

**Review of the West Palaearctic *Pseudocistela*
with description of *P. hajeki* sp. nov. from Iran
(Coleoptera: Tenebrionidae: Alleculinae)**

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Abstract. *Pseudocistela hajeki* sp. nov. from Iran is described and illustrated, and a key to the West Palaearctic species of the genus *Pseudocistela* Crotch, 1873 is provided. *Pseudocistela ceramboides serrata* (Chevrolat, 1844), syn. nov., is a new synonym of *P. ceramboides* (Linnaeus, 1758).

Key words. Coleoptera, Tenebrionidae, Alleculinae, *Pseudocistela*, taxonomy, new species, new synonymy, key, Iran, Palaearctic Region

Introduction

LINNAEUS (1758) described the first Palaearctic species of the genus *Pseudocistela* Crotch, 1873 as *Chrysomela ceramboides*. *Pseudocistela* species differ from species of other similar West Palaearctic genera of the subtribe Gonoderina Seidlitz, 1896 (i.e. *Copistethus* Seidlitz, 1890, *Cornucistela* Campbell, 1980, *Gonodera* Mulsant, 1856, *Isomira* Mulsant 1856) mainly in antennae reaching up to half of body length, antennomeres 4–10 longer than wide, broadest at apex and distinctly serrate, pronotum clearly broadest at base and regularly narrowing to apex in outline.

NOVÁK & PETTERSSON (2008) listed 10 species from the Palaearctic Region. Six species, *Pseudocistela haagi* Harold, 1878, *P. muhldorfi* Borchmann, 1930, *P. pamirica* Plavilshchikov, 1927, *P. rubroflava* (Fairmaire, 1878), *P. semirubra* Pic, 1910, and *P. watanabei* Kôno, 1934 are from the eastern parts of the Palaearctic Region. *Pseudocistela impressicollis* (Chevrolat, 1873) from Syria was described in *Cistela* Geoffroy, 1762. This small species with length of only 6 mm and antennomeres 1 and 2 yellow distinctly differs from the species discussed bellow, which are more than 10 mm long and with all antennomeres black.

A new species from Iran, *Pseudocistela hajeki* sp. nov., is described, illustrated and keyed with the other West Palaearctic species, and *P. ceramboides serrata* (Chevrolat, 1844) is considered a new synonym for *Pseudocistela ceramboides* (Linnaeus, 1758).

Material and methods

Two important morphometric characteristics are used for the descriptions of the species of the subfamily Alleculinae. The ‘dorsal ocular index’ (CAMPBELL & MARSHALL 1964) is calculated by measuring minimum distance between the eyes and dividing this value by the maximum dorsal width across eyes; the quotient resulting from this division is converted into an index by multiplying by 100. The ‘pronotal index’ (CAMPBELL 1965) expresses the ratio of pronotal length along midline to width at basal angles; this ratio is multiplied by 100 for convenience in handling. These indexes are used in this paper as well.

The following abbreviations indicate the depository of the specimens investigated:

MKYA	C. M. Iablokoff-Khznorian collection, deposited in M. Yu. Kalashian collection, Yerevan, Armenia;
NMPC	National Museum, Prague, Czech Republic;
TSOC	Tomáš Sitek collection, Ostrava, Czech Republic;
VNPC	Vladimír Novák collection, Prague, Czech Republic;
VZPC	Vladimír Zieris collection, Pardubice, Czech Republic.

Measurements were made using Olympus SZ 40 stereoscopic microscope with continuous magnification and Soft Imaging System AnalySIS software. Measurements of body parts and corresponding abbreviations used in text are as follows:

AL	total antennal length;
BL	maximum body length;
EL	maximum elytral length;
EW	maximum elytral width;
HL	maximum length of head (visible part);
HW	maximum width of head;
OI	dorsal ocular index;
PI	dorsal pronotal index;
PL	maximum pronotal length;
PW	pronotal width at base;
RLA	ratios of relative lengths of antennomeres 1–11 from base to apex (3 = 1.00);
RL/WA	ratios of length to maximum width of antennomeres 1–11 from base to apex;
RLT	ratios of relative lengths of tarsomeres 1–5 and 1–4 respectively, from base to apex (1 = 1.00).

