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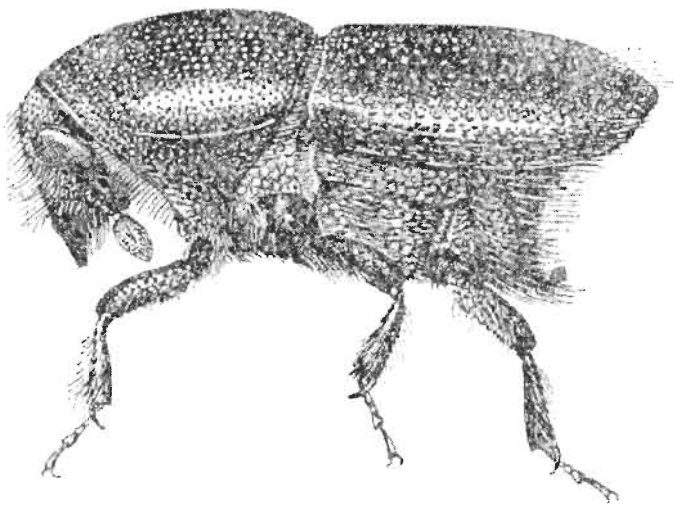

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West-Palearctic species of the genus *Ludovicius* Rondani, 1843 (Diptera: Dolichopodidae)

Западно-палеарктические виды рода *Ludovicius* Rondani, 1843 (Diptera: Dolichopodidae)

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KEY WORDS: Diptera, Dolichopodidae, *Ludovicius*, Palearctic Region, Israel, Egypt, key, new species, new record, check list.

КЛЮЧЕВЫЕ СЛОВА: Diptera, Dolichopodidae, *Ludovicius*, Палеарктика, Израиль, Египет, определитель, новые виды, новые указания, каталог.

ABSTRACT. *Ludovicius israelensis* sp.n. and *L. golanicus* sp.n. from Israel and *L. sinaiensis* sp.n. from Egypt are described. A catalogue of known species and a key to West-Palearctic species of *Ludovicius* are given. Taxonomical position of the genus is discussed.

РЕЗЮМЕ. В статье описаны *Ludovicius israelensis* sp.n. и *golanicus* sp.n. из Израиля и *L. sinaiensis* sp.n. из Египта. Приведены каталог известных видов и определитель западно-палеарктических видов рода *Ludovicius*. Обсуждается таксономическое положение этого рода в подсемействе Dolichopodinae.

Introduction

The old genus *Ludovicius* Rondani, 1843 has been previously revised by Parent [1938] and Stackelberg [1941], who included five Mediterranean and one Chinese species in the genus. D. Yang [1996a, 1996b, 1998a, 1998b, 1998c, 1999; Yang et al., 1998; Yang & Saigusa, 1999] has described recently 15 new species of *Ludovicius* from central and south-western provinces of China (mainly north of 30°N) and has published a key to Chinese species [Yang, 1998b]. I have also seen an undescribed species of *Ludovicius* from Kenya. Parent [1938] has given a detailed description of the genus, but most part of generic diagnostic attributes that he used is characteristic of the whole subfamily Dolichopodinae. The author distinguished *Luduvicius*, *Sybistroma* Meigen, 1824 (now *Nodicornis* Rondani, 1843) and some species of *Hercostomus* Loew, 1857 from other genera of the subfamily by antennal stylus having apical flattening (male secondary sexual character, MSSC). *Ludovicius* was diagnosed by a scape remarkably swollen, almost semi-globular, vase-like at apex, embracing pedicel, which is rudimentary, hardly visible in outer view, but well discernible and convex anteriad in inner view (MSSC). Females of all species have simple scape and stylus, and at least several species of the genus have normally developed pedicel in females. Stackelberg and Yang (op. cit.) have not given additional diagnostic characters for the genus. Stackelberg [1941] has noted close relationship of *Ludovicius* to *Hercostomus*, distinguishing the former from the latter by swollen rudimentary scape, almost hidden pedicel (in lateral view) and apical or subapical stylus (MSSC). At the same time, many species of Chinese *Ludovicius* have dorsal or basodorsal simple stylus [Yang, op. cit.], whereas at least *Hercostomus quadrifilatus* (Strobl, 1899) [described as *Gymnopternus* (*Hypophyllus*) *quadrifilatus*] and *H. riparius* Negrobov et Grichanov, 1982 have flattened apically stylus [Parent, 1938; Negrobov & Grichanov, 1982].

