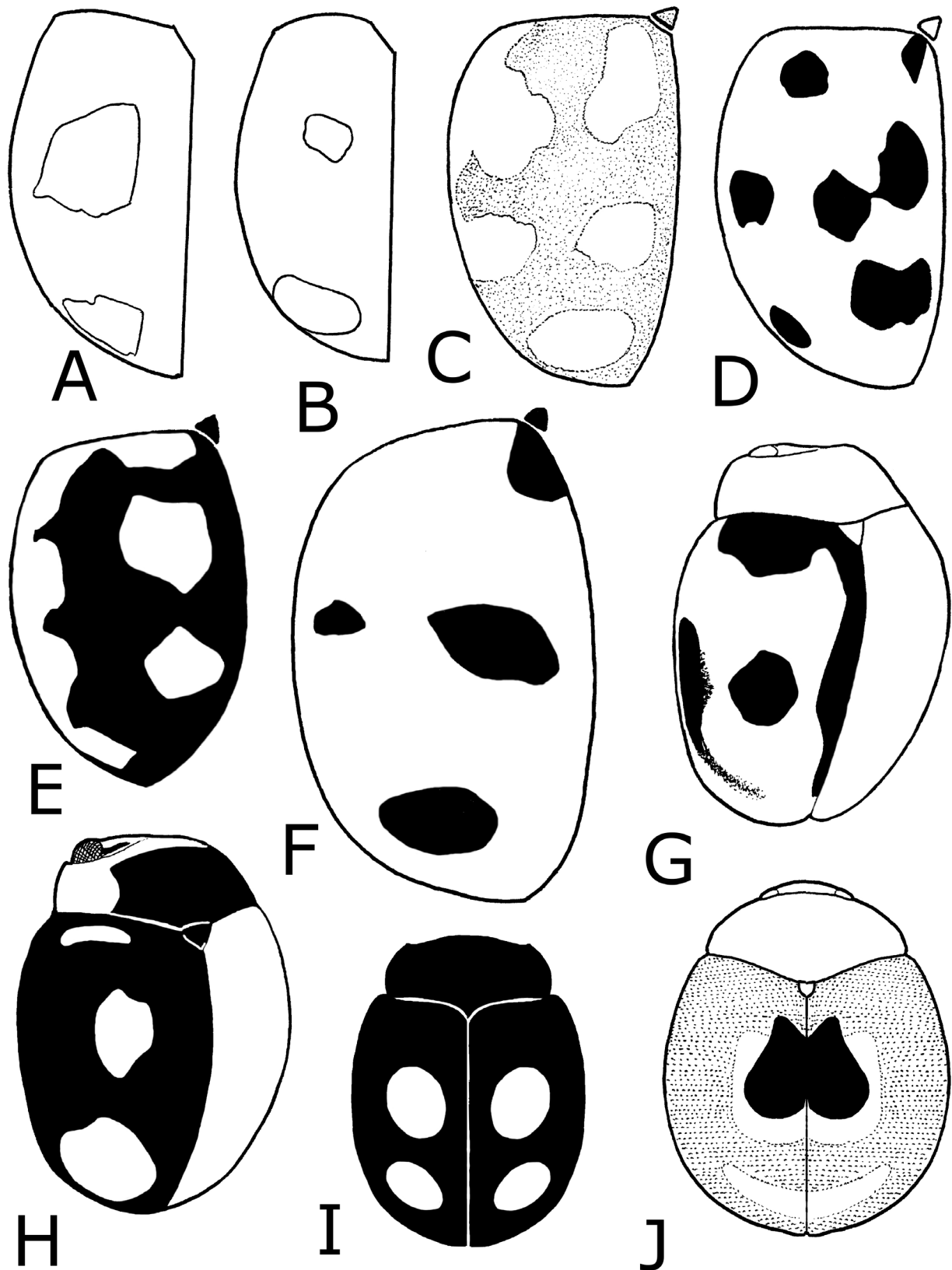
the punctures on frons and vertex shagreened; scutellum flat, with fine punctures; elytral markings very small, transverse or sometimes rounded.



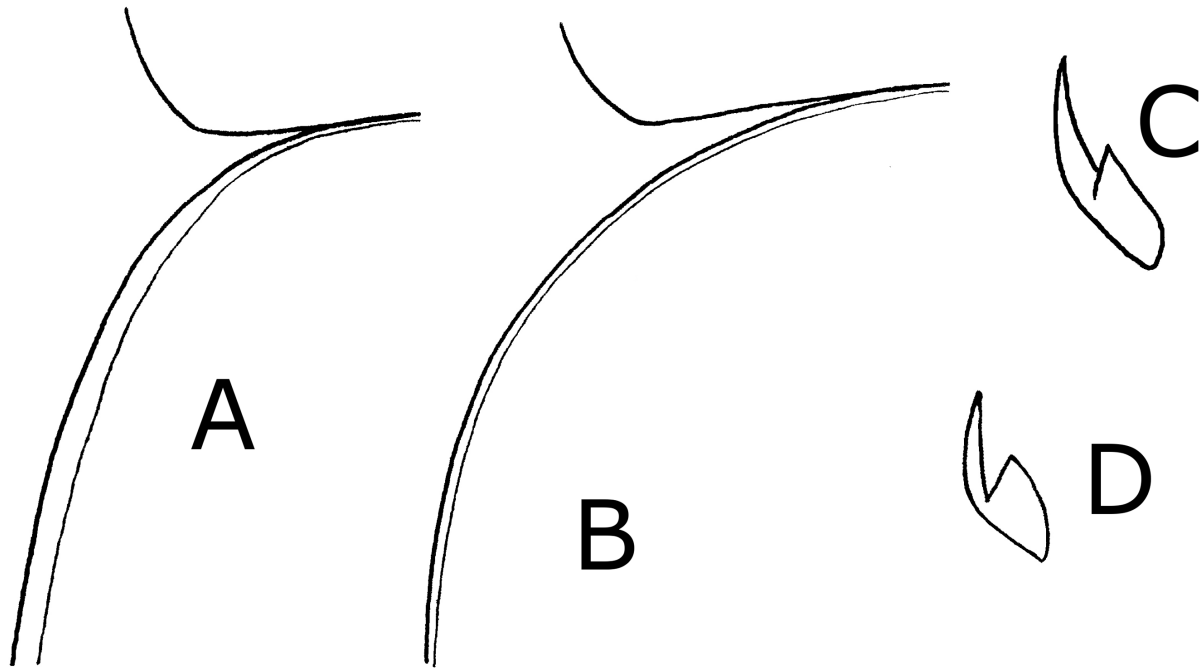
**FIGURE 6.** Male genitalia of different species of ladybirds. (A–E) Dorsal and lateral view: (A) *S. schmidti* Fuersch. (B) *S. apetzii* Mulsant. (C) *S. suffrianioides* Sahlberg. (D) *S. marinus* (Mulsant). (E) *Nephus reunioni* (Fuersch). (F–L) Lateral view: (F) *S. interruptus* (Goeze). (G) *S. doriae* Capra. (H) *S. frontalis* (Fabricius). (I) *S. ferrugatus* (Moll). (J) *S. limbatus* Stephens. (K) *S. haemorrhoidalis* Herbst. (L) *S. jakowlewi* Weise. (M) Dorsal view of *S. nderihensis* Mulsant. (A–D, F–K: after Lompe (2002); E: after Chazeau, *et al.* (1974); other illustrations by author).



