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Revision of the Palaearctic species of the *Coccinella transversoguttata* species group with notes on some other species of the genus (Coleoptera: Coccinellidae)

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Abstract. Palaearctic species belonging to the *Coccinella transversoguttata* species group are revised and redescribed: *C. transverosguttata transversoguttata* Faldermann, 1835, *C. magnopunctata* Rybakow, 1889, and *C. marussii* Kapur, 1973. *Coccinella marussii* sensu FÜRSCH (1981) from Turkey is recognized as a new species – *C. hodeki* sp. nov. Notes on some other Palaearctic species of *Coccinella* Linnaeus, 1758 are given with respect to the prepared new 'Catalogue of Palaearctic Coleoptera'. *Coccinella tibetina* Kapur, 1963 is regarded as a valid species, not a synonym of *C. saucerottii* Mulsant, 1850. *Neococcinella* Savoyskaya, 1969 is synonymized with *Spilota* Billberg, 1820 and *Spilota* is confirmed as a valid subgenus including three species: *Coccinella alpigrada* (Iablokoff-Khnzorian, 1957), *C. miranda* Wollaston, 1864 and *C. undecimpunctata* Linnaeus, 1758. The name *C. venusta* (Weise, 1979) is removed from the synonymy with *C. adalioides* Capra, 1944. *Coccinella iranica* Dobrzhanskiy, 1926 and *C. alpigrada* are new for Turkey.

Key words. Coccinellidae, *Coccinella*, Palaearctic region, taxonomy, new species, new subgenus combination, faunistics, China, India, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Turkey

Introduction

The genus *Coccinella* Linnaeus, 1758, involving important aphidophagous species, is principally distributed in the Holarctic region. Only a minority of species reached the Oriental and/or Australian regions. As for its phylogenetic position, the genus is closely related to the Afrotropical *Lioadalia* Crotch, 1874 and, through a peculiar Palaearctic genus *Aaages* Barovskiy, 1926, to a large complex of species of the Holarctic genera *Ceratomegilla* Crotch, 1873 and *Hippodamia* Chevrolat, 1836. Species of the genus *Coccinella* in a broad concept

were listed in several catalogues published at the beginning of 20th century; the distribution of 30 Palaearctic species was given e.g. by JACOBSON (1915).

DOBRZHANSKIY (1925) laid the foundations of the modern classification of the genus *Coccinella*; he was the first to precisely define essential characters of the genus, using peculiarities in the colour pattern and especially in the structure of male and female genitalia to separate the genera *Synharmonia* Ganglbauer, 1899 (now *Oenopia* Mulsant, 1850) and *Coccinula* Dobrzhanskiy, 1925. Later, he treated 12 Palaearctic (DOBRZHANSKIY 1926) and 10 Nearctic species (DOBRZHANSKIY 1931) of *Coccinella* using characters on male and female genitalia, mostly figured for the first time. DOBRZHANSKIY (1926) defined the typical colour-pattern of *Coccinella* and named particular elytral spots. In the second work, DOBRZHANSKIY (1931) analytically compared North American species with the Palaearctic ones and subdivided *Coccinella* into six species groups according to the similarities in the shape of the median lobe of aedeagus. Although the groups were not strictly defined at that time, and, consequently, only slightly influenced the approach of further students in *Coccinella*, this subdivision may be, with some corrections and additions, accepted also at present. The splitting of *Coccinella* into three genera by DOBRZHANSKIY (1925) was followed by MADER (1926-1937), who redescribed 18 Palaearctic species of *Coccinella* using chiefly coloration, which lead him to describe many new aberrations and incorrect interpretation of some taxa of subspecific rank as he neglected the genitalic characters. KORSCHEFSKY (1932) catalogued all species of *Coccinella*, giving their synonymy, extensive list of infrasubspecific names, complete bibliography and known distribution. However, his concept of the genus was extremely wide and many unrelated taxa were included as subgenera. Moreover, he did not respect the original status of some infrasubspecific names. Further valid Palaearctic species, classified now as true *Coccinella*, were described by SEMENOV & DOBRZHANSKIY (1923), DOBRZHANSKIY (1927a), OHTA (1928), LIU (1962), KAPUR (1963, 1973), MIYATAKE (1963), LEWIS (1967) and IABLOKOFF-KHNZORIAN (1970b). Several other papers dealt with the taxanomy of the genus. FILIPPOV (1961) studied the variability in the colour pattern of elytra in the Coccinellidae. He illustrated a complete set of colour patterns of elytra in 8 species of *Coccinella* and compared them with some other Palaearctic genera. He proposed the generic name *Miliziella* Filippov, 1961 for *Semiadalia turkestanica* Semenov & Dobrzhanskiy, 1923 (classified now in *Coccinella*). BROWN (1962) revised the *Coccinella* occurring in North America north of Mexico, corrected the nomenclature, subspecific concept of some species including *C. transversoguttata*, described one new species, and gave precise distributional data and a valuable key. In addition, BROWN (l967) published a review of *Coccinella* recorded by various authors from Mexico, among them *C. nugatoria* Mulsant, 1850 and its subspecies *sonorica* Casey, 1908, which he considered to be a valid species. SAVOYSKAYA (1969), using the morphology of larvae and male genitalia, subdivided *Coccinella* into two subgenera: *Coccinella* s. str. and *Neococcinella* Savoyskaya, 1969. The subgenus *Neococcinella* fully corresponds with the *C. undecimpunctata* species group proposed by DOBRZHANSKIY (1931). The same taxon was erected also by IABLOKOFF-KHNZORIAN (1970a) under the name *Dobzhanskia* Iablokoff-Khnzorian, 1970. Authors of both papers declared *C. undecimpunctata* Linnaeus, 1758 as the type-species. In his review IABLOKOFF-KHNZORIAN (1979) gave the key characters of *Coccinella* which he divided into four subgenera as he i) retained *Neococcinella* with 3 species and synonymized *Dobzhanskia*

with it; ii) downgraded the monotypic genus *Chelonitis* Weise, 1879 to a subgenus of *Coccinella* and carried out nomenclatural changes resulting from the thus arisen secondary homonymy of the nominotypical species; iii) proposed a separate subgenus, *Acoccinella* Iablokoff-Khnzorian, 1979, for the peculiar *C. barovskii* Iablokoff-Khnzorian, 1970; iv) classified the remaining species as *Coccinella* s. str., which became an assemblage of species belonging to at least five species groups of *Coccinella* proposed by DOBRZHANSKIY (1931). Based on the study of available type material, IABLOKOFF-KHNZORIAN (1979) catalogued 26 Palaearctic species of *Coccinella* including three species he did not study, and confirmed and/or clarified the nomenclature of most treated species. However, he could not evaluate those published by LIU (1962), his decision on species described by KAPUR (1963) remained obscure, he did not study the types of *C. iranica* Dobrzhanskiy, 1926, and he entirely missed *C. marussii* Kapur, 1973. The subsequent monograph by IABLOKOFF-KHNZORIAN (1982) is principal for students of the Palaeartic Coccinellinae. In that work he fully followed his previous taxonomic concept (including the imperfections mentioned above) (IABLOKOFF-KHNZORIAN 1979), shortly redescribed external characters as well as the genitalia of both sexes in most species, added two new ones, and provided two identification keys based on external characters and on genitalia; all species and some details are figured. His data on types and type depositories are valuable; geographic distribution, overall review of bionomy and extensive individual variation of some species remained rather scarcely taxonomically treated. In an equally important and valuable work, GORDON (1985) treated the Coccinellidae of North America north of Mexico. He adopted BROWN's (1962) identification key of Nearctic *Coccinella*, did not support the subgeneric division of *Coccinella*, and did not include the Mexican subspecies of *C. transversoguttata*. He supplemented short diagnoses of some species with excellent figures of habitus and genitalia, and gave valuable data on types and type depositories, and mapped distribution of some species.

The present paper contributes to the knowledge of the morphology and taxonomy of species belonging to the *C. transversoguttata* species group proposed originally by DOBRZHANSKIY (1931) for two Palaearctic species.

Material and methods

The present paper is based predominantly on the collection of the Department of Entomology of the National Museum, Praha (NMPC). Further material comes from the collections of V. Navrátil, Praha, Czech Republic (CVNC) and M. Šlachta, České Budějovice, Czech Republic (CMSC). Standard methods of mounting and measurement were applied by means of a stereoscopic and transmitted-light microscope with an ocular micrometer. Dissected body parts, abdomen and tarsal claw were mounted with a methylcelulose glue on the same card as the specimen; the antennae and genitalia are preserved in polyethylene microvials with glycerine attached to the same pin as the specimen. Means and their ratios were calculated from at least six measurements. Measurements are given in the following form: Mean (Minimum-maximum). Basic scheme of colour pattern and the nomenclature of elytral spots follow DOBRZHANSKIY (1931).

Results

Diagnosis of *Coccinella transversoguttata* species group

Species of *Coccinella* with body ovoid, usually acuminate at apex, medium- to large-sized, slightly to moderately convex. Ground colour of elytra red, black pattern composed of 11 spots arranged in a pattern of ½, 1, 1, 1 and 2. Elytral suture sometimes bordered with black stripe, transversal (½+1, 2+3, 4+5) and/or longitudinal (1+2) fusions of spots frequent and species-specific. Pale markings of fore legs always present in male. Apices of hind femora reaching or usually surpassing outer margin of epipleura. Median lobe of aedeagus composed of two portions: basal portion simply rectangular; distal portion, arising dorsally from the basal one, hastate and specific, at base always less than half as wide as basal portion. Basal piece of aedeagus quadrangular, truncate distally, and bearing large triangular appendix. Sipho with large elongate siphonal capsule, armed with strong inner hook-shaped branch, outer rib large, nearly semicircular. Basal portion of siphonal tube not dilated laterally. Preapical portion of sipho moderately enlarged, bearing at least two inequal membranose swellings. Spermatheca densely annulate, infundibulum large but slender, equally dilated at both ends.

Coccinella (*Coccinella*) *marussii* Kapur, 1973

(Figs. 1-29, 75-76, 83-85, 93)

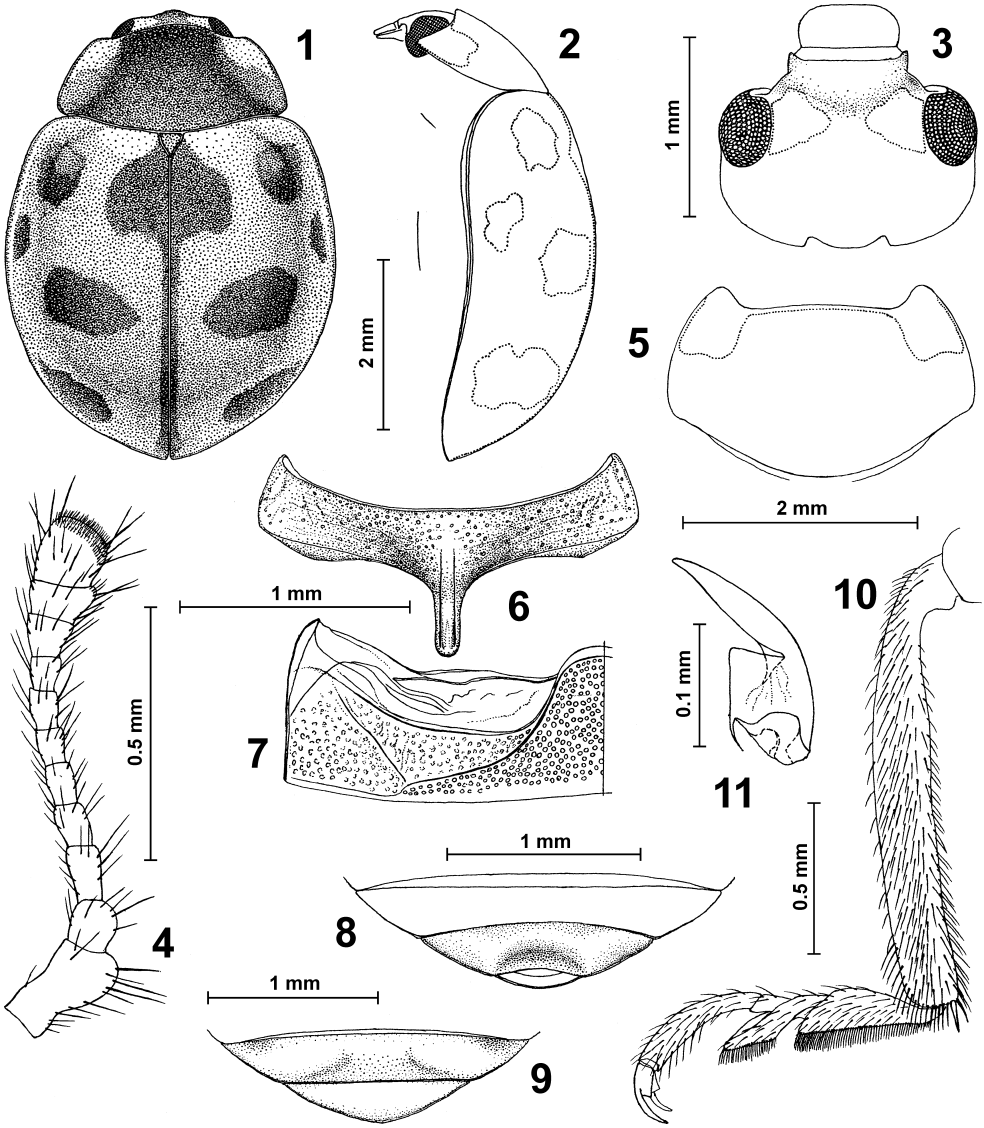
Coccinella marussii Kapur, 1973: 374.

Material examined. INDIA: KASHMIR, Srinagar env., vii.1995, 1 ♂, R. Sauer lgt. (NMPC). **PAKISTAN** bor.: BALTISTAN province, Karakoram Mts., Hushe valley, Nangbrok r., Bondid creek, ca 3500 m a.s.l., 31.vii.1999, 2 ♀♀ (head lost in one specimen), M. Šlachta lgt. (CMSC, NMPC); Hushe valley, Nangbrok r., Bondid creek, ca 4000 m a.s.l., 2.viii.1999, 1 ♀, M. Šlachta lgt. (CMSC); Hushe vall., ca 3500 m a.s.l., Apobrock vall., 10.ix.2001, 2 ♂♂, M. Šlachta lgt. (CMSC, NMPC).

Redescription. Body subovate, in male 1.37-1.42 times and in female 1.37-1.43 times as long as wide, slightly convex. Upper surface not much shiny, finely and densely punctate, rudimentary pubescent, setae shorter than diameter of punctures.

