

**Two new European species of the genus *Leiodes* Latreille, 1796
(Coleoptera: Leiodidae: Leiodinae)**

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Abstract. *Leiodes kopecky* sp. nov. from Spain and *L. matusi* sp. nov. from Armenia are described and compared to the similar species. Keys to determination of Spanish and Armenian *Leiodes* are provided. *Leiodes calcarata* (Erichson, 1845) is recorded from Armenia for the first time.

INTRODUCTION

Two species new to science are described in this paper - one from the Spanish mainland, the second from Armenia.

In the updated Catalogue of Palaearctic Coleoptera (2015), Perreau listed 10 Spanish species of the genus *Leiodes* Latreille, 1796. Beside them, Fuente (1925) also mentioned *L. hiemalis* Abeille, 1901 from Barcelona. Together with the species new to science *L. kopecky* sp. nov., the genus comprises 12 species known from the continental Spain. Further two species of the genus are known from the Canary Islands, so the present number of the Spanish species of the genus *Leiodes* is 14. This number indicates that the Spanish *Leiodes* fauna has not yet been sufficiently known. When comparing the number of the Spanish *Leiodes* species with some other countries, e.g. with the Czech Republic, a distinct difference is obvious. The area of the Kingdom of Spain is more than 6.4 times larger than the Czech Republic, nevertheless the known fauna of the *Leiodes* species is 2.2 times richer (altogether 31 species) in the Czech Republic.

The known Armenian *Leiodes* fauna is even poorer. Švec (2018) counted only three species from there. So there are, only five species known from the country including the new species and one newly recorded species presented in this paper.

MATERIAL AND METHODS

This paper is based on small but interesting material collected by entomologists from the Czech Republic and Germany recently.

As the *Leiodes* material from Spain is rare in the collections and also taking into account that the specimen provided me for the determination shows very specific characters differing the species from the other members of *Leiodes*, I decided to describe it as a new species even though only one male is available.

Abbreviations:

MSBC	M. Schülke collection (Museum für Naturkunde Berlin, Germany);
NMPC	National Museum, Praha, Czech Republic;
ZSPC	private collection Zdeněk Švec, Praha, Czech Republic.
AI-AXI	antennomeres I-XI
L	length
W	width
W/L	ratio of the relevant measurements

The examined specimens were compared with the types and other material deposited in the NMPC and ZSPC. The material mentioned in this paper is preserved in MSBC and /or ZSPC.

Measurements of the body length and the individual body parts were measured to the first decimal place of millimetre.

The dissected male genitalia were mounted in water soluble medium polyvinylpyrrolidone (Lompe 1986) on a transparent label added to the same pins as the type specimens.

The type specimens are indicated by a red label added to the same pin bearing the status of the specimen (holotypus, paratypus respectively), its name, name of the author and year of the designation.

Data quoted from the labels accompanying the specimens are reproduced verbatim; an oblique line (/) indicates a line break on a label.

The terminology concerning to the type of the mesoventral longitudinal carina follows that in Švec (2008).

KEYS AND DESCRIPTION

Key to identification of the *Leiodes* species of the continental Spain

- 1 Elytral base distinctly emarginate before hind pronotal angles. Emargination less distinct in females and in small males. 2
- Elytral base straight. 3
- 2(1) Head with 4 large punctures on vertex. Very variable in colour and size - usually unicolorous reddish or head, pronotum and/or elytral suture and elytral margins or even longitudinal spot on elytra darker. Antennomere XI distinctly narrower than AX. Antennal club usually black or dark, exceptionally light or partly infuscate. Mesoventral carina low of type A. Parameres multisetose approximately as long as median lobe. 2.2-4.0 mm. Recorded from almost entire Europe (29 countries), Northern Africa (Algeria, Tunisia) and Middle East (Turkey). *L. calcarata* Erichson, 1845
- Head with 2 large punctures on vertex. Stable in colour - unicolorous reddish. Antennomere XI distinctly narrower than AX. Antenna light unicolorous. Mesoventral carina of type A. Parameres bisetose shorter than median lobe. 2.5-4.0 mm. Known from W-, S and Central Europe (12 countries). . *L. macropus* (Rye, 1873)
- 3(1) Elytra with transverse strigosities. 4
- Elytra without transverse strigosity. 6
- 4(3) Dorsum reddish-brown, unicolorous. Parameres shorter than median lobe. 5
- Head, pronotum and majority of elytra dark brown, each elytron with yellow vague spot on anterior and posterior parts. Parameres twice as long as median lobe, multisetose. Posterior pronotal angles distinctly developed, shortly rounded. Mesoventral carina of type A. 1.9-2.9 mm. Spain.
..... *L. tудиensis* Bolaño, Villero & Fresneda