**FIGURE 7.** Details of different species of ladybirds. (A–B) Contour of pronotum: (A) *Tetrabrachys connatus* (Creutzer), (B) *T. weisei* (Reitter). (C–D) Shape of body and elytral pattern: (C) *Chilocorus infernalis* Mulsant, (D) *Ch. renipustulatus* (Scriba) (= *Ch. kuwanae*, specimen from Japan, Honshu Isl.). (E) Male genitalia dorsal view *Ch. renipustulatus* (= *kuwanae*, specimen from Japan, Honshu Isl.). (F–G) Shape of body: (F) *Hyperaspis reppensis* (Herbst), (G) *H. inexpectata* Guenther. (H) *Ceratomegilla schneideri* (Weise), slightly oblique dorsal habitus view. (Illustrations by author)



**FIGURE 8.** Details of different species of ladybirds. (A–F) Left elytron: (A) *Hyperaspis desertorum* Weise, (B) *H. femorata* Motschulsky, (C–D) *Adalia decempunctata* (Linnaeus), (E) *Coccinula sinuatomarginata* (Faldermann), (F) *Coccinella magnifica* Redtenbacher. (G–H) Slightly oblique dorsal habitus view: (G) *Scymnus argutus* Mulsant, (H) *Hyperaspis effusa* Weise. (I–J) Dorsal habitus view: (I) *Nephus reunioni* (Fuersch), (J) *Clitostethus arcuatus* (Rossi). (I: after Chazeau *et al.* (1974); other illustrations by author).



**FIGURE 9.** Details of different species of ladybirds. (A–B) Lateral border of left elytron near base, dorsal view: (A) *Coccinella septempunctata* Linnaeus, (B) *C. magnifica* Redtenbacher. (C–D) Tarsal claw: (C) *Adalia conglomerata* (Linnaeus), (D) *A. bipunctata* (Linnaeus). (Illustrations by author)

Savoyskaya (1984) diagnosed *Ch. kuwanae* by "penis guide **distinctly** shorter than parameres" while other *Chilocorus* were distinguished by "penis guide **slightly** shorter than, as long as, or longer than parameres". This author also noted for *Ch. kuwanae*: "elytra with very small transverse, sometimes rounded spot" and for *Ch. renipustulatus*: "elytra with large, transverse, usually kidney-shaped spot".

Kuznetsov (1992) separated these taxa as follows: in *Ch. renipustulatus* elytron with large kidney-shaped spot; elytra finely and densely punctate; body 2.7–3.7mm long; in *Ch. kuwanae* elytron with very small transverse spot; elytra finely and sparsely punctate; body 3.5–4.8mm long.

I examined 48 specimens from the area of *Ch. renipustulatus* (European Russia: Karelia, Moscow reg., Ryazan reg., Kaliningrad reg., Lipetsk reg., Nizhny Novgorod reg.), Slovakia, Germany, Ukraine (Transcarpathian reg.), the Russian Caucasus (Krasnodar Krai, Stavropol Krai, Kabardino-Balkaria, Karachay-Cherkessia), Georgia, Siberia (Khanty-Mansiysk Autonomous Okrug), Russian Far East (Amur reg., Primorsky Krai) and 8 specimens from the native area of *Ch. kuwanae* (Sakhalin Isl., Korea, Japan: Honshu Isl.). As a result, I established that male genitalia is the same in males from the areas of *Ch. renipustulatus* and *Ch. kuwanae* (Fig. 7E). The shape and size of elytral spots vary in different specimens, but do not represent a geographical difference. The punctation of the head, scutellum, and elytra, size, and proportions of the body do not differ geographically in the specimens at my disposal. In the specimens from Japan and Sakhalin Isl. the frons is distinctly microsculptured; in the specimens from Korea the frons is smooth or microsculptured; in the specimens from Siberia and Russian Far East the frons is smooth; in the specimens from Europe and the Caucasus this character varies: the frons is usually smooth, rarely with microsculpture. This character may indicate on intraspecific geographical difference, but not a separate species. Therefore, I consider the name *Ch. kuwanae* to be a junior synonym of *Ch. renipustulatus*.

***Clitostethus* Weise**  
(Zaslavski 1965)

1. Head rufous or yellow. Pronotum yellow. Elytra rufous with joint black spot before mid-length (spot sometimes separated in right and left parts), this spot bordered laterally and posteriorly with pale yellow horseshoe mark. Elytra also with joint arcuate pale yellow band at apical declivity (sometimes absent) (Fig. 8J). Length 1.5–1.6mm. South (Crimea, Krasnodar Krai) . . . . .  
 . . . . . *C. arcuatus* (Rossi) \*\*

## ***Coccidula* Kugelann**

(Zaslavski 1965)

1. Dorsum red with scutellum black. Humeri slightly projecting laterally. Length 2.6–3.7mm. Widely distributed. . . . . *C. rufa* (Herbst) \*\*
- Dorsum rufous, elytra usually with black spot at base (sometimes absent), each elytron with two black spots, sometimes fused to each other, scutellum black. Humeri greatly projecting laterally. Length 3.0–3.6mm. Middle belt, south . . . . . *C. scutellata* (Herbst) \*\*

## ***Coccinella* Linnaeus**

(Zaslavski 1965; Kuznetsov 1992)

1. Epimera of mesothorax white . . . . . 2
- Epimera of mesothorax black . . . . . 6
2. Elytra rufous with three transverse black bands, from which anterior one entire, and two others interrupted at suture. Pronotum black with anterior angles white. Length 4.9–5.6mm. North . . . . . *C. trifasciata* Linnaeus \*\*
- Elytra rufous or red with black spots . . . . . 3
3. Length not less than 6.0mm. Elytra with joint spot near scutellum and each with three or four spots (in latter case, with spot on humeral callus) . . . . . 4
- Length no more than 5.2mm. Elytra with joint spot near scutellum and each with two, four or five spots. If four spots present, then spot on humeral callus absent . . . . . 5
4. Lateral margin of elytron broadened in anterior half (Fig. 9A), narrow in posterior half. Elytra with joint spot near scutellum and each with three spots of different size. Pronotum black with white anterior angles. Epimera of metathorax black. Length 6.3–7.9mm. Widely distributed. . . . . *C. septempunctata* Linnaeus \*\*
- Lateral margin of elytron narrow along entire length (Fig. 9B). Elytra with spot near scutellum and each usually with three spots, from which lateral spot in anterior half small, and two others very large (Fig. 8F), rarely with one more small spot on humeral callus. Pronotum black with white anterior angles. Epimera of metathorax white. Length 6.0–8.0mm. Widely distributed . . . . . *C. magnifica* Redtenbacher (*C. distincta* Faldermann) \*\*
5. Elytra with joint spot near scutellum and each with four or five spots. Pronotum black with white lateral stripe broadened anteriorly. Length 3.5–4.7mm. Widely distributed . . . . . *C. undecimpunctata* Linnaeus \*\*
- Elytra with joint spot near scutellum and each with two spots. Pronotum black with white lateral spot broadened anteriorly. Length 4.3–5.2mm. Widely distributed. . . . . *C. quinquepunctata* Linnaeus \*\*
6. Elytra with joint small spot near scutellum and each with one black spot at mid-length. Length 4.5–7.0mm. Widely distributed . . . . . *C. saucerottii lutshniki* Dobzhansky\*\*
- Elytra yellow or rufous with black pattern composed of joint elongate spots. Length 3.5–4.5mm. North, middle belt . . . . . *C. hieroglyphica* Linnaeus\*\*