The world fauna of the genus *Hercostomus* s.l. (including *Hercostomus* s.str., *Gymnopternus* Loew, 1857, *Poecilobothrus* Mik, 1878 and *Platyopsis* Parent, 1929) numbers about 460 mostly Holarctic species. There is no any reliable record of the genus from western Indian Ocean Islands and Australia. The genus has greatly variable MSSC and other characters regarded now as having generic value in the subfamily Dolichopodinae. About 130 described recently from China species of *Hercostomus* demonstrate an additional extent of variability in this widely distributed genus. Studying the Afrotropical, Palearctic and Fossil fauna of the subfamily Dolichopodinae [Grichanov, 1997, 1999 et al.] and published descriptions of new species, I have found no strict borders between *Hercostomus* and such genera as *Ortochile* Latreille, 1809, *Paracleius* Bigot, 1859 (=*Paraclius* Loew, 1864), *Pelastoneurus* Loew, 1861 and *Pseudohercostomus* Stackelberg, 1931. Moreover, many species of the subgenus *Hercostomus* s.str. are much closer to *Ludovicius* (species described from

China especially), *Nodicornis* or *Sybistroma* (= *Hypophyllus* Loew, 1832), than to the subgenus *Gymnopternus*. Some other American and Oriental genera that I have not seen could be also congeneric with *Hercostomus*. It is worth to note also, that *Nodicornis maerens* (Loew, 1873) is almost identical to *Ludovicius transcaucasicus* Stackelberg, 1941, d'Assis-Fonseca [1978] has placed *Ortochile* as a subgenus of *Hercostomus*, and many species of mentioned above genera have been originally described in the *Hercostomus* and *Gymnopternus*. However, I think, a thorough revision of all genera of the Dolichopodinae is needed in order to redefine the subfamily and its boundaries before any taxonomical changes in the position of genera will be done. At this moment I am able to suppose only that the genus *Pterostylus* Mik, 1878, subgenera *Gymnopternus* and *Poecilobothrus*, Afrotropical group I of *Hercostomus* s.str. species [Grichanov, 1999] and some other species of *Hercostomus* s.str. should be placed in synonymy to *Dolichopus* Latreille, 1796, whereas other species of *Hercostomus*, species of the genera *Ludovicius*, *Nodicornis*, *Sybistroma*, *Paracleius*, *Pelastoneurus* and *Pseudohercostomus* should be placed in synonymy to *Ortochile*.

It is known a little about ecology of *Ludovicius* species, which seems to be rather rare in collections. For example, Pârvu [1996] has collected only one male in Romania on limestony soil, in a depression where the water of a lake met reed. According to Negrobov [1965] and my observations, *L. transcaucasicus* has been found in foliaceous and mixed forests, mainly on austral slopes of foothills not higher than 1000 m a.s.l. Imagoes have been observed from the end of May up to mid-July with a maximum in mid-June. *Ludovicius israelensis* sp.n. and *L. golanicus* sp.n. from Israel and *L. sinaiensis* sp.n. from Egypt are described in this paper. *L. impar* Rondani is recorded from Israel for the first time. A catalogue of known species and a key to Western Palearctic species of *Ludovicius* are also given. The author of this paper was lucky, examining specimens of *L. doufourii* (Macquart), *L. eucerus* (Loew) and *L. impar* Rondani, types of *L. miricornis* Parent and *L. spectabilis* Parent in the so called Collection of Parent in the Museum of Natural History, Paris [MNHP] and type of *L. transcaucasicus* Stackelberg in the Zoological Institute of the Russian Academy of Sciences, St.-Petersburg [ZIN].

Holotypes and paratypes of the new species are deposited in the Department of Zoology of the Tel Aviv University, Israel [TAU]. Hypopygia removed from the dry specimens are placed after alkalisation into glycerol and mounted on the same pin in a cavity of polymer film covered with a piece of adhesive tape. Listing material examined, I use here slash (/) to separate labels on one pin and square brackets [...] to insert my personal remarks. The relative lengths of the podomeres and other structures are representative ratios and not measurements (1 mm = 78). Terminology in the antenna morphology has been corrected according to Stuckenberg [1999]. Third antennal segment is named here as postpedicel rather than first flagellomere in my previous papers, and arista is renamed in stylus.

List of known species of *Ludovicius* Rondani (for complete references see Soos et al., 1991)

Genus *Ludovicius* Rondani

Ludovicius Rondani, 1843: N. Ann. Sci. nat. Bologna 10: 43. Type species: *Ludovicius impar* Rondani, 1843 (monotypy)

=*Haltericerus* Rondani, 1856: Dipterol. ital. Prodr. 1: 143 (nom. nov. for *Ludovicius* Rondani, 1843). Type species: *Ludovicius impar* Rondani, 1843 (automatic)

=*Nemospathus* Bigot, 1859: Ann. Soc. ent. France (3)7: 228. Type species: *Sybistroma dufourii* Macquart, 1838 (original designation).