Double slash (//) separates data on different labels and slash (/) data in different rows.

Key to the males of the West Palaearctic species of *Pseudocistela*

1. Body length 6 mm. Antennomeres 1 and 2 yellow. Syria. *P. impressicollis* (Chevrolat, 1873)
- Body at least 10 mm long. Antennomeres 1–11 black. 2
2. Pronotum conical in outline, sides directly narrowed; each of antennomeres 4–10 2.5–3 times longer than antennomere 3, and each of antennomeres 7–9 less than three times longer than wide. 3
- Pronotum more semicircular in outline, sides of pronotum distinctly rounded; each of antennomeres 4–10 only approximately twice longer than antennomere 3, and each of antennomeres 7–9 more than three times longer than wide. Habitus as in Fig. 3; head and pronotum as in Fig. 13; antennae as in Fig. 14; aedeagus as in Figs 15, 16. Iran. *P. hajeki* sp. nov.

3. Antennomeres 4 and 5 more than 2.25 times longer than wide. PI near 60. Habitus as in Fig. 4; head and pronotum as in Fig. 17; antennae as in Fig. 18. Azerbaijan.
 *P. znojko* (Iablokoff-Khnzorian, 1959)
- Antennomeres 4 and 5 only approximately twice longer than wide. PI near 50. Habitus as in Fig. 1; head and pronotum as in Fig. 5; antennae as in Fig. 6; aedeagus as in Figs 9, 10. West Palaearctic Region. *P. ceramboides* (Linnaeus, 1758)

Taxonomy

Pseudocistela Crotch, 1873

Pseudocistela Crotch, 1873: 108

Pseudocistela ceramboides (Linnaeus, 1758)

(Figs 1–2, 5–12)

Chrysomela ceramboides Linnaeus, 1758: 377

Cistela ceramboides: FABRICIUS (1775: 116)

Pseudocistela ceramboides: SCHILSKY (1890: 190)

Cistela serrata Chevrolat, 1844: 125, **syn. nov.**

Gonodera (Pseudocistela) ceramboides var. *serrata*: SEIDLITZ (1891: 525)

Pseudocistela ceramboides var. *serrata*: SEIDLITZ (1896: 88)

Pseudocistela ceramboides serrata: NOVÁK & PETTERSSON (2008: 327)

Material examined. *Pseudocistela ceramboides* ‘*ceramboides*’: 1 ♂: CZ Moravia mer. / Hnanice / 10. 6. / Číla lgt. 1997 (VNPC).

Pseudocistela ceramboides ‘*serrata*’: 1 ♂: SLOVAKIA mer. / Hajnáčka / 20.6.1988 / Zd. Černý lgt. (VNPC); 1 ♂: ROMANIA Mt. Mehedinti / Motru Sec, valea Lupşei / 13.6.2010 / V. Zieris lgt. (VZPC); 1 ♀: Greece centr. Thessalia / Kria Vrisi, Kefambaka env. / Pimdos mts., E part, 900m / Tomáš Sitek lgt. 12.6.2010 (TSOC); 1 f*: CZ-BOHEMIA, Č. Středohoří: / Děčín-Krásný Studenec / vrch Klobouk, 23.5.2006 / P. Moravec lgt. (5520) (VNPC).

Comments on synonymy. Both former subspecies of *P. ceramboides* differ easily by the colouration of the pronotum, plus in the following details:

Pseudocistela ceramboides ceramboides (Figs 1, 5–6, 9–10): Commonly known form. Body (including pronotum) black, elytra ochre yellow. Male: habitus as in Fig. 1; head and pronotum as in Fig. 5; antennae as in Fig. 6; aedeagus as in Figs 9, 10. HL 1.52 mm; HW 1.70 mm; OI 25.00; PL 1.51 mm; PW 2.93 mm; PI 51.65; EL 8.54 mm; EW 4.05 mm; BL 11.57 mm; BL/EW 2.86; HW/PW 0.58; PW/EW 0.72; AL 8.30 mm; AL/BL 0.72. RLA (1–11): 1.33 : 0.66 : 1.00 : 2.78 : 2.99 : 2.91 : 2.95 : 3.12 : 3.07 : 2.90 : 3.58. RLA/W (1–11): 1.84 : 1.18 : 1.37 : 2.04 : 2.09 : 2.12 : 2.41 : 2.48 : 2.77 : 3.04 : 5.41.

