

Three new *Lethrus* species close to *L. raymondi* (Coleoptera: Geotrupidae) from the Balkan Peninsula

David KRÁL¹⁾ & Oliver HILLERT²⁾

¹⁾Department of Zoology, Faculty of Science, Charles University in Prague, Viničná 7, CZ-128 43 Praha 2, Czech Republic; e-mail: kral@natur.cuni.cz

²⁾Kieferndamm 10, D-15566 Schöneiche bei Berlin, Germany; e-mail: o.hillert@yahoo.de

Abstract. Three new species of *Lethrus* (*Lethrus*) Scopoli, 1777 from the Balkan Peninsula are described: *L. (L.) halkidikiensis* sp. nov. (Greece: Halkidiki Peninsula), *L. (L.) perun* sp. nov. (SW Bulgaria) and *L. (L.) strymonensis* sp. nov. (N Greece: region Séres). They are closely related to *L. (L.) raymondi* Reitter, 1890. Diagnostic characters (shape of mandibles and shape of ventral mandibular process) are illustrated. The character matrix for the separation of males of the *Lethrus* species closely related to *L. raymondi* known from Bulgaria, Macedonia and NW Greece and a map of the distribution areas for each species are presented.

Key words. Coleoptera, Scarabaeoidea, Geotrupidae, Lethrinae, *Lethrus*, taxonomy, new species, distribution, Bulgaria, Greece, Macedonia, Palaearctic Region

Introduction

Almost 120 described species of entirely flightless beetles of the genus *Lethrus* Scopoli, 1777, together form the monotypic subfamily Lethrinae within the scarabaeoid family Geotrupidae (NIKOLAJEV 2003, HILLERT 2004, KRÁL & NIKOLAJEV 2006). This morphologically distinctive group is considered to be monophyletic (e.g. NIKOLAJEV 2003, BROWNE & SCHOLZ 1999, SCHOLZ & GREBENIKOV 2005). We recognize 11 species in this genus distributed in central and south-eastern Europe, the Balkan Peninsula and Turkey at the present time. All of them are currently placed in the nominotypical subgenus. They are *Lethrus apterus* (Laxmann, 1770), *L. ares* Král, Rejsek & Schneider, 2001, *L. armeniacus* Reitter, 1890, *L. brachiicollis* Fairmaire, 1855, *L. elephas* Reitter, 1890, *L. fallax* Nikolajev, 1975, *L. liviae* Pittino, 2011, *L. macrognathus* Fairmaire, 1866, *L. raymondi* Reitter, 1890, *L. rotundicollis* Fairmaire, 1866 and *L. schaumii* Reitter, 1890 (KRÁL et al. 2001b, NIKOLAJEV 2003, KRÁL & NIKOLAJEV 2006, PITTINO 2011). It is generally thought that the usually low dispersal capability (the only mode of movement is walking) has resulted in intensive speciation in isolated mountain valleys of

the southeastern parts of the Balkan Peninsula and adjacent western Turkey in connection with Quaternary climate fluctuations. In this area the populations show allopatric characteristics, being isolated from one another, and often of limited distribution. Many of these populations probably represent undescribed species but their taxonomic status has not yet been evaluated (e.g., KRÁL et al. 2001b, DROŽOVÁ 2011). Samples of material of *Lethrus* from the Balkan Peninsula were studied in parallel also by standard molecular analysis methods and results obtained indicate significant differences between populations meriting them the species status (DROŽOVÁ et al. in prep.). The same is true for some species groups of this genus from Middle Asia, e.g. a great number of species of the subgenera *Furcilethrus* Nikolajev, 1968 and *Heteroplistodus* B. Jakovlev, 1890 (NIKOLAJEV 2003). A similar situation found in the Geotrupidae is seen in other flightless groups, e.g. in the representatives of the genus *Thorectes* Mulsant, 1842 native to the Iberian Peninsula (cf. MARTÍN-PIERA & LÓPEZ-COLÓN 2000, CUNHA et al. 2011, etc.), or in apterous and brachypterous species of the genus *Odontotrypes* Fairmaire, 1887 known from the Tibetan Plateau and the Himalaya (KRÁL et al. 2001a). One of the results of the '*Lethrus*' expeditions of both authors and their collaborators to Bulgaria, Greece and Turkey during the years 2000–2011 are the descriptions of three new species from this area given in this paper.

Material and methods

The following abbreviations identify the collections housing the material examined:

| | |
|------|--|
| ABCB | Axel Bellmann collection, Bremen, Germany; |
| ARCL | Andreas Reichenbach collection, Leipzig, Germany; |
| BMNH | Natural History Museum, London, United Kingdom (Maxwell V. L. Barclay); |
| DEIC | Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany (Lutz Behne, Lothar Zerche); |
| DKCP | David Král collection, Praha, Czech Republic (deposited in NMPC); |
| ERCS | Eckehard Rößner collection, Schwerin, Germany; |
| HKCS | Harald Kalz collection, Schlabendorf, Germany; |
| GNCA | Georgij V. Nikolajev collection, Almaty, Kazakhstan; |
| HNHM | Hungarian Natural History Museum, Budapest, Hungary (Ottó Merkl); |
| IBCF | Ivo Boščík collection, Frýdek-Místek, Czech Republic; |
| JKCP | Jiří Klícha collection, Praha, Czech Republic; |
| JRCO | Jaroslav Ryšánek collection, Ohrada u Kolína, Czech Republic; |
| JSCB | Joachim Schulze collection, Berlin, Germany; |
| JSCS | Joachim Schönfeld collection, Sinzig, Germany; |
| JSCP | Jan Schneider collection, Praha, Czech Republic; |
| JVCS | Jan Víša collection, Slaný, Czech Republic; |
| LBCB | Lukáš Bureš collection, Brno, Czech Republic; |
| LNCB | László Nádai collection, Budapest, Hungary; |
| LSCN | Ludger Schmidt collection, Neustadt, Germany; |
| MECW | Manfred Egger collection, Wattens, Austria; |
| MHCM | Michael Hirmeier collection, integrated in ZSMC, München, Germany; |
| MHNG | Muséum d'histoire naturelle, Genève, Switzerland (Giulio Cuccodoro, Ivan Löbl); |
| MKCV | Miloš Krejčíř collection, Vlašim, Czech Republic; |
| MNCR | Milan Nikodým collection, Roztoky u Prahy, Czech Republic; |
| MNHN | Muséum national d'Histoire naturelle, Paris, France (Yves Cambefort, Olivier Montreuil); |
| MTCK | Miloslav Turčín collection, Králův Dvůr, Czech Republic; |

- NHMB Naturhistorisches Museum, Basel, Switzerland (†Michel Brancucci, Isabelle Zürcher-Pfänder);
- NHMW Naturhistorisches Museum, Wien, Austria (Mannfred Jäch, Harald Schillhammer);
- NMPC Národní muzeum, Praha, Czech Republic (Jiří Hájek, Josef Jelinek);
- NNML Nationaal Natuurhistorisch Museum, Leiden, Netherlands (Jan Krikken);
- OHCB Oliver Hillert collection, Schöneiche bei Berlin, Germany;
- PKCS Petr Kyliés collection, Slaný, Czech Republic;
- PPCB Pavel Průdek collection, Brno, Czech Republic;
- PVCP Petr Včelička collection, Praha, Czech Republic;
- RMCM Radoslav Muczka collection, Mikulov, Czech Republic;
- RCCP Radek Červenka collection, Praha, Czech Republic;
- RECF Richard Eichler collection, Forst, Germany;
- RECJ Richard Erben collection, Jaroměř, Czech Republic;
- RPCM Riccardo Pittino collection, Milano, Italy;
- SJCP Stanislav Jákl collection, Praha, Czech Republic;
- SMNS Staatliches Museum für Naturkunde, Stuttgart, Germany (Wolfgang Schawaller);
- SMTD Senckenberg Naturhistorische Sammlungen, Dresden, Germany (Olaf Jäger, Klaus Klaas);
- SMFD Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany (Richard zur Strassen, Damir Kovac, Andrea Vesmanis);
- SMNG Senckenberg Museum für Naturkunde, Görlitz, Germany (Bernhard Seifert, Rolf Franke);
- SOFM National Museum of Natural History, Sofia, Bulgaria (A. Popov, Vladimir Sakalian);
- SPCP Svatopluk Pokorný collection, Praha, Czech Republic;
- SZCM Stefano Ziani collection, Meldola, Italy;
- TBCP Tristão Branco collection, Porto, Portugal;
- TRCP Tomáš Růžička collection, Praha, Czech Republic;
- USCK Ulrich Schaffrath collection, Kassel, Germany;
- VKCS Václav Křivan collection, Štětěchy, Czech Republic;
- VMCP Vladislav Malý collection, Praha, Czech Republic;
- VNCP Vladimír Novák collection, Praha, Czech Republic;
- VRCH Vladislav Řebíček collection, Hradištko pod Medníkem, Czech Republic;
- VT CZ Václav Týr collection, Žihle, Czech Republic;
- VVCK Vladimír Vrabc collection, Kolín, Czech Republic;
- ZFMK Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany (Dirk Ahrens, Michael Schmidt, Karin Ulmer);
- ZISB Institute of Zoology, Bulgarian Academy of Sciences [BANS], Sofia, Bulgaria (Vladimir Sakalian);
- ZMAS Zoological Museum, Academy of Sciences, St. Petersburg, Russia (Andrey V. Frolov, Mark G. Volkovich);
- ZMHB Museum für Naturkunde der Humboldt Universität, Berlin, Germany (Johannes Frisch, Manfred Uhlig, Bernd Jäger);
- ZSMC Zoologische Staatssammlung, München, Germany (Michael Balke, Martin Baehr, Max Kühbander).