acutatus Yang, 1996a: 87. China (Sichuan).
apicilaris Yang, 1999: 203. China (Ningxia).
biaristatus Yang, 1999: 204. China (Henan).
biniger Yang et Saigusa, 1999: 233. China (Sichuan).
curvatus Yang, 1998a: 180. China (Gansu).
digitiformis Yang, Yang et Li, 1998: 81. China (Henan).
dorsalis Yang, 1996b: 243. China (Tibet).
dufourii (Macquart, 1834: 427), (*Sybistroma*). France, Spain, Italy, "Yugoslavia", Morocco, Algeria.
=*spathulatus* (Loew, 1861: 313), (*Haltericerus*).
emeishanus Yang, 1998b: 177. China (Sichuan).
eucerus (Loew, 1861: 311), (*Haltericerus*). France, Spain, Austria, Italy.
flavus Yang, 1996a: 87. China (Henan).
golanicus Grichanov, sp.n. Israel.
henanus Yang, 1996a: 88. China (Henan).
impar Rondani, 1843: 43. Italy, Hungaria, Romania, Bulgaria, Israel.
incisus Yang, 1998b: 177. China (Gansu, Ningxia, Sichuan).
israelensis Grichanov, sp.n. Israel.
longaristatus Yang et Saigusa, 1999: 234. China (Sichuan).
miricornis Parent, 1926: 124. China (Shanghai).
neixianganus Yang, 1999: 205. China (Henan).
sichuanensis Yang, 1998c: 235. China (Sichuan).
sinaiensis Grichanov, sp.n. Egypt.
spectabilis Parent, 1928: 86. France.
transcaucasicus Stackelberg, 1941: 200. Georgia (Abkhazia), Russia (north-western Caucasus).
yunnanensis Yang, 1998b: 178. China (Yunnan).

Descriptions and new records

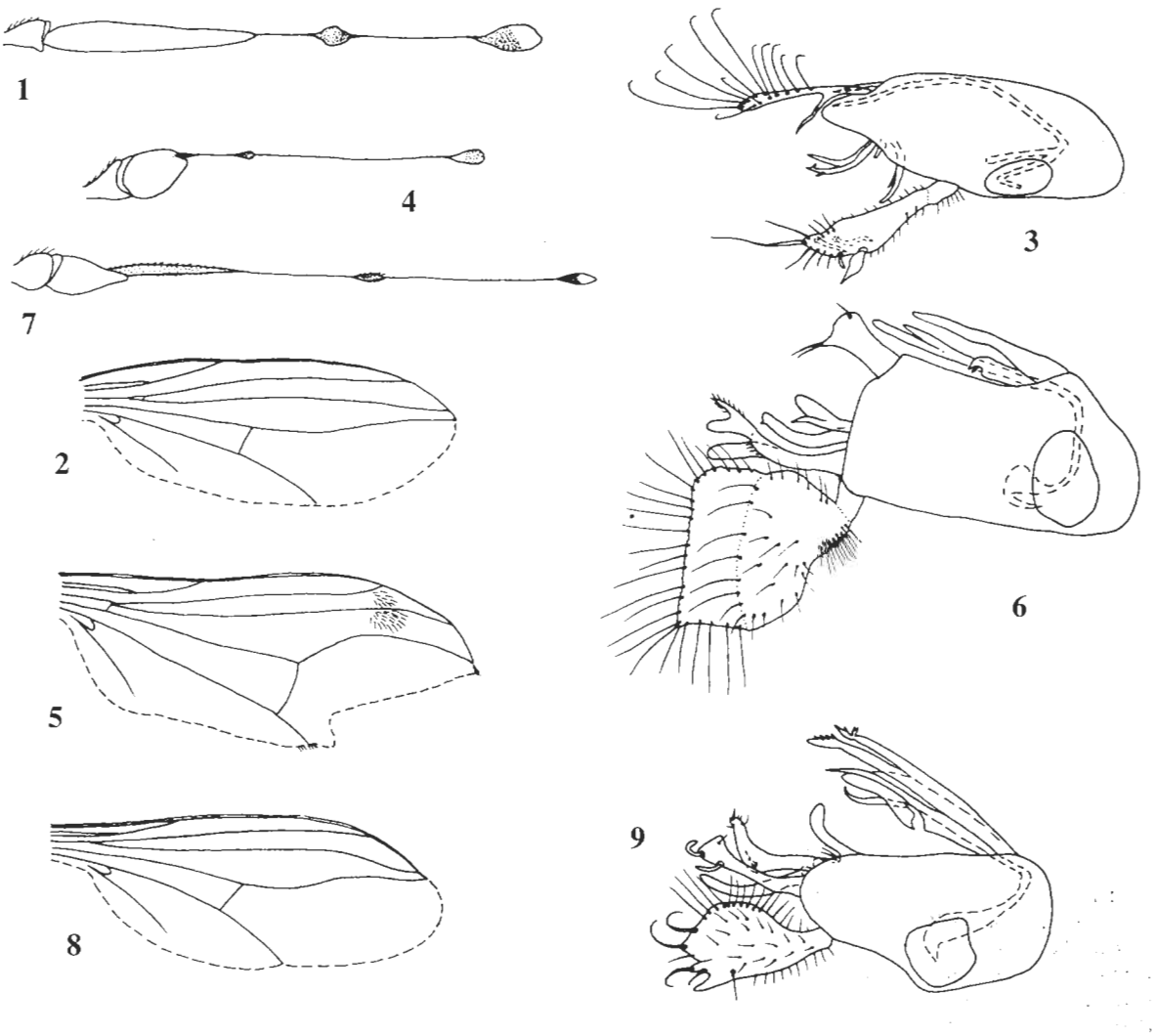
Ludovicius israelensis Grichanov, **sp.n.**

Figs. 1–3.