Pseudocistela ceramboides serrata (Figs 2, 7–8, 11–12). Body black, pronotum and elytra ochre yellow. Male: habitus as in Fig. 2; head and pronotum as in Fig. 7; antennae as in Fig. 8; aedeagus as in Figs 11, 12. HL 1.53 mm; HW 1.54 mm; OI 28.76; PL 1.46 mm; PW 2.77 mm; PI 52.70; EL 7.68 mm; EW 3.48 mm; BL 10.67 mm; BL/EW 3.07; HW/PW 0.59; PW/EW 0.80; AL 7.27 mm; AL/BL 0.68. RLA (1–11): 1.27 : 0.54 : 1.00 : 2.68 : 2.79 : 2.87 : 2.87 : 2.92 : 2.81 : 2.63 : 3.51. RLA/W (1–11): 1.77 : 1.00 : 1.52 : 2.36 : 2.38 : 2.61 : 2.82 : 2.80 : 2.74 : 2.87 : 5.47.

However, all important morphological characters (i.e. shape of the body, pronotum, antennae, and especially aedeagus), as well as morphometric characters (i.e. OI, PI, and RLA) are approximately the same in *P. ceramboides ceramboides* and *P. ceramboides serrata*. As the distribution of *P. ceramboides serrata* is completely within the distribution range of *P. ceramboides ceramboides*, it cannot be considered an allopatric geographic subspecies. Therefore, I here regard both taxa as mere colour forms, consistent also with SEIDLITZ (1891, 1896), considering *P. ceramboides serrata* a junior synonym of *P. ceramboides ceramboides*.

Known distribution of both colour forms. Typical *Pseudocistela ceramboides* with black pronotum ('*P. c. ceramboides*'): Austria, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany, Greece, Hungary, Ireland, Italy, Latvia, Norway, Poland, Romania, Russia, Slovakia, Spain, South European Territory of Russia, Sweden, Switzerland, Ukraine, 'Caucasus' (NOVÁK & PETERSSON 2008).

Colour form with ochre yellow pronotum ('*P. ceramboides serrata*'): Hungary, Slovakia (NOVÁK & PETERSSON 2008); Czech Republic, Greece, Romania (this paper).

Pseudocistela hajeki sp. nov.

(Figs 3, 13–16)

Type locality. Iran, Golestan Province, Korud Abad, 36°53.1'N 54°53.2'E.