## ***Coccinula* Dobzhansky**

(Zaslavski 1965)

1. All four spots adjacent to elytral lateral margin usually separated from each other, rarely two anterior ones connected to each other, posterior spot kidney-shaped. Length 3.0–4.3mm. Widely distributed . . . . . *C. quatuordecimpustulata* (Linnaeus) \*\*
- All four spots adjacent to elytral lateral margin usually connected to each other, posterior spot quadrangular or semicircular (Fig. 8E). Length 2.6–3.5mm. South (Saratov reg., Crimea, the Caucasus). . . . . *C. sinuatomarginata* (Faldermann) \*\*

## ***Cryptolaemus* Mulsant**

(Savojskaja 1983)

1. Head, antennae, prosternum, pronotum, abdominal ventrites, spot at elytral apex rufous. Pronotal base medially darkened. Elytra (except apex), meso- and metasternum, and legs black. Body covered with densely distributed light yellow setae. Length 6.0mm (Fig. 11A). Introduced to the Black Sea coast of the Caucasus, occurs in Sochi. . . . *C. montrouzieri* Mulsant\*\*

## ***Cycloneda* Crotch**

(Gordon 1985)

1. Pronotum black with white pattern. Elytra red with narrow white band at base near scutellum and black lateral margin. Length 3.2–6.5mm. Introduced for control of aphids in greenhouses. . . . . *C. sanguinea limbifer* Casey\*



## **Cynegetis Dejean**

(Zaslavski 1965)

1. Head and scutellum black, pronotum and elytra reddish-brown, pronotum sometimes with black spot. Length 3.0–4.0mm. Middle belt (Smolensk reg.), south (Saratov reg.) (Iablokoff-Khnzorian 1983) ..... *C. impunctata* (Linnaeus) \*

## **Diomus Mulsant**

(Eizaguirre 1998)

1. Body brown, with mouthparts, labrum, legs, and large spot in elytral apical half rufous. Length 1.5–1.6mm. South (Crimea, southern Volga river basin, Daghestan). ..... *D. rubidus* Motschulsky\*\*

## **Exochomus Redtenbacher**

(Zaslavski 1965; Biranvand *et al.* 2017)

1. Background of pronotum and elytra black ..... 2
- Pronotum and elytra entirely rufous or reddish-brown, or with small black spots ..... 3
2. Each elytron with two separate rufous spots: former falciform at humerus, latter rounded or irregular, transverse, placed behind mid-length. Body almost round. Penis guide shorter than parameres. Length 3.0–5.0mm. Widely distributed .....  
..... *E. quadripustulatus* (Linnaeus) \*\*
- Each elytron with one large brown or orange irregular spot. Body broadly oval. Penis guide longer than parameres. Length 4.3–5.0mm. South (Karachay-Cherkessia, Daghestan) (Iablokoff-Khnzorian 1983). ..... *E. undulatus* Weise
3. Pronotum with black spot at middle of base, each elytron with four black spots, scutellum black. Penis guide as long as parameres. Length 2.8–4.5mm. South. .... *E. octosignatus* (Gebler) \*\*
- Elytra brown, without spots. Length 3.0–5.0mm. Widely distributed ..... *E. quadripustulatus* (Linnaeus) \*\*

## **Halyzia Mulsant**

(Zaslavski 1965)

1. Dorsum rufous, with white (light yellow) spots: three on pronotum and eight on each elytron. Pronotum and elytra with widely bent and translucent lateral margin. Length 5.8–6.4mm. North, middle belt, south (Krasnodar Krai) .....  
..... *H. sedecimguttata* (Linnaeus) \*\*

## **Harmonia Mulsant**

(Zaslavski 1965; Chapin & Brou 1991; Kuznetsov 1992)

1. Elytra without transverse fold at apical declivity ..... 2
- Elytra with transverse fold at apical declivity. Pronotum light yellow or white, with black M-shaped pattern, which sometimes spreading at most of pronotal surface, and then only lateral sides remaining light. Episterna of metathorax brown or black. Elytral coloration variable; two color forms predominate: 1) f. *succinea*: elytra orange to red with joint black spot near scutellum, each with 0–9 black spots, 2) f. *spectabilis*: elytra black, each with one-two red spots: large anterior and small posterior ones. Length 5.8–7.5mm. Introduced in the Russian Caucasus, found in Belgorod reg., Crimea and Moscow .....  
..... *H. axyridis* (Pallas) \*\*
2. Body elongate, moderately convex. Pronotum light yellow with 11 black punctiform spots, sometimes partially fused to each other. Episterna of metathorax white. Each elytron with eight black spots or with only two spots at lateral margin. Prosternal process without carinae. Length 5.0–6.5mm. Widely distributed. .... *H. quadripunctata* (Pontoppidan) \*\*
- Body broadly oval, convex. Pronotum black with two large white or pale yellow spots. Episterna of metathorax brown or black. Elytra black, each with six yellow spots. Length 5.8–7.5mm. The known area of this form reaches W. Siberia (Omsk reg.) westward (Orlova-Bienkowskaja *et al.* 2015), but Tyumaseva (2013) reports it in the East of European Russia (Chelyabinsk reg.) ..... *H. axyridis* (Pallas) f. *axyridis*
- Body round, very convex. Dorsum orange with black bilobed spot at base of pronotum and seven black spots (1, 3, 2, 1) on each elytron. Prosternal process with two carinae. Length 7.4–10.0mm. Introduced in the Russian Caucasus for control of aphids in greenhouses (Semyanov 1999) ..... *H. dimidiata* (Fabricius)

## **Hippodamia Chevrolat**

(Zaslavski 1965)

1. Postcoxal lines absent. Base of pronotum immarginate ..... 2
- Postcoxal lines present ..... 3
2. Pale lateral stripe of pronotum broad, with small black spot in middle. Tibiae yellow. Apical angle of elytron rectangular. Length 4.5–7.0mm. Widely distributed. .... *H. tredecimpunctata* (Linnaeus) \*\*
- Pale lateral stripe of pronotum narrow, without black spot. Tibiae black with apex rufous. Apical angle of elytron acute. Length 5.0–7.0mm. North, middle belt. .... *H. septemmaculata* (DeGeer) \*\*
3. Base of pronotum marginate. Pronotum white, with transverse black basal spot, from which four projections running forward, this black spot sometimes broadened and occupying most of pronotal surface. Elytra yellow or orange, with joint black spot near scutellum, each with 0–6 black spots. Length 3.9–5.5mm. Middle belt, south ..... *H. variegata* (Goeze) \*\*
- Base of pronotum immarginate. Pronotum white, with large bilobate black spot. Elytra yellow with black pattern. Length 4.4mm. North (Iablokoff-Khinzorian 1983). .... *H. arctica* (Schneider) \*\*

## **Hyperaspis Chevrolat**

(Mulsant 1850, Zaslavski 1965)