Holotype. ♂, Israel: W. Nemrod, 10.VI.1976, A. Freidberg [TAU].

Paratypes. 1 ♂, same label; 1 ♂, Israel: Banias, 21.VI.1982, F. Kaplan [TAU].

DESCRIPTION. Male. Frons green-black, grey pollinose; face densely grey pollinose, densely covered with light hairs increasing in length downward. One long and strong vertical at the top of head, one short postvertical, a pair of long and strong ocellar setae present. Upper postocular setae black; lateral and lower postocular setae white. Eyes with mostly short hairs increasing in length at face and very long at



Figs 1–9. 1–3 — *Ludovicius israelensis* sp.n., 4–6 — *Ludovicius sinaiensis* sp.n., 7–9 — *Ludovicius golanicus* sp.n. Antenna (1, 4, 7), Wing (2, 5, 8), Hypopygium, left lateral view (3, 6, 9).

Рис. 1–9. 1–3. *Ludovicius israelensis* sp.n., 4–6 — *Ludovicius sinaiensis* sp.n., 7–9 — *Ludovicius golanicus* sp.n. Усик (1, 4, 7), крыло (2, 5, 8), гипопигий, вид слева сбоку (3, 6, 9).

clypeus. Face under antennae as wide as height of postpedicel, greatly narrowed towards palpi below middle; ratio of its maximal width to minimal width to height, 15 : 2 : 35; clypeus not reaching lower margin of eyes. Antenna 4 times as long as height of head; scape and pedicel reddish; scape as long as high, subtriangular, with short dorsal setulae; pedicel greatly reduced; postpedicel mostly brown-black, red at base, asymmetric, ribbon-like, slightly narrowing in distal third, 11 times longer than high, glabrous; stylus practically apical, positioned just before apex, mostly black, with microscopic hairs, ovoid flattening at 1/3 and suboval apical flattening; the last is white in distal 1/2. Length ratio of scape to postpedicel to stylus, 19 : 110 : 155. Palpus and proboscis small, brown, with short hairs; palpus with 1 short black seta.

Thorax greenish-black with weak metallic reflection, grey pollinose; humeri and metaepimeres brown. 6 strong dorsocentral setae; 2 rows of acrostichals; 2 strong notopleural, 1 strong and 1 fine humeral, 1 posthumeral setae present. Procpisternum with 1 strong black seta above fore coxa and several long light hairs. Scutellum with 2 strong setae, 2 lateral hairs and 4 short marginal hairs between major setae.

Legs mostly yellow; fore and hind coxae reddish-yellow; mid coxa brown externally; femora reddish dorsally; mid and hind tarsi brown-black from tip of basitarsus. Fore coxa with microscopic hairs anteriorly and several very short setae at apex; mid coxa with 2 strong external setae in addition to anterior hairs; hind coxa with 1 strong external seta. Fore leg without long hairs. Fore tibia with 1 anterodorsal and 2 posterodorsal very short setae. Fore tarsus simple. Length ratio of fore coxa to femur to tibia to tarsus (segments from first to fifth), 50 : 78 : 78 : 40 : 14 : 12 : 10 : 9. Mid femur with 1 anterior subapical seta and ventral row of 10–12 white cilia nearly 2 times longer than diameter of femur. Mid tibia with 2 anterodorsal, 2 posterodorsal, 1 very short ventral and 4–5 apical setae. Mid tarsus simple. Length ratio of mid coxa to femur to tibia to tarsus (segments from first to fifth), 40 : 107 : 133 : 70 : 37 : 27 : 15 : 10. Hind femur with one subapical anterodorsal seta at 3/4 and 1 ventral cilia at extreme base, 2

times longer than diameter of femur. Hind tibia with 2 anterodorsal, 3–4 posterodorsal, 2–3 apical setae. Hind tarsus simple. Length ratio of hind coxa to femur to tibia to tarsus (segments from first to fifth), 35 : 120 : 160 : 44 : 62 : 35 : 20 : 10.