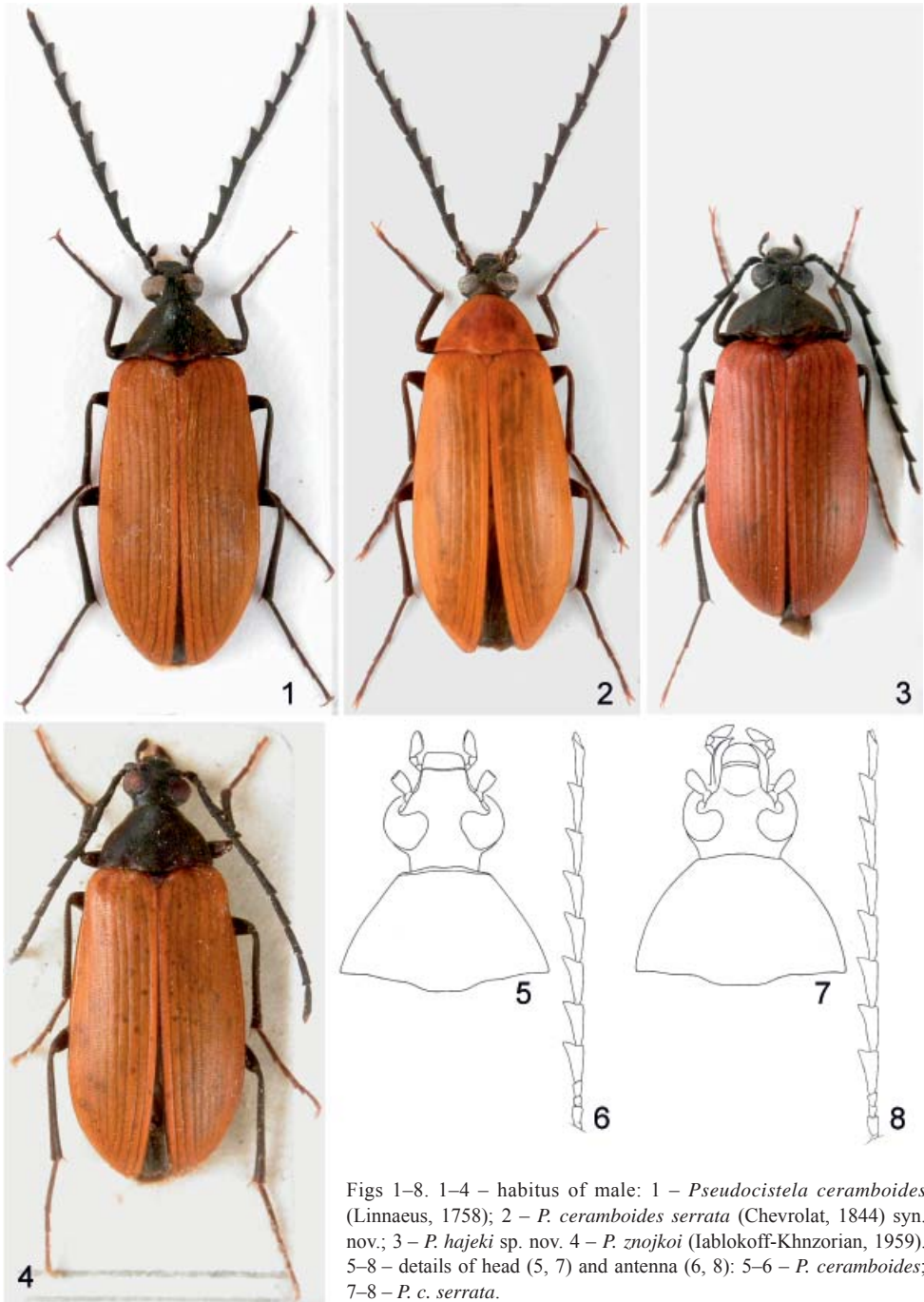
Type material. HOLOTYPE: ♂, 'IRAN, 28.-29.V.2006 / Golestan prov., KORUD ABAD / (stream valley with *Alnus*; at light) / 36°53.1'N 54°53.2'E; 230 m Jiří Hájek & Pavel Chvojka leg.' (NMPC). PARATYPES: 1 ♂ 2 ♀♀, same data as holotype (NMPC, VNPC); 2 ♂♂, 'IRAN, Gilan prov., 3.-4.VI.2006 / 4 km N LUNAK / (forested river valley; at light) / 37°01.8'N; 49°53.6'E; 320 m / Jiří Hájek & Pavel Chvojka leg.' (NMPC, VNPC).

Description. *Male* (holotype). Habitus of male holotype as in Fig. 3. Body from pale reddish-brown to black, BL 11.75 mm, widest near two thirds of elytral length, maximum width 4.46 mm, 2.59 times longer than wide.