Head black, eye canthus and rather large roundly triangular to rhombo-trapezoidal spot on each side of frons white-yellow, the spot being close to inner orbit of eye but not touching it. Mouthparts black, mandible with outer portion of base whitish translucent, apex and narrow inner edge red-brown; labial palpi and tips of apical maxillary palpomeres brown. Antenna pale brown, scape black, apical antennomere more or less infuscate. Pronotum black, anterior corners each with quadrangular white-yellow spot, the spots interconnected in male by narrow white-yellow anterior border. Elytra orange-red, with narrow sutural band and nine moderately large black spots corresponding to spots ½ (scutellar), 1 (humeral), 2 (lateral), 3 (discal) and 4+5 (marginal + apical) of the basic pattern. Scutellar spot large, roundly trapezoidal to pentagonal, gradually or suddenly narrowing towards black sutural band, the latter sometimes slightly widened before elytral apex; humeral spot quadrangularly rounded, its antero-lateral part covering humeral bulge; lateral spot smallest of all, round to irregularly longitudinally oval, situated at about one-third of elytral length near lateral margin but not touching it; discal

spot large, transversely oval, situated somewhat obliquely behind the level of midlength of lateral spot and closer to suture than to lateral margin; preapical spot composed of two confluent ones (marginal and apical), transversely oval, subequal in size to discal spot, and situated transversely in posterior third of elytron closer to lateral than to sutural margin. Underside



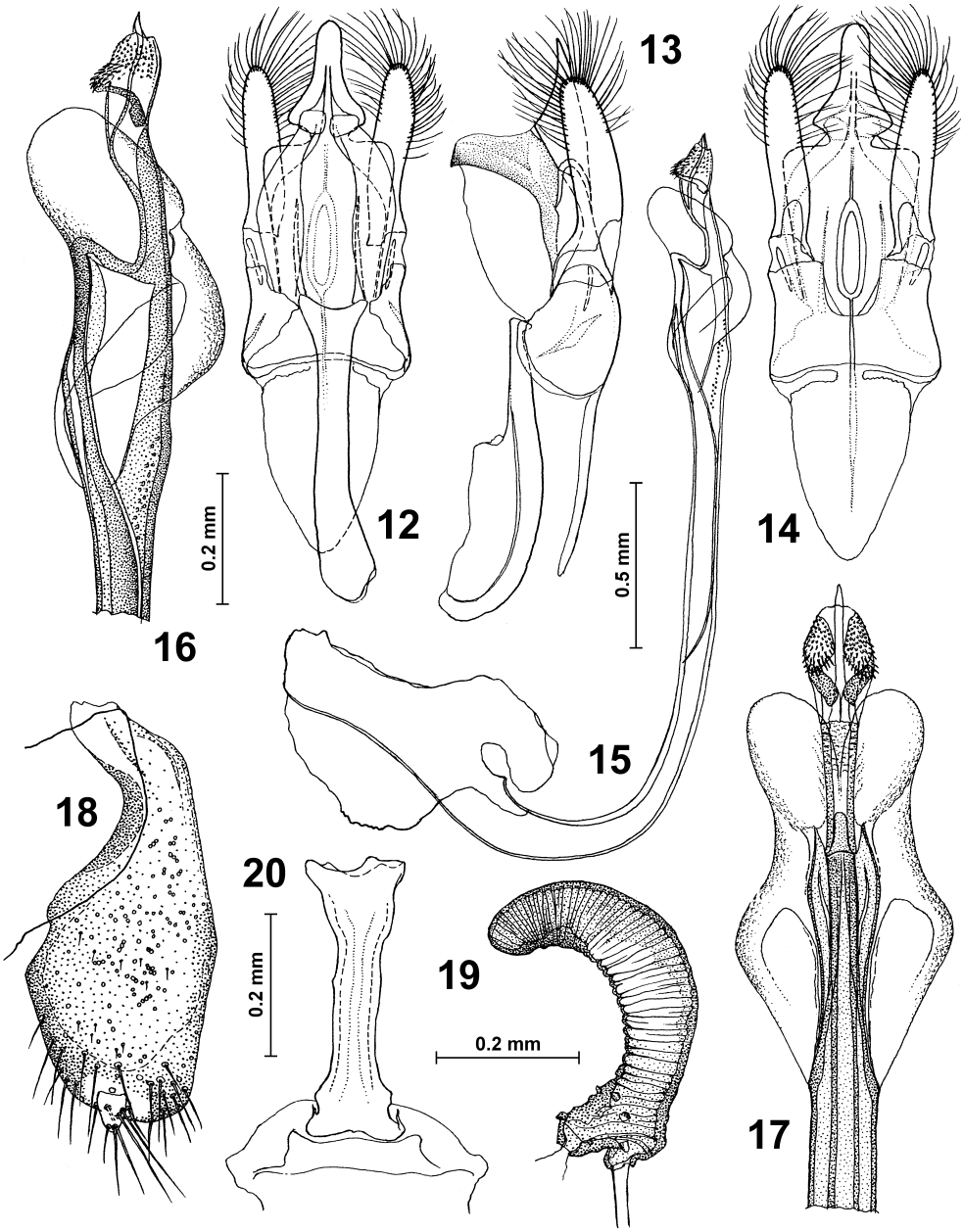
Figs. 1-11. *Coccinella marussii* Kapur, 1973. 1 – form of body, dorsal view; 2 – ibidem, lateral view; 3 – head; 4 – antenna; 5 – pronotum; 6 – prosternum; 7 – abdominal ventrite 1; 8 – abdominal ventrites 5-6 of male; 9 – abdominal ventrites 5-6 of female; 10 – hind tibia and tarsus; 11 – tarsal claw.

and legs black, small area at antero-lateral corners of propleura apricot, elytral epipleura orange-red, mesepimera, metepimera, and sometimes narrow stripe at posterior end of metepisternum yellow-white. In male, anterior face of fore coxa with large yellow-white spot and ventral face of front femur with narrow yellow-white stripe. Tarsomere 3 and basal portion of tarsomere 4 of all tarsi brown, tarsal claws brown to red-brown, black at the base.

Head 1.3 times as wide as long, 0.54-0.57 times as wide as pronotum. Apex of clypeus truncate, straight or indistinctly concave in middle. Antero-lateral corners asymmetrical, triangular, moderately prominent anteriorly, depressed ventrally, parallel-sided. Clypeus moderately transverse, convex, fronto-clypeal furrow rather distinct, widely V-shaped. Frons 0.54-0.58 times as wide as head, transversely flat. Eyes small, widely oval. Inner orbits slightly more arcuate in anterior half than in posterior one, subparallel. Long portion of temples behind eyes straight, parallel, then widely arcuate, strongly narrowing towards occipital aperture. Surface granulate-reticulate, rather coarsely punctate, covered with short pubescence. Punctures 0.9-1.2 times as large as eye facets, setae along orbits as long as 3-4 diameters and on clypeal margin as 6-7 diameters of eye facet. Antenna as in Fig. 4.

Pronotum trapezoidal, 1.83 (1.80-1.84) times as wide as long, moderately convex. Anterior margin of pronotum deeply and rather narrowly emarginate, the emargination trapezoidal, moderately convex in middle. Anterior corners prominent, their inner margin flatly S-shaped. Outer margin rather widely arcuate, meeting the inner one at sharp, nearly rectangular, subsymmetrical angle. Pronotum widest just before posterior corners. Posterior corners widely obtusangulately arcuate, situated at posterior 0.45 of pronotal length. Distance between anterior and posterior corners equal to 0.75 of pronotal length. Lateral margins nearly regularly arcuate or gradually somewhat more slightly so in posterior one third, converging anteriorly, not reflexed, rather strongly bordered. Base widely arcuate, sides gradually straightened, slightly emarginate before posterior corners. Surface finely granulate-reticulate, finely and densely punctate. Punctures 0.9-1.2 times as large as eye facets, irregularly spaced, separated by 1-2.5 diameters, becoming somewhat denser and separated by 0.9-2 diameters basally. Scutellum small, equilaterally triangular, at base as wide as 0.08-0.10 of pronotal width. Surface densely covered with small inequal punctures, interstices between punctures smooth.

Elytra widely oval, in male 1.07-1.15 times and in female 1.08-1.15 times as long as wide, rather slightly convex, in both sexes about 2.5-2.8 times as long as high, nearly regularly or indistinctly more strongly convex in posterior 0.4 of elytral length (lateral view). Elytral base slightly concave, humeral angle widely arcuate, not projecting anteriorly, its inner margin scarcely depressed. Humeral bulge slightly developed, small. Outline of the disc rather widely and regularly convex in caudal view, in short lateral portion gradually straightened and in anterior 0.4 of elytra distinctly depressed under humeral bulge. Comparatively wide longitudinal furrow near lateral margin under humeral bulge is distinctly dilated in the reach of the lateral black spot, occupying about half of its width. Lateral margins widely arcuate, somewhat less so in anterior third than in posterior two thirds, narrowly reflexed and moderately bordered. Apex of elytra acuminate, scarcely caudate. Surface with traces of reticulation consisting of very dense micropunctures, finely punctate. Punctures smaller, sparser and somewhat shallower than on pronotum, 0.7-0.9 times as large as eye facets, separated by 1.5-4 diameters, becoming coarser, 1.2-2 times as large as eye facets and separated by 0.9-1.5 diameter along lateral margins.



Figs. 12-17. *Coccinella marussi* Kapur, 1973. 12 – tegmen, ventral view; 13 – ibidem, lateral view 14 – ibidem, dorsal view; 15 – sipho; 16 – apex of sipho, lateral view; 17 – idem, ventral view; 18 – genital plate; 19 – spermatheca; 20 – infundibulum.

Ventral surface moderately shiny, covered with dense, greyish-white, on distal part of tibiae pale ochraceous pubescence. Setae usually as long as 4-6 diameters, in middle of metasternum and of abdominal ventrites as 3-4 diameters, and on lateral parts of body at most as 6-8 diameters of eye facet. Propleura horizontal, in anterior half widely longitudinally excavated, gradually impressed towards antero-lateral corners of prosternum, forming indistinct groove for reception of antennal tip. Surface obsoletely reticulate, shallowly punctate, punctures equal to eye facets or indistinct; small area close to antero-lateral corners of prosternum with fine dense oblique wrinkles. Epipleuron about 1.55 (1.47-1.69) times as wide as base of mesosternum, feebly sloping dorso-laterally, rather deeply and widely excavated in anterior 0.7. Surface obsoletely rugose, densely covered with shallow punctures of inequal size but usually larger than eye facets. Prosternum moderately convex in middle, its anterior margin rather deeply semi-elliptically emarginate. Basisternal lobes rather narrow, flattened, at the narrowest part distinctly more than twice as wide as prosternal process. Prosternal process narrow, only finely saddle-shaped behind midlength, apex semicircular. Prosternal carinae parallel, reaching anterior third of length of prosternum. Surface of prosternum finely transversely wrinkled, finely and rather densely punctate, punctures becoming obsolete postero-laterally. Mesosternal process at base 1.18 (1.06-1.29) times as wide as long in middle, rather strongly convex. Anterior margin moderately carinulate, straight or very shallowly emarginate in middle. Surface without wrinkles or indistinctly transversely wrinkled, sometimes obsoletely reticulate, coarsely and nearly regularly punctate. Punctures separated by their diameter, becoming denser towards base, 1.2-1.5 times as large as eye facets. Metasternum 3.97 (3.75-4.26) times as long as mesosternal process, rather strongly transversely convex, flattened postero-medially. Medial longitudinal sulcus complete, slightly impressed except for anterior portion. Precoxal bulge well developed, transverse. Surface finely transversely wrinkled and finely punctate. Wrinkles becoming finer and very dense antero-laterally. Punctures along medial sulcus inequal in size and distribution, 0.6-1.2 times as large as eye facets, somewhat deeply impressed, usually sparse, becoming somewhat denser and shallower to indistinct along lateral margins. Abdominal ventrites 1-4 in medial third distinctly transversely convex, sides flattened. Ventrite 1 only finely saddle-shaped medially, with surface rather coarsely densely punctate; punctures 1.2-1.5 times as large as eye facets, separated by 0.25-0.5 their diameter, becoming smaller and sparser postero-medially. Femoral line V-shaped, inner part strongly arcuate at basal half, then gradually straightened, shortly broken before meeting straight line before posterior margin of ventrite 1, and nearly crossing the outer, strongly oblique and nearly straight lateral line. Posterior margin of ventrite 5 in female straight, in male widely shallowly emarginate, that of ventrite 6 in female arcuate and distinctly acuminate, in male narrowly rather deeply arcuately emarginate. Moreover, ventrite 6 in male with shallow transversely oval impression in the middle. Legs long, slender, distal end of hind femora reaching a little over the outer margin of epipleuron. Hind tibia 7.44-8.02 times as longer as wide, outer margin feebly arcuate, inner one nearly straight. Tarsus moderately slender, tarsomere 3 reaching only a little over the midlength of the free part of tarsomere 2. Tarsal claw moderately slender, rather slightly curved dorsally, with sharp basal tooth situated submedially.

Male genitalia. Tegmen moderately sized. Median lobe of aedeagus in larger basal portion subrectangular, in smaller apical one hastate, extended well beyond apices of parameres.

Hastate portion rhomboid and dilated at base, passing into narrow, tongue-shaped apex, distinctly shorter than half of hastate portion. Dorsal margin slightly sinuate with apex sharply pointed, feebly curved ventrally. Paramere thick, finger-shaped, only slightly curved at basal 0.4. Basal piece of aedeagus quadrangular, bearing large triangularly acuminate appendix. Trabes robust, gradually more strongly curved distally, nearly as long as basal piece and paramere combined. Sipho moderately long. Siphonal capsule robust with inner hook-shaped projection strong, curved dorsally, dorsal rib well developed, irregularly semicircular. Siphonal tube moderately slender, in basal third irregularly semicircularly rounded, forming rather sharp angle, apex of sipho only slightly dilated at the base. Preapical supporting sclerites parallel-sided dorsoventrally and narrowed laterally, bearing two inequal interconnected membranose swellings at each side, not extremely enlarged. Proximal pair of swellings subtriangular, without free portion, distal one oval, partly free. Terminal ampulla of sipho moderate in size, subtriangular.

Female genitalia. Genital plate (hemiventrite 9) robust, about twice as long as wide, asymmetrically pear-shaped with rather thick, strongly curved basal portion. Stylus well developed, conical, bearing 4 setae. Spermatheca semicircular, nodulus short, much shorter than ramus, cornu moderately enlarged medially. Infundibulum about as long as spermatheca, with body cylindrical, equally enlarged at both ends, campaniform distal end rather short.

Length. Males (n = 3) 4.87-5.28 mm; females (n = 3) 5.13-5.35 mm. KAPUR (1973) gives 5.4 mm.

Variability. Black spots on elytra discrete (Fig. 83) or gradually confluent in a pattern of ½+S, 1+2+3 and 4+5 (Fig. 84) or of 1+2+3+S+½+S+3+2+1 (Fig. 85) to form a tricuspidate or anchor-like pattern in anterior half of elytra. Spots on posterior half of elytra invariably confluent.

Distribution. Known material of *C. marussii* is extremely limited, coming only from the mountainous parts of northernmost Pakistan and Kashmir.

Discussion. The species has been known only from the female holotype deposited in Museo Civico di Storia Naturale, Trieste, Italy. Although I have not studied the type, the identity of the examined material is doubtless given the locality. It is a characteristically coloured species with the tips of hind femora visible from above, and related to *C. magnopunctata* Rybakow, 1889, in having similar siphonal structures. The hastate portion of median lobe, however, much resembles that of *C. transversoguttata*. FÜRSCH (1981) also recorded *C. marussii* from Turkey but the material belongs to another, undescribed species; this new species is described below.

Coccinella (*Coccinella*) *hodeki* sp. nov.

(Figs. 21-33, 77, 86)

Coccinella marussii: FÜRSCH (1981): 81 (misidentification).

Type material. HOLOTYPE, ♂: **TURKEY**: ERZURUM province, 15 km SW Erzurum, Palandöken Dağları [Mts.], Tekederesi village env., 39°48.8´N, 041°09.0´E – 39°47.6´N, 041°09.7´E, steppes and pasture near spring, tunnels of gopher, 1965-2230 m a.s.l., 26.-28.vi.2004, J. Hájek & J. Růžička lgt. Antenna, abdomen, male genitalia and tarsal claw of hind leg dissected.