Wing simple, hyaline; veins brown. Costa simple. R_1 reaching 2/5 of wing length. R_{2+3} almost straight. Ratio of part of costa between R_{2+3} and R_{4+5} to this between R_{4+5} and M_{1+2}, 28 : 5. R_{4+5} and M_{1+2} regularly convergent, subparallel at apex. M_{1+2} joining costa just before wing apex. Crossvein *m-cu* straight, forming right angle with CuA_1 and acute inner angle with M_{1+2} longitudinal veins. Ratio of *m-cu* to distal part of CuA_1, 19 : 46. Anal vein distinct; anal lobe broad; anal angle right. Lower calypter reddish-yellow, with brownish-golden setae. Halter reddish.

Abdomen greenish-black, grey pollinose. 7th segment black, 1/2 length of epandrium. 8th segment brown, with fine black cilia. Epandrium reddish with light appendages and setae, large, projected distally, nearly 2.5 times longer than high. Hypandrium fused with epandrium except apical pointed lobes. Aedeagus thin, concealed. Distoventral epandrial lobe long, with row of 5 long subapical setae, row of 7 shorter setae in distal 2/3 and one thick pedunculate seta at 1/3. Distodorsal unpaired epandrial process as long as surstyli, narrow, curved ventrad, trilobate. Surstylus curved, with 2 narrow lobes: dorsal lobe with 2 short processes at apex. Cercus with light and dark simple setae at apex, 2 thick dorsal and 2 thick inner setae in apical 1/3, elongate, narrow, widest at 2/3.

Female unknown.

Length (mm): body 3.5, antenna 3.7, wing 3.1/0.9, hypopygium 1.1.

DISTRIBUTION: Israel.

ETYMOLOGY. The species is named for the country of origin.

DIAGNOSIS. The new species is related to Chinese *L. miricornis* Parent [1926], differing from this and other species of the genus in having long pubescence on face and neighbouring parts of eyes, and very long postpedicel. According to Yang [1998], *L. israelensis* keys out to Chinese *L. dorsalis* Yang [Yang, 1996], differing in subapical stylus having two flattenings, morphology of hypopygium and other characters.

Ludovicius sinaiensis Grichanov, **sp.n.**
Fig. 4–6.

Holotype. ♂, [Egypt] Israel: Sinai, Wadi Hibran, 11.VI.1973, A. Freidberg [TAU].

Paratypes. 3 ♂♂, 2 ♀♀, same label; 1 ♂, Israel: Sinai, A-Tur, 12.VI.1973, A. Freidberg; 1 ♂, Israel: Sinai Mts., El-Arbain, 14.VII.1974, A. Freidberg; 1 ♂, Israel: Sinai, W. Watir, 6.IV.1973, M. Kaplan; 1 ♂, Israel: Fazael, 28.IV.1976, D. Simon [TAU].

DESCRIPTION. Male. Frons greenish-black, grey-whitish pollinose; face densely silvery-white pollinose. One long and strong vertical at the top of head, one short postvertical, a pair of long and strong ocellar setae present. Postocular setae entirely black. Eyes with short hairs, face glabrous. Face under antennae as wide as height of postpedicel, slightly narrowed towards clypeus; ratio of its maximal width to minimal width to height, 20 : 12 : 50; clypeus not reaching lower margin of eyes. Antenna 1.5 times as long as height of head; scape, pedicel and postpedicel black; scape as long as high, subtriangular, with short dorsal setulae; pedicel greatly reduced; postpedicel asymmetric, subtriangular, slightly longer than high, glabrous; stylus subapical, positioned just before apex, glabrous; 1st segment of stylus 1/3 length of 2nd, bonelike, mostly dirty-yellow, having black thickened apices; 2nd segment of stylus with dirty-yellow filiform stem and suboval apical flattening; the latter is white in basal 1/2 and black in distal 1/2. Length ratio of scape to postpedicel to stylus, 14 : 19 : 95. Palpus and proboscis small, brown, with short hairs; palpus with 1 fine black seta.

Thorax metallic dark-green, grey pollinose. 6 strong dorsocentral setae gradually decreasing in length anteriorly; 2 rows of acrostichals; 2 strong notopleural, 1 strong and 1 fine humeral, 1 strong and 1 fine posthumeral setae present. Proepisternum with 1 strong black seta above fore coxa and several long light and dark hairs. Scutellum with 2 strong setae and 2 lateral hairs.