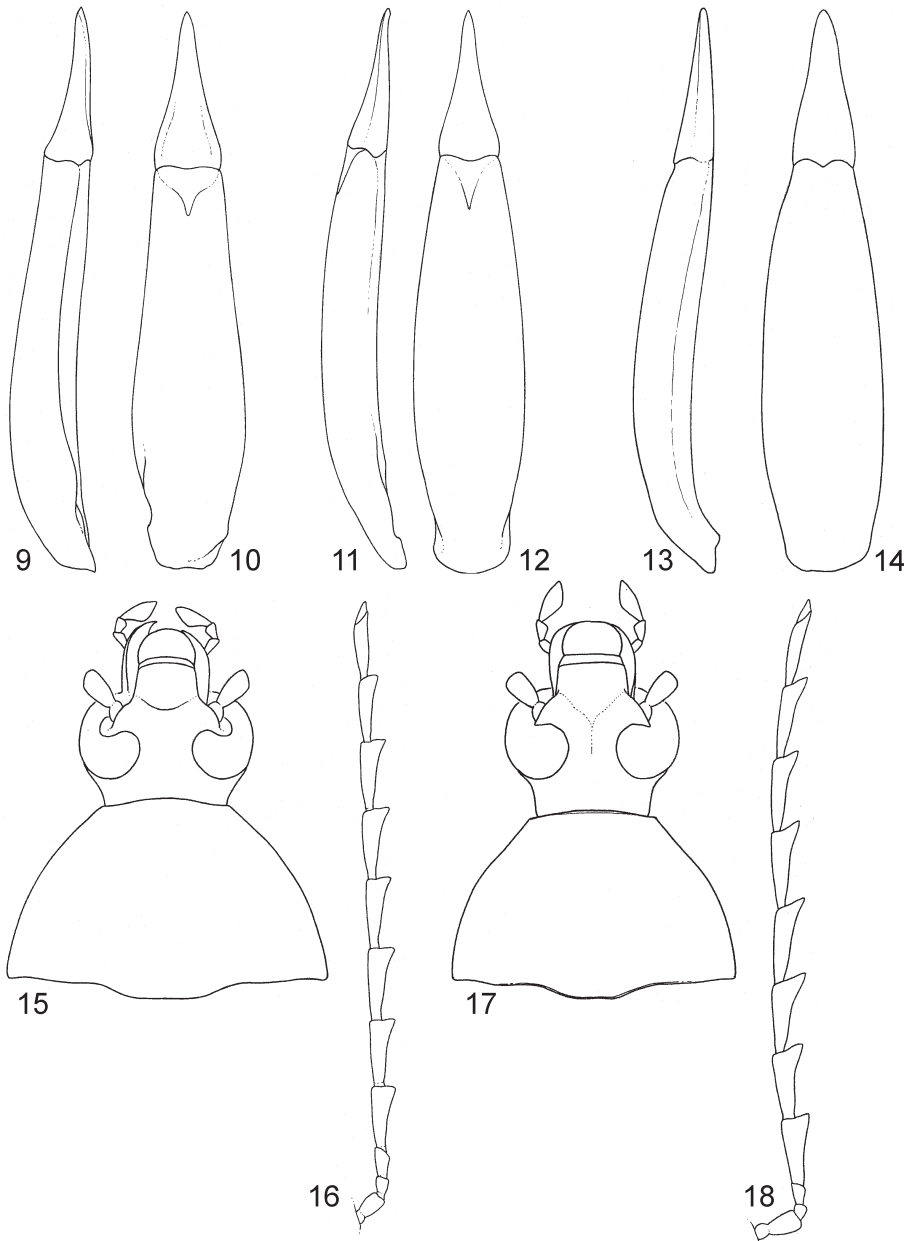
Head (Fig. 15) black, relatively small and narrow, with microgranulation and dense punctation, posterior half and clypeus with pale brown setation, anterior half with dark brown setation. Head widest across eyes, HW 1.68 mm, approximately 0.52 times as wide as pronotal base. HL (visible part) 1.55 mm. Eyes large, transverse, dark, distinctly excised. Space between eyes relatively narrow, shorter than diameter of eye, OI equal to 27.20.

Antenna (Fig. 16). Relatively long (8.19 mm, i.e. reaching 0.71 of body length), unicolored black with short and dense dark setation, dense punctation and microgranulation. Antennomeres 1–3 slightly shiny, antennomeres 4–11 dull, antennomeres 4–10 strongly serrate, widest at apex, antennomere 2 shortest, antennomeres 4–11 longer than antennomere 3. Antennomere 5 more than 2.5 times longer than width of antennomere 4; antennomere 4 less than twice longer than antennomere 3. RLA (1–11) equal to 0.91 : 0.52 : 1.00 : 1.89 : 2.07 : 2.08 : 2.13 : 2.08 : 2.11 : 2.03 : 2.49. RLA/W (1–11) equal to 1.66 : 1.18 : 1.97 : 2.36 : 2.73 : 2.80 : 3.36 : 3.34 : 3.27 : 3.55 : 6.14.