Altogether 3,423 specimens (see records under species headings below) were studied. Genitalia of at least three males of the new species were dissected for examination. We decided to include in the type series only material from the type locality to minimize the possibility of including multiple taxa in the type material (and the possible presence of morphologically very similar, allopatrically distributed species of the genus). Specimens were examined with an Olympus SZ61 stereomicroscope; measurements were taken with an ocular grid. Specimens of the presently described species are provided with one red printed label: ‘name of the taxon HOLOTYPUS, ALLOTYPUS or PARATYPUS, David Král & Oliver Hillert det. 2006 or 2011’. The exact label data are cited for the type material only; individual labels are indicated (only for types) by double slash (/), individual lines on every label by

a single slash (/), [p] – preceding data within quotation marks are printed, [hw] – preceding data within quotation marks are handwritten. The authors' remarks and additional comments are in square brackets. Coordinates and altitude are assigned for each locality mentioned in the text (material examined in each species) (see Appendix 1). These data were used in the construction of distribution maps (see Figs 43–46).

The material was obtained mainly during the following expeditions to Bulgaria and Greece (participants in parenthesis): Greece, May 2000 (Stephan Gottwald, Oliver Hillert, Michael Hornburg and Katrin Krause); Greece, May 2001 (David Král, Jiří Rejsek and Jan Schneider); Greece – Turkey, May 2002 (David Král, Vladimír Novák, Jiří Rejsek, Tomáš Růžička and Vladimír Vrabec); Greece, April 2003 (Radek Dunda, Oliver Hillert, David Král and Jan Schneider); Greece, April 2005 (Oliver Hillert, David Král, Jan Schneider and Jan Vondráček); Bulgaria – Greece, April 2006 (Radek Červenka, Radek Dunda, Oliver Hillert and David Král); Bulgaria, May 2006 (Jiří Klícha, Petr Kyliés and Radoslav Muczka); Greece, April 2007 (Radek Červenka, Jiří Hájek, Tomáš Růžička and Jan Schneider); Greece, April 2009 (Dana Drožová, David Král, Hana Podskalská-Šípková, Petr Šípek and Aneta Venderová-Fuchsová); Greece, April 2011 (Stephan Gottwald and Oliver Hillert).

Taxonomy

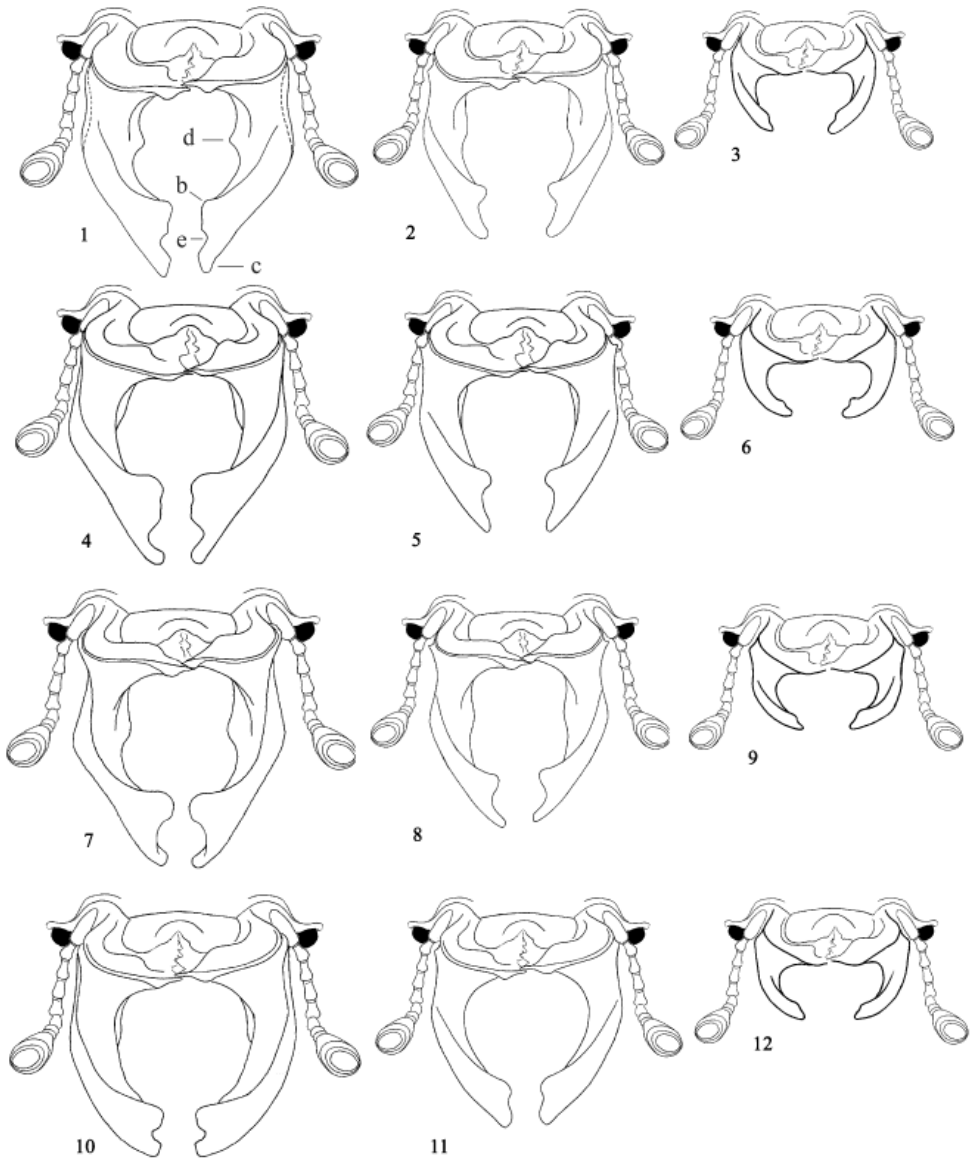
Lethrus (Lethrus) halkidikiensis sp. nov.

(Figs 1–3, 13–15, 25–27, 39, 43, 47)

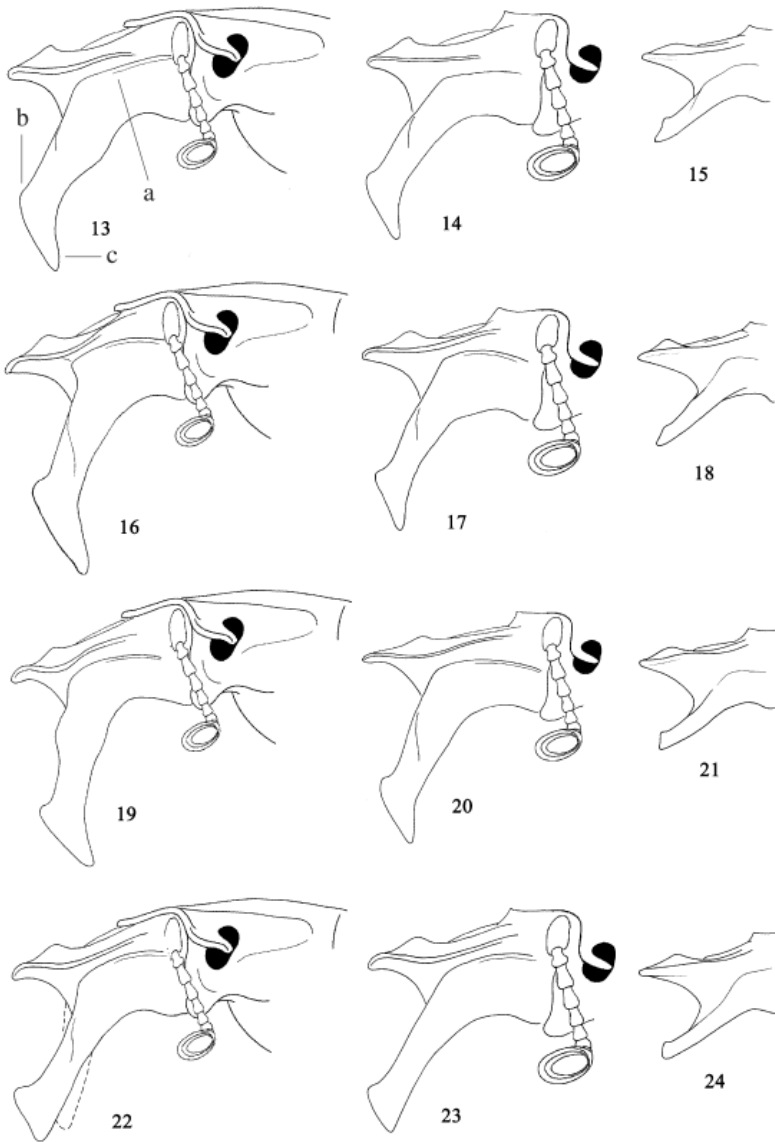
Type locality. Greece, Thessaloniki distr., Tagarades env., 66 m [a. s. l.], 40°27.798'N 023°02.198'E (Fig. 47).