Legs mostly yellow; fore coxa brownish at base, mid and hind coxae black with yellow apex; hind femur with black dorsal spot at apex; reddish dorsally; mid tarsus brown-black from tip of basitarsus, hind tarsus black except brownish base. Fore coxa with short hairs anteriorly and several fine setae at apex; mid coxa with 1 external seta in addition to anterior hairs; hind coxa with 1 fine external seta. Fore femur with shallow ventral excavation in basal 1/3; posteroventral row of undulate setae in basal 1/2, 2 times longer than diameter of femur; 3 anteroventral and 1 posteroventral cilia at distal 1/3, 2 times longer than diameter of femur. Fore tibia swollen, fusiform, with 2–3 posterodorsal cilia at distal 1/3, approximately as long as diameter of tibia, 1 anterodorsal and 2 posterodorsal very short setae. Fore basitarsus flattened laterally, having subtriangular basoventral projection, riblike ventral crest along entire length and 3 elongate posterior setulae in distal 1/2; 2nd–3rd segments with riblike ventral margin, flattened laterally; 4th segment flattened ventrally, with 2 elongate apicodorsal setulae; 5th segment flattened ventrally at base and laterally in distal 1/2, covered with long dorsal hairs 1.5-2 times longer than width of tarsomere, having pointed distal apicodorsal projection and distinctly enlarged pulvilli. Length ratio of fore coxa to femur to tibia to tarsus (segments from first to fifth), 55 : 78 : 74 : 43 : 16 : 15 : 10 : 25. Mid femur with 1 anterior subapical seta and anteroventral brush of sparse black hairs nearly equal in length to diameter of femur. Mid tibia with 4 anterodorsal, 5 posterodorsal setae, 2 very short ventral setae at basal 1/4, 1 long undulate apicoventral seta equal in length to basitarsus and 3–4 elongate apical setae. Mid tarsus simple. Length ratio of mid coxa to femur to tibia to tarsus (segments from first to fifth), 39 : 107 : 135 : 58 : 28 : 22 : 17 : 17. Hind femur with one subapical anterodorsal seta at 2/3. Hind tibia with 4 anterodorsal, 5 posterodorsal, 3-4 apical setae. Hind tarsus simple. Length ratio of hind coxa to femur to tibia to tarsus (segments from first to fifth), 35 : 105 : 147 : 52 : 56 : 34 : 23 : 15.

Wing strongly modified, hyaline; veins brown. Costa simple. R_1 almost reaching middle of wing length. R_{2+3} almost straight, slightly curved posterad at apex. Ratio of part of costa between R_{2+3} and R_{4+5} to this between R_{4+5} and M_{1+2}, 38 : 20. R_{4+5} almost straight, running parallel to R_{2+3}, curved posterad at apex, being parallel to distal 1/2 of distal part of M_{1+2}. Last radial and first posterior cells each having a small group of macrotrichia at end of R_{2+3} on lower side of wing membrane. Distal part of M_{1+2} forming wide arc, joining costa just before wing apex. Crossvein *m-cu* almost straight, forming right angles with longitudinal veins. Ratio of *m-cu* to distal part of CuA_1, 30 : 25. Posterior wing margin between M_{1+2} and CuA_1 having deep right-angular emargination at 2/3 of wing length. Wing margin bearing also somewhat elongate hairs at wing apex and at end of CuA_1. Anal vein distinct; anal lobe broad; anal angle obtuse. Lower calypter yellow, with black setae. Halter yellow.

Abdomen metallic green, weakly whitish pollinose. 7th segment green-black, slightly longer than epandrium. 8th segment black, with short black cilia. Epandrium black with brown-black appendages and setae, large, subrectangular, slightly convex ventrally, twice longer than high. Hypandrium bilobate, with long and short lobes. Aedeagus thin, bifurcated. Distoventral epandrial lobe relatively short and broad, with 1 short distoventral seta and short distodorsal process bearing 2 strong setae. Distal unpaired epandrial process shorter than dorsal lobi of surstylus, relatively broad, with a pair of dorsoapical denticles. Surstylus slightly curved, with 2 bifurcated lobes; ventral lobe shorter than unpaired epandrial lobe; dorsal lobe of surstylus covered with short hairs in places. Cercus with dark simple cilia, broad and flat, with straight crenulated distal margin, acute distodorsal and rounded basoventral apices.

Female similar to male except lacking male secondary sexual characters, otherwise as follows. Legs, wing and antenna simple. Face slightly wider; ratio of its maximal width to minimal width to height, 22 : 18 : 52. Length ratio of scape to pedicel to postpedicel to stylus (1st and 2nd segments), 10 : 6 : 14 : 13 : 45. Postpedicel as long as high. Ratio of part of costa between R_{2+3} and R_{4+5} to this between R_{4+5} and M_{1+2}, 32 : 8. M_{1+2} fairly curved; R_{4+5} and M_{1+2} weakly regularly convergent. Ratio of *m-cu* to distal part of CuA_1, 30 : 32. Fore tibia with 2 anterodorsal and 3 posterodorsal setae. Length ratio of fore femur to tibia to tarsus (segments from first to fifth), 87 : 78 : 44 : 12 : 12 : 10 : 11. Mid femur bearing anteroventral row of elongate setulae along entire length. Mid tibia with 2 rather strong ventral setae at 1/4 and 1/2.

Length (mm): body 3.9–4.4, male antenna 1.5, female antenna 1.0, wing 3.5/1.3, hypopygium 1.5.

DISTRIBUTION: Egypt.

ETYMOLOGY. The species is named for the type locality.