1. Tarsal claws with denticle near base. Elytra entirely black, or black with yellow spots ..... 2
- Tarsal claws without denticle. Elytra black, each with three yellow spots. Underside of body and femora black. Prothoracic hypomeron yellow. Tibiae and tarsi rufous. Length 3.2–3.4mm. Middle belt, south ..... *H. erythrocephala* (Fabricius) \*\*
2. Each elytron with small transverse yellow spot at base, triangular spot at mid-length, and larger oval spot at apex (Fig. 8H), last two spots sometimes connected to each other or fused forming large longitudinal spot. Length 3.0–3.3mm. Middle belt (Samara), south, Ural Mts. (Ekaterinburg) ..... *H. effusa* Weise \*\*
- Small transverse yellow spot at elytral base absent ..... 3
3. Elytra with yellow or orange spots ..... 4
- Elytra entirely black, without spots. Length 3.1mm. See also couplet 7 (antithesis) ..... *H. concolor* Suffrian (*H. inexpectata* Guenther) \*\*
4. Each elytron with one spot or stripe ..... 5
- Each elytron with two spots ..... 8
5. Elytron with small rounded spot ..... 6
- Elytron black with orange longitudinal stripe beginning behind humeral callus and running to apical declivity, broadened there and occupying most surface of apical declivity. Pronotum orange, with large black spot medially. Length 3.9–4.0mm. South (Astrakhan reg.) ..... *H. vittifera* Mulsant \*\*
6. Yellow spot located just behind mid-length of elytron. Body broadly oval. Length 2.7–3.3mm. Widely distributed ..... *H. campestris* (Herbst) \*\*
- Yellow spot located near posterior margin of elytron ..... 7
7. Body elongate oval (Fig. 7F). Length 2.7–3.2mm. Widely distributed ..... *H. reppensis* (Herbst) \*\*
- Body broadly oval (Fig. 7G). Length 3.1mm. North (St.-Petersburg), middle belt (Moscow and Orel reg.) ..... *H. concolor* Suffrian (*H. inexpectata* Guenther) \*\*
8. One large, roundly quadrangular spot located at elytral mid-length. Smaller, roundly-triangular spot at elytral apical declivity (Fig. 8A). Length 2.6–3.0mm (Fig. 10B) South. .... *H. desertorum* Weise \*\*
- One small, rounded spot located at elytral mid-length. Larger spot at elytral apical declivity (Fig. 8B). Length 3.1–3.3mm (Fig. 11B) South. (Crimea, Krasnodar Krai, Daghestan, southern Volga river basin) ..... *H. femorata* Motschulsky \*\*

## **Lindorus Casey**

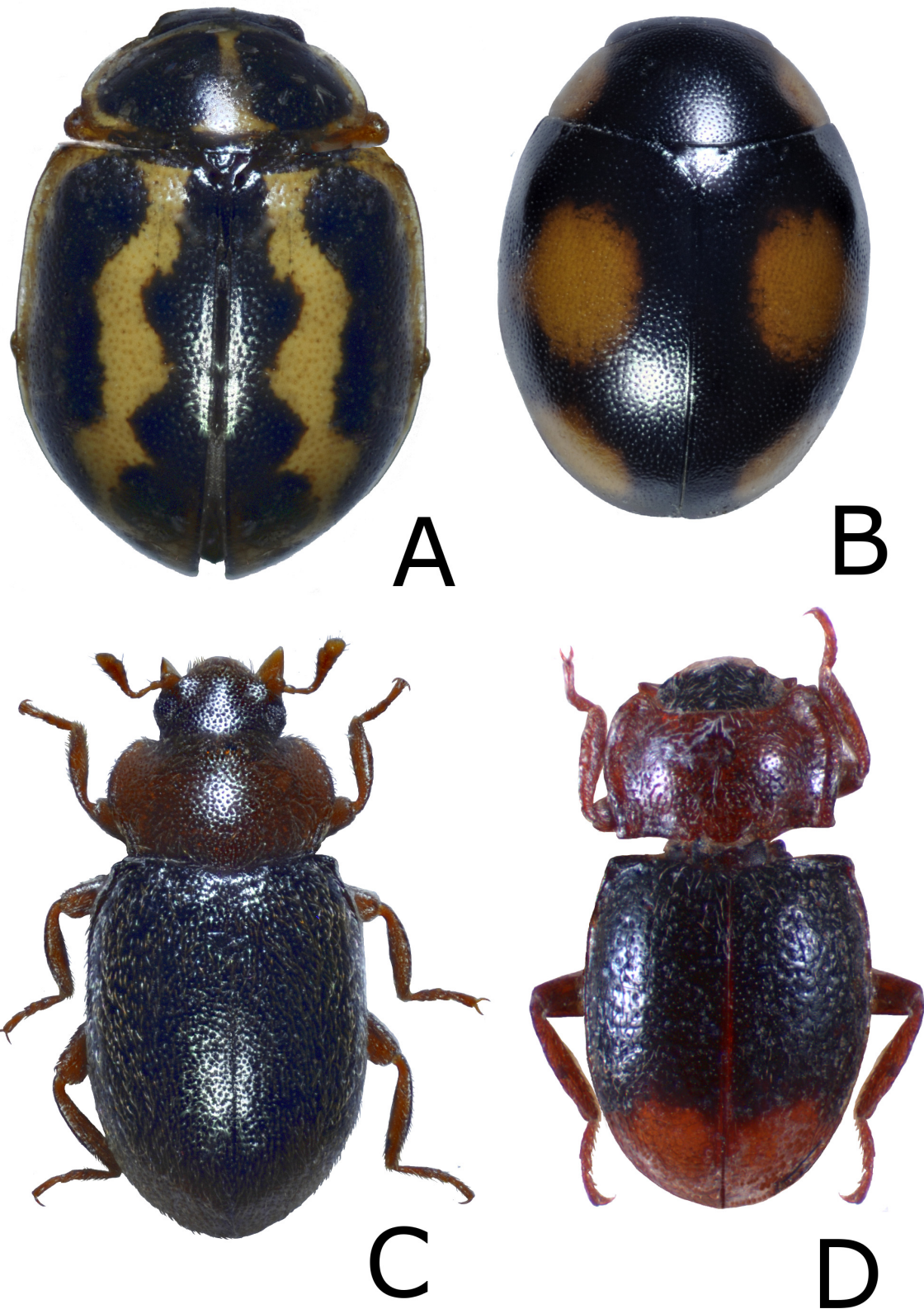
(Lompe 2002)

1. Head rufous. Pronotum entirely rufous or with black spot at middle, elytra blackish bronze. Length 2.1–2.5mm (Fig. 11D) Introduced to the Black Sea coast of the Caucasus, occurs in Sochi ..... *L. lophanthae* (Blaisdell) \*\*

## **Myrrha Mulsant**

(Zaslavski 1965)

1. Dorsum rufous or light brown, with yellow (white) pronotal lateral sides, two spots at pronotal base, and eight–nine spots on each elytron. Length 3.5–4.6mm. Widely distributed. .... *M. octodecimguttata* (Linnaeus) \*\*



**FIGURE 10.** Dorsal habitus photomicrographs of different species of ladybirds. (A) *Anisosticta strigata* (Thunberg) (NE European Russia: Komi Republic, Ust-Tsylma Vill.), (B) *Hyperaspis desertorum* Weise (SE European Russia: Astrakhan reg.), (C) *Tetrabrachys weisei* (Reitter) (Crimea Penins.), (D) *T. arnoldii* (Iablokoff-Khnzorian), holotype (the Russian Caucasus: Goryachy Kliuch). (A–C: photos by author; D: photo by A.G. Moseyko).