Type material (499 specimens). **GREECE: CENTRAL MACEDONIA PROVINCE:** HOLOTYPE (♂) and ALLOTYPE (♀) (DKCP), 'GR, Thessaloniki distr., 14.iv.2003 / TAGARADES env., 66m / 40°27.798'N 023°02.198'E / [GPS] David Král lgt. [p]'. PARATYPES: 33 ♂♂ 29 ♀♀ (DKCP), same data; 11 ♂♂ 8 ♀♀ (SJCP), same data but 'Radek Dunda lgt. [p]'; 26 ♂♂ 20 ♀♀ (JSCP), same data but 'Jan Schneider lgt. [p]'; 21 ♂♂ 18 ♀♀ (OHCB), 'Greece, (C. Macedonia), 66m, Thessaloniki env., Tagarades env., N 40°27'79.8''E 023°02'19.8'' [GPS], 14.IV.2003, leg. O. Hillert [p]', 1 ♂ 1 ♀ (ARCL), 1 ♂ 1 ♀ (DACB), 1 ♂ 1 ♀ (DEIC), 1 ♂ 1 ♀ (ERCS), 1 ♂ 1 ♀ (HKCS), 1 ♂ 1 ♀ (MHCM), 1 ♂ 1 ♀ (NNML), 1 ♂ 1 ♀ (RPCM), 1 ♂ 1 ♀ (SMNS), 1 ♂ 1 ♀ (SMTD), 1 ♂ 1 ♀ (USCK), 1 ♂ 1 ♀ (ZMHB), 1 ♂ 1 ♀ (ZSMC), all same data; 11 ♂♂ 12 ♀♀ (DKCP), 'GR, Thessaloniki distr., 12.IV.2006 / TAGARADES env., 177m / N40°28'04''E 023°00'51'' / [GPS], David Král lgt. [p]'; 8 ♂♂ 3 ♀♀ (RCCP), same data but 'Radek Červenka lgt. [p]'; 3 ♂♂ 2 ♀♀ (SJCP), same data but 'Radek Dunda lgt. [p]'; 15 ♂♂ 16 ♀♀ (JSCP), same data but 'Jan Schneider lgt. [p]'; 12 ♂♂ 10 ♀♀ (OHCB), same data but 'Oliver Hillert lgt. [p]', 1 ♂ 1 ♀ (GNCA), 1 ♂ 1 ♀ (JSCB), 1 ♂ 1 ♀ (RPCM), 1 ♂ 1 ♀ (SZCM), 1 ♂ 1 ♀ (TBCP), 1 ♂ 1 ♀ (VMCP), all same data; 17 ♂♂ 11 ♀♀ (NMPC), 'GREECE – THESSALONIKI / ca. 3 km S TAGARADES / 40°28.1'N, 23°00.8'E; ca. 170 m / (Olive orchard; field) / Jiří Hájek leg. 27.IV.2007 [p]'; 16 ♂♂ 15 ♀♀ (TRCP), same data but 'Tomáš Růžička lgt. [p]'; 31 ♂♂ 36 ♀♀ (JSCP), same data but 'Jan Schneider lgt. [p]'; 13 ♂♂ 11 ♀♀ (RCCP), 'GR bor. MACEDONIA / THESSALONIKI distr. / ca. 3 km S Tagarades / 40°28.1'N, 23°00.8'E; ca. 170 m / (olive orchard; field) / R. Červenka lgt. 27.IV.2007 [p]'; 34 ♂♂ 17 ♀♀ (OHCB), 'Greece, (C. Macedonia), 66m / Thessaloniki env., TAGARADES env. / N 40°27'79.8''E 023°02'19.8'' / [GPS], 09.IV.2011, lgt. O. Hillert [p]'.

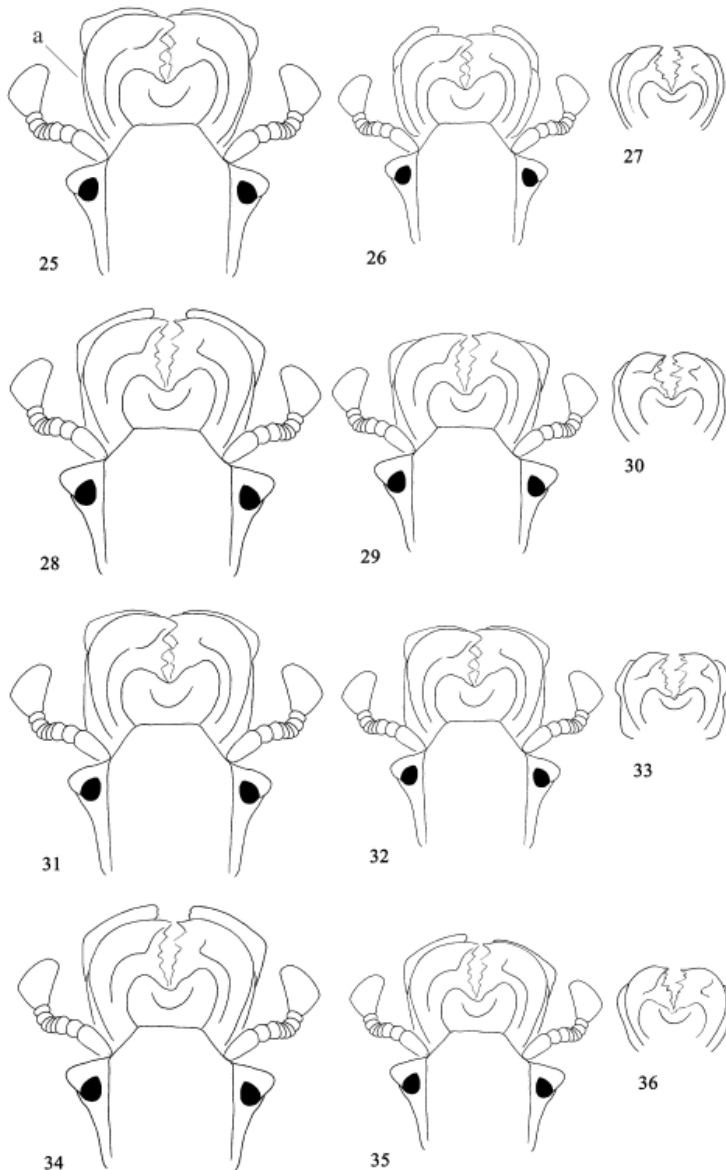
Additional material examined (133 specimens). **GREECE: CENTRAL MACEDONIA PROVINCE:** 1 ♂ (ZFMK), Saloniki, 20.iv.1968, H. Roer leg.; 1 ♂ (RPCM), about 8 km N of Poligiros, 5.v.1983, M. Berra leg.; 1 ♀ (PDCO), Kassandra, Griorigi (Kriopigi), 29.iv.–11.v.1986, Köstlin leg.; 3 ♂♂ 6 ♀♀ (MECW), 1 ♀ (ZSMC), Gerakini env., 30.v.1987, Egger leg.; 2 ♂♂ 2 ♀♀ (LSCN), Kassandra, Polychronon, 19.iii.1989, V. Assing leg.; 2 ♂♂ 2 ♀♀ (SMNG), W Kassandra, Kalandra, 28.v.1999, Franke leg.; 1 ♂ (RECF), Kassandra mer., 22.ix.2001, dead spec.; 7 ♂♂ 8 ♀♀ (DKCP), Kassandra, Kassandra env., 40°02'26"N 023°26'03"E, 99 m, 23.iv.2005, David Král leg.; 13 ♂♂ 8 ♀♀ (JSCP), same data but Jan Schneider leg.; 5 ♂♂ 2 ♀♀ (OHCB), same data but Oliver Hillert leg.; 2 ♂♂ 1 ♀ (DKCP), Metamórfosi, 40°13.83'N 23°36.46'E, 22.iv.2009, D. Král, D. Drožová, H. Podskalská, P. Šípek & A. Venderová leg.; 14 spec. (IBCF), Nea Gonia – Nea Silata, 40°20'N 23°34'E, ca. 70 m, 2.v.2009, Ivo Boščík leg.; 22 spec. (LBCB), same data but Lukáš Bureš leg.; 9 spec. (PPCB), same data but Pavel Průdek leg.; 17 spec. (PVCP), same data but Petr Včelička leg.; 2 ♂♂ (ZFMK), Saloniki; 1 ♂ (DKCP), Saloniki, ex coll. Dr. Z. Veselý.