- 5(4) Posterior pronotal angles feebly expressed, broadly rounded. Antennal club darkened. Mesoventral carina of type A. Oblong oval. Parameres bisetose with appendix. 3.0-3.5 mm. Europe from Spain to Caucasus (14 countries), Central Asia (Kazakhstan). *L. hybrida* (Erichson, 1845)
- Posterior pronotal angles tightly rounded, rectangular. Antennae light unicolorous. Mesoventral carina high, roundly angled of type δ . Oval. Parameres unisetose. 1.5-2.5 mm. E: W- S- and Central Europe (11 countries) and North of Africa (Algeria). *L. flavicornis* (Brisout, 1883)
- 6(3) Mesoventral carina low without any angle seen laterally (type A). 7
- Mesoventral carina high with rounded angle seen laterally (types α , γ). 11
- 7(6) Elytral epipleura without erect setae. 8
- Elytral epipleura with short light erect setae. Head, pronotum, scutellum, lateral sides of elytra and narrow strip along suture dark brown. Ninth elytral stria short, irregular, parallel to lateral margin of elytra. Parameres bisetose, median lobe broadly rounded apically (Fig. 2). 3.5 mm. Spain. *L. kopeckyi* sp.n.
- 8(7) Body large (4.0-7.0 mm). Ninth elytral stria strongly reduced, approached and parallel to elytral margin. Unicolorous reddish. Antennal club black. Widely distributed throughout Europe (17 countries from Spain to Ukraine), Middle East (Syria, Turkey, Israel). *L. cinnamomea* (Panzer, 1793)
- Body smaller (2.5-4.0 mm). Ninth elytral stria short, oblique, well distant from elytral margin anteriorly. 9
- 9(8) AXI distinctly narrower than AX. 10
- AXI approximately as wide as AX at least a little narrower than AX. Antennal club slim, black. Ninth stria oblique. Posterior pronotal angles obliquely skewed anteriorly. 2.5-3.2 mm. Widely distributed in Europe - from Spain to Russia (18 countries). *L. ferruginea* (Fabricius, 1787)
- 10(9) Dorsum reddish or reddish - brown. Antennal club wide, infuscate. Posterior pronotal angles obtuse broadly rounded. Parameres distinctly shorter than median lobe. 2.5-3.2 mm. W-N- Europe (four countries). *L. distinguenda* (Fairmaire, 1856)
- Dorsum bicoloured - head, disc of pronotum, scutellum, elytral margins and suture dark. Antennal club long, infuscate. Posterior pronotal angles rectangular, shortly rounded. Parameres almost as long as median lobe. 3.0-4.5 mm. Spain, France. *L. hiemalis* Abeille, 1901
- 11(6) All elytral striae straight. Pronotum extremely finely and sparsely punctured, seemingly smooth. Posterior pronotal angles shortly rounded. Head with 4 large punctures. Mesoventral carina of type α . 1.5-2.5 mm. Widely distributed in Europe - from Spain to Russia (22 countries) and Northern Africa (Algeria). *L. badia* (Sturm, 1807)
- Elytral stria 2-4 or even 5 curved outwards medially. Pronotum finely and sparsely but distinctly punctured. Very similar to *L. ferruginea* having skewed posterior pronotal angles. Head without any or with 2 large punctures. Mesoventral carina of type γ . 2.5-4.0 mm. Rare but widely occurring in Europe - from Spain to Russia (15 countries). *L. nigrita* (Schmidt, 1841)

***Leiodes kopeckyi* sp. nov.**

(Figs. 1, 2)

Type material. Holotype (σ): “ Spain, 26.2.-3.3.2016/ Almoraima env./ lgt. P. Kylies”, (ZSPC).

Description. Length of body 3.5 mm. Length of body parts: head 0.3 mm, pronotum 0.9 mm, elytra 2.3 mm, antenna 0.8 mm, aedeagus 0.7 mm. Maximum widths of body parts: head 0.9 mm, pronotum 1.6 mm at base, 1.7 mm just before half pronotal length, elytra 1.7 mm at base, 2.0 mm at basal third of their length.