A



B



C



D

**FIGURE 11.** Dorsal habitus photomicrographs of different species of ladybirds. (A) *Cryptolaemus montrouzieri* Mulsant (the Russian Caucasus: Sochi), (B) *Hyperaspis femorata* Motschulsky (the Russian Caucasus: Gelendzhik), (C) *Ceratomegilla schneideri* (Weise) (the Russian Caucasus, Adygea Republic), (D) *Lindorus lophanthae* (Blaisdell) (the Russian Caucasus: Sochi). (Photos by author)

### **Myzia Mulsant**

(Zaslavski 1965)

1. Pronotum white (light yellow) with rufous or black M-shaped spot. Elytra rufous with white spots and longitudinal stripes; coloration variable. Length 6.0–9.0mm. Widely distributed. . . . . *M. oblongoguttata* (Linnaeus) (*Neomysia oblongoguttata*) \*\*

### **Nephus Mulsant**

(Weise 1879; Chazeau *et al.* 1974)

1. Elytra entirely black or brown. Length 1.5–1.8mm. Widely distributed . . . . . *N. redtenbacheri* (Mulsant) \*\*
- Elytra rufous, with joint brown diffuse spot in anterior half, this spot broad at base and narrowed backwards and sometimes indistinct. Pronotal disc brown, lateral sides rufous. Postcoxal line incomplete, broadly arcuate. Length 1.9–2.7mm. South (Crimea) (Iablokoff-Khinzorian 1983) . . . . . *N. ludyi* (Weise) \*\*
- Elytra black or dark brown with pale spots. . . . . 2
2. Each elytron with two yellow or rufous spots. . . . . 3
- Each elytron with 1 spot . . . . . 4
3. Anterior elytral spot elongate, kidney-shaped, beginning behind humeral tubercle and running diagonally back to suture. Posterior elytral spot transverse, kidney-shaped. Dark brown or black, elytral apex with narrow brown edging, mouthparts, legs, and antennae yellow-brown, in male pronotum with very narrow pale edging anteriorly. Penis guide with large projection at base (viewed laterally). Length 1.5–2.0mm. Middle belt (Lipetsk reg., Ulyanovsk reg.) . . . . . *N. quadrimaculatus* (Herbst) \*\*
- Anterior elytral spot oval, less diagonal than in previous species. Posterior elytral spot oval, diagonal (Fig. 8I). Brown-black, with clypeus and two spots on each elytron light orange. Elytral apical margin pale, mouthparts and legs pale. Penis guide without projecting at base (viewed laterally) (Fig. 6E). Length 1.6–1.9mm. Introduced to the Black Sea coast of the Caucasus (Maslyakov & Izhevsky 2011). No current information on the state of population. . . . . *N. reunioni* (Fuersch)
4. Elytral spot placed in anterior half. Length 1.5–2.0mm. See also couplet 3. . . . . *N. quadrimaculatus* (Herbst) \*\*
- Large longitudinal pale spot occupying almost whole elytral length. Body convex. Antennae and mouthparts rufous, legs entirely rufous, or with femora darkened. Length 1.3–1.8mm. See also couplet 1 . . . . . *N. redtenbacheri* (Mulsant) \*\*
- Elytral spot placed in posterior half. Body convex, black or brown; with very narrow yellow-red stripes on pronotal anterior margin and elytral apical margin, and with large yellow-red spot in elytral posterior half. Length 1.5–2.2mm. Middle belt, South (Crimea, the Caucasus). . . . . *N. bipunctatus* (Kugelann) \*\*

### **Oenopia Mulsant**

(Zaslavski 1965)

1. Pronotum white or light yellow, with seven black spots. Elytra pink or yellow with black sutural stripe and each with seven-eighth black irregular spots, rarely elytra entirely black. Length 3.5–5.0mm. Widely distributed. . . . . *O. conglobata* (Linnaeus) \*\*
- Pronotum black with yellow or white anterior border and broad lateral spots. Elytra black, each with six yellow spots, from which three spots adjacent to lateral margin separate or connected to each other. Length 3.0–3.7mm. Middle belt (Lipetsk reg.) . . . . . *O. lyncea* (Olivier) \*\*

### **Parexochomus Barovsky**

(Zaslavski 1965)

1. Elytra pure black. Pronotum and elytra glabrous, without setae. Length 3.2–3.4mm. Widely distributed . . . . . *P. nigromaculatus* (Goeze) (*P. flavipes* auct. nec Thunberg) \*\*
- Elytra black with blue tint. Pronotum and lateral sides of elytra with sparsely distributed white adpressed setae. Length 2.4–2.6mm. South (Crimea, Krasnodar Krai, Astrakhan reg., Kalmykia). . . . . *P. melanocephalus* (Zoubkoff) \*\*

### **Pharoscymnus Bedel**

(Savojskaja 1984)

1. Head brown. Pronotum brown with yellow lateral sides. Elytra brown with yellow undulate pattern. Pronotal base marginated medially. Elytral lateral border narrow. Length 2.1mm. South (Astrakhan reg.: Baskunchak lake) . . . . . *Ph. smirnovi* Dobzhansky \*\*

### ***Platynaspis* Redtenbacher**

(Zaslavski 1965)

1. Head black (females) or yellow (males). Pronotum black with wide yellow lateral stripe, not reaching posterior angles. Elytra black, each with two rufous spots. Length 2.5–3.5mm. Widely distributed. . . . . *P. luteorubra* (Goeze) \*\*

### ***Propylea* Mulsant**

(Zaslavski 1965)

1. Dorsum yellow. Pronotum with four or six black spots, which can be fused in large 4-lobed spot. Elytra with black suture, each with six–seven elongate quadrangular black spots, which usually connect to each other; pattern variable. Length 3.5–4.5mm. Widely distributed. . . . . *P. quatuordecimpunctata* (Linnaeus) \*\*

### ***Psyllobora* Dejean**

(Zaslavski 1965)

1. Dorsum entirely yellow or with head and pronotum white, with black spots: five on pronotum, 11 on each elytron. Length 3.0–4.5mm. Widely distributed . . . . . *P. vigintiduopunctata* (Linnaeus) \*\*

### ***Rhyzobius* Stephens**

(Zaslavski 1965)

1. Body oval. Dorsum rufous, elytra with variable black pattern, usually with irregular longitudinal spots along lateral margin, reaching suture at elytral declivity. Length 3.0–3.3mm. North (Leningrad reg.)?, middle belt (Smolensk reg.)? (Iablokoff-Khnzorian 1983). . . . . *Rh. chrysoloides* (Herbst) \*

### ***Rodolia* Mulsant**

(Savojskaja 1983; Leeper 2015)

1. Dorsum purplish-red with black pattern: head, pronotal base and scutellum black, elytra with joint spot behind scutellum and suture black, each with four black spots, usually fused to each other. Length 2.0–4.0mm. Introduced to the Black Sea coast of the Caucasus (Iablokoff-Khnzorian 1983) from Australia; occurs in Sochi (Adler District, Veseloe Vill.). . . . . *R. cardinalis* (Mulsant) \*\*
- Elytra entirely pink-red or orange, rarely black. Introduced to European Russia from Middle Asia (Izhevsky 1990). No current information on the state of population . . . . . *R. fausti* (Weise) \*