Figs 1–12. Head, frontal aspect. Maximally developed males: 1 – *Lethrus (Lethrus) halkidikensis* sp. nov. (holotype); 4 – *L. (L.) perun* sp. nov. (holotype); 7 – *L. (L.) raymondi* Reitter, 1890 (Greece: Néa Filadélfia – OHCB); 10 – *L. (L.) strymonensis* sp. nov. (holotype). Medium developed males: 2 – *Lethrus (L.) halkidikensis* sp. nov. (paratype, Greece: Tagarádes – OHCB); 5 – *L. (L.) perun* sp. nov. (paratype, Bulgaria: Khotovo – OHCB); 8 – *L. (L.) raymondi* (Greece: Néa Filadélfia – OHCB); 11 – *L. (L.) strymonensis* sp. nov. (paratype, Greece: Séres – OHCB). Underdeveloped males: 3 – *Lethrus (L.) halkidikensis* sp. nov. (paratype, Greece: Tagarádes – OHCB); 6 – *L. (L.) perun* sp. nov. (paratype, Bulgaria: Khotovo – OHCB); 9 – *L. (L.) raymondi* (Greece: Néa Filadélfia – OHCB); 12 – *L. (L.) strymonensis* sp. nov. (paratype, Greece: Séres – OHCB). Lettering: b – subapical tooth of ventral mandibular process, d – inferiobasal tooth of ventral mandibular process, e – apical emargination of ventral mandibular process. Schematically, not to scale.



Figs 13–24. Head, lateral aspect. Maximally developed males: 13 – *Lethrus (Lethrus) halkidikensis* sp. nov. (holotype); 16 – *L. (L.) perun* sp. nov. (holotype); 19 – *L. (L.) raymondi* Reitter, 1890 (Greece: Néa Filadélfia – OHCB); 22 – *L. (L.) strymonensis* sp. nov. (holotype). Medium developed males: 14 – *Lethrus (L.) halkidikensis* sp. nov. (paratype, Greece: Tagarádes – OHCB); 17 – *L. (L.) perun* sp. nov. (paratype, Bulgaria: Khotovo – OHCB); 20 – *L. (L.) raymondi* (Greece: Néa Filadélfia – OHCB); 23 – *L. (L.) strymonensis* sp. nov. (paratype, Greece: Séres – OHCB). Underdeveloped males: 15 – *Lethrus (L.) halkidikensis* sp. nov. (paratype, Greece: Tagarádes – OHCB); 18 – *L. (L.) perun* sp. nov. (paratype, Bulgaria: Khotovo – OHCB); 21 – *L. (L.) raymondi* (Greece: Néa Filadélfia – OHCB); 24 – *L. (L.) strymonensis* sp. nov. (paratype, Greece: Séres – OHCB). Lettering: a – lateral longitudinal keel on base of ventral mandibular process, b – subapical tooth of ventral mandibular process, c – apical tooth of ventral mandibular process. Schematically, not to scale.



Figs 25–36. Head, dorsal aspect. Maximally developed males: 25 – *Lethrus (Lethrus) halkidikensis* sp. nov. (holotype); 28 – *L. (L.) perun* sp. nov. (holotype); 31 – *L. (L.) raymondi* Reitter, 1890 (Greece: Néa Filadélfia – OHCB); 34 – *L. (L.) strymonensis* sp. nov. (holotype). Medium developed males: 26 – *Lethrus (L.) halkidikensis* sp. nov. (paratype, Greece: Tagarádes – OHCB); 29 – *L. (L.) perun* sp. nov. (paratype, Bulgaria: Khotovo – OHCB); 32 – *L. (L.) raymondi* (Greece: Néa Filadélfia – OHCB); 35 – *L. (L.) strymonensis* sp. nov. (paratype, Greece: Séres – OHCB). Underdeveloped males: 27 – *Lethrus (L.) halkidikensis* sp. nov. (paratype, Greece: Tagarádes – OHCB); 30 – *L. (L.) perun* sp. nov. (paratype, Bulgaria: Khotovo – OHCB); 33 – *L. (L.) raymondi* (Greece: Néa Filadélfia – OHCB); 36 – *L. (L.) strymonensis* sp. nov. (paratype, Greece: Séres – OHCB). Lettering: a – lateral longitudinal keel on base of ventral mandibular process. Schematically, not to scale.

Description of holotype. Maximally developed (hyperthelic) male with well developed ventral mandibular processes. Total body length 29 mm. Oblong, strongly convex; dorsal surface black, except moderately shiny pronotum almost alutaceous; ventral surface black with weak blue tinge, moderately shiny, claws black-brown; setation black.

Head (Figs 1, 13, 25, 39). Labrum bilobed, asymmetrical, right lobe remarkably more developed; surface rugosely and coarsely, shallowly and sparsely punctate, each puncture bearing short recumbent macroseta; anterior margin with dense row of long macrosetae. Clypeus transverse, trapezoidal with anterior angles round. Frontal impressions vague, frontal tubercles indistinct. Frontoclypeal suture present only laterally; keels separating eye canthus from frons only slightly developed but distinct, slightly divergent posteriad. Eye canthus exceeding eyes, projecting anterolaterad, almost rectangular, lateral margins divergent posteriad, anterolateral angle round, oblique keel above eyes absent. Pleurostomal process evenly arcuate, hardly exceeding ventrolateral mandibular outline. Punctuation of frons double, consisting of coarse, transversally rugose, regularly and densely distributed punctures, intermixed with fine, irregularly distributed ones; coarse punctures separated by approximately less than their diameter, punctuation becoming distinctly sparser posteriad and on occiput; clypeus and eye canthus distinctly rugose.

Mandibles symmetrical, external outline almost semicircular, pointed subapically in dorsal aspect (Figs 25, 39) with maximum width approximately in middle of mandibular length.

Ventral mandibular processes (Figs 1, 13, 39) symmetrical, distinctly longer than horizontal length of mandibles; base thickened, not exceeding lateral mandibular outline in dorsal aspect, with approximately straight external outline in basal half in frontal aspect; longitudinal keel on base laterally present, in dorsal aspect straight and distinctly parallel to lateral mandibular outline, not so broad as maximum width of mandibular outline basally; in lateral aspect distinctly parallel to lateral mandibular outline; posterior subbasal tooth absent (visible in lateral aspect); inferiobasal tooth present, angulate in frontal aspect; both processes bent inward approximately at middle of mandibular length in frontal view; anterior subapical tooth present, weakly visible in lateral aspect, distinctly extended in frontal aspect; apical emargination remarkably deep; apical tooth sharp, strongly extended apically.

Pronotum transverse, distinctly broader than base of elytra, broadest just behind middle; margin entirely bordered, slightly crenulate on anterior parts. Anterior angles not projecting anterolaterad, with evenly arcuate outline; lateral margin approximately straight to round posterior angle; basal margin straight. Punctuation of dorsal surface simple, consisting of deep, sparsely and irregularly distributed punctures; punctures separated by approximately two to four times their diameters discally, surface near lateral margins considerably shagreened and alutaceous.

Scutellar shield widely triangular, finely shagreened.

Elytra almost semicircular, apices not prominent, each apex forming independent arc. Epipleuron strongly narrowed apicad, epipleural keel not reaching elytron apex. Whole surface alutaceous, finely transversally rugose; striae not indicated, entirely vanishing in rugosities.

Legs. Profemur not armed, protibia with eight gradually diminishing external denticles proximally, and with row of tubercles on ventromedial edge.

Aedeagus of typical shape of species closely related to *L. raymondi* (see Figs 37–38).

Variability in males. Body length 21–30 mm. Mandibular processes in medium developed (Figs 2, 14, 26) and underdeveloped (hypothelic) males (Figs 3, 15, 27) short, more or less straight with only slightly indicated teeth, or entirely without them, simply round to almost acute apically.

Females (body length 20–29 mm, allotype 28 mm) differ from males as follows: external outline of mandibles almost straight, in apical quarter round in dorsal aspect; ventral mandibular process absent; protibia broader, row of tubercles on ventromedial edge less pronounced.

Differential diagnosis. For differential diagnosis see the character matrix (Table 1).

Etymology. Derived from the area of origin the new species, the Halkidiki (Χαλκιδική) [= Chalkidiki or Khalkidiki] Peninsula.

Collecting circumstances. The type series was collected on intensively grazed pasture on moderately steep slopes consisting of loess soil (Fig. 47).