Oblong oval (Fig. 1), head except of clypeus, pronotum except of narrow strip along base, scutellum, elytral lateral margins and narrow strip along suture brown, rest of dorsum yellow. Antennomeres I-V reddish, AVI infuscate, AVII-XI dark brown. Venter yellow-brown,



Figs. 1-2. *Leiodes kopeckyi* sp. nov.: 1- body in dorsal view; 2- aedeagus.

margins of coxal cavities and longitudinal mesoventral carina dark. Dorsum punctured, without any microreticulation or strigosites.

Head. Dorsal surface with distinct punctures separated by 1-3 times their own diameters, some very small and fine punctures interposed. Vertex with 4 large punctures. Last antennomere distinctly narrower than the previous one as wide as long. AVIII is extraordinarily short, scarcely visible between the neighbours. Ratio of length of antennomeres VII-XI (AVII=1.0): 1.0-0.2-1.3-1.1-1.7. Ratio of width of antennomeres VII-XI (AVII=1.0): 1.0-0.8-1.3-1.4-1.1. W/L AVII-AXI: 1.5-7.5-1.5-2.0-1.0.

Pronotum. Widest just before half of pronotal length. Sides roundly tapered toward base and also anteriorly in dorsal view; roundly angled in the middle of pronotal length in lateral view. Posterior angles very obtuse, shortly rounded in dorsal view and obtuse, broader rounded in lateral view. Base straight. Punctures separated by about 1-2 times their own diameter with very small and fine numerous punctures interposed. Behind anterior margin and base with row of very large and rather densely arranged punctures. Lateral margin of hypomeron mainly on basal half with very fine and very short erect setae visible in oblique view.

Scutellum. With several distinct punctures.

Elytra. Broadest approximately at basal third of their length. With nine punctured striae. Stria 9 short, first parallel to lateral channel, distant from lateral margin by about 2 times punctures diameter, later obliquely joining lateral channel. Striae distinctly deepened, stria punctures well expressed separated predominantly by their own diameter. Interval punctures very fine and small, separated by about 3-6 times their diameters. Sutural stria deepened all along its length, reaching approximately level of scutellar tip. Lateral channel without larger punctures or foveae. Epipleura with erect short light dense setae visible in dorsal view. Some sparse erect setae also present near lateral margins and apex of elytra.

Legs. Anterior tarsomeres slim, anterior tibiae 2.7 times as wide apically as at base. Inner terminal thorn of anterior tibia slightly bent, a little longer than lateral one; as long as tarsomere I. Meso-tibiae of usual size. Hind margin of metafemur with distinct lobe apically, hind tibiae straight, widened apically.

Mesoventrite. Longitudinal carina of type A.

Genitalia. Aedeagus as in Fig. 2.

Differential diagnosis. *Leiodes kopeckyi* sp. n. can be compared with *L. hiemalis* regarding the size, colouring and shape of the body, presence 4 large frontal punctures, narrowed AXI and the shape of pronotum. The new species distinctly differs mainly by broadly rounded apex of median lobe and by setose elytral epipleura.

Etymology. The new species is dedicated to Tomáš Kopecký (Hradec Králové, Czech Republic).

Key to the identification of the Armenian *Leiodes* Latreille, 1796

(*L. dubia* is included in the key in brackets as it occurs in neighbouring countries)

- 1 Elytra without transversal wrinkles. Body broadly to oblong oval. 2
- Elytra with transversal wrinkles. Body oblong oval, flatly convex. Antennae light, unicolorous. Mesoventral carina type A. Parameres multisetose with appendix. 3.5 mm. Azerbaijan, Armenia. *L. pilifera* Reitter, 1885
- 2(1) Pronotal base straight even near hind angles. 3
- Pronotal base distinctly emarginate before hind angles. Very variable in colour and size - usually unicolorous reddish or head, pronotum and/or elytral suture and elytral margins or even longitudinal spot on elytra darker. Antennomere XI distinctly narrower than AX. Antennal club usually black or dark, exceptionally light or partly infuscate. Mesoventral carina low of type A. Parameres multisetose approximately as long as median lobe. 2.2-4.0 mm. Recorded from almost whole Europe (29 countries of Europe), Northern Africa (Algeria, Tunisia) and Middle East (Turkey). *L. calcarata* Erichson, 1845
- 3(2) Elytra matt with very distinct densely arranged punctures in intervals. Parameres bisetose with appendix. Mesoventral carina of type A. 3.0 mm. Armenia. *L. punctatissimata* Hatch, 1929
- Elytra shining with very finely and sparsely arranged punctures in intervals. 4
- 4(3) Body oblong oval, larger (3.5 mm). Mesoventral carina low of type A. 5
- Body shortly oval, smaller (1.7-1.9 mm). Mesoventral carina high, roundly angulate of type β . Armenia. *L. armeniaca* Švec, 2018
- 5(4) AXI as wide as or almost as wide as AX. Hind tarsomeres distinctly conical (Fig. 7). Median lobe apically broadly rounded (Fig. 5). 3.0-4.0 mm. Widely distributed in Europe (24 countries from Portugal to Georgia), Middle East and Central Asia (Turkey, Mongolia, Siberia). (*L. dubia* (Kugelann, 1794))
- AXI distinctly narrower than AX, Hind tarsomeres feebly conical, predominantly parallel-sided (Fig. 6). Median lobe shortly rounded (Fig. 4). 3.3-3.5 mm. Armenia. *L. matusi* sp. nov.