### ***Scymniscus* Dobzhansky**

(Dobzhansky 1928)

1. Body weakly convex, flattened. Black or brown, with very narrow yellow-red stripes on pronotal anterior margin and elytral apical margin, and with large yellow-red spot in elytral posterior half. Length 1.6–2.0mm. Southern European Russia, Krasnodar Krai . . . . . *S. biflammulatus* (Motschulsky) \*\*

### ***Scymnus* Kugelann**

(Lompe 2002; Nedvěd 2015)

**Remark:** Three species, *S. pallipes* Mulsant, *S. testaceus* Motschulsky, *S. sangtanabiensis* Bielawski, 1959 have been recorded from the N. Caucasus (Iablokoff-Khnzorian 1983) but not included in the key below. *S. pallipes* is distributed in Central Asia, the record from the Russian Caucasus is doubtful. *S. testaceus* is not sufficiently studied, probably conspecific with *S. limbatus*. *S. sangtanabiensis* is a rare species described from Afghanistan, its occurrence in the Russian Caucasus should be confirmed.

1. Postcoxal line incomplete: outer end not reaching anterior margin of ventrite. Antennae 11-segmented in most species (10-segmented in *S. silesiacus*, couplet 5) ..... 2
- Postcoxal line complete: its outer end reaching anterior border of ventrite. Antennae 10- or 11-segmented ..... 21
2. Elytra unicolorous ..... 3
- Elytra with spots ..... 10
3. Elytra brown or brownish-yellow ..... 4
- Elytra black ..... 6
4. Body smaller (length 1.5–2.2mm). Broadly oval ..... 5
- Body larger (length 2.2–3.0mm). Oblong oval. Elytra rather evenly punctate. Body brownish-yellow, convex. North, middle belt. .... *S. abietis* (Paykull) \*\*
5. Elytra very densely and finely punctate with sparsely distributed large punctures on finely punctate background. Body less convex, than in *S. abietis*. Antennae 10-segmented. Length 1.8–2.0mm. Crimea: Yalta (Iablokoff-Khnzorian 1983) .....  
..... *S. silesiacus* Weise
- Elytra with double punctation: rows of large punctures can be traced against finely and densely punctate background. Antennae 11-segmented. See also couplet 15 ..... *S. interruptus* (Goeze)
6. Legs entirely black or with tarsi brown. Elytra black, sometimes with metallic tint. Postcoxal line complete in some specimens. Length 1.8–2.8 mm. Widely distributed ..... *S. nigrinus* Kugelann \*\*
- Legs at least partially pale. .... 7
7. Femora brown or black ..... 8
- Femora entirely pale or darkened only at base. .... 9
8. Body elongate oval. Legs mostly pale. Length 2.0–3.2 mm. Penis guide longer than parameres (Fig. 6H). See also couplets 17 and 19 ..... *S. frontalis* (Fabricius), black variation
- Body broadly oval. Legs mostly dark Length 2.0–3.0mm. Penis guide shorter than parameres (Fig. 6B). See also couplets 16 and 18 ..... *S. apetzi* Mulsant, black variation
9. Body elongate oval. Elytra often with brownish apical edge. Length 2.0–3.3mm. See also couplet 12 .....  
..... *S. schmidtii* Fuersch (*S. mimulus* Capra et Fuersch), black variation
- Body broadly oval, rather convex. In male head rufous, pronotum rufous with black spot at middle of pronotal base, in female head black with labrum yellow, pronotum black. Antennae and mouthparts yellow. This species differs from *S. auritus* in apical edge of elytra dark. Length 2.2–2.5mm. Widely distributed. .... *S. rubromaculatus* (Goeze) \*\*
10. Each elytron with one spot ..... 11
- Each elytron with two spots. Anterior and posterior spots sometimes narrowly connected to each other or spreading over most of elytron ..... 18
11. Pale-yellow or orange spot located in posterior half of elytron, sometimes diffuse. Body broadly oval, densely covered with yellow or white setae. Legs entirely rufous, or with femora darkened. Penis guide slender, long, curved (Fig. 6L). Length 2.4–2.5mm. North (Leningrad reg.), middle belt (Moscow) ..... *S. jakowlewi* Weise \*\*
- Pale spot located at mid-length or in anterior half of elytron ..... 12
12. Penis guide very long and curved (Fig. 6 A). Body black, with head and most of pronotal anterior angles reddish-yellow. Antennae, mouthparts and legs red. Femora more or less darkened. Elytron with large red spot, not including epipleura. This species differs from *S. frontalis* in elytral puncture rows which can be traced at densely and minutely punctate background. Length 2.4mm. See also couplet 9. Middle belt (Moscow reg.) ..... *S. schmidtii* Fuersch (*S. mimulus* Capra et Fuersch) \*\*
- Penis guide with apex straight, not curved downwards ..... 13
13. Body 1.4× longer than wide ..... 14
- Body 1.6× longer than wide ..... 17
14. Elytron with large red-yellow spot, extending onto epipleura ..... 15
- Elytron with red-yellow spot, not extending onto epipleura. .... 16
15. Legs yellowish-brown. Elytra with large punctures. Apex of elytra with pale margin. More than half of epipleura red-yellow. Length 2.0–2.8mm. Crimea. (Iablokoff-Khnzorian 1983). .... *S. marginalis* (Rossi)
- Legs red-yellow with femora partially darkened. Elytra with rows of large punctures against densely and finely punctate background. Apex of elytra black. Less than half of epipleura red-yellow. Penis guide (Fig. 6F). Length 1.5–2.5mm. See also couplet 5. Middle belt (Moscow reg.), south (Crimea, southern Volga river basin, Krasnodar Krai) . . . . *S. interruptus* (Goeze) \*\*
16. Penis guide slightly longer than parameres (Fig. 6C). Very close to *S. apetzi*, but body more elongate; elytra with punctures larger than those on pronotum; humeral callus weaker. Tibiae dark or pale. Length 2.4mm. Crimea (Evpatoria) .....  
..... *S. suffrianioides* Sahlberg (*S. pallipediformis* Guenther, *S. apetzoides* Capra et Fuersch) \*\*
- Penis guide shorter than parameres (Fig. 6B). In male anterior part of head pale, vertex black. In female head black with only labrum pale. Pronotum usually with pale anterior angles. Legs entirely dark, or, at least, with mid- and hind-legs dark. See also couplets 8 and 18. South (from Saratov to Crimea and the Caucasus). .... *S. apetzi* Mulsant\*\*
17. Penis guide 1.4× longer than parameres (Fig. 6G). Mid- and hind-tibiae curved. Pronotum with anterior and lateral sides yellow-red. In male 5th abdominal ventrite strongly emarginate at apex. Variation with two spots on each elytron more common. Length 2.0–3.0mm. See also couplet 20. South (Rostov reg., Stavropol Krai) ..... *S. doriae* Capra \*\*
- Penis guide 1.1× longer than parameres (Fig. 6H). Mid- and hind-tibiae not curved. Head red in male, black in female (at most anteriorly red). Pronotum usually with anterior and lateral sides red, rarely entirely black. Legs red, sometimes with darkened femora. In male 5th abdominal ventrite with broad and deep emargination and impression before emargination. Variation with two spots on each elytron is common, specimens with elytra entirely black are rare. Length 2.0–3.0mm. See also couplets 8 and 19. Widely distributed ..... *S. frontalis* (Fabricius) \*\*