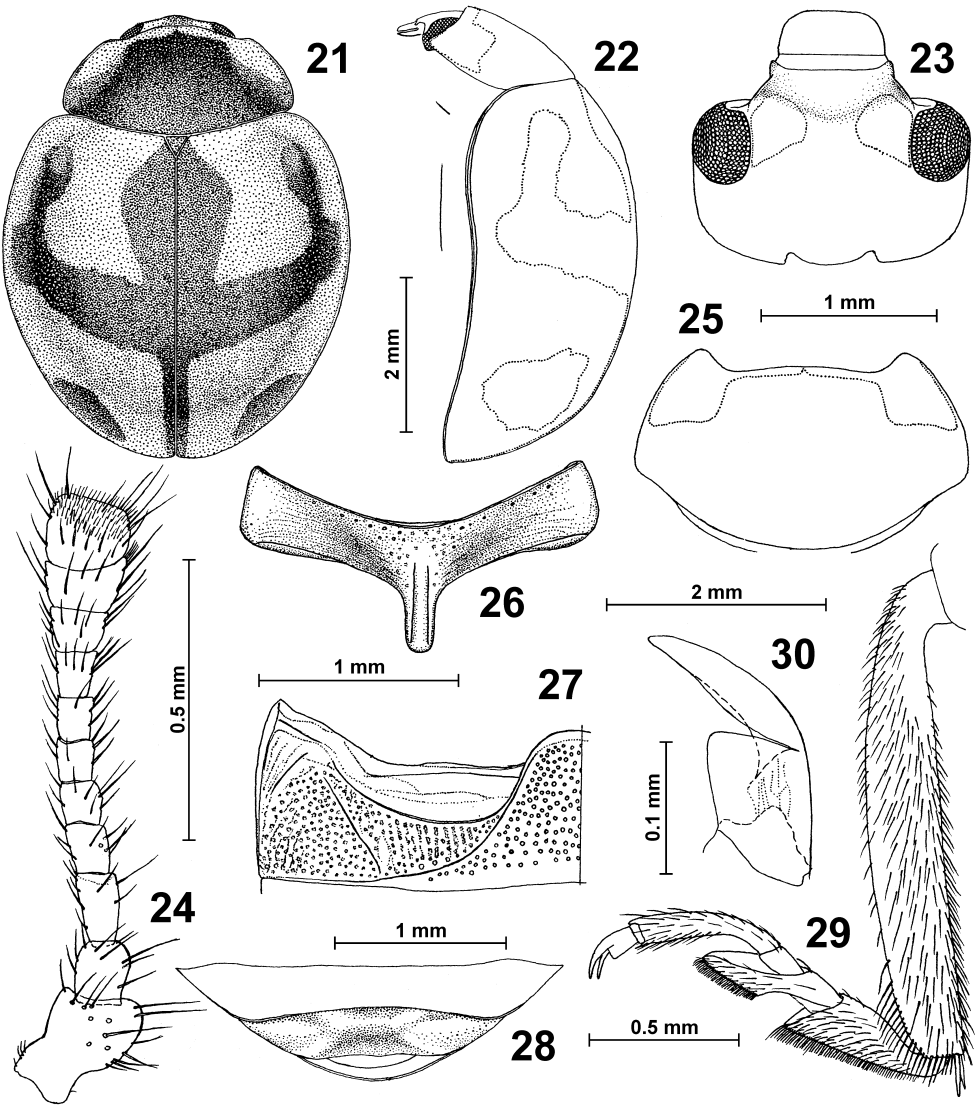
Description. Body robust, shortly oval, in male 1.28 times as long as wide, rather strongly convex. Upper surfaces not much shiny, finely and densely punctate, rudimentary pubescent, setae shorter than diameters of punctures.

Head black, eye canthus and large rhombo-pentagonal frontal spot white-yellow. Mouthparts black, mandible with outer portion of base whitish translucent, apex pale brown; tips of apical maxillary and labial palpomeres brown. Antenna paler, brown, scape and apical antennomere strongly infuscate. Pronotum black, antero-lateral corners each with large trapezoidal white-yellow spot; spots interconnected by narrow white-yellow anterior border suddenly interrupted in middle. Elytra orange-red, with large elongate rhomboid black scutellar spot gradually narrowed towards midlength of elytra and extended as narrow black sutural line in posterior half of elytra; anterior half of elytra with compound black pattern as if composed of three confluent spots 1+2+3 on each elytron and widely interconnected with sutural black marks to form a tricuspidate pattern. Apical half of elytron with large oval transverse black spot, much closer to lateral margin (though not touching it) than to suture. White-yellow subtriangular mark present at base of elytra close to scutellum. Underside black, except for rather small whitish area at antero-lateral corners of propleura, orange-red elytral epipleura, white mesepimera and white-ochraceous metepimera. Legs black, anterior face of fore coxae in male with white-ochraceous spot. Ventral face of fore femora with pale stripe in male. Most of tarsomeres 3 brown, tarsal claws red-brown.

Head roundly pentagonal, more than 1.33 times as wide as long, 0.51 times as wide as pronotum. Apex of clypeal margin truncate, straight in middle, antero-lateral angle asymmetrical, sharply triangular, moderately produced forward and only slightly depressed, lateral sides parallel. Clypeus rather strongly transversely convex, frontoclypeal sulcus distinctly marked, widely V-shaped. Frons 0.60 times as wide as head, slightly transverse and convex. Eyes small, subcircular. Inner orbits slightly and regularly arcuate, subparallel. Long portion of temples behind eyes straight, parallel, then nearly semicircularly narrowing towards occipital aperture. Surface granulate-reticulate with irregularly dispersed double punctures and covered with rather sparse grey-white pubescence. Puncture diameters 0.9-1.2 times (smaller punctures) or 1.5-1.8 times (larger punctures) as large those of eye facets. Smaller punctures separated usually at most by their diameter, present at middle of frontoclypeus and becoming distinctly sparser laterally, intermingled with larger ones along clypeal margins, orbits and on vertex. Setae in middle of front rudimentary or missing, along orbits as long as 3-5 diameters and on clypeal margins as 6-7 diameters of eye facet. Antenna as in Fig. 24.

Pronotum pentagonally oval, 1.81 times as wide as long, strongly transverse and convex. Anterior margin of pronotum deeply and rather narrowly emarginate, emargination trapezoidal, moderately convex in middle. Anterior corners prominent, their inner margin flatly and irregularly S-shaped. Outer margin moderately arcuate, reaching inner one at rectangular, somewhat asymmetrical tip. Posterior corners slightly obtusangulate, not widely rounded, situated at posterior 0.4 of pronotal length. Distance between anterior and posterior corners equal to 0.75 of pronotal length. Lateral parts of pronotal surface as strongly convex as disc, gradually moderately flattened and slightly depressed towards anterior corners. Lateral margins widely, towards anterior corners somewhat more strongly arcuate, strongly converging

anteriorly, somewhat obtusangulate, not reflexed, rather strongly bordered. Base widely and regularly arcuate, gradually straightened laterally, slightly emarginate before posterior corners. Surface finely subgranulate- to granulate-reticulate, finely densely punctate. Punctures



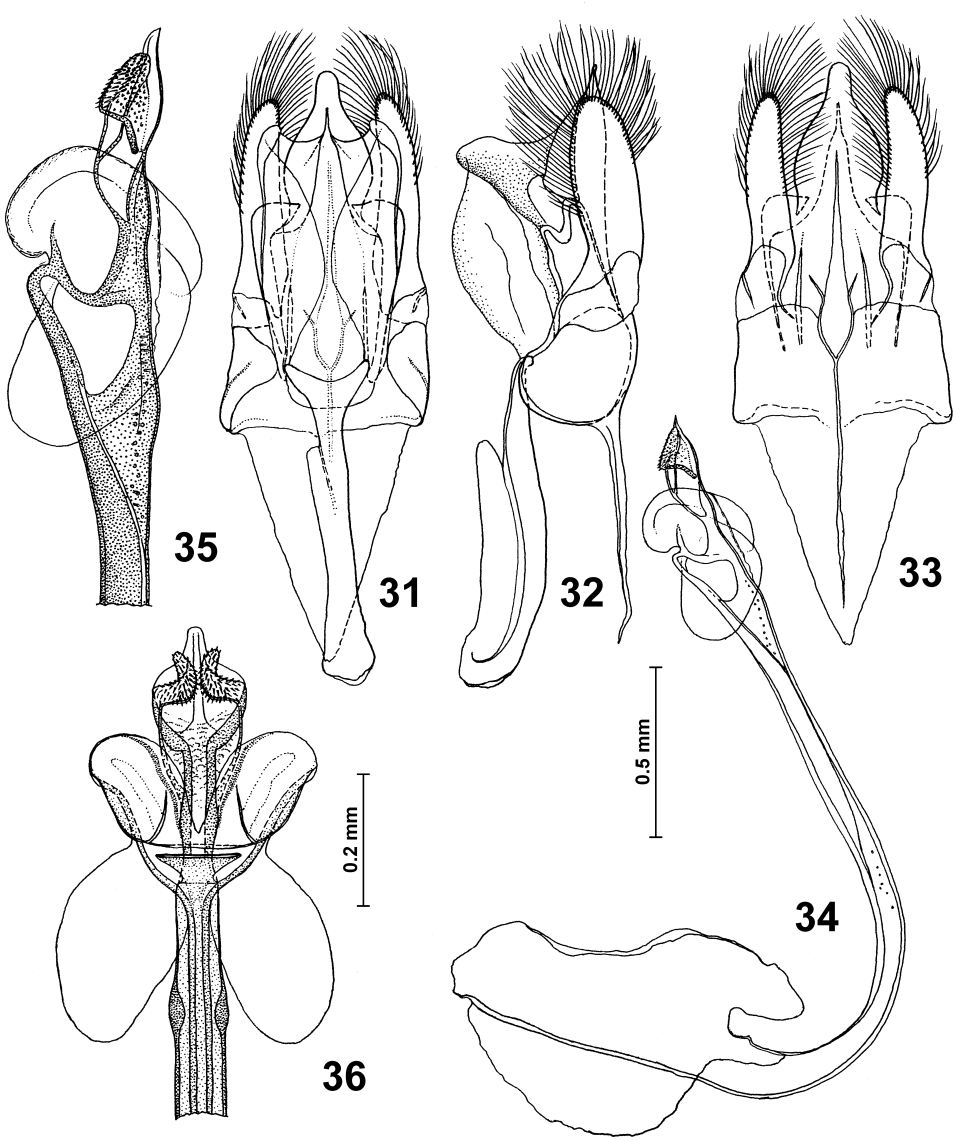
Figs. 21-26. *Coccinella hodeki* sp. nov. 21 – form of body, dorsal view; 22 – ibidem, lateral view; 23 – head; 24 – antenna; 25 – pronotum; 26 – prosternum; 27 – abdominal ventrite l; 28 – abdominal ventrites 5-6 of male; 29 – hind tibia and tarsus; 30 – tarsal claw.

0.8-1.1 times as large as eye facets, somewhat irregularly spaced, more strongly impressed than on head, separated usually by their diameter and becoming gradually somewhat sparser anteriorly and laterally, separated by 1.5-2 diameters. Scutellum small, equilaterally triangular, at base as wide as 0.08 of pronotal width. Surface densely covered with small punctures.

Elytra widely oval, in male 1.05 times as long as wide, rather strongly convex. In lateral view 2.1 times as long as high, somewhat more strongly convex posteriorly than anteriorly. Base of elytron slightly incurved, humeral angle widely arcuate, subrectangular, not projecting anteriorly, its inner margin scarcely depressed. Humeral bulge small, rather slightly developed. Outline of disc including sides regularly semicircular (posterior view), sides under humeral bulge moderately depressed, with slight longitudinal furrow near lateral margin. Lateral margins widely regularly arcuate, more strongly so towards humeral angle and apex, not reflexed but strongly margined, margin gradually weaker from humerus to apex. Apex of elytra narrowly arcuate, not pointed. Surface finely obsoletely reticulate and finely densely punctate. Reticulation represented by dense micropunctures, punctures 1-1.2 times as large as eye facets, separated usually by 1.5-2 diameters and becoming slightly larger and denser laterally.

Ventral surface rather shiny, covered with greyish white, on distal part of tibiae pale brown pubescence. Setae in middle of metasternum as long as 2-5 diameters and on sides and on femora as 6-7 diameters of eye facet. Propleuron moderately longitudinally excavated in middle. Surface somewhat obsoletely reticulate, with fine dense oblique wrinkles along anterior part of its inner margin, punctures shallow, about as large as eye facets, not too dense. Epipleuron at most 1.75 times as wide as base of mesosternum, feebly sloping dorso-mesad, at broadened portion widely excavate, without narrow flattened or subhorizontal area along outer margin. Surface moderately rugose, with punctures as on propleura. Prosternum rather strongly convex in middle, with anterior margin deeply emarginate, emargination broadly V-shaped, arcuate, with medial portion narrowly straightened. Basisternal lobes moderately wide, at narrowest part hardly twice as wide as prosternal process. Prosternal process moderately narrow, not saddle-shaped, with roundly truncate apex. Prosternal carinae parallel, reaching anterior third of length of prosternum. Surface finely transversely wrinkled, irregularly covered with rather small and moderately dense punctures. Punctures along anterior margin smaller than eye facets, separated by 2 (1.5-3) diameters, becoming sparser posteriorly and indistinct laterally. Mesosternal process at base 1.31 times as wide as long at midline, strongly convex. Anterior margin strongly carinate with shallow median emargination. Surface coarsely and densely wrinkled and irregularly punctate. Wrinkles longitudinal, arranged radially. Punctures about 1.5 times as large as eye facets, sparse at anterior margin, becoming much denser posteriorly, frequently oval, nearly catenulate at base. Metasternum 3.75 times as long as mesosternal process, moderately convex, flattened postero-medially, medial longitudinal sulcus complete, well impressed. Precoxal bulges indistinct. Surface irregularly sparsely punctate, finely and densely transversely wrinkled, wrinkles distinctly deeper and somewhat coarser postero-laterally than antero-medially. Punctures transversely oval or round, 1.0-1.5 times as large as eye facets, separated by 1-4 (5) their diameteres along medial sulcus and becoming somewhat denser, separated by 0.5-2 diameters laterally. Abdominal ventrites slightly convex medially, flattened laterally. Ventrite 1 with median portion only feebly saddle-shaped, sur-

face rather coarsely and deeply punctate, punctures 1.5-2 times larger than eye facets, irregularly arranged, smaller punctures very dense at anterolateral part of intercoxal process. Femoral line V-shaped, inner branch regularly arcuate, not fully reaching posterior margin of ventrite 1, nearly crossed by oblique line. Posterior margin of ventrite 5 in male widely and



Figs. 31-36. *Coccinella hodeki* sp. nov. 31 – tegmen, venteral view; 32 – ibidem, lateral view, 33 – ibidem, dorsal view; 34 – sipho; 35 – apex of sipho, lateral view; 36 – ibidem, ventral view.

shallowly emarginate. Ventrite 6 with shallow postero-median subtrapezoidal impression and distinctly bisinuate posterior margin. Legs moderately slender, distal end of middle and hind femora reaching outer margin of epipleura. Hind tibia 6.67 times as long as wide, inner margin apart from basal portion straight, outer one slightly but regularly arcuate. Tarsomere 3 slightly surpassing midlength of free part of tarsomere 2. Tarsal claw moderately slender, obtusangulately curved in middle, with rather large subquadrangular tooth reaching midlength of claw.