Leiodes matusi sp. nov.

(Figs. 3, 4, 6, 8)

Type material. Holotype (σ): “ARMENIA, Lanjanist env./ sifting - leaf litter, rotten wood/ 1560 m, 18.v.2015/ 39.859084N 44.937384E/ M. Kocian lgt.”, (ZSPC); paratypes: (σ), the same data, (ZSPC); (3 ♀), “ARMENIA [AR18-30a]/ 30 km W Kapan, 39°08'26''N/ 46°14'36''E, 1680 m, river bank/ litter and debris sifted/ 11.vii. 2018, leg M. Schülke” (MSBC, ZSPC); (3 ♀), “ARMENIA [AR18-30] 30 km N/ Kapan, 39°14'36''N/ 46°08'28''E/ 1680 m, N-slope with trickling/ water, litter and debris sifted/ 11.vii. 2018, leg M. Schülke” (MSBC, ZSPC).

Description. Length of body 3.3-3.5 mm, 3.5 mm in holotype. Length of body parts in holotype: head 0.6 mm, pronotum 1.0 mm, elytra 1.9 mm, antenna 0.9 mm, aedeagus 0.7 mm. Maximum widths of body parts: head 0.9 mm, pronotum 1.6 mm at base, 1.7 mm at basal fifth of pronotal length, elytra 1.6 mm at base, 1.8 mm at basal third of their length.

Oblong oval (Fig. 3), dorsum lightly yellow-red. Antennal club laterally slightly infusate. Venter yellowish, margins of coxal cavities and longitudinal mesoventral carina darker. Dorsum punctured, without any microreticulation or strigosities.

Head. Dorsal surface with distinct punctures separated by 1-3 times their own diameters, vertex with 4 large punctures. Last antennomere distinctly narrower than the previous (Fig.8). AXI almost as wide as long. AVIII is short as it is usual. Ratio of length of antennomeres VII-XI (AVII=1.0): 1.0-0.6-1.3-1.4-1.9. Ratio of width of antennomeres VII-XI (AVII=1.0): 1.0-0.9-0.5-1.6-1.3. W/L AVII-AXI: 1.4-2.0-1.8-1.6-0.9.

Pronotum. Widest before base. Sides roundly tapered toward base and also anteriorly in dorsal view; rounded in lateral view. Posterior angles rectangular broadly rounded in dorsal view and very obtuse, very broadly rounded in lateral view. Base straight. Punctures much stronger and larger than those on head separated by about 1-2 times their own diameter. Behind anterior margin and base with several larger punctures as it is usual in the genus. Lateral margin of hypomeron without any setae.

Scutellum. With several distinct punctures.

Elytra. Broadest approximately at basal third of their length. With nine punctured striae. Stria 9 short, first parallel to lateral channel, distant from lateral margin by about 2 times punctures diameter, later obliquely joining lateral channel. Striae not deepened, stria punctures well expressed, separated predominantly by their own diameter. Interval punctures fine small, separated by about 3-5 times their diameters. Sutural stria deepened, reaching approximately half of elytral length. Lateral channel without larger punctures or foveae. Epipleura without any setae. Some sporadic short erect setae present near lateral margins of elytra.

Legs. Anterior tarsomeres slim, anterior tibiae approximately 2.0 times as wide apically as at base. Both terminal thorns of anterior tibia straight equal in length, as long as first tarsomere. Meso-tibiae of usual size. Hind margin of metafemur with distinct but small rounded lobe apically, hind tibiae distinctly bent. Hind tarsomeres almost parallel-sided (Fig. 6).