18. Broadly oval, 1.4× longer than wide. In male head just anteriorly yellow. See also couplets 8 and 16. . . . . *S. apetzi* Mulsant  
 - Elongate oval, 1.6× longer than wide. In male head entirely pale . . . . . 19
19. Penis guide very broad at base (Fig. 6 H). See also couplets 8 and 17. . . . . *S. frontalis* (Fabricius), variation with four spots  
 - Penis guide not broadened at base. . . . . 20
20. Penis guide slightly longer than parameres, broad (in ventral view), 2× as long as wide (Fig. 6M). Length 2.0–2.4mm. South (Crimea, Stavropol Krai, Krasnodar Krai, southern Volga river basin) . . . . . *S. nderihensis* Mulsant\*\*  
 - Penis guide distinctly longer than parameres (Fig. 6G), narrow (in ventral view), 3× as long as wide. Length 2.0–3.0mm. See also couplet 17. . . . . *S. doriae* Capra \*\*
21. Antennae 11-segmented . . . . . 22  
 - Antennae 10-segmented . . . . . 28
22. Elytra black or dark brown, sometimes with posterior margin reddish, or with large red apical spot . . . . . 23  
 - Elytra brown (black) with pale pattern, or entirely pale . . . . . 25
23. Elytra entirely black, without reddish apical margin. Pronotum, antennae, and legs red. Dorsum covered with densely distributed and deep punctures. Postcoxal line arcuate, its arc reaching three quarters of length of ventrite. Length 0.9–1.1mm. This species similar with *S. ater* and differs by body more elongate and antennae 11-segmented. North (Kola Penins.) (Iablokoff-Khnzorian 1983) . . . . . *S. fennicus* Sahlberg  
 - Elytra black with only apical margin narrowly reddish, or with apical part mostly reddish . . . . . 24
24. Elytra black, with large, well limited reddish spot in posterior part. All abdominal ventrites red-yellow, or with only 1st ventrite black. Elytra evenly punctate. Pronotum red with large black spot at middle of base. Length 2.5–3.0mm. Male genitalia (Fig. 6I). This species similar in color to *S. haemorrhoidalis*, and differs in body size, color of abdominal ventrites, and antennae 11-segmented. Widely distributed . . . . . *S. ferrugatus* (Moll) \*\*  
 - Elytra black with apical margin reddish. Broadly oval. 4th and 5th abdominal ventrites reddish. Head usually reddish in both sexes, sometimes black in female. In male pronotum red with dark spot at middle of base, this spot rarely absent, in female pronotum black. Antennae, maxillary palpi, and legs yellow-brown, at most femora blackish basally. Arc of postcoxal line almost reaching posterior border of ventrite. Length 2.0–2.5mm. Widely distributed. . . . . *S. auritus* Thunberg \*\*
25. Elytra brown, each usually with four black spots: 1st at humerus and elytral base, 2nd at lateral side near mid-length, 3rd at middle of disc, 4th on suture, forming sutural stripe (Fig. 8G). Length 1.6mm. South (Daghestan) (Iablokoff-Khnzorian 1983) . . . . . *S. argutus* Mulsant\*  
 - Elytra entirely pale. Humeral callus indistinct. Male genitalia (Fig. 6D). Length 1.0–1.8mm. South (Crimea, Ciscaucasia, Krasnodar Krai, Adygea, Volgograd, Astrakhan reg.). See also couplet 27. . . . . *S. marinus* (Mulsant) (*S. mediterraneus* Iablokoff-Khnzorian) \*\*  
 - Elytra dark brown, each with two pale spots, located one after another, or apical part of elytron with very large pale spot, occupying most of surface . . . . . 26
26. Elytra pale with joint dark basal spot, projecting back along suture. . . . . 27  
 - Elytra dark brown, each with two transverse rufous spots, located one after another. Head and pronotal lateral sides (or only anterior angles) pale, antennae, maxillary palpi and legs rufous, femora rufous or darkened. Body broadly oval. Elytral lateral margin usually with weak, obsolete projection before apex, i.e. elytra not evenly narrowed behind their mid-length to apical angle. Length 1.9–2.5mm. South (Crimea, the Caucasus, southern Volga river basin north to Saratov). . . . . *S. subvillosus* (Goeze) \*\*
27. Body weakly convex, with indistinct humeral callus. Length 1.0–1.8mm. See also couplet 25 . . . . . *S. marinus* (Mulsant) \*\*  
 - Very convex, with distinct humeral callus. Length 1.8mm. Widely distributed. . . . . *S. suturalis* Thunberg \*\*
28. Body covered by arched setae. Body brown or blackish. Elytra with diffuse black sutural and lateral stripes, latter sometimes developed only at mid-length. Male genitalia (Fig. 6J). Length 1.7–2.0mm. Widely distributed . . . . . *S. limbatus* Stephens\*\*  
 - Body covered by non-arched setae . . . . . 29
29. Elytra black, without pale apical margin. Pronotum black. Antennae, maxillary palpi, tarsi and sometimes tibiae brown. Body elongate oval, convex, covered with sparsely distributed white setae. Head and pronotum covered with fine punctures, elytra covered with rather strong punctures. Arc of postcoxal line reaching two-thirds of length of ventrite. This species looks like *Stethorus pusillus* and differs in setae at elytral apical declivity directed obliquely from suture. Length 1.0–1.5mm. Widely distributed . . . . . *S. ater* Kugelann \*\*  
 - Elytra black, with large, indistinctly limited yellow-red spot, occupying entire apex. In both sexes, pronotum red with large black spot at middle of base. First-third abdominal ventrites black, fourth-fifth red. Elytra with uneven punctation: rows of large punctures can be traced at densely finely punctate background. Male genitalia (Fig. 6K). Length 1.5–2.3mm. Widely distributed . . . . . *S. haemorrhoidalis* Herbst \*\*

### ***Serangium* Blackburn** (Poorani 1998)

1. Eyes not widely separated, interocular distance less than 2× eye width (measured in plane of frons). Male genitalia: right paramere triangular. C. and S. India, introduced in N. America. Length 1.5–2.0mm . . . . . [*S. parcesetosum* Sicard]  
 - Eyes more widely separated, interocular distance slightly more than 2× eye width (measured in plane of frons). Male genitalia: right paramere broadly rounded. N. India, introduced in the Russian Caucasus (Krasnodar Krai). In the Russian literature it is often mistakenly identified as *S. parcesetosum* (e.g., Timofeeva & Hoang Duc Nhuan 1978; Izhevsky 1990; Maslyakov & Izhevsky 2011). Length 1.5–2.0mm . . . . . *S. montazerii* Fürsch \*\*



### ***Sospita* Mulsant**

(Zaslavski 1965)

1. Dorsum rufous or black. Seven spots on pronotum and 10 spots on each elytron white or pale yellow. Length 4.7–6.0mm. North, middle belt, south (the Caucasus) . . . . . *S. vigintiguttata* (Linnaeus) \*\*