DIAGNOSIS. *L. sinaiensis* is remarkable in having strongly modified fore leg and wing. The new species keys out to Chinese *L. miricornis* Parent [Stackelberg, 1941; Yang, 1998], differing in mostly black posterior four coxae, morphology and coloration of antennal stylus and hypopygium. Female keys out to *L. miricornis* and *L. eucerus* (Loew) [Parent, 1938], differing from the first in mostly black posterior four coxae, from the second species in entirely black postocular setae.

Ludovicius golanicus Grichanov, **sp.n.**
Fig. 7–9.

Holotype. ♂, Israel: Tel Dan, 13.IV.1983, A. Freidberg [TAU].

Paratype. 1 ♂, Israel: Golan, Qusbiye, 15.IV.1982, A. Freidberg [TAU].

DESCRIPTION. Male. Frons greenish-black, weakly grey pollinose; face densely white pollinose. One long and strong vertical at the top of head, one short postvertical, a pair of long and strong ocellar setae present. Postocular setae entirely black. Eyes with short hairs, face glabrous. Face narrower than height of postpedicel, narrowed towards clypeus; ratio of its maximal width to minimal width to height, 12 : 3 : 40; clypeus not reaching lower margin of eyes. Antenna 2.5 times as long as height of head, mostly black; scape and pedicel broadly yellow ventrally; scape as long as high, with short dorsal setulae; pedicel greatly reduced; postpedicel asymmetric, elongate-triangular, 2.5 times longer than high, microscopically haired; stylus subapical, positioned just before apex; 1st segment of stylus longer than 2nd, microscopically haired, black, distinctly flattened and widened in basal half and at extreme apex; 2nd segment of stylus mostly black, with white narrow suboval apical flattening. Length ratio of scape to postpedicel to 1st to 2nd stylomeres, 10 : 25 : 84 : 67. Palpus and proboscis small, brown, with short hairs; palpus with 1 fine black seta.

Thorax metallic dark-green, grey pollinose. 6 strong dorsocentral setae slightly decreasing in length anteriorly; 2 rows of acrostichals; 2 strong notopleural, 1 strong and 1 fine humeral, 1 strong and 1 fine posthumeral setae present. Proepisternum with 1 strong black seta above fore coxa and several long light and dark hairs. Posterior slope of mesonotum and scutellum dorsally covered with numerous short dark hairs. Scutellum with 2 strong marginal setae and 2 lateral hairs.

Legs mostly yellow; all coxae black with yellow apex; fore tarsus darkened apically; 3rd–4th segments of mid tarsus black, 5th segment of same tarsus white except extreme base; hind tarsus black from tip of basitarsus, 5th segment brownish. Fore coxa with short hairs anteriorly and several fine black setae at apex; mid coxa with 1 external seta in addition to anterior hairs; hind coxa with 1 fine external seta. All femora simple, without long hairs. Fore tibia with 1 anterodorsal, 2 posterodorsal and 3 apical setae. Fore tarsus simple. Length ratio of fore coxa to femur to tibia to tarsus (segments from first to fifth), 48 : 64 : 68 : 35 : 15 : 11 : 8 : 10. Mid femur with 1 anterior subapical seta. Mid tibia with 3 anterodorsal, 2 posterodorsal setae, 1 anteroventral, 1 posteroventral and 3–4 apical setae. 3rd–5th segments of mid tarsus widened and flattened laterally; 3rd tarsomere 3 times longer than wide, 4–5th tarsomeres each 2 times longer than wide. Length ratio of mid coxa to femur to tibia to tarsus (segments from first to fifth), 43 : 88 : 105 : 57 : 40 : 20 : 15 : 14. Hind femur with one subapical anterodorsal seta at 3/4. Hind tibia with 3 anterodorsal, 3 posterodorsal, 5 short ventral and 3–4 apical setae. Hind tarsus simple. Length ratio of hind coxa to femur to tibia to tarsus (segments from first to fifth), 27 : 102 : 124 : 38 : 51 : 28 : 19 : 13.

Wing simple, mostly hyaline, greyish along costa; veins black. Costa simple. R_1 reaching first third of wing length. R_{2+3} almost straight, slightly curved posterad at apex. Ratio of part of costa between R_{2+3} and R_{4+5} to this between R_{4+5} and M_{1+2}, 24 : 4. R_{4+5} and distal part of M_{1+2} distinctly convergent. Crossvein *m-cu* straight, forming right angles with longitudinal veins. Ratio of *m-cu* to distal part of CuA_1, 20 : 48. Posterior wing margin almost evenly convex. Anal vein distinct; anal lobe broad; anal angle obtuse. Lower calypter yellow, with black setae. Halter yellow.