Male genitalia: Tegmen robust. Median lobe of aedeagus in ventral view with basal half subquadrangular, shorter than wide, apical hastate half narrowly pear-shaped with sides irregularly sinuate, with parallel-sided terminal portion extended well over apices of parameres. In lateral view, dorsal margin distinctly sinuate, apex slightly curved dorsally. Paramere thick, finger-shaped, only slightly curved at basal 0.4. Trabes simple but robust, slightly curved dorsally, as long as basal piece and paramere combined. Sipho comparatively short. Siphonal capsule large, inner hook-shaped branch rather short, roundly pointed and moderately curved dorsally at apex; dorsal rib well developed, asymmetrically semicircular. Siphonal tube rather short, widely obtusangulately rounded at basal 0.4, then straight; preapical supporting sclerites gradually dilated ventrally but not laterally, bearing two rather large membranose swellings on each side, terminal ampulla moderate, triangular. Anterior pair of swellings moderate, posterior ones strikingly magnified and for most part free.

Female genitalia. FÜRSCH (1981), giving no illustration, compared them with those of true *C. marussii* and regarded them as identical with those figured by KAPUR (1973).

Length. Holotype: 5.71 mm; width: 4.46 mm.

Differential diagnosis. FÜRSCH (1981) studied a series of both sexes from Turkey ('Bielefeld, gelang am 4.8.1965 in der Umgebung von Bitlis (Nahe Van-See, Ostanatolien)', deposited in 'Zoolog. Staatssamlung München und der Sammlung Fürsch', number of specimens not given). The presence of tricuspidate pattern of elytra and the similarity of spermathecae lead him to the conclusion that the material was identical with *C. marussii*. However, the schematic illustrations of the aedeagus (Fig. 1), median lobe of aedeagus (Fig. 2) and the apex of sipho (Fig. 3) given by FÜRSCH (1981) undoubtledly show that it is a separate species. Its peculiar coloration of the elytra which are strongly convex, and broadly oval at the apex and the tips of hind femora concealed from above somewhat resemble *C. magnifica* L. Redtenbacher, 1843. In the latter species, the apical portion of median lobe is quite narrow. On the other hand, *C. hodeki* sp. nov. belongs to the *C. transversoguttata* species group and shares a similar colour pattern with dark forms of *C marussii*. The hastate portion of the median lobe is also similar with that of *C. magnopunctata*, and the subterminal swellings of the sipho exhibit some similarity with *C. transversoguttata*. The phylogenetic relationship of *C. hodeki* sp. nov. thus remains unclear and detailed study of other related species is necessary.

Etymology. The species in named after Ivo Hodek (Czech Academy of Sciences, České Budějovice), an outstanding specialist in the biology of ladybirds.

Distribution. Known hitherto only from east Anatolia in Turkey (provinces Bitlis and Erzurum). The material quoted by FÜRSCH (1981) is not included in the type material.

Coccinella (*Coccinella*) *magnopunctata* Rybakow, 1889

(Figs. 37-55, 78-79, 83-88, 95)

Coccinella undecimpunctata var. *magnopunctata* Rybakow, 1889: 290; Weise (1889): 573.
Coccinella Semenowi Weise, 1889: 651; Jacobson (1915): 982 (distribution).
Coccinella magnopunctata: Dobrzhanskiy (1926): 22; Korschefsky (1932): 469 (catalogue); Kapur (1963): 33.
Coccinella magnoguttata Mader, 1930 in MADER (1926-1937): 152 (misspelling).
Coccinella (s. str.) *magnopunctata*: Iablokoff-Khnzorian (1979): 67 (catalogue); Iablokoff-Khnzorian (1982): 363.

Material examined. CHINA: Gansu, Luqu, 2500 m a.s.l., 11.vii.1990, 1 ♀, M. Nikodým lgt. (NMPC); Xiahe (Labrang), 3300-3700 m a.s.l., 1.-15.vi.1998, 2 ♂♂ 4 ♀♀, V. Major lgt. (NMPC, CVNC); Quinghai, valley 40 km S of Huangyuan, 2500 m a.s.l., 6.-8.vii.1980, 1 ♂, M. Nikodým lgt. (NMPC); Sichuan, Litang env., 5000 m a.s.l., 29.vii.-3.viii.1995, 1 ♂ 1 ♀, J. Schneider lgt. (NMPC).

Redescription. Body oval, in male 1.31-1.36 and in female 1.34-1.37 times as long as wide, moderately convex. Upper surfaces not much shiny, finely densely punctate, rudimentary pubescent, setae not longer than diameters of punctures.

Head black, eye canthus and two large trapezoidal frontal spots yellow-white, isolated, rarely touching orbits or narrowly interconnected by canthus. Mouthparts black, mandible with outer portion of base white-yellow to orange, apex pale brown, apices of labrum and terminal segments of maxillary and labial palpi sometimes brown. Antennae ochraceous to pale brown, scape, distal ends of pedicel and antennomeres 8-9 as well as antennomeres 10 and 11 infuscate. Pronotum black with small narrowly triangular, more or less broken ochraceous-white spot at each antero-lateral corner, reaching posterior 0.25-0.33 of lateral margin. Both spots narrowly interconnected at anterior margin of pronotum. Scutellum black. Elytra orange-red with 11 black spots of inequal size always arranged in a basic pattern of ½, 1, 1, 1, 2. Scutellar spot large, round, rather deeply triangularly emarginate along suture; humeral spot situated at the same level as sutural one, medium sized, round to rectangularly oval, its outer portion covering humeral bulge; lateral spot small and rounded, situated before anterior third of elytral length close to lateral margin; discal spot large, round to transversely oval, more or less emarginate antero-laterally, its major part situated before midlength of elytra; marginal spot small, frequently smallest of all, rounded; apical spot large, oblong oval to subrectangular, situated at posterior third, more than twice closer to sutural than to lateral margin. Underside black, propleura with small crescent-shaped, pale ochraceous spot at anterior corners, elytral epipleura red-orange, mesepimera white-yellow, metepimera partly brown. Legs black, anterior face of fore coxae with large pale ochraceous spot in male. Ventral face of fore femora in male with long pale stripe. Tarsal claw dark reddish brown with black base.

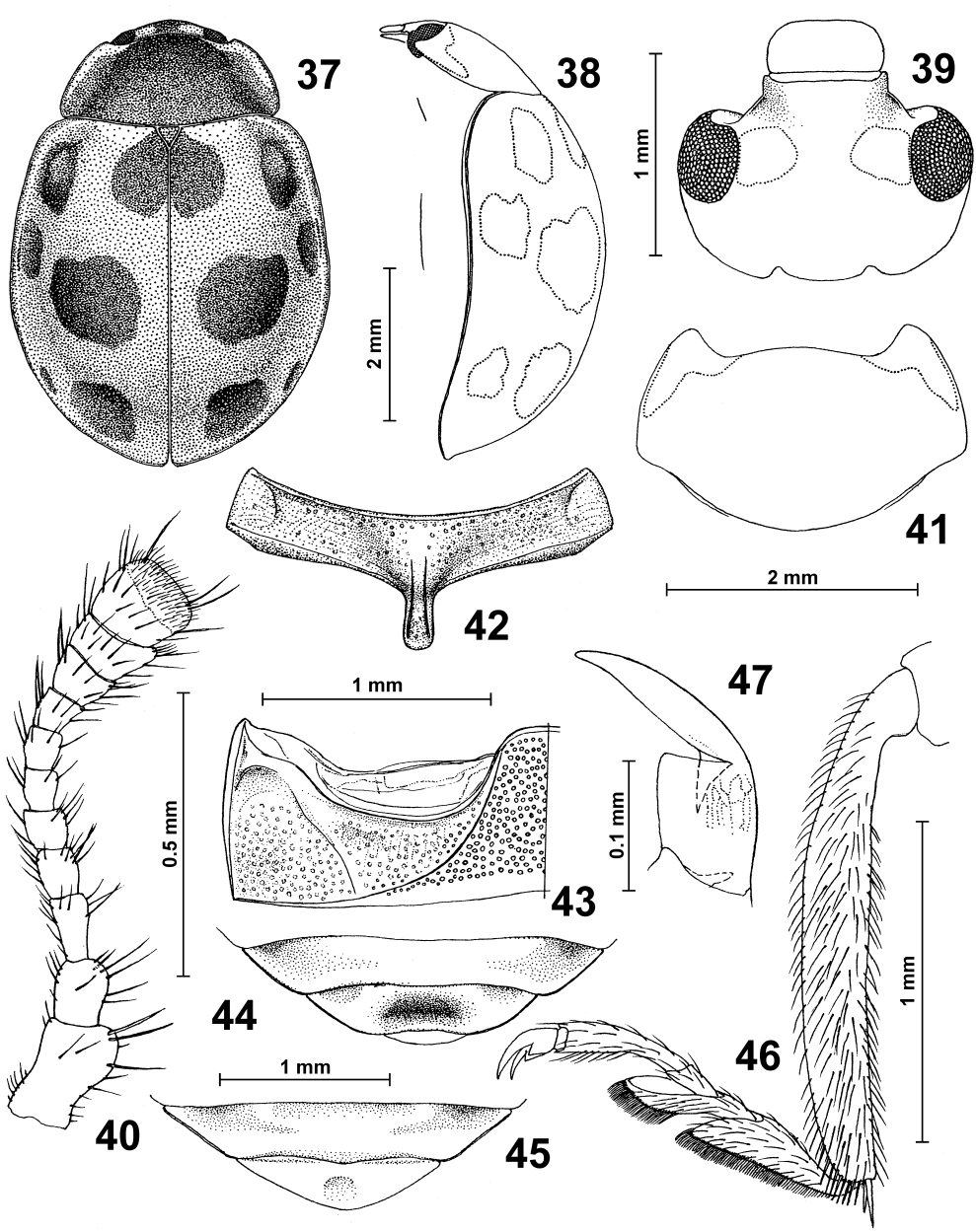
Head including labrum roundly pentagonal, capsule 1.4 times as wide as long and 0.52 (0.50-0.55) times as wide as pronotum. Anterior margin of clypeus truncate, straight in middle; antero-lateral angle asymmetrical, rectangularly triangular, narrowly arcuate at apex, moderately produced forward and at most slightly depressed; lateral margins parallel. Clypeus moderately transverse and convex, frontoclypeal sulcus only slightly marked laterally. Frons

0.58 (0.53-0.61) times as wide as head, moderately transverse and convex. Eyes small, shortly oval. Inner orbits moderately arcuate, more strongly so in posterior third, feebly converging anteriorly. Long portion of temples behind eyes feebly arcuate, rather strongly convergent posteriorly, then almost rounded and narrowing towards occipital aperture. Surface granulate-reticulate, rather finely punctate, covered with sparse pubescence. Punctures rather shallow, 0.9-1.2 or 1.5 times as large as eye facets, separated usually by their diameter, irregularly intermixed with larger ones on clypeus and vertex. Setae as long as 2-4 diameters of eye facets, towards antero-lateral part of frontoclypeus gradually longer, as long as 4-7 diameters. Antenna as in Fig. 40.

Pronotum roundly pentagonal, 1.89 (1.86-1.98) times as wide as long, moderately regularly convex. Anterior margin rather widely and deeply trapezoidally emarginate, emarginated part arcuately convex in middle. Anterior corners moderately prominent, their inner margin flatly irregularly S-shaped, outer margin rather strongly arcuate, reaching the inner one at rectangular, somewhat widely arcuate asymmetrical tip. Posterior corners arcuate at obtuse angle, close to rectangular, situated at posterior 0.43 of pronotal length. Distance between anterior and posterior corners reaching nearly 0.75 of pronotal length. Lateral parts of pronotal surface slightly less convex than disc, antero-lateral area of pronotum rather flattened. Lateral margins gradually straightened towards posterior corners, moderately converging anteriorly, very narrowly reflexed and rather strongly bordered. Base semicircular in middle, sides gradually straightened, slightly emarginate before posterior corners. Surface somewhat obsoletely reticulate to subgranulate-reticulate, finely densely punctate. Punctures 0.9-1.2 times as large as eye facets, separated by 1-1.5 diameters, sometimes irregularly spaced, somewhat denser towards base. Scutellum equilaterally triangular, flat to moderately convex in longitudinal direction, at base as wide as 0.09-0.10 of pronotal width, sides feebly sinuate. Surface without reticulation, with more than 10 minute to small punctures.

Elytra ovate, in male 1.04-1.08 and in female 1.07-1.12 times as long as wide, moderately convex, in lateral view about 2.5-2.6 times as long as high, distinctly more convex posteriorly than anteriorly, apex shortly caudate. Base of elytra slightly concave, humeral angle widely obtusangulate, arcuate, not projecting anteriorly, its inner margin scarcely depressed. Humeral callus slightly developed, small. Outline of disc (posterior view) widely and not much strongly but regularly arcuate, gradually straightened towards lateral margins of elytra, in anterior half under humeral bulge distinctly depressed, with moderately deep longitudinal furrow near lateral margin. Furrow distinctly dilated on lateral black spot, reaching about half of its width. Lateral margins more flatly arcuate in anterior half than in posterior one, not reflexed but strongly bordered, border gradually narrowed from humerus to apex. Apex not widely arcuate, more or less acuminate. Surface somewhat obsoletely reticulate, finely and rather densely punctate. Punctures usually 0.8 times as large as eye facets and separated by 2.5-4 diameters.