Maxillary palpus blackish-brown, with microgranulation and short pale brown setation, ultimate palpomere and palpomere 2 with a few long brown setae at apex, slightly shiny. Palpomeres 2–4 distinctly widest at apex, penultimate palpomere shorter than palpomere 2 and ultimate palpomere. Ultimate palpomere in form of long triangle, axe-shaped. RLP (2–4) equal to 1.52 : 1.00 : 1.97. RLP/W (2–4) equal to 2.42 : 1.62 : 1.94.



Figs 1–8. 1–4 – habitus of male: 1 – *Pseudocistela cerambooides* (Linnaeus, 1758); 2 – *P. cerambooides serrata* (Chevrolat, 1844) syn. nov.; 3 – *P. hajeki* sp. nov. 4 – *P. znojkoii* (Iablokoff-Khnzorian, 1959). 5–8 – details of head (5, 7) and antenna (6, 8): 5–6 – *P. cerambooides*; 7–8 – *P. c. serrata*.



Figs 9–18. 9–14 – aedeagus (9, 11, 13 – lateral view; 10, 12, 14 – dorsal view): 9–10 – *Pseudocistela ceramboides* (Linnaeus, 1758); 11–12 – *P. ceramboides serrata* (Chevrolat, 1844); 13–14 – *P. hajeki* sp. nov. 15–18 – head and pronotum of male (15, 17) and male antenna (16, 18): 15–16 – *P. hajeki* sp. nov.; 17–18 – *P. znojki* (Iablokoff-Khnzorian, 1959).

Pronotum (Fig. 13) blackish-brown, transverse, with short and dense pale brown setation, microgranulation and punctation, punctures dense, shallow and very small; at base 1.93 as wide as head across eyes, longest in middle, HL 1.85 mm and widest at base, HW at base 3.24 mm. PI equal to 57.06. Borders complete and distinct only in middle of base and at anterior margin. Posterior margin bisinuate, straight before scutellum. Posterior angles rectangular, anterior angles indistinct, obtuse-angled, lateral margins finely rounded and narrowed from base to anterior part.

Elytra unicolored pale reddish-brown, with short and dense pale brown setation and microgranulation, EL 8.35 mm; EW 4.46 mm, distinctly broader than pronotum, widest approximately at two thirds from base. EL/EW ratio equal to 1.87. Surface punctate, elytral striae distinct, punctures of elytral striae in a single row, small, separated by less than one diameter. Elytral intervals with punctation and microgranulation, punctures very small and shallow, rather dull. Elytral epipleura well-developed, pale reddish-brown with sparse pale brown setae, evenly narrowing in basal half to abdominal ventrite 1, in apical half parallel-sided.

Scutellum large, triangular, dark brown with microgranulation and pale brown setation.

Legs. Tibiae and femora dark blackish-brown with pale brown and brown setation, tarsi brown with short and dense pale brown setation. Femur thicker than tibia. Tibia narrow, dilated anteriorly. Penultimate tarsomere of each tarsus without membranous lobes. RLT 1–5 and 1–4 equal to 1.00 : 0.47 : 0.42 : 0.39 : 0.99 (protarsus), 1.00 : 0.45 : 0.76 : 0.25 : 0.70 (mesotarsus), and 1.00 : 0.39 : 0.26 : 0.55 (metatarsus). Both anterior tarsal claws with 8 visible teeth.

Ventral side of body blackish-brown, with short and sparse pale brown setation, punctation and rugosities. Abdomen dark brown, with sparse, short, pale brown setation, microgranulation and dense and shallow punctation, punctures small, slightly shiny. Abdominal ventrites 1–5 in middle of apical part paler.

Aedeagus (Figs 13, 14). Pale brown, with fine microgranulation. Basal third of basal piece slightly rounded laterally and narrowing dorsally, 2.68 times longer than apical piece. Apical piece in dorsal and lateral view longitudinally triangular.