Abdomen metallic green, weakly whitish pollinose. 7th segment green-black, shorter than epandrium. 8th segment black, with short black cilia. Epandrium black, large, subtrapezoidal, straight ventrally, twice longer than high. Hypandrium brown, multilobate, having dorsal angle; ventral lobes serrate at apex. Distoventral epandrial lobe relatively long and narrow, with 2 short epandrial setae at base of epandrial lobe. Distal unpaired epandrial process as long as dorsal lobi of surstylus, relatively narrow. Surstylus yellow, slightly curved, with 2 lobes of equal length; ventral lobe with strong inner seta at middle and several short apical setulae; dorsal lobe of surstylus expanded apically, bearing two thick and one simple setae. Cercus yellow, broadly black at apex, semioval, having 2 incisions at extreme apex, light hairs ventrally and 3–4 strong curved black setae at apex.

Female unknown.

Length (mm): body 3.1, antenna 2.4, wing 3.1/1.1, hypopygium 1.0.

DISTRIBUTION: Israel.

ETYMOLOGY. The species is named for the type locality.

DIAGNOSIS. *L. golanicus* is remarkable in having strongly modified mid leg. The new species keys out to Chinese *L. miricornis* Parent [Stackelberg, 1941; Yang, 1998], differing in mostly black coxae, morphology and coloration of antennal stylus and hypopygium. An unknown female is probably close to *L. sinaiensis*, differing in partly yellow antennal scape.

Ludovicius impar Rondani, 1843

MATERIAL EXAMINED. ♂ [no hypopygium], v. Ryder / *L. impar* Rond. [MNHP, Coll. Parent]; ♂, Israel, Carmel, 6.XI.1980, A. Freidberg [TAU].

REMARK. This is a first record of the species from Israel. Males of *L. impar* are specific in long antennal stylus having long and rather narrow apical widening; the latter is black in basal 1/2 and white in apical 1/2 (see figures of antenna, wing, fore tarsus and hypopygium in Pârvu, 1996: Fig. 7).

Ludovicius transcaucasicus Stackelberg, 1941

MATERIAL EXAMINED. 1 ♂, 1 ♀, Russia: Krasnodar Terr., Goryachii Klyuch env., 12.VI.2000, I. Grichanov [author's collection].

REMARK. Up to date the species is known from a small mountain region between populated places Goryachii Klyuch (Krasnodar Territory), Khamyshki and Guzeripl (southern Adygea) and Sukhumi (Abkhazia). The male and female are specific in entirely black legs (see description of female in Negrobov, 1965: Fig. 2).

KEY TO WESTERN PALEARCTIC SPECIES OF *LUDOVICIUS* RONDANI

MALES

1. Antennal stylus with widening or thickening at apex of 1st segment in addition to apical flattening at apex of 2nd segment 2
— Stylus with apical flattening only 4
2. Lower postocular setae white; fore and mid legs and wing simple; face densely covered with light hairs increasing in length downward ..... *L. israelensis*
— Postocular setae entirely black; face glabrous 3
3. Antennal scape and pedicel entirely black; fore leg and wing strongly modified; mid tarsus simple *L. sinaiensis*
— Antennal scape and pedicel yellow ventrally; mid tarsus modified; fore leg and wing simple ..... *L. golanicus*
4. At least femora black 5
— Legs almost entirely yellow 6
5. Legs entirely black ..... *L. transcaucasicus*
— Fore and mid tibia red-yellow, basal part of hind tibia reddish ..... *L. spectabilis*
6. Fore basitarsus having a spine at apex bearing 4 long cilia; 2nd segment of fore tarsus with a short anterior and a long posterior setae at apex; 3rd segment of same tarsus as long as 1st and 2nd combined; mid femur with long fine ventral cilia; stylus ciliated, with strong, almost round black flattening at apex ..... *L. eucerus*
— Fore tarsus simple; mid femur without long cilia; stylus not ciliated, with suboval flattening 7
7. Postpedicel elongate, conic, with long stylus having long and rather narrow apical widening; the latter is black in basal 1/2 and white in apical 1/2 ..... *L. impar*
— Postpedicel oval, with obtuse apex, short, with longer, finer and more apical stylus having rounded apical black flattening with short whitish pointed apex ... *L. dufourii*

FEMALES

1. Femora black 2
— Femora yellow 3
2. Legs entirely black ..... *L. transcaucasicus*
— Fore and mid tibia red-yellow, basal part of hind tibia reddish ..... *L. spectabilis*
3. Metaepimeron black, abdomen entirely metallic green . 4
— Metaepimeron yellow, abdomen partly yellow 5
4. Lower postocular setae white ..... *L. eucerus*
— Postocular setae entirely black ..... *L. sinaiensis*
5. Pleura with only anteroventral angle of pteropleuron yellow on its outer apex; 1st segment of stylus slightly thickened at apex, distinctly thicker than 2nd ..... *L. impar*
— Anteroventral angle of pteropleuron widely yellow as well as margins of different pleural sclerites; 1st segment of stylus not thickened at apex, being hardly distinct ..... *L. dufourii*

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