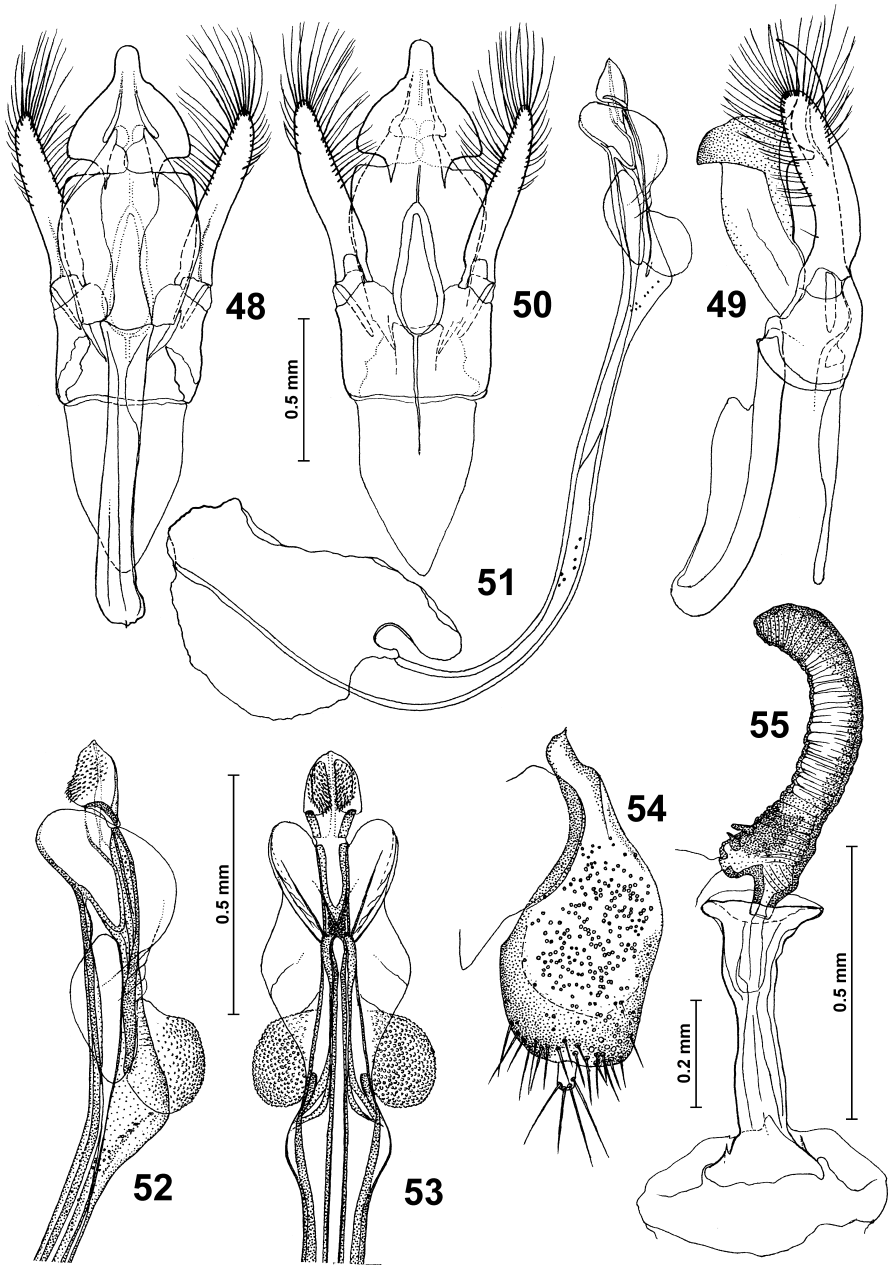
Ventral surface moderately shiny with greyish-white and, on distal part of tibiae, pale brown pubescence. Setae usually as long as 4-6 diameters of eye facet, at sides and on femora 6-7 diameters. Propleura with moderately deep longitudinal median groove. Surface rather distinctly reticulate, with fine and dense oblique wrinkles along anterior part of its inner margin,



Figs. 37-47. *Coccinella magnopunctata* Rybakow, 1889. 37 – form of body, dorsal view; 38 – ibidem, lateral view; 39 – head; 40 – antenna; 41 – pronotum; 42 – prosternum; 43 – abdominal ventrite 1; 44 – abdominal ventrites 5-6 of male; 45 – abdominal ventrites 5-6 of female; 46 – hind tibia and tarsus; 47 – tarsal claw.

punctures very shallow, appearing larger than eye facets, not very dense. Epipleuron 1.64 (1.44-1.97) times as wide as base of mesosternum, feebly sloping dorsomesad, at broadened portion widely excavate. Surface obsoletely rugose, densely punctate, punctures subequal to eye facets, however, with shallow (and hardly visible) margins. Prosternum rather strongly convex in middle; anterior margin deeply emarginate, the emargination arcuate to broadly V-shaped with shortly truncated apex. Basisternal lobes moderately wide, at narrowest part hardly twice as wide as prosternal process. Prosternal process narrow, moderately saddle-shaped with round apex. Prosternal carinae subparallel, reaching anterior third of prosternum. Surface finely transversely wrinkled and irregularly covered with rather small, moderately dense punctures. Punctures along anterior margin smaller than eye facets, separated by 2 (1.5-3) diameters, becoming somewhat sparser posteriorly or indistinct laterally. Mesosternal process at base 1.09 (0.87-1.29) times as wide as long at midline, strongly convex. Anterior margin of process strongly carinate, narrowly and very shallowly emarginate in middle. Surface of mesosternum irregularly punctate with coarsely and longitudinally wrinkled base; wrinkles arranged radially; punctures in wrinkles 1.5-2 times as large as eye facets, sometimes catenulate at base, becoming smaller and much sparser at anterior margin. Metasternum 4.08 (3.83-4.76) times as long as mesosternal process, moderately convex, moderately flattened postero-medially, medial longitudinal sulcus complete and well impressed. Precoxal bulges distinct, slightly developed. Surface not much densely, transversely wrinkled, obsoletely reticulate in antero-lateral portions, rather sparsely finely punctate. Punctures equal in size to eye facets, well impressed, sparsely and irregularly spaced along longitudinal sulcus, becoming slightly larger but much shallower and closer laterally, separated by their diameter or less. Abdominal ventrites moderately, not much widely convex medially. Ventrite 1 with median part only feebly saddle-shaped, surface rather coarsely and deeply punctate, punctures round to shortly oval, (1)-1.5-2 times as large as eye facets, irregularly dispersed, mostly separated by 0.5-1.5 times their diameter, smaller punctures very dense at antero-lateral portion of intercoxal process. Femoral line V-shaped, inner branch regularly arcuate, not quite reaching posterior margin of ventrite 1, nearly crossed by oblique line. Posterior margin of ventrite 5 in female truncate with double shallow emargination occupying half of the width of posterior margin, in male broadly and rather deeply emarginate with inner third of emargination finely convex posteriorly. Ventrite 6 in female with posterior margin widely rounded with angulate apex, bearing shallow and rounded subapical impression. Ventrite 6 in male with posterior margin subrounded but widely emarginate in middle, emarginate part some more or less straight in middle; bearing rather large, transversely oval, deep impression near midlength. Legs rather long, moderately slender, distal end of middle and hind femora slightly surpassing outer margin of epipleuron. Hind tibia feebly curved, 6.81 (6.67-7.35) times as long as wide; inner margin apart from basal portion straight to feebly concave, outer one slightly and regularly arcuate. Tarsomere 3 only slightly surpassing midlength of free part of tarsomere 2. Tarsal claw moderately slender, obtusangulately curved in middle, subquadrangular basal tooth situated nearly medially.

Male genitalia. Tegmen robust. Median lobe of aedeagus in ventral view with basal portion subquadrangular; apical hastate portion broadly pear-shaped, nearly as wide as basal one, sinuate at sides. Dorsal margin in lateral view nearly straight with apex strongly curved ven-



Figs. 48-55. *Coccinella magnopunctata* Rybakow, 1889. 48 – tegmen, ventral view; 49 – ibidem, lateral view; 50 – ibidem, dorsal view; 51 – sipho; 52 – apex of sipho, lateral view; 53 – ibidem, ventral view; 54 – genital plate; 55 – spermatheca and infundibulum.

trally, reaching over apex of paramere. Parameres strong, finger shaped, slightly curved in basal half. Basal piece quadrangular, somewhat wider than long, bearing subpentagonal basal appendix. Trabes robust, slightly curved distally, only a little shorter than basal piece and paramere combined. Sipho comparatively long, siphonal capsule robust, inner hook-shaped projection distinctly curved dorsally, roundly truncate at apex; dorsal rib strongly developed, semicircular. Siphonal tube in basal third widely rectangularly rounded, then straightened and slightly curved dorsally. Siphonal apex rather long, strikingly dilated at base (dilatation in lateral view elongate triangular dorsally), supporting sclerites parallel-sided dorso-ventrally (lateral view) and gradually narrowed anteriad (dorsal view), bearing three inequal swellings: two anterior ones as in *C. marussii*, and one round basal one armed with micro-prominences. Terminal ampulla of sipho comparatively small, subtriangular.

Female genitalia. Genital plate (hemiventrite 9), robust, about twice as long as wide, asymmetrically pear-shaped with rather slender, moderately curved basal portion, broadly arcuately truncate at apex. Stylus well developed, subcylindrical, bearing four setae. Spermatheca C-shaped, rather slender, less curved medially than at both ends, cornu hardly enlarged in middle, nodulus shortly conical, ramus somewhat shorter than nodulus, quadrangular in outline. Infundibulum about as long as spermatheca, with body cylindrical and enlarged at both ends; basal portion very shortly cone-shaped, distal dilatation 1.5 times as long and asymmetrically campaniform.

Length. Males (n = 3) 6.02-6.46 mm; females (n = 5) 6.32-6.91 mm. WEISE (1889), DOBRZHANSKIY (1926) and MADER (1930 in 1926-1937) report 5-7 mm.

Variability. No principal variability in the colour pattern was found; the elytral spots always remain isolated (Figs. 87-88).

Distribution. China: Gansu, Quinghai, Sichuan and Xizang provinces; India: Kashmir; Mongolia (IABLOKOFF-KHNZORIAN 1979, 1982); Nepal: Manang district; Russia: Tuva.

Discussion. Originally described as a variety of *Coccinella undecimpunctata* Linnaeus, 1758 by RYBAKOW (1889), who found unusually enlarged elytral black spots ½, 3 and 5 in an unknown number of specimens from localities 'Dy-Tschu' and 'Amdo' (in China, Quinghai province). WEISE (1889) recorded only the variety *magnopunctata* of *C. undecimpunctata* in provinces 'Kan-ssu' and 'Sze-tschuan' and based *C. semenowi* Weise, 1889 on other (numerous) material from 'Kan-ssu' and 'Amdo'. His short description was based on differences in the position and size of some elytral spots between *C. undecimpunctata* and *C. semenowi*. SICARD (1892) added *magnopunctata* Ribakow [sic!] to the list of varieties of *C. undecimpunctata*. He was followed by GANGLBAUER (1899) and consequently by many students of the European Coccinellidae at the beginning of the 20th century. JACOBSON (1915) regarded *C. semenowi* as a distinct species, giving its distributional data. DOBRZHANSKIY (1926) studied the types of *C. magnopunctata* and *C. semenowi* deposited in the Zoological Museum of the Academy of Sciences (St. Petersburg), shortly redescribed *C. magnopunctata* as a distinct species, synonymized *C. semenowi* with it, and figured the aedeagus. MADER (1930 in 1926-1937, as *C. magnoguttata*) compared external characters of *C. magnopunctata* with those of *C. undecimpunctata*. IABLOKOFF-KHNZORIAN (1979, 1982) placed the species in *Coccinella* s. str. and designated the holotypes of *C. magnopunctata* and *C semenowi*.

The species undoubtedly belongs to *C. transversoguttata* species group. It seems to be a derived species within this group as suggested by the three preapical siphonal membranose swellings and the extremely enlarged hastate portion of the median lobe of aedeagus. It is evidently more closely related to *C. marussii* than to *C. transversoguttata*.

Coccinella (*Coccinella*) *transversoguttata transversoguttata* Faldermann, 1835

(Figs. 56-74, 80-82, 89-92, 96)

Coccinella transversoguttata Faldermann, 1835: 454; Mulsant (1850a): 117, partim; Crotch (1874): 116, partim; Weise (1879): 109; Weise (1885): 28, partim; Jacobson (1915): 982, partim (distribution); Dobrzhanskiy (1924): 22 (female genitalia); Dobrzhanskiy (1926): 21; Mader (1930 in 1926-1937): 150, partim (infrasubspecific variation); Fürsch (1981): 82; Bielawski (1984): 417.

Coccinella transversoguttata var. *Sedakovi*: Weise (1889): 537 (misidentification).

Coccinella geminopunctata Liu, 1962: 265.

Coccinella (s. str.) *geminopunctata*: Iablokoff-Khnzorian (1979): 68 (as incertae sedis); Iablokoff-Khnzorian (1982): 362.

Coccinella (s. str.) *transversoguttata*: Iablokoff-Khnzorian (1979): 67 (catalogue); Iablokoff-Khnzorian (1982): 364.

Coccinella (s. str.) *transversoguttata biinterrupta* Iablokoff-Khnzorian, 1979: 67 (catalogue); Iablokoff-Khnzorian (1982): 365.

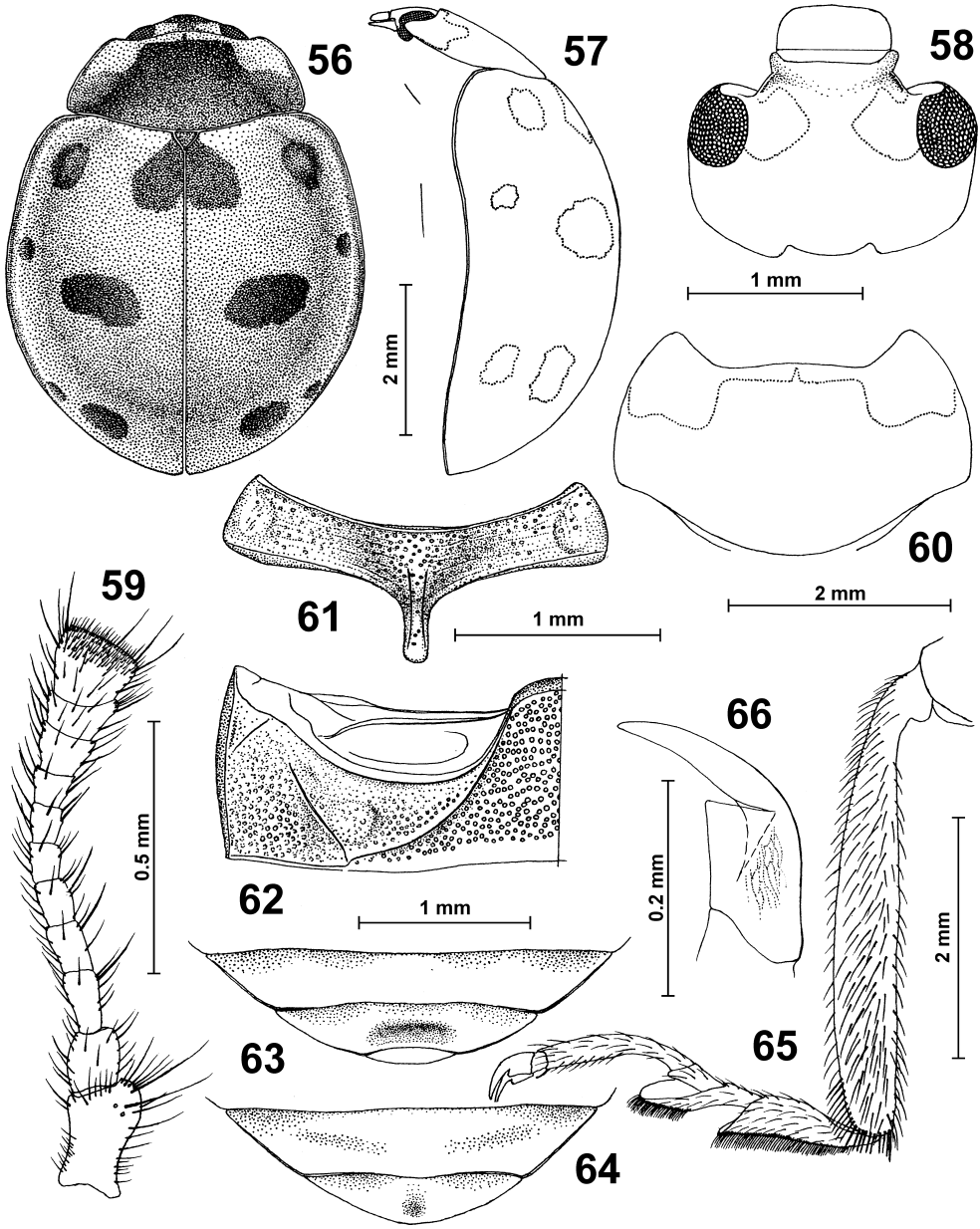
Material examined. CHINA: Gansu, Xiahe (Labrang), 3300-3700 m a.s.l., 1.-15.vi.1989, 8 spec., V. Major lgt. (CVNC, NMPC); Shinlong Shan Mts., Yuzhong, 3200 m a.s.l., 6.-7.vii.1989, 3 spec., V. Major lgt. (CVNC); Shaanxi, Hua Shan Mts., 19.vi.1991, 1 spec., R. Dunda lgt. (NMPC); Qing Ling Shan Mts., road Baoji – Taibai vill., pass 35 km S of Baoji, 21.-23.vi.1998, 1 spec., O. Šafránek & M. Trýzna lgt. (CVNC); Qing Ling Shan Mts., 1500 m a.s.l., Hou Zen Zi county, 30 km SE of Taiban Shan Mt., 26.vi.1998, 1 spec., O. Šafránek & M. Trýzna lgt. (NMPC); Sichuan, Sabde env., 3000 m a.s.l., 13.vii.1992, 1 spec., R. Dunda lgt. (NMPC); Kangding, vii.1992, 2 spec., R. Sauer lgt. (NMPC); Kangding, 3000 m a.s.l., 23.-27.vii.1995, 5 spec., J. Schneider lgt. (NMPC); Zhilong, vii.1992, 1 spec., R. Dunda lgt. (NMPC); Xizang, 'Tibet', Quamdo – E env., (31°09´N, 97°11´E), ca 3500 m a.s.l., cultural steppe, 15.vii.1997, 5 spec., M. Trýzna & O. Šafránek lgt. (CVNC); 'E Tibet', Bomi env. (29°52´N, 95°45´E), mixed forest ca 3000 m a.s.l., 9-10.vii.1997, 5 spec., M. Trýzna & O. Šafránek lgt. (CVNC); Yunnan, Weibaoshan Mts., 2800-3000 m a.s.l., (25°12´N 100°24´E), 29.-30.vi.1992, l spec., V. Kubáň lgt. (NMPC); Habashan Mts., S slope, 1 spec., V. Kubáň lgt. (NMPC); Cangshan Mts., 2500-3000 m a.s.l., (25°43´N 100°06´E), 24.vii.1992, 1 spec., V. Kubáň lgt. (NMPC); Yunlongshan Nat. Reserve, 50 km N of Lijiang, 24.-29.vi.1993, 5 spec., E. Jendek & O. Šauša lgt. (NMPC); Zhongdien env. 6.-8.viii.1995, 18 spec., J. Schneider lgt. (NMPC). **KAZAKHSTAN**: Tian Shan Mts., Chr. Bayulu, Dolon pass, 3200 m a.s.l., 16.-18.vii.1988, 7 spec., L. Chernyshev lgt. (NMPC). **KYRGYZSTAN**: Issyk-Kul Lake (Przevalsk env.), vii.1981, 25 spec., S. Pokorný lgt. (NMPC); Issyk Kul Lake, Grigoryevka, vii.1991, 2 spec., R. Sauer lgt. (NMPC); Tian Shan Mts., Teploklyuchevka, vii.1991, 5 spec. R. Sauer lgt. (NMPC). **MONGOLIA**: Bulgan, Dashinchilen Somon (256 km of Ulaanbaatar), 8.vi.1959, 1 spec., C. Purkyně lgt. (NMPC); Khentey, Somon Cencher, 2 spec., Mandal lgt. (NMPC); 20 km W of Bashiret vill., 1200 m a.s.l., (48°34.99 N, 110°03.92 E),