Distribution. Northern Greece: Halkidiki Peninsula (Fig. 43).

Lethrus (Lethrus) perun sp. nov.

(Figs 4–6, 16–18, 28–30, 40, 44, 48)

Lethrus (Lethrus) raymondii (partim): GUÉORGUIEV & BUNALSKI (2004): 268 (comments, distribution).

Type locality. Bulgaria, Khotovo, 188 m [a. s. l.], 41°29'57"N 023°20'18"E (Fig. 48).

Type material (331 specimens). **BULGARIA: BLAGOEVGRAD PROVINCE:** HOLOTYPE (♂) and ALLOTYPE (♀) (DKCP), 'SW Bulgaria 9.IV.2006 / KHOTOVO 188m / N41°29'57"E023°20'18"' / [GPS] David Král lgt. [p]'. PARATYPES: 21 ♂♂ 16 ♀♀ (DKCP), same data; 18 ♂♂ 7 ♀♀ (RCCP), same data but 'Radek Červenka lgt. [p]'; 3 ♂♂ 2 ♀♀ (SJCP), same data but 'Radek Dunda lgt. [p]'; 57 ♂♂ 25 ♀♀ (OHCB), same data but 'Oliver Hillert lgt. [p]'; 1 ♂ 1 ♀ (ARCL), 1 ♂ 1 ♀ (DACB), 1 ♂ 1 ♀ (DEIC), 1 ♂ 1 ♀ (ERCS), 1 ♂ 1 ♀ (GNCA), 1 ♂ 1 ♀ (HKCS), 1 ♂ 1 ♀ (JSCB), 1 ♂ 1 ♀ (LSCN), 1 ♂ 1 ♀ (MHCM), 1 ♂ 1 ♀ (NNML), 2 ♂♂ 2 ♀♀ (RPCM), 1 ♂ 1 ♀ (SMNS), 1 ♂ 1 ♀ (SMTD), 2 ♂♂ 2 ♀♀ (SZCM), 2 ♂♂ 2 ♀♀ (TBPCP), 1 ♂ 1 ♀ (USCK), 1 ♂ 1 ♀ (ZMHB), 1 ♂ 1 ♀ (ZSMC), all same data; 2 ♂♂ (SPCP), 'Bulg. mer. / Chotovo, V. 1984 / Ing. Pokorný lgt. [p]'; 1 ♀ (VMCP), same data; 1 ♂ 1 ♀ (HNHM), 'Bulgaria, Chotovo / 9.V.1985 / leg. Gór A. [p]'; 15 ♂♂ 15 ♀♀ (RCCP), 'Bulgaria mer. occ. / Chotovo / 27.4.1988, lgt. Červenka [p]'; 4 ♂♂ 2 ♀♀ (OHCB), 4 ♂♂ 3 ♀♀ (MNCR), 5 ♂♂ 7 ♀♀ (ZSMC), all same data; 4 ♂♂ 3 ♀♀ (RPCM), 'Bulgaria, southwest / Khotovo, 27.IV.1988 / R. Červenka lgt. [p]'; 1 ♂ (VTCZ), 'Bulgaria 2000 / CHOTOVO 16.4. / M. Kohout [lgt.] [hw, Indian ink]'; 1 ♂ (PKCS), same data; 3 ♂♂ 2 ♀♀ (PKCS), 'BG mer. occ. / 1.5.2005, Melnik – Chotovo / Kyliies leg. [p]'; 1 ♂ 1 ♀ (PKCS), 'BG mer. occ. / 29.5.2005, Melnik – Chotovo / Kyliies leg. [p]'; 15 ♂♂ 27 ♀♀ (PKCS), 'Bulgaria south / Melnik – Chotovo / 3.5.2006 / lgt. Petr Kyliies [p]'; 1 ♂ 1 ♀ (JVCS), the same but 'lgt. Jiří Klícha [p]'; 8 ♂♂ 9 ♀♀ (JKCP), same data; 1 ♀ (RMCM), same data but 'lgt. Radoslav Muczka [p]'.
Additional material examined (582 specimens). **BULGARIA: BLAGOEVGRAD PROVINCE:** 2 ♂♂ 1 ♀ (SOFM), 1 ♂ (ZISB), Levunovo, 2.vii.1953, B. Zakharieva leg.; 2 ♂♂ 1 ♀ (DKCP), Levunovo, 10.v.1983, Z. Kačenka leg.; 1 ♂ (VMCP), Melnik, 9.vi.[19]78, L. Mencl leg.; 2 ♂♂ 1 ♀ (HNHM), Melnik, 10.v.1985, A. Gór leg.; 1 ♂ (VMCP), Melnik, 20.v.[19]85, Vl. Malý leg.; 3 ♂♂ 3 ♀♀ (DKCP), Dolno Spančevo, vi.1979, Pavel Marhoul leg.; 12 ♂♂ 15 ♀♀ (DKCP), 9.iv.2006, Dolno Spančevo, 41°25'30"N 023°22'46"E, 130 m, David Král leg.; 9 ♂♂ 14 ♀♀ (RCCP), same data but Radek Červenka leg.; 5 ♂♂ 4 ♀♀ (SJCP), same data but Radek Dunda leg.; 8 ♂♂ 5 ♀♀ (OHCB), same data but Oliver Hillert leg.; 5 ♂♂ 2 ♀♀ (DKCP), 2 ♂♂ (JVCS), v.1980, Liljanovo, Jan Nedvěd leg.; 2 ♂♂ 1 ♀ (DKCP), Liljanovo, 10.–12.v.1986, David Král leg.; 2 ♂♂ (OHCB), 1 ♂ 1 ♀ (JSCB), Sandanski, 5.v.1984, D. Wrase leg.; 3 ♂♂ 4 ♀♀ (ERCS), Sandanski, 6.–11.v.1984, B. Jäger leg.; 1 ♂ 1 ♀ (OHCB), Sandanski, 6.–11.v.1984, D. W. Wrase leg.; 1 ♂ (JSCB), 2 ♂♂ (ZMHB), Sandanski, 28.iv.[19]85, B. Jäger leg.; 1 ♀ (JVCS), Sandanski, 8.v.[19]86, Dr. Sobota leg.; 4 ♂♂ (SOFM), Sandanski, 12.–14.vi.1987, Al. Slivov leg.; 1 ♂ 1 ♀ (SPCP), 1 ♂ 1 ♀ (VMCP), Demjanica, v.1984, Ing. Pokorný leg.; 1 ♀ (JSCS), 1 ♂ (OHCB), Ilindenci, 400–600 m, 20.–21.iv.1985, B. Zvarič leg.; 1 ♂ (JSCS), 1 ♂ 2 ♀♀ (OHCB), Ilindenci, 21.iv.1985, B. Zvarič leg.; 2 ♀♀ (JVCS), Ilindenci, 400–600m,

Table 1. Character matrix for separation of maximally developed males of the *Lethrus* species close to *L. raymondi* Reitter, 1890 known from Bulgaria, Macedonia and NW Greece

| Character | <i>L. (L.) raymondi</i> Reitter, 1890 | <i>L. (L.) balkikitiensis</i> sp. nov. | <i>L. (L.) perun</i> sp. nov. | <i>L. (L.) strymonensis</i> sp. nov. |
|---|---|--|---|---|
| External mandibular outline in dorsal aspect | almost semicircular, maximum width approximately in middle of mandibular length (Fig. 31) | almost semicircular, maximum width approximately in middle of mandibular length (Fig. 25) | almost semicircular, maximum width approximately in middle of mandibular length (Fig. 28) | obovigal, maximum width in anterior third of mandibular length (Fig. 34) |
| Lateral longitudinal keel on base of ventral mandibular process in dorsal aspect | straight and distinctly subparallel to lateral mandibular outline, so broad as maximum width of mandibular outline basally (Fig. 31) | straight and distinctly parallel to lateral mandibular outline, not so broad as maximum width of mandibular outline basally (Fig. 25a) | straight and distinctly subparallel to lateral mandibular outline, not so broad as maximum width of mandibular outline basally (Fig. 28) | straight and nearly parallel to lateral mandibular outline, not so broad as maximum width of mandibular outline basally (Fig. 34) |
| Lateral longitudinal keel on base of ventral mandibular process in lateral aspect | very weakly arcuate, distinctly subparallel to lateral mandibular outline, divergent gradually basad approximately from middle of its length (Fig. 19) | straight, distinctly parallel to lateral mandibular outline (Fig. 13a) | very weakly arcuate, distinctly subparallel to lateral mandibular outline, divergent gradually basad approximately from middle of its length (Fig. 16) | very weakly arcuate, approximately parallel to lateral mandibular outline (Fig. 22) |
| Shape of ventral mandibular process in lateral aspect | anterior subapical tooth present, broadened distad, apical tooth extended apically (Fig. 19) | anterior subapical tooth present, weakly visible, broadened distad, apical tooth strongly extended apically (Fig. 13b, c) | anterior subapical tooth present, broadened distad, apical tooth strongly extended apically (Fig. 16) | anterior subapical tooth present, broadened distad, apical tooth not extended apically (Fig. 22) |
| Shape of ventral mandibular process in frontal aspect | outline strongly concave basally, inferio basal tooth present, round; subapical tooth distinctly extended, apical emargination remarkably deep, ventral process bent inward in middle of mandibles (Fig. 7) | outline not concave, inferio basal tooth present, angulate; subapical tooth distinctly extended, apical emargination remarkably deep, ventral process bent inward in middle of mandibles (Fig. 1b–c) | outline weakly concave basally, inferio basal tooth absent, subapical tooth distinctly extended, apical emargination remarkably deep, ventral process bent inward in middle of mandibles (Fig. 4) | outline not concave basally, inferio basal tooth present, slightly indicated, subapical tooth not extended, apical emargination weak, ventral process bent inward in basal third of mandibles (Fig. 10) |