### ***Stethorus* Weise**

(Kapur 1948; Zaslavski 1965)

1. Head black or brown, with mouthparts yellow. Femora black with apices yellow. Postcoxal line arcuate, reaching mid-length of ventrite. Male: parameres scarcely shorter than Penis guide. Length 1.3–1.5mm. Widely distributed . . . . . *S. pusillus* (Herbst) (*punctillum* Weise) \*\*
- Head black with anterior half yellow. Femora yellow. Postcoxal line arcuate, reaching two-fifths of ventrite length. Male: parameres as long as two-thirds of penis guide. Length 1.3–1.4mm. South (Astrakhan, Daghestan) . *S. gilvifrons* (Mulsant) \*\*

### ***Subcoccinella* Guerin-Meneville**

(Zaslavski 1965)

1. Dorsum rufous or orange, pronotum unicolorous or with one, three or five black spots, each elytron with 12 black spots, sometimes missing or partly fused, scutellum black. Length 3.4–4.5mm. Widely distributed . . . . . *S. vigintiquatuorpunctata* (Linnaeus) \*\*

### ***Tetrabrachys* Kapur**

(Zaslavski 1965; Iablokoff-Khnzorian 1974; Savojskaja 1983)

1. Elytra narrowed toward humeri and distinctly narrower basally than largest width of pronotum . . . . . 2
- Elytra with large humeral denticle, scarcely narrower basally than largest width of pronotum, covered with very large, sparsely distributed punctures, black with large rounded yellow spot at apex. Postcoxal line arcuate, projecting beyond mid-length of ventrite. Length 3.0mm. (Fig. 10D). Originally described on the base of one specimen from the Caucasus: Krasnodar Krai (Goryachy Kliuch), found repeatedly in the W. Caucasus (Abago Mt.) (Zamotajlov & Nikitsky 2010) . . . . . *T. arnoldii* (Iablokoff-Khnzorian) \*\*
2. Postcoxal line distinctly angulate, reaching mid-length of ventrite. Elytra entirely black or with apex rufous or brown. Head black, pronotum, antennae and legs rufous. Body less convex. . . . . 3
- Postcoxal line arcuate, nearly reaching mid-length of ventrite. Elytra black with large rufous spot at apex. Body more convex. Pronotum weakly cordate (Fig. 7B). Length 2.7–3.3mm. (Fig. 10C). Crimea . . . . . *T. weisei* (Reitter) \*\*
3. Elytra entirely black or with apex brown, broadly rounded at apex. Lateral margins of pronotum evenly rounded (Fig. 7A). Length 2.5–3.7mm. Ukraine (Iablokoff-Khnzorian 1983) . . . . . [*T. connatus* (Creutzer)] \*
- Elytra black with apical fourth rufous, slightly elongate at apex. Pronotum weakly cordate. Length 2.5–3.5mm. Crimea . . . . . *T. tauricus* (Semenov) \*\*

### ***Tythaspis* Crotch**

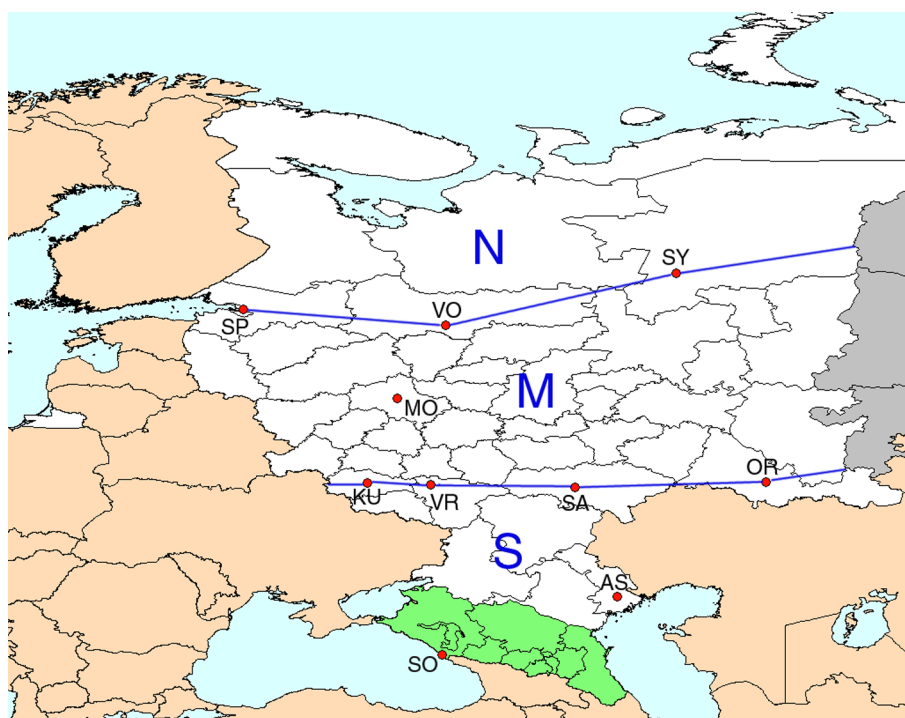
(Zaslavski 1965)

1. Dorsum yellow, pronotum with six black spots, sometimes partially fused to each other. Elytra with black sutural stripe, and each with eight black spots, from which three-four lateral spots usually connected to each other forming undulate stripe. Length 2.5–3.2mm. Widely distributed . . . . . *T. sedecimpunctata* (Linnaeus) \*\*
- Dorsum yellow, pronotum with two black spots laterally. Elytra with three longitudinal black stripes: joint sutural one, and one for each elytron. Length 2.0–3.0mm. Middle belt (Penza reg., Mordovia, Tambov, Voronezh, Samara), south . . . . . *T. gebleri* (Mulsant) (*lineola* Gebler) \*\*

### ***Vibidia* Mulsant**

(Zaslavski 1965)

1. Dorsum rufous. Pronotum with white lateral sides. Each elytron with six white spots. Length 3.0–4.1mm. Widely distributed . . . . . *V. duodecimguttata* (Poda) \*\*



**FIGURE 12.** Subdivisions of the region under consideration. Original map. (N) north, (M) middle belt, (S) south (including the Russian Caucasus marked with green), (ST) St.-Petersburg, (VO) Vologda, (SY) Syktyvkar, (MO) Moscow, (KU) Kursk, (VR) Voronezh, (SA) Saratov, (OR) Orenburg, (SO) Sochi, (AS) Astrakhan.

## Acknowledgements

I am grateful to B.A. Korotyaev (1), A.A. Gusakov (2), V.Yu. Savitsky (3), S.A. Kurbatov (4) for generously allowing me to borrow material from the collections of: Zoological Institute of Russian Academy of Sciences (1), Zoological Museum of the Moscow State University (2), Department of Entomology of the Moscow State University (3), and All-Russian Plant Quarantine Center (including private collection of A.S. Ukrainsky) (4), to S.M. Tsurikov for placing Coccinellidae specimens from private M.N. Tsurikov collection at my disposal, and to T. McElrath, V.F. Khabibullin, A.S. Konstantinov, O. Nedvěď, A.S. Sazhnev, and N.J. Vandenberg for valuable comments and suggestions for improving the manuscript. I would especially like to thank B.A. Korotyaev, without whom this work would be impossible. The study is supported by a grant from the Russian Science Foundation № 16-14-10031.

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