12.-19.viii.2001, 1 spec., J. Schneider lgt. (CVNC); BAYANKHONGOR, 86 km NW of Bayankhongor, 2070 m a.s.l., (46°50´N 100°04´E), 14.vii.2004, 1 spec., M. Kadlecová lgt. (CVMC); CHOYBALSAN, Bogdgegén, 1700 m a.s.l., vii.1961, 1 spec., Frühb lgt. (NMPC); TÖV, Terejl vill. env, Ghorki Tereji Nat. Reserve, 1600 m a.s.l., (47°58.69´N 107°28.31´E), 23.-27.viii.2001, 1 spec., J. Schneider lgt. (CVNC); ULAANBAATAR, Ulaanbaator, v.-vii.1957, 5 spec., C. Purkyně lgt. (NMPC); Ulaanbaator, (10.)vii.1966, 12 spec., vi.1967, 2 spec., Soběslavský lgt. (NMPC); Ulaanbaator, vi.1984, 6 spec., V. Malý lgt. (NMPC); Ulaanbaatar, 22.vi.1987, 1 spec., O. Majzlan lgt. (NMPC); 6 km S of Ulaanbaatar city, valley behind Zaisan monument, 1500 m a.s.l., (47°51.88´N 106°54.76´E), 13.vii.-29.viii.2001, 1 spec., J. Schneider lgt. (CVNC). **NEPAL**: [POKHARA province], road Dana – Muktinath, 14.-19.viii.1997, 1 spec., A. Křížová lgt. (CVNC). **RUSSIA**: 'Sibiria', Reitter Leder, 5 spec. (NMPC); 'Sibiria or. ', Reitter, 1 spec. (NMPC); 'Sibiria', Berezovka, coll. J. Fleischer, 4 spec. (NMPC); 'Transbaikalia', Berezovka, no other data, 9 spec. (NMPC); Irkutsk, 14.v.1904, 1 spec., Jurinskiy lgt. (NMPC); Tuva, Kyzyl envel., Biy Khem riv., 2.v.1999, 2 spec., A. Klimenko lgt. (CVNC); Irkutsk, vii.1982, 1 spec., Gaier lgt. (NMPC); Baikalska Obl., Jablonovaya, 1912, 1 spec., coll. A. Procházka (NMPC); Baikal Lake, Chamar Daban Mt., Babushkino, 3.-9.viii.1990, 1 spec., R. Sauer lgt. (NMPC); 'Transbaikalia', Troitskosavsk, 7 spec., coll. Gassner (NMPC); Selenga Tal, v.-vi.1908, 4 spec. (NMPC); Yakutsk, no other data, 1 spec. (NMPC); Far East: Pashkova, Amur, 1 spec., B. v. Bodemeyer (NMPC).

Redescription. Body broadly oval, in male 1.30 (1.28-1.35) and in female 1.32 (1.28-1.37) times as long as wide, moderately convex. Upper surfaces moderately shiny, finely punctate, covered with rudimentary pubescence. Setae not longer than diameters of punctures.

Head black, eye canthus and rather large roundly triangular spot on each side of frons white-yellow to apricot; each spot touching inner orbit of eye and frequently connected with eye canthus. Mouthparts black, mandible with lateral part of base whitish, apex brown. Antenna pale brown, scape black with brown apex, two or three apical antennomeres infuscate. Scutellum black. Elytra orange-red with 11 black spots arranged in a pattern of ½, 1, 1, 1 and 2. Scutellar spot rather large, triangular to pentagonal, rarely rhomboid, usually deeply emarginate posteriorly along suture; humeral spot small to moderately large, its anterolateral part situated on humeral callus; lateral spot small, subrounded to quadrangular, situated at anterior 0.33 of elytral length close to lateral margin; discal spot moderately large to large, usually transversely oval and about twice as wide as long to subquadrately rounded, situated before midlength of elytron, with center at inner 0.33 of elytral width; marginal spot small, subrounded, situated at posterior 0.65, close to lateral margin; apical spot moderately large, angulately rounded to rounded, situated at posterior 0.65 and medial 0.35 of elytra. Underside black, tips of antero-lateral corners of propleura and mesepimera whitish, metepimera dark or brownish with whitish stripe, elytral epipleuron orange-red. Legs black, anterior face of fore coxae with white-yellow to apricot spot as well as ventral furrow of each front femur in male with a long pale stripe.

Head roundly pentagonal, capsule 1.33 times as wide as long, 0.53 (0.50-0.57) times as wide as pronotum. Anterior margin of clypeus truncate, straight in middle. Antero-lateral corners asymmetrically triangular, moderately prominent anteriorly and depressed ventrally.



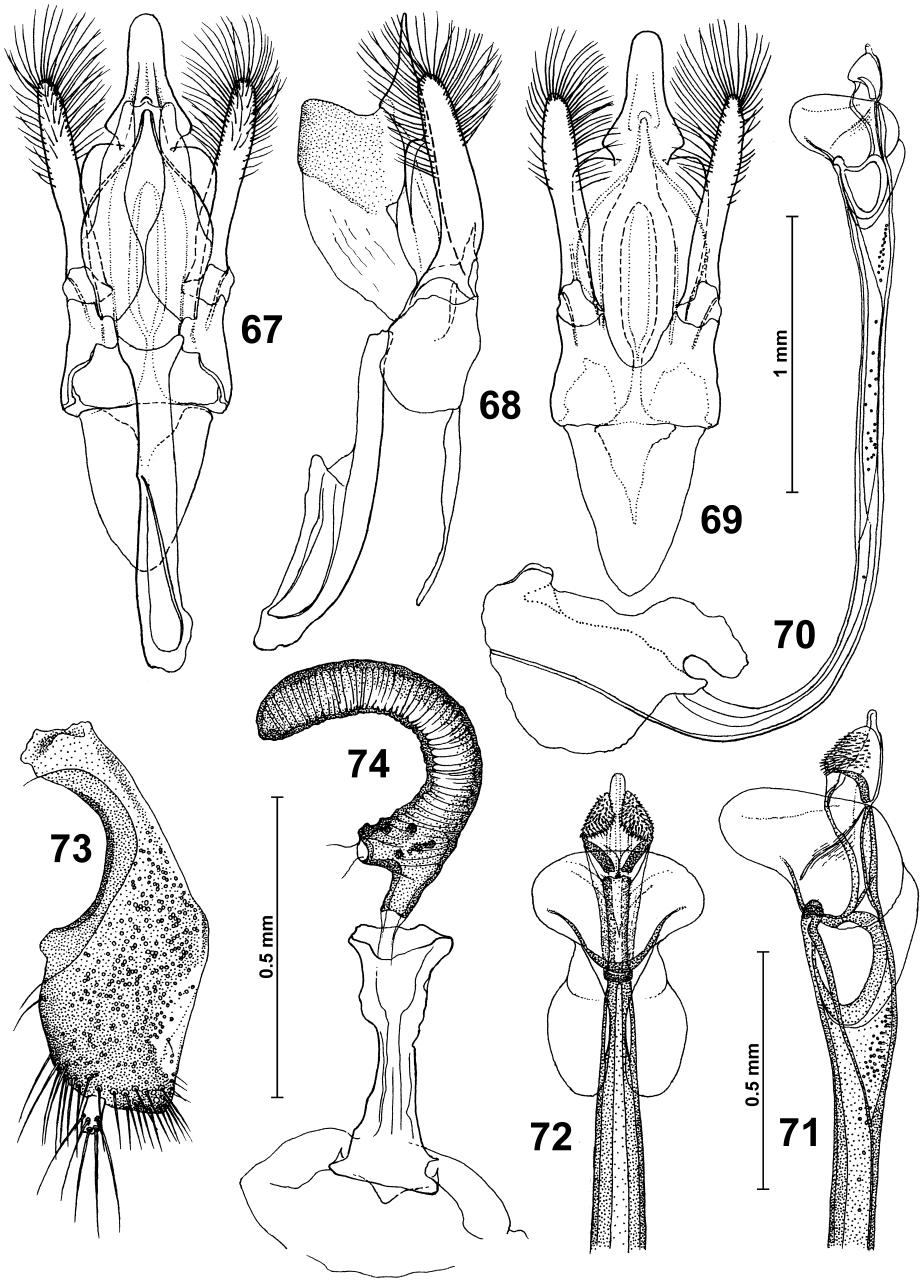
Figs. 56-66. *Coccinella transversoguttata transversoguttata* Faldermann, 1835. 56 – form of body, dorsal view; 57 – ibidem, lateral view; 58 – head; 59 – antenna; 60 – pronotum; 61 – prosternum; 62 – abdominal ventrite 1; 63 – abdominal ventrites 5-6 of male; 64 – abdomninal ventrites 5-6 of female; 65 – hind tibia and tarsus; 66 – tarsal claw.

Clypeus short, moderately transversely convex, fronto-clypeal furrow rather distinct laterally and slightly so medially, widely V-shaped. Frons 0.57 (0.55-0.62) times as wide as head, slightly convex. Eyes small, shortly oval. Inner orbits moderately arcuate, somewhat more strongly so in posterior third, parallel. Long portion of temples behind eyes feebly arcuate, slightly converging posteriorly, then subrounded and strongly narrowing towards occipital aperture. Surface granulate-reticulate, rather finely punctate, covered with sparse pubescence. Punctures usually 0.9-1.2 times as large as eye facets; along orbits, on clypeus and vertex intermingled with sparse larger ones being 1.5 times as large as eye facets. Setae along orbits as long as 2-5 diameters of eye facet, becoming longer anteriorly, at anterior margin of clypeus as long as 7-9 diameters of eye facet. Antenna as in Fig. 59.

Pronotum trapezoidal, 1.84 (1.80-1.91) times as wide as long, moderately convex. Anterior margin of pronotum rather widely and deeply emarginate, emargination trapezoidal with moderately convex middle. Anterior corners moderately prominent, their inner margin irregularly sinuous with main portion straight, outer margin rather strongly arcuate, reaching inner one at distinctly sharp and widely arcuate, asymmetrical tip. Posterior corners arcuate at obtuse angle, close to rectangular, situated at posterior third of pronotal length. Distance between anterior and posterior corners almost equal to 0.8 of pronotal length. Sublateral parts of pronotum indistinctly less convex than disc, antero-lateral area rather flattened. Lateral margins towards posterior corners more strongly arcuate, moderately converging anteriorly, narrowly reflexed but rather strongly bordered, the border being stronger medially. Base semicircular, emarginate at sides. Surface finely subgranulate-reticulate, finely and rather densely punctate. Punctures 0.6-1.2 times as large as eye facets, separated by 2-3 diameters, becoming gradually sparser anteriorly and somewhat larger and denser laterally. Scutellum equilaterally triangular, at base as wide as 0.08-0.10 of pronotal width, sides feebly sinuate. Surface sometimes with shallow median furrow, traces of reticulation and more than 10 minute to small punctures.

Elytra widely oval, in male 1.06 (1.03-1.14) and in female 1.07 (1.05-1.13) times as long as wide, moderately convex, in both sexes about 2.3-2.6 times as long as high in lateral view, more strongly convex posteriorly than anteriorly, apex not or feebly caudate. Base of elytra slighty concave. Humeral angle widely obtusangulate, arcuate, not projecting anteriorly. Humeral bulge slightly developed, small. Outline of disc (posterior view) semicircular, at lateral margins of elytra shortly straightened, under humeral bulge distinctly depressed, with moderately deep longitudinal furrow near lateral margin. Furrow distinctly dilated on lateral black spot, reaching about half of its width. Lateral margins in anterior half more flatly arcuate than posteriorly, not reflexed but strongly bordered, border gradually weaker from humerus to apex. Apex rather widely arcuate, more or less acuminate, sometimes slightly caudate. Surface obsoletely reticulate, finely and rather densely punctate. Punctures usually 0.8-1.2 times as large as eye facets, separated by 2.5-4 diameters, becoming nearly twice as large and denser (sometimes catenulate) along lateral margins.