20.–21.iv.1985, B. Zvarič leg.; 21 ♂♂ 15 ♀♀ (DKCP), 4 ♂♂ 8 ♀♀ (VMCP), Ilindenci, 7.–8.v.[1]986, David Král leg.; 1 ♂ 2 ♀♀ (DKCP), Lozenica, 2.vi.1989, S. Bečvář leg.; 1 ♀ (JVCS), Kresna, Struma valley, 26.–28.v.1978, Karel Majer leg.; 1 ♀ (OHCb), Kresna, v.[19]53, Dr. J. Sobota leg.; 2 ♀♀ (JVCS), Strumjani, 1.–4.v.2006, Petr Kyliès leg.; 18 ♂♂ 14 ♀♀ (JKCP), same data but Jiří Kliča leg.; 5 ♂♂ (RMCM), same but Radoslav Muczka leg.; 6 ♂♂ 5 ♀♀ (VRCH), Strumjani, 41°36'26"N 23°13'42"E, 26.iv.2009, Vladislav Řebíček leg.; 16 ♂♂ 8 ♀♀ (JRCO), Strumjani, 41°36'26"N 23°13'42"E, 26.–27.iv.2009, Jaroslav Ryšánek leg.; 6 ♂♂ 7 ♀♀ (MTCK), same data but Miloslav Turčín leg.; 16 ♂♂ 17 ♀♀ (MKCV), same data but Miloš Krejčíř leg.; 2 ♂♂ 2 ♀♀ (RECJ), same data but Richard Erben leg.; 154 specimens (IBCF), Leshnitsa, 41°32'08"N 23°17'23"E, ca. 200 m, 30.iv.2009, Ivo Boščík leg.; 21 spec. (LBCB), same data but Lukáš Bureš leg.; 3 ♂♂ 4 ♀♀ (PPCB), 1 ♂ 1 ♀ (DKCP), same data but Pavel Průdek leg.; 7 spec. (PVCP), same data but Petr Včelička leg.; 7 ♂♂ 5 ♀♀ (LNCB), Sklave, 28.–30.v.1990, Czetó Zsolt leg.; 2 ♂♂ 2 ♀♀ (LNCB), Sklave, 23.v.1998, László Nádai leg.; 1 ♀ (LNCB), Struma valley, Kresna, 24.–28.v.1998, László Nádai leg.; 1 ♀ (LNCB), Sklave, Petrich [district], 41°31.753'N 023°20.156'E, 240 m, 26.v.2007, Székely Kálmán leg.

Description of holotype. Maximally developed (hyperthelic) male with well developed ventral mandibular processes. Total body length 28 mm. Oblong, strongly convex; dorsal surface black, except moderately shiny pronotum almost alutaceous; ventral surface black with weak blue tinge, moderately shiny, claws black-brown; setation black.

Head (Figs 4, 16, 28, 40). Labrum bilobed, asymmetrical, right lobe remarkably more developed; surface rugosely and coarsely, shallowly and sparsely punctate, each puncture bearing short recumbent macroseta; anterior margin with dense row of long macrosetae. Clypeus transverse, trapezoidal with anterior angles round. Frontal impressions vague, frontal tubercles indistinct. Frontoclypeal suture present only laterally; keels separating eye canthus from frons only slightly developed but distinct, slightly divergent posteriad. Eye canthus exceeding eyes, projecting anterolaterad, almost rectangular, lateral margins divergent posteriad, anterolateral angle round, oblique keel above eyes absent. Pleurostomal process evenly arcuate, hardly exceeding ventrolateral mandibular outline. Punctuation of frons double, consisting of coarse, transversally rugose, regularly and densely distributed punctures, intermixed with fine, irregularly distributed ones; coarse punctures separated by approximately less than their diameter, punctuation becoming distinctly sparser posteriad and on occiput; clypeus and eye canthus distinctly rugose.

Mandibles symmetrical, external outline in dorsal aspect almost semicircular, pointed subapically (Figs 28, 40), maximum width approximately in middle of mandibular length.

Ventral mandibular processes (Figs 4, 16, 40) symmetrical, distinctly longer than horizontal length of mandible; base thickened, not exceeding lateral mandibular outline in dorsal aspect, with weakly concave external outline in basal half in frontal aspect; longitudinal keel on base laterally present, in dorsal aspect straight and distinctly subparallel to lateral mandibular outline, not as broad as maximum width of mandibular outline basally; in lateral aspect very weakly arcuate, distinctly subparallel to lateral mandibular outline, divergent gradually basad from approximately middle of its length; anterior subbasal tooth absent; posterior subbasal tooth absent (lateral aspect); inferiobasal tooth absent; both processes bent inward approximately at middle of mandibular length in frontal view; anterior subapical tooth present, weakly visible in lateral aspect, distinctly extended in frontal aspect; apical emargination remarkably deep; apical tooth sharp, strongly extended apically.

Pronotum transverse, distinctly broader than base of elytra, broadest just behind middle; margin entirely bordered, slightly crenulate on anterior parts. Anterior angles not projecting anterolaterad, with evenly arcuate outline; lateral margin approximately straight to round posterior angle; basal margin straight. Punctuation of dorsal surface simple, consisting of deep, sparsely and unevenly distributed punctures; punctures separated by approximately two to four times their diameters discally, surface near lateral margins considerably shagreened and alutaceous.

Scutellar shield widely triangular, finely shagreened.

Elytra almost semicircular, apices not prominent, each apex forming independent arc. Epipleuron strongly narrowed apicad, epipleural keel not reaching elytral apex. Whole surface alutaceous, finely transversally rugose; striae not indicated, entirely vanishing in rugosities.

Legs. Profemur not armed, protibia with eight gradually diminishing external denticles proximad, and with row of tubercles on ventromedial edge.

Aedeagus of typical shape of species closely related to *L. raymondi* (see Figs 37–38).

Variability in males. Body length 20–29 mm. Mandibular processes in medium developed (Figs 5, 17, 29) and underdeveloped (hypothelic) males (Figs 6, 18, 30) short, more or less straight with only indicated teeth or without them at all, simply rounded to almost acute apically.

Females (body length 21–28 mm, allotype 28 mm) differ from males as follows: external outline of mandibles almost straight, in apical quarter rounded in dorsal aspect; ventral mandibular process absent; protibia broader, row of tubercles on ventromedial edge less pronounced.

Differential diagnosis. For differential diagnosis see the character matrix (Table 1).

Etymology. Noun in apposition. In Slavic mythology, Perun (cyrillic: Перун) is the highest God of the Pantheon and the God of thunder and lightning. It is assumed that the name of the Pirin Mountains situated in the area of distribution of the new species is derived from his name.

Collecting circumstances. The type series was collected on uncultivated pasture with a disturbed surface on slightly sloping loess soil basis; woody vegetation consisted of solitary fruit trees and shrubs (Fig. 48).

Distribution. Bulgaria: left margin of the Struma river basin north of the defile between the Belasitsa and the Slavyanka mts (Fig. 44). Records of *L. raymondi* by Guéorguiev & Bunalski (2004) from Kalimantsi, Katuntsi, Levunovo and Sandanski concern almost certainly this species.

Lethrus (Lethrus) raymondi Reitter, 1890

(Figs 7–9, 19–21, 31–33, 37–38, 41, 45, 49)

Lethrus Raymondi Reitter, 1890: 293 (description, key).

Lethrus raymondi: REITTER (1891): 227 (female diagnosis); MIKŠIĆ (1955): 232 (distribution); MIKŠIĆ (1957): 177 (distribution); MIKŠIĆ (1959): 65, 117 (distribution); MIKŠIĆ (1965): 242 (key); MIKŠIĆ (1970): 15 (list, distribution); ANGELOV (1965): 101 (distribution).

Lethrus Reimondi (incorrect subsequent spelling): NEDJALKOV (1905): 422 (distribution).