Female. Antennae shorter (reaching only 0.50 of BL), space between eyes broader than in male. RLA (1–11) equal to 0.89 : 0.39 : 1.00 : 1.50 : 1.32 : 1.50 : 1.50 : 1.53 : 1.42 : 1.43 : 1.75. RLA/W (1–11) equal to 1.92 : 1.09 : 2.55 : 2.79 : 2.47 : 2.33 : 2.33 : 2.26 : 2.49 : 2.87 : 4.45. RLT 1–5 and 1–4 equal to 1.00 : 0.52 : 0.44 : 0.33 : 1.12 (protarsus), 1.00 : 0.42 : 0.31 : 0.25 : 0.72 (mesotarsus), and 1.00 : 0.38 : 0.27 : 0.56 (metatarsus). Both anterior tarsal claws with 8 visible teeth.

Variability. The type specimens somewhat vary in size; each character is given as its mean value, with full range in parentheses. Males (n = 4). BL 11.01 mm (10.51–11.75 mm); HL 1.49 mm (1.43–1.55 mm); HW 1.65 mm (1.54–1.70 mm). OI 28.49 (26.49–31.91). PL (along midline) 1.76 mm (1.62–1.85 mm); PW at base 2.99 mm (2.64–3.24 mm). PI 59.16 (57.06–61.26). EL 7.76 mm (7.46–8.35 mm); EW 4.21 mm (3.87–4.46 mm).

Females (n = 2). BL 11.59 mm (10.75–12.43 mm); HL 1.56 mm (1.50–1.62 mm); HW 1.56 mm (1.44–1.68 mm). OI 46.45 (45.63–47.27). PL (along midline) 1.90 mm (1.71–2.09 mm); PW at base 3.59 mm (3.33–3.85 mm). PI 52.77 (51.41–54.12). EL 8.13 mm (7.54–8.72 mm); EW 4.66 mm (4.42–4.90 mm).

Differential diagnosis. *Pseudocistela hajeki* sp. nov. differs from *P. znojkoii* and *P. ceramboides* mainly in pronotum more semicircular with sides distinctly rounded, and each of antennomeres 4–10 approximately only twice longer than antennomere 3; while *P. znojkoii* and *P. ceramboides* have conical pronotum with sides narrowed in straight line, and each of antennomeres 4–10 2.5–3 times longer than antennomere 3. For further details see the key above.

Etymology. Dedicated to my friend Jiří Hájek, head of the Department of Entomology of the National Museum in Prague and renowned expert on the beetle families Dytiscidae, Gyrinidae, Eulichadidae and Callirhipidae.

Distribution. Iran: Gilan, Golestan.

Pseudocistela znojkoii (Iablokoff-Khnzorian, 1959)

(Figs 4, 17–18)

Gonodera znojkoii Iablokoff-Khnzorian, 1959: 60

Pseudocistela znojkoii: NOVÁK & PETTERSSON (2008: 39) (new combination)

Type locality. Azerbaijan, Talysh, Alekseevka.

Type material. HOLOTYPE: 1 ♂ (by monotypy): ‘Талыш / Алексеевка / Азрб. 21. 5.56’ [handwritten, white label] // ‘Pseudoc. / Znojkoii’ [handwritten, red label] (MKYA). The type specimen is glued on white label; nearly complete, only right ultimate protarsomere missing.

Diagnosis. Body black, elytra ochre yellow. Male: habitus as in Fig. 4; head and pronotum as in Fig. 17; antennae as in Fig. 18. HL 1.61 mm; HW 1.54 mm; OI 27.65; PL 1.56 mm; PW 2.60 mm; PI 60.24; EL 7.38 mm; EW 3.81 mm; BL 10.55 mm; BL/EW 2.77; HW/PW 0.59; PW/EW 0.68; LA 7.41 mm; LA/BL 0.70. RLA (1–11): 1.23 : 0.61 : 1.00 : 2.73 : 2.62 : 2.58 : 2.68 : 2.81 : 2.82 : 2.94 : 3.33. RLA/W (1–11): 1.69 : 1.10 : 1.52 : 2.30 : 2.26 : 2.42 : 2.29 : 2.36 : 2.77 : 3.40 : 6.61.

Distribution. Azerbaijan.

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- figurées, de chaque genre d'animaux. Avec un texte descriptif mis au courant de la science. Ouvrage pouvant servir d'atlas à tous les traités de zoologie. III. Texte explicatif. Insectes.* J. B. Baillière, Paris, 576 pp., 104 pls.
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