Ventral surface moderately shiny, covered with dense, greyish white and, on distal part of tibiae, ochraceous to pale brown pubescence. Setae usually as long as 4-6 diameters of an eye facet, in middle part of metasternum and abdominal ventrites as long as 3-4 diameters and on lateral parts of body at most as long as 6-8 diameters. Propleura horizontal, anterior portion



Figs. 67-74. *Coccinella transveresoguttata transversoguttata* Faldermann, 1835. 67 – tegmen, ventral view; 68 – ibidem, lateral view; 69 – ibidem, dorsal view; 70 – sipho; 71 – apex of sipho, lateral view; 72 – ibidem, ventral view; 73 – genital plate; 74 – spermatheca and infundibulum.

with wide longitudinal medial furrow. Surface finely obliquely wrinkled at sides of prosternum, all propleura distinctly reticulate and finely densely punctate; punctures subequal to eye facets. Epipleuron 1.62 (1.48-1.84) times as wide as base of mesosternum, feebly sloping latero-ventrally, widely excavate. Surface moderately rugose, finely densely punctate, punctures 1-1.5 times as large as eye facet, separated usually by 1-2.5 diameters. Prosternum rather strongly convex in middle with anterior margin deeply emarginate; emargination arcuate to broadly V-shaped with shortly truncated apex. Basisternal lobes at the narrowest part hardly three times as wide as prosternal process, flattened laterally. Prosternal process narrow, apex roundly truncate. Prosternal carinae subparallel, feebly narrowing medially, reaching anterior third of prosternum. Surface finely transversely wrinkled and finely punctate. Punctures subequal to eye facets, rather dense, becoming obsolete at postero-lateral part of basisternal lobes. Mesosternal process at base 1.17 (1.06-1.28) times as wide as long at midlength, rather strongly convex. Anterior margin not much widely and shallowly emarginate in middle and bordered by thin high carina. Surface of mesosternum irregularly punctate with coarse, radially arranged wrinkles at base; punctures in wrinkles 1.5-2 times as large as eye facets, sometimes catenulate at base, becoming smaller, subequal to eye facets and much sparser at anterior margin. Metasternum 3.92 (3.45-4.29) times as long as mesosternal process, rather slightly transversely convex, flattened postero-medially, medial longitudinal sulcus complete, slightly impressed medially. Precoxal bulges slightly developed, transversely oval. Surface rather coarsely and densely transversely wrinkled, obsoletely to distinctly reticulate at antero-lateral portions, sparsely punctate. Punctures along median sulcus rather deep, round to oval, subequal to eye facets or larger, irregularly dispersed, separated by 2-5 diameters, becoming much denser and shallower laterally. Abdominal ventrites 1-5 in medial third distinctly transversely convex, sides gradually flattened. Ventrite 1 at most finely saddle-shaped in middle. Surface finely densely punctate, punctures 1.2-1.5 times larger than eye facets, separated by 0.4-1.5 diameters. Femoral line V-shaped, inner branch usually regularly arcuate, discontinuously running to line at posterior margin of ventrite 1 and nearly crossed by oblique, feebly sinuate lateral line. Posterior margin of ventrite 5 in female truncate, nearly straight, feebly emarginate laterally, in male slightly emarginate with medial portion straightened. Posterior margin of ventrite 6 in female acuminate with small circular impression before rounded apex, in male semicircular, rather narrow medial portion deeply emarginate with moderately deep, transversely oval impression before apex. Legs slender with long tarsi. Distal end of hind femora only slightly surpassing outer margin of epipleura. Hind tibia straight to feebly curved, 7.09 (6.78-7.74) times as long as wide, with outer margin slightly and regularly arcuate. Tarsomere 3 reaching posterior third of free part of tarsomere 2. Tarsal claw rather slender, obtusangulately curved at midlength, subquadrangular basal tooth situated distinctly beyond midlength.

Male genitalia. Tegmen somewhat slender. Median lobe of aedeagus in ventral view with basal portion subquadrangular, distinctly longer than wide; hastate apical portion rhomboidal and dilated at base, nearly 0.67 times as wide as basal portion wide, passing into long, tongue-shaped apex. Dorsal margin of median lobe in lateral view finely sinuate with apex feebly curved dorsally. Parameres finger-shaped but thin, only slightly curved at basal 0.25. Trabes moderately thin, only slightly curved distally. Sipho moderately long, basal capsule robust,

inner hook-shaped branch moderately curved dorsally, roundly truncate at apex, dorsal rib strongly developed, semicircular. Siphonal tube at base subrectangular, then straight, preapical portion with supporting sclerites moderately dilated both dorsally and ventrally but narrowed laterally, bearing two swellings: proximal one small and on each side longitudinally oval, remaining partly free, apical one strikingly enlarged ventrally. Terminal ampulla of sipho moderate, triangular.

Female genitalia. Genital plate (hemiventrite 9) robust, blade-shaped, more than twice as long as wide, apex quite asymmetrically truncate, gradually arched outwards. Stylus well developed, cylindrical, bearing usually five setae. Spermatheca C-shaped, nodulus and ramus moderately long, somewhat narrower than cornu, nodulus about 1.5 times longer than ramus, cornu strongly curved, without dilated portion, slightly straightened distally. Infundibulum about as long as spermatheca thick, with cylindrical body equally enlarged at both ends, distal end campaniform, nearly 0.33 times as long as infundibulum.

Length. Males (n = 17) 5.00-6.56 mm; females (n = 14) 5.08-6.72 mm. MULSANT (1850a) gives 5.6-7.8 mm for all populations; WEISE (1885, 1892) reports 5.5-8 mm, DOBZHANSKIY (1926) 5.9-7.2 mm, BROWN (1962) 6.0-7.2 mm and IABLOKOFF-KHNZORIAN (1982) 4-8 mm.

Variability. *Coccinella transversoguttata* is widely distributed in the Holarctic region and is represented by four subspecies in the New World. *Coccinella t. richardsoni* Brown, 1962, common and widely distributed in the main part of America north of Mexico, and *C. t. ephippiata* Zetterstedt, 1838, restricted to the coastal parts of Greenland, are both moderately convex. Two montane populations described as distinct species from Mexico are only slightly convex and are now considered as subspecies: *C. t. nugatoria* Mulsant, 1850 and *C. t. sonorica* Casey, 1908. They perhaps represent isolated, southernmost Nearctic populations of *C. transversoguttata*. Specimens of *C. t. ephippiata* with full elytral pattern are inseparable from fully spoted Palaearctic specimens (BROWN 1962). On the other hand, *C. t. richardsoni* is very variable and the colour pattern becomes gradually reduced (as for the presence of an entire subbasal band and the lateral spot) in the east-west direction. BROWN (1962) also suggested that the relative width of apical hastate portion of the median lobe of the aedeagus (measured as the ratio of the width of the anterior tongue-shaped process of the hastate portion to the width of the basal portion of median lobe) is important for delimiting the subspecies of *C. transversoguttata*. It follows from my measurements here (n = number of specimens measured) that this ratio overlaps between subspecies and cannot be used as the only separating character: 0.28-0.31 (n = 6) for *C. t. transversoguttata*, 0.27-0.29 (n = 4) for *C. t. richardsoni*, 0.24 for *C. t. ephippiata* (BROWN 1962, Fig. 4) and 0.21-0.27 (n = 3) for *C. t. nugatoria*. It seems that the Palaearctic populations are subspecifically more clearly distinct from Nearctic ones when the elytral pattern is considered.

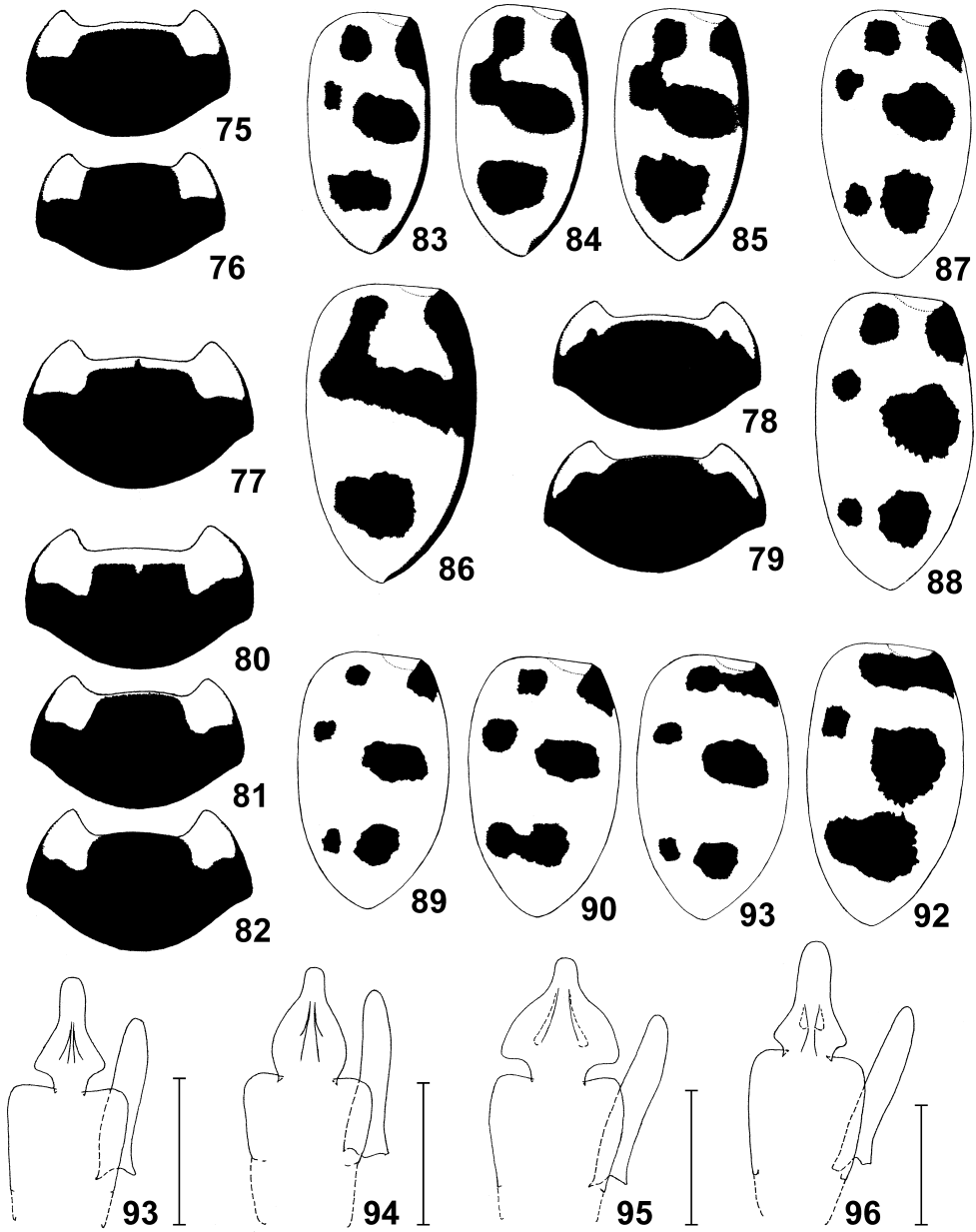
The nominate subspecies, treated here, occurs only in the Old World and has the broadest hastate portion of median lobe of aedeagus (see above). The black elytral spots are complete and usually more strongly developed than that in the Nearctic populations, and may be isolated (Fig. 89) or gradually confluent in the pattern of ½, 1, 2, 3 and 4+5 (Fig. 90), ½+1, 2, 3, 4 and 5 (Fig. 91), and (commonly) ½+1, 2, 3 and 4+5 (Fig. 92), forming a subbasal band. The latter pattern is nearly invariably present in northern populations inhabiting West and East Sibiria, Far East of Russia and Mongolia. Middle Asian and Chinese populations are more

variable and/or specimens with isolated elytral spots may to a various degree dominate in the local populations. FILIPPOV (1961) surveyed the variability of the elytral colour pattern and recorded numerous colour deviations. Although he illustrated some cases of longitudinal connection betwen two spots, the species never has the tricuspidate pattern of *C. marussii* or *C. hodeki* sp. nov.

Distribution. The nominotypical subspecies occurs in China (Gansu, Quinghai, Shaanxi, Sichuan, Xinjiang, Xizang and Yunnan provinces), Kazakhstan, Kyrgyzstan, Mongolia (widely distributed in all provinces), Nepal (Pokhara province), Russia (West and East Sibiria: Irkutsk, Tomsk, Tuva, Yenisseisk, Yakutia; Far East: Amur province, Khabarovsk district, Primorskiy district, Magadan region, Kamchatka, Sakhalin). Older records from northern Scandinavia and the northernmost territory of European Russia were not confirmed (BROWN 1962).

Discussion. *Coccinella transversoguttata* species group is related to species belonging to C. *novemnotata* and *C. difficilis* species groups proposed by DOBRZHANSKIY (1931), all having the median lobe of aedeagus divided into two portions. However, the distal portion is differently shaped in *C. transversoguttata* group. Palaearctic species of the group may be identified by the key given below.

Coccinella transversoguttata was originally described by FALDERMANN (1835) from Irkutsk (type depository unknown). The concept of the species, broadly distributed in the Holarctic region, was soon uncritically widened. Three taxa with a characteristic subbasal transverse band on the elytra were described before 1850: *C. transversoguttata*; *C. ephippiata* Zetterstedt, 1837 from Greenland and *C. quinquenotata* Kirby, 1838 from the Nearctic region. MULSANT (1850a) synonymized *C. quinquenotata* together with *C. ephippiata* as a variety ('Var. A.') of *C. transversoguttata* ('Var. B.'), and described a similar species, *C. transversalis* Mulsant, 1850, from Mexico. He subsequently replaced the preoccupied name *C. transversalis* Mulsant (nec Fabricius, 1781) with *C. nugatoria* Mulsant, 1850 (MULSANT 1850b). CROTCH (1874) listed all these taxa under *C. transversoguttata* and added a new synonym, *C. californica* Mannerheim, 1843, as an extremely pale variety. WEISE (1879, 1885, 1892) regarded all taxa as identical and separated only *quinquenotata* as a variety. Later, all taxa synonymized with *C. transversoguttata* were downgraded by MADER (1930 in 1926-1937) to mere aberrations, who described additional four. Dobrzhanskiy provided a short key of female genitalia (DOBRZHANSKIY 1924), illustrated the aedeagus of a Palaearctic specimen (DOBRZHANSKIY 1926) and male and female genitalia of Nearctic representatives (DOBRZHANSKIY 1931), as well as separated *C. californica* from *C. transversoguttata* (DOBRZHANSKIY 1931). Somewhat unfortunately, he also divided the latter species into two partly sympatric subspecies, *C. t. transversoguttata* and *C. t. nugatoria*. BROWN (1962) treated the infraspecific variability of Nearctic populations of *C. transversoguttata*, originally named as *C. quinquenotata* Kirby, 1837 (not *C. septempunctata* var. *quinquenotata* Haworth, 1912). He replaced that name with *C. richardsoni* Brown, 1962 and delimited two subspecies, *C. t. richardsoni* and *C. t. ephippiata*. He also considered Mexican populations as specifically distinct and used the names *C. nugatoria nugatoria* and *C. nugatoria sonorica* for them (BROWN 1962, 1967). LIU (1962) described *C. geminopunctata* from China. The type series was composed of 10 selected specimens of both sexes from Gansu, Xinjiang and Yunnan provinces. The specimens had elytra with black spots normally developed but isolated, and the schematic illustrations of



Figs. 75-96. 75-82 – colour pattern of pronotum. 75-76 – *Coccinella marussii* Kapur, 1973. 75 – male; 76 – female. 77 – *C. hodeki* sp. nov., male. 78-79 – *C. magnopunctata* Rybakow, 1889. 78 – male; 79 – female. 80-82 – *C. t. transversoguttata* Faldermann, 1835. 80-81 – male; 82 – female. 83-92 – colour pattern of elytra. 83-85 – *C. marussii*; 86 – *C. hodeki* sp. nov.; 87-88 – *C. magnopunctata*; 89-92 – *C. t. transversoguttata*. 93-96 – outline of median lobe of aedeagus and paramere. 93 – *C. marussii*; 94 – *C. hodeki* sp. nov.; 95 – *C. magnopunctata*; 96 – *C. t. transversoguttata*. Scale lines = 0.5 mm.

male genitalia show all details characteristic for *C. transversoguttata* (LIU 1962). IABLOKOFF-KHNZORIAN (1979) placed *C. transversoguttata* into the subgenus *Coccinella* s. str. and enumerated six subspecies, four Nearctic, including *C. nugatoria*, and two Palaearctic, including *biinterrupta* which he upgraded from Mader's aberration with the the authorship attributed to Mader. The latter subspecies, *C. t. biinterrupta* Iablokoff-Khnzorian, 1979, described and keyed by IABLOKOFF-KHNZORIAN (1982), is undoubtedly identical with *C. geminopunctata* Liu, 1962, and the second name has priority. FÜRSCH (1981) synonymized, without any comment, *C. geminopunctata* with *C. transversoguttata* and rejected ssp. *biinterrupta* Mader, 1930 in the sense of IABLOKOFF-KHNZORIAN (1979) on the basis of overlapping distribution with 'normal form'. BIELAWSKI (1984) redescribed the nominate (sub)species based on Mongolian material and illustrated its habitus, the characteristic elytral pattern, lateral spot of pronotum, last ventrites and genitalia of both sexes.