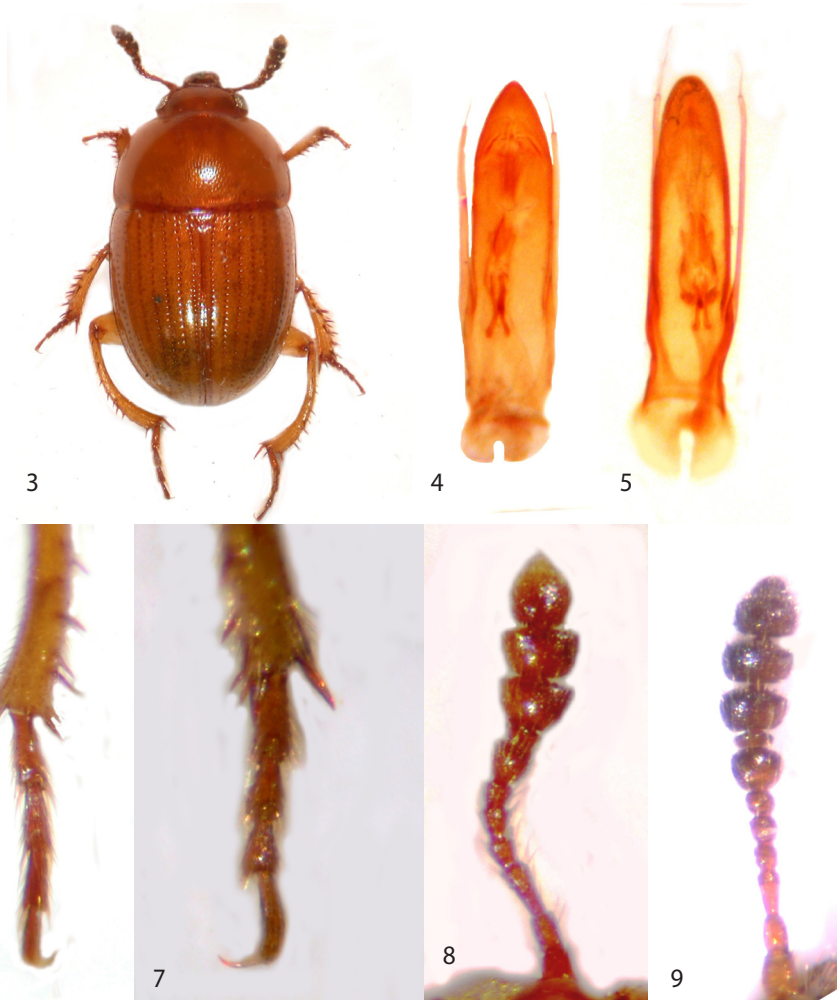
Mesoventrite. Longitudinal carina of type A.

Genitalia. Aedeagus as in Fig. 4

Variation and sexual dimorphism. Tarsi slim in both sexes. Hind tibiae slightly bent to straight, hind femur with small rounded lobe apically in females.

Differential diagnosis. *Leiodes matusi* sp. n. can be compared with *L. dubia* regarding the size, colouring and shape of the body, presence of 4 large frontal punctures and the shape of pronotum. The new species distinctly differs mainly by very shortly rounded apex of median lobe, a little different endophallus (Figs. 4, 5), by narrower AXI (Figs. 8, 9) and parallel-sided posterior tarsomeres that are distinctly conical in *L. dubia* (Figs. 6, 7).

Etymology. The new species is dedicated to its collector Matúš Kocian (Praha, Czech Republic).



Figs. 3-9. Figs. 3, 4, 6, 8. *Leiodes matusi* sp. nov. Figs. 5, 7. 9. *L. dubia* (Kugelann, 1794). Figs.: 3- body in dorsal view; 4, 5- aedeagus; 6, 7- hind tarsus; 8, 9- antenna.

FAUNISTIC

Leiodes calcarata (Erichson, 1745)

Material examined: ♂, “ARMENIA [AR18-30a]/ 30 km W Kapan, 39°08'26''N/ 46°14'36''E, 1680 m, river bank/ litter and debris sifted/ 11.vii. 2018, leg M. Schülke” (MSBC).

Distribution: Europe: Armenia, Austria, Bulgaria, Belarus, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Great Britain, Germany, Hungary, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Nederland, Norway, Poland, Portugal, Romania, Russia, Slovakia,

Spain, Sweden, Switzerland, Ukraine; Northern Africa: Algier, Tunisia; Asia: Turkey.
New record for Armenia.

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