Lethrus (Autolethrus) Raymondi: SEMENOV (1892): 237 (classification, list); SEMENOV (1894): 484 (classification, list); REITTER (1893): 35 (revision, key); BOUCOMONT (1912): 38 (catalogue); WINKLER (1929): 1042 (catalogue).

Lethrus (Autolethrus) raymondi: SEMENOV-TIAN-SHANSKIJ (1935): 1398 (distribution, zoogeography); SEMENOV-

TIAN-SHANSKIJ & MEDVEDEV (1936): 37, 74, 86; Figs 33, 101, 164, 212, 268, 312 (description, key, classification, distribution); MIKŠIĆ (1958): 133, 135 (diagnostic characters, key, distribution); BARAUD (1992): 82 (diagnostic characters, key, distribution); BUNALSKI (2001): 167 (list).

Lethrus (Lethrus) raymondi: KRÁL et al. (2001b): 257; Figs 2, 5, 8 (diagnostic characters, distribution); NIKOLAJEV (2003): 136, 151; Figs 96: 5, 99: 1, 110: 1 (description, key, classification, distribution, type designation); GUÉ-ORGUIEV & BUNALSKI (2004): 268 (distribution); KRÁL & NIKOLAJEV (2006): 293 (catalogue).

Type locality. ‘Türkei (Salonicki)’ [= Greece, Thessaloniki].

Type material examined (8 specimens). **GREECE: CENTRAL MACEDONIA PROVINCE:** LECTOTYPE (♂) (ZMAS) (designated by NIKOLAJEV 2003: 151), ‘Salonichi // L. Raymondi / Reitt. 64. [hw, blue ink] // Type [p, red label] // L. Raymondi Rtrr. / type [hw, Indian ink] / k. [kolekciya = collection of] V. Yakovleva [= V. Yakovlev; p, original in Cyrillics] // Syntypus [p, red label] // Lectotypus / Lethrus raymondi Reitter / design. G. Nikolajev / 30.08.2002 [p, red label]’. PARALECTOTYPES: ♀ (ZMAS), ‘Salonichi // L. Raymondi / Reitt. 64. [hw, blue ink] // Lethrus / Raymondi m. / Salonichi [probably Reitter’s hw, Indian ink] // Lethr. Raymondi / ♀. Typ. Rtrr. [hw, Indian ink] / A. Semenow det. [p] // Syntypus [p, red label]’; ♂ (ZMAS), ‘L. Raymondi / Reitt. 64. [hw, blue ink] // Lethr. Raymondi / ♂. Typ. Rtrr. III. 98 [hw, Indian ink] / A. Semenow det. [p] // Syntypus [p, red label]’; ♂ (ZMAS), ‘L. Raymondi / Reitt. 64. [hw, blue ink] // Lethr. Raymondi / ♂. Typ. Rtrr. III. 98 [hw, Indian ink] / A. Semenow det. [p] // L. Raymondi Rtrr. / [hw, Indian ink] / k. [kolekciya = collection of] V. Yakovleva [= V. Yakovlev; p, original in Cyrillics] // Syntypus [p, red label]’; ♂ (HNHM), ‘Salonicki / Emge [probably Reitter’s hw, Indian ink] // Holotypus [red p label] 1890 / Lethrus (Autolethrus) / Raymondi / Reitter [not Reitter’s hw, Indian ink, label with red margin] // Lectotypus [p] Lethrus / raymondi Reitter / 10.04.1973 Nikolajev [Nikolajev’s hw, red label]’, [not published by Nikolajev]; ♂ (MNHN), ‘L. Raymondi / m. Salonicki [probably Reitter’s hw, Indian ink] // Typus [red p label with black margin] // Museum Paris / 1938 / Coll. A. Boucomont [p] // Lethrus ♂ / raymondi / Reitter / Lectotypus / Det. R. Pittino 1993 [Pittino’s hw, red label]’, [not published by Pittino]; ♀ (MNHN), ‘L. Raymondi / Reitt. ♀ Salonicki [not Reitter’s hw but probably of Boucomont, Indian ink] // Typus [red p label with black margin] // Museum Paris / 1938 / Coll. A. Boucomont [p] // Lethrus ♀ / raymondi / Reitt. / Paralectotypus / Det. R. Pittino 1993 [Pittino’s hw, red label]’, [not published by Pittino]; ♂ (ZSMC), ‘Raymondi, Rtrr. / Saloniky [hw] // Kiesenwetter [p] // Lethrus / raymondi / Reitter / Syntypus / Det. O. Hillert 2003 [hw]’.

Additional material examined (815 specimens). **GREECE: CENTRAL MACEDONIA PROVINCE:** 1 ♂ 2 ♀♀ (MNHN), 1 ♂ (RPCM), Saripazar, 1910, R. Michel, Museum Paris, Mission du Vardar; 2 ♂♂ (BMNH), Kalamaria, iv.1918, J. Waterson; 2 ♂♂ 1 ♀ (MNHN), Salonique env., Région du Mont Prophète Élie, 786 m, v.1918, Dr. A. Berton; 4 ♂♂ 4 ♀♀ (ZSMC), Langadas, 2.v.1942, F. Kühnhorn leg.; 1 ♂ 1 ♀ (ZSMC), Kolchikon nr. Loutra Langadas, E of Saloniki, 7.v.1942, P. Babič leg.; 66 spec. (RPCM), 7 km W Petroto 20 km N of Thessaloniki, 300 m, 3.iv.1990, L. & R. Pittino leg.; 13 spec. (RPCM), same data but 22.iv.1990; 103 spec. (RPCM), 5 ♂♂ 6 ♀♀ (MNHN), same data but 20.iii.1991; 11 spec. (RPCM), same data but 20.iv.1993; 5 ♂♂ 6 ♀♀ (MNHN), 7 km W Petroto, 200 m, 20.iii.1991, Pittino leg.; 27 ♂♂ 30 ♀♀ (DKCP), Néa Filadélfia env., 40°46’31”N 22°49’24”E, 54 m, 19.iv.2005, David Král leg.; 41 ♂♂ 102 ♀♀ (JSCP), same data but Jan Schneider leg.; 37 ♂♂ 42 ♀♀ (OHCB), same data but Oliver Hillert leg.; 2 ♂♂ 2 ♀♀ (DKCP), Néa Filadélfia env., 40°46’31”N 22°49’24”E, 54 m, 12.iv.2006; 15 ♂♂ 10 ♀♀ (RCCP), same data but Radek Červenka leg.; 4 ♂♂ 4 ♀♀ (SJCP), same data but Radek Dunda leg.; 7 ♂♂ 3 ♀♀ (OHCB), same data but Oliver Hillert leg.; 7 ♂♂ 11 ♀♀ (NMPC), ca. 3 km S Nea Filadélfia, 40°46.5’N 22°49.3’E, ca. 85 m, steppe, field, river, 27.–28.iv.2007, Jiří Hájek leg.; 10 ♂♂ 15 ♀♀ (RCCP), same data but Radek Červenka leg.; 2 ♂♂ 5 ♀♀ (TRCP), same data but Tomáš Růžička leg.; 8 ♂♂ 13 ♀♀ (JSCP), same data but Jan Schneider leg.; 1 ♂ (MHNG), 1 ♂ (SMFD), 1 ♂ (ZMHB), Kortatsch, A. Schatzmayr; 1 ♂ (SOFM), Solun, col. Nedelkow; 1 ♂ (DEIC), Salonick, G. Müller; 1 ♂ (DEIC), Salonicki, Dieck; 1 ♂ (OHCB), Salonicki, Gr., Emge; 3 ♂♂ 1 ♀ (DEIC), 1 ♂ 1 ♀ (MNHN), 1 ♂ (OHCB), Salonik; 1 ♂ 1 ♀ (DEIC), Salonik, Bruck; 1 ♂ (NHMB), 1 ♂ 1 ♀ (SMFD), Saloniki, Scriba; 2 ♂♂ 1 ♀ (HNHM), 1 ♂ 1 ♀ (MNHN), Saloniki; 1 ♂ (HNHM), Saloniki; 1 ♂ (HNHM), 1 ♂ 1 ♀ (MNHN), Salonique, Collection Le Moulit; 1 ♂ (MNHN), Salonique, Museum Paris, Mission du Vardar; 1 ♂ (MNHN), Salonique, P. Donkier; 1 ♂ (MNHN), Saloniki; 2 ♂♂ 1 ♀ (ZMHB), Saloniki; 2 ♂♂ 1 ♀ (SMTD), Salonicki, Kirsch; 2 ♂♂ (SMTD), Salonicki; 1 ♀ (SMTD), Salonik, Kiesenwetter; 1 ♂ (NLHD), 1 ♂ (SMTD), Saloniki, Macedon; 1 ♀ (SMTD), Salonicki, Müller; 6 ♂♂ 1 ♀ (ZSMC), Saloniky, Kiesenwetter; 9 ♂♂ 2 ♀♀ (ZSMC), Saloniky; 1 ♂ 1 ♀ (MNHN), Griechenland, Reitter; 2 ♂♂ (NHMW), Graecia; 1 ♂ 1 ♀ (ZSMC), same data. **MACEDONIA:** 2 ♂♂ (ZSMC), Veles, 3.iv.[19]18; 1 ♂ (ZSMC), Veles, 20.iii.[19]18; 2 ♂♂

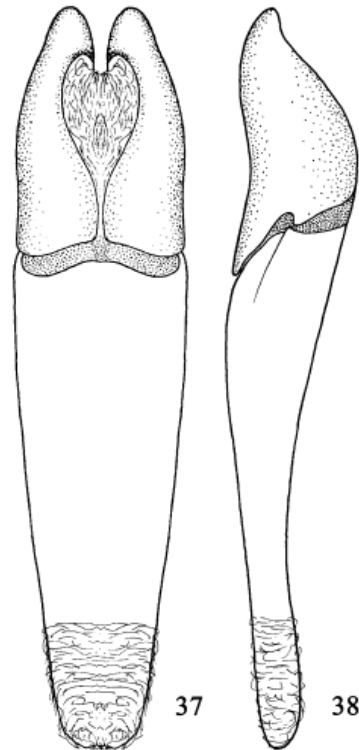
(SMFD), Veles, 12.iv.[19]18; 8 ♂♂ 4 ♀♀ (ZSMC), same data; 14 ♂♂ 6 ♀♀ (ZSMC), Veles, 15.iv.[19]18; 4 ♂♂ 1 ♀ (ZMHB), Veles, P. Schulze S.G.; 10 ♂♂ 3 ♀♀ (ZSMC), Stip, 7.iv.[19]18; 3 ♂♂ (DEIC), Štip, 15.v.[19]37, W. Liebmann; 1 ♂ (OHCB), Stip; 5 ♂♂ 1 ♀ (ZSMC), Usküb, 7.iv.[19]18, Macedon. Exp. [19]17–[19]18; 1 ♂ (ZSMC), Usküb, 2.vii.[19]18, Macedon. Exp. [19]17–[19]18; 6 ♂♂ 2 ♀♀ (ZSMC), Usküb, 12.iv.[19]18, Macedon. Exp. [19]17–[19]18; 3 ♂♂ (ZSMC), Usküb, Macedon. Exp. [19]17–[19]18; 1 ♂ 1 ♀ (SMFD), Usküb; 1 ♂ (ZMHB), Usküb; 1 ♂ (NHMB), Ūsküb; 1 ♂ 1 ♀ (SMFD), same data; 2 ♀♀ (ZSMC), Kalučkovo, Macedon. Exp. [19]17–[19]18; 1 ♂ (ZSMC), Plavuša Planina, Macedon. Exp. [19]17–[19]18; 1 ♂ (ZSMC), Plavuša pl.; 1 ♂ (SMFD), Wodno, 7.iv.[19]28; 3 ♂♂ 2 ♀♀ (VKCS), Nogaevci / Ubogo, 41.62484899 N 21.95277169E, 216 m a.s.l., 12–13.v.2006, Václav Křivan leg.; 7 ♂♂ 5 ♀♀ (VKCS), Penuš, 10 km SE Štip, 21.v.2006, 41°42'02"N 22°06'53"E, 270 m a.s.l., Václav Křivan leg.; 2 ♂♂ (DEIC), 1 ♂ (MNHN), Keretschkoj, A. Schatzmayr; 1 ♂ (ZFMK), Macedonien, Doiran lake 1 ♂ 3 ♀♀ (NMPC), Skoplje, Petrbok [igt.]. **Not located or imprecisely localized:** 1 ♂ 1 ♀ (HNHM), Balkán, coll. E. Friv.; 2 ♂♂ (DEIC), Macedonia; 1 ♂ (ZMHB), Macedonien; 1 ♂ (MNHN), Turcia; 1 ♂ (SMFD), Türk.

Diagnostic characters of males. Total body length 20–29 mm. Dorsal surface black, except of moderately shiny pronotum almost alutaceous; ventral surface black with weak blue tinge, moderately shiny.

Head (Figs 7, 19, 31, 41). Clypeus transverse, trapezoidal with anterior angles round. Eye canthus exceeding eyes, projecting anterolaterad, almost rectangular, lateral margins divergent posteriad, anterolateral angle round, oblique keel above eyes absent. Pleurostomal process evenly arcuate, hardly exceeding ventrolateral mandibular outline. Punctation of frons double, consisting of coarse, transversally rugose, regularly and densely distributed punctures, intermixed with fine, unevenly irregularly distributed ones; coarse punctures separated by approximately less than their diameter, punctation becoming distinctly sparser posteriad and on occiput; clypeus and eye canthus distinctly rugose.

Mandibles in maximally developed (hyperthelic) male with well developed ventral mandibular processes symmetrical, external outline almost semicircular, pointed subapically, in dorsal aspect (Figs 31, 41) with maximum width approximately at middle of mandibular length.

Ventral mandibular processes (Figs 7, 20, 41) symmetrical, distinctly longer than horizontal length of mandible; base thickened, not exceeding lateral mandibular outline in dorsal aspect, with strongly concave external outline in basal half in frontal aspect; longitudinal keel on base laterally present, in dorsal aspect straight and distinctly subparallel to lateral mandibular outline, so broad as maximum width of



Figs 37–38. *Lethrus (Lethrus) raymondi* Reitter, 1890 (Greece: Néa Filadélfia – OHCB). 37 – aedeagus in dorsal aspect; 38 – the same, but in lateral aspect. Schematically, not to scale.

mandibular outline basally; in lateral aspect very weakly arcuate, distinctly subparallel to lateral mandibular outline, divergent gradually basad approximately from middle of its length; anterior subbasal tooth absent; posterior subbasal tooth absent (lateral aspect); inferiobasal tooth present, round; both processes bent inward approximately middle of mandibular length in frontal view; anterior subapical tooth present, distinctly visible in lateral aspect, distinctly extended in frontal aspect; apical emargination deep; apical tooth sharp, strongly extended apically.

Pronotum transverse, distinctly broader than base of elytra, broadest just behind middle; margin entirely bordered, slightly crenulate in anterior parts. Anterior angles not projecting anterolaterad, with evenly arcuate outline; lateral margin approximately straight to round posterior angle; posterior margin straight. Punctuation of dorsal surface simple, consisting of deep, sparsely and irregularly distributed punctures; punctures separated by approximately two to four times their diameters discally, surface near lateral margins considerably shagreened and alutaceous.

Scutellar shield widely triangular, finely shagreened.

Elytra almost semicircular, apices not prominent, each apex forming independent arcus. Epipleuron strongly narrowed apicad, epipleural keel not reaching elytron apex. Whole surface alutaceous, finely transversally rugose; striae not indicated, entirely vanishing in rugosities.

Legs. Profemur not armed, protibia with seven to nine gradually diminishing external denticles proximad, and with row of tubercles on ventromedial edge.

Aedeagus as in Figs 37–38.

Variability in males. Mandibular processes in medium developed (Figs 8, 20, 32) and underdeveloped (hypothelic) (Figs 9, 21, 33) males short, more or less straight with only indicated teeth or without them at all, simply round to almost acute apically.

Females differ from males as follows: external outline of mandibles almost straight, only in apical quarter rounded in dorsal aspect; ventral mandibular process absent; protibia broader, row of tubercles on ventromedial edge less pronounced.

Differential diagnosis. For differential diagnosis see character matrix (Table 1).

Collecting circumstances. The material collected by the authors was taken on intensively grazed pasture on moderately steep slopes consisting of loess soil (Fig. 49).

Distribution. Macedonia: basin of the river Vardar (= Axiós) approximately between Skopje and Gevgelija; Greece: left side of the Axiós (= Vardar) river basin (Fig. 45). Precise published records available are as follows: Greece: Thessaloniki (BARAUD 1992, NEDJALKOV 1905, REITTER 1893); Macedonia: Gevgelija, Skopje, Štip, Vodno (BARAUD 1992, MIKŠIĆ 1955, 1959).

Records from the Thracian lowlands in Bulgaria – Chirpan, Khaskovo and Stara Zagora by (MIKŠIĆ 1959) or Plovdiv (ANGELOV 1965) concern almost certainly *L. schaumii* as well as records from ‘Roumélie’ (BARAUD 1992), ‘Rumélien’ (BOUCOMONT 1912, WINKLER 1929) or ‘Vostochnaya Rumeliya [in cyrillic]’ (SEMENOV-TIAN-SHANSKIJ & MEDVEDEV 1936). Records from ‘Kleinasien’, ‘Asia minor’ or ‘Malaya Aziya [in cyrillic]’ (cf. BOUCOMONT 1912; REITTER 1890, 1893; SEMENOV-TIAN-SHANSKIJ & MEDVEDEV 1936; WINKLER 1929) concern other species, probably *L. rotundicollis*.