Key to the Palaearctic species of *C. transversoguttata* species group

1 (2) Pale markings in anterior angles of pronotum triangular (Figs. 78-79). Elytra with isolated black spots. Apical hastate part of median lobe of aedeagus strongly dilated, nearly as wide as basal part, sinuate at sides (Fig. 95). Preapical portion of sipho strikingly dilated at base, bearing three membranose swellings. .... ***C. magnopunctata* Rybakow, 1889**

2 (1) Pale markings in anterior angles of pronotum quadrangular (Figs. 75-77, 80-82). Elytra with at least two black spots connected (usually 4+5), if no spots connected, then sutural margin of elytra red. Apical hastate portion of median lobe of aedeagus slightly dilated, at most 0.67 times as wide as basal portion (Figs. 93-94, 96). Preapical portion of sipho not strikingly dilated at base, bearing two membranose swellings.

3 (6) Sutural margin of elytra black. Spots ½ and 1 never connected. Tongue-shaped process of apical hastate portion of median lobe of aedeagus less than 0.5 times as long as the entire portion.

4 (5) Elytra slightly convex, about 2.5-2.8 times as long as high. Apices of hind femora surpassing lateral margins of elytra. Apical hastate portion of median lobe rhomboidally dilated at base with sides concave (Fig. 93). . ..... ***C. marussii* Kapur, 1973**

5 (4) Elytra strongly convex, about 2.1 times as long as high. Apices of hind femora reaching lateral margins of elytra. Apical hastate portion of median lobe pear-shaped with sides sinuate (Fig. 94). ... ***C. hodeki* sp. nov.**

6 (3) Sutural margin of elytra red. Spots ½ and 1 frequently connected, forming characteristic subbasal band. Tongue-shaped process of apical hastate portion of median lobe of aedeagus more than twice as long as the hastate portion (Fig. 96). ..... ***C. transversoguttata transversoguttata* Faldermann, 1835**

Notes on some other Palaearctic species of *Coccinella*

I. *Coccinella* (*Coccinella*) *tibetina* Kapur, 1963 stat. restit.

Coccinella tibetina Kapur, 1963: 34.
Coccinella (s. str.) *saucerottei* ?ssp. *tibetina*: IABLOKOFF-KHNZORIAN (1979): 67 (catalogue).
Coccinella (s. str.) *saucerottii*: IABLOKOFF-KHNZORIAN (1982): 366 (partim).
Coccinella saucerottei: FÜRSCH (1981): 83 (partim).

Described as a distinct species from Tibet by KAPUR (1963). Except for the type material (five specimens deposited in the British Museum of Natural History, London, and in the Zoological Survey of India, Calcutta), no other material has been studied so far. IABLOKOFF-KHNZORIAN (1979, 1982) studied the original description and transferred *C. tibetina* into the

subgenus *Coccinella* s. str. and placed it in synonymy with *C. saucerottii* Mulsant, 1850 as a taxon of probably subspecific rank. FÜRSCH (1981) schematically illustrated some details of male genitalia of *C. saucerottii* and compared them with those of *C. tibetina* as illustrated by KAPUR (1963). In spite of some proportional differences in male genitalia of both species, FÜRSCH (1981) considered *C. tibetina* as a synonym of *C. saucerottii*. Having studied the same papers and material of *C. saucerottii* deposited in NMPC, I consider *C. tibetina* as a valid species of the *C. septempunctata* species group, being more closely related to *C. septempunctata* than to *C. saucerottii*. The species may be easily distinguished from *C. septempunctata* by the ovoid body and partly connected elytral spots 4 and 5. Both species can be separated as follows:

1 (2) Frons with two small and round, pale yellow spots situated far from orbits. Ground colour of elytra carmine or blood-red, black spots (11 in a pattern of ½, 1, 1, 1 and 2), , allways small if present, spot 1 present, spots 2+3 and 4+5 connected. Median lobe of aedeagus hastate, sides concavely narrowing towards pointed apex. Parameres spatulate, about as long as median lobe. Terminal ampulla of sipho with dorsal margin prolonged into long bristle. ..... ***C. saucerottii* Mulsant, 1850**

2 (1) Frons with two large, oval to roundish, pale testaceous spots close to orbits. Ground colour of elytra orange red, black spots (9 in a pattern of ½, 1, 1 and 2) moderately large, spot 1 absent, spots 4+5 connected. Median lobe of aedeagus gradually narrowed laterally and for most part conical with rounded apex. Parameres finger-shaped, 0.67 times as long as median lobe. Terminal ampulla of sipho without bristly prolongation. .... ***C. tibetina* Kapur, 1963**

Coccinella (*Coccinella*) *saucerottii* Mulsant, 1850

Material examined. CZECH REPUBLIC: MORAVIA, Uherský Brod, v.1933, 1 ♂ 1 ♀, O. Kodym lgt. (NMPC). **SLOVAKIA**: Tisovec, 4.vi.1933, 1 spec., J. Roubal lgt. (NMPC). **TURKEY**: ERZURUM province, İspir, 21.v.2000, 3 spec., L. Skoupý lgt. (NMPC); ESKİŞEHİR province, Sakarıılıca near Gümele 6-9.vii.1997, 1 ♂, P. Průdek & M. Říha lgt. (NMPC). **RUSSIA**: Yakutsk, 1 spec., Jurinsky lgt. (NMPC).

II. *Coccinella* (*Coccinella*) *iranica* Dobrzhanskiy, 1926

Coccinella iranica Dobrzhanskiy, 1926: 28; MADER (1930 in 1926-1937): 165; KORSCHEFSKY (1932): 467 (catalogue).

Coccinella (s. str.) *iranica*: IABLOKOFF-KHNZORIAN (1979): 68 (incertae sedis); IABLOKOFF-KHNZORIAN (1982): 382.

Material examined. IRAN: N Iran, C. Elburz Mts., Tochal Mt., 3600-3900 m a.s.l., 1 spec., Loc. no. 61; C. Elburz Mts., Damavand, east, 3000-3500 m a.s.l., 22.vii.1970, 3 spec., Loc no. 66; Kandavan valley, 2545 m a.s.l., 10.-11.viii.1970, 1 spec., Loc no 86; Kandavan pass, 3000 m a.s.l., 11.viii.1970, 1 spec., Loc. no. 87; Elburz Mts, Tochal Mt., 2000-3500 m a.s.l., 29.-30.vi.1973, 1 spec., Loc. no. 261; Kandavan pass, 2700-2900 m a.s.l., 4.-9.vii.1977, Loc. no. 395, all Exped. Nat. Mus. Praha (all NMPC). **TURKEY**: BİTLİS province, (ca 30 km NNW), Nemrud Dağı, 2250-3050 m a.s.l., volcano, (38°39´N 42°15´E), 1.vii.2003, 1 ♂, J. Hájek & J. Hotový lgt. (NMPC).

Little known species described by DOBRZHANSKIY (1926) from northern Iran. Its coloration of elytra and especially the aedeagus are quite peculiar, making so its identification easy.

DOBRZHANSKIY (1931) placed it into the *C. difficilis* species group together with *C. tianshanica* Dobrzhanskiy, 1927. IABLOKOFF-KHNZORIAN (1979, 1982), having seen no material, placed the species into subgenus *Coccinella* s. str. FÜRSCH (1981) compared the outline of median lobe of *C. iranica* with *C. hodeki* sp. nov. (see Discussion of that species) and concluded that the two species are not closely related. It is a montane species, living at ca 2500-3900 m a.s.l. of the Elburz range. It is here recorded as a new species for Turkey.

III. *Coccinella* subgenus *Spilota* Billberg, 1820

Spilota Billberg, 1820: 61.
Spilota: TIMBERLAKE (1919): 163.
Coccinella (*Neococcinella*) Savoyskaya, 1969: 104, **syn. nov**.; IABLOKOFF-KHNZORIAN (1979): 66 (catalogue); IABLOKOFF-KHNZORIAN (1982): 341.
Dobzhanskia Iablokoff-Khnzorian, 1970a: 70; IABLOKOFF-KHNZORIAN (1979): 66 (synonymy).

Diagnosis of *Coccinella* (*Spilota*). Oval to elongate oval, slightly to moderately convex. Ground colour of elytra orange-red with 11 black spots arranged in basic scheme or yellow with colour pattern derived from basic scheme. Aedeagus with basal piece robust, much longer than paramere, in ventral aspect elongate pentagonal and deeply emarginate dorsally, without terminal appendix. Trabes distinctly shorter than basal piece and paramere combined, somewhat wider laterally than in other *Coccinella* but without distal cleft as in *Ceratomegilla*. Sipho moderate, siphonal capsule straight and pointed at base, with dorsal rib small and restricted to basal portion, inner distal projection slightly developed, at most semicircular. Tubular part of sipho semicircular, peculiarly sickle-shaped and strikingly dilated laterally, forming round to oval dish at base. Preapical part of sipho narrowing laterally, bearing only one membranose swelling on each side. Terminal ampulla of sipho small, rather elongate, with supporting sclerites parallel-sided in lateral view. Spermatheca with sparse annulation.

Discussion. In his key to Palaearctic *Coccinella*, DOBRZHANSKIY (1926) separated two species, *C. undecimpunctata* Linnaeus, 1758 and *C. miranda* Wollaston, 1864, from other *Coccinella* using characters of the basal portion of siphonal tube. Later he proposed the *C. undecimpunctata* species group for three Palaearctic species (DOBRZHANSKIY 1931), adding *C. pontica* Dobrzanskiy, 1927 which is currently considered as a subspecies of *C. undecimpunctata*. SAVOYSKAYA (1969) and IABLOKOFF-KHNZORIAN (1970a) independently proposed each a new subgenus for *C. undecimpunctata* – *Neococcinella* Savoyskaya, 1969 and *Dobzhanskia* Iablokoff-Khnzorian, 1970. *Dobzhanskia* was synonymized with *Neococcinella* by IABLOKOFF-KHNZORIAN (1979). The priority of the generic name *Spilota* Billberg, 1820 was first stressed by BELICEK (1976), as *C. undecimpunctata* was designated by TIMBERLAKE (1919) as the type species of that taxon.

BELICEK (1976) found only shared characters in 'male genital armature, structure of female genitalia, as well as general body structure and color pattern, especially of pronotum and elytra' in *C. septempunctata* and *C. undecimpunctata*. He thus synonymized *Spilota* with *Coccinella*. GORDON (1985) followed the same opinion and added *Neococcinella* and *Dobzhanskia* into the synonymy list of *Coccinella*. However, the peculiar characters of male genital

armature of *Spilota* are unique in *Coccinella*. The common presence of a reduced siphonal capsule and the basal dilatation of siphonal tube in species of *Spilota* and *Ceratomegilla* supports the subgeneric status of *Spilota* in *Coccinella* rather than reducing it to a synonym of *Coccinella*.

Therefore, the three species currently placed in *Neococcinella* must be classified as follows: *C.* (*Spilota*) *alpigrada* (Iablokoff-Khnzorian), comb. subgen. nov.; *C.* (*Spilota*) *miranda* Wollaston, comb. subgen. nov.; and *C.* (*Spilota*) *undecimpunctata* Linnaeus, comb. subgen. nov.

Coccinella (*Spilota*) *alpigrada* (Iablokoff-Khnzorian, 1957) comb. subgen. nov.

Adalia alpigrada Iablokoff-Khnzorian, 1957: 170.
Coccinella alpigrada: IABLOKOFF-KHNZORIAN (1970a): 70 (male genitalia).
Coccinella (*Neococcinella*) *alpigrada*: IABLOKOFF-KHNZORIAN (1979): 66 (catalogue); IABLOKOFF-KHNZORIAN (1982): 356.

Material examined. TURKEY: ERZURUM province, (ca 50 km S), Hamzalar – hot springs (39°27´N, 41°07´E), 1935 m a.s.l., 21.vi.2003, 1 ♀, J. Hájek & J. Hotový leg. (NMPC).

The taxonomy of this species was treated by IABLOKOFF-KHNZORIAN (1957, 1970a, 1979). The species has been hitherto known only from Armenia and regarded as subalpine, living at the altitude of ca 3300 m a.s.l. in Mt. Gogui of Sevan Mts. It is here identified as new for Turkey; the specimen lacks spot 1.

IV. *Coccinella* (*Chelonitis*) *venusta* (Weise, 1879)

Genus *Chelonitis* was established by WEISE (1879) for *Chelonitis venusta* Weise, 1879 differing from other European Coccinellinae in the complete lack of the additional lateral line of abdominal ventrite 1 and the peculiar coloration of elytra. SICARD (1907) described an aberrant form of it as ab. *adalioides* Sicard, 1907 (locality not given). CAPRA (1944) upgraded Sicard's name to subspecific status, gave distributional data on both subspecies and fixed the type locality of *C. adalioides* by neotype from coll. F. Solari. IABLOKOFF-KHNZORIAN (1979) transferred *Chelonitis* to *Coccinella* and rejected the name *venusta* Weise, 1879 because of a secondary homonymy with *C. venusta* Melsheimer, 1847. He replaced *C.* (*Ch.*) *venusta* (Weise) with *C. adalioides* Capra (attributing it to Sicard) and proposed the name *C.* (*Ch.*) *adalioides venustula* Iablokoff-Khnzorian, 1979 for Weise's taxon. The relationships between names are in fact more complex. At that time, *C. venusta* Melsheimer was already transferred to *Neoharmonia* sensu Casey, 1899 as its type species, designated by TIMBERLAKE (1943). However, the genus *Neoharmonia* was originally proposed by CROTCH (1871) and its type species *Harmonia viridipennis* Mulsant, 1866 (= *Harmonia ampla* Mulsant, 1850) was designated by RYE (1873). It is now classified as *Neoharmonia venusta ampla* (Mulsant, 1850). Because the Nearctic *Neoharmonia venusta* (Melsheimer 1847) and the Palaearctic *Coccinella* (*Chelonitis*) *venusta* (Weise, 1879) are not congeneric, the junior secondary homonym recognized by

IABLOKOFF-KHNZORIAN (1979) must be reinstated according to Article 59.4 of ICZN (1999). The synonymy of *C.* (*Ch.*) *venusta* for the two known subspecies is as follows:

Coccinella (*Chelonitis*) *venusta venusta* (Weise, 1879)

syn. *Coccinella* (*Chelonitis*) *adalioides venustula* Iablokoff-Khnzorian, 1979

Coccinella (*Chelonitis*) *venusta adalioides* Capra, 1944

syn. *Coccinella* (*Chelonitis*) *adalioides adalioides* Iablokoff-Khnzorian, 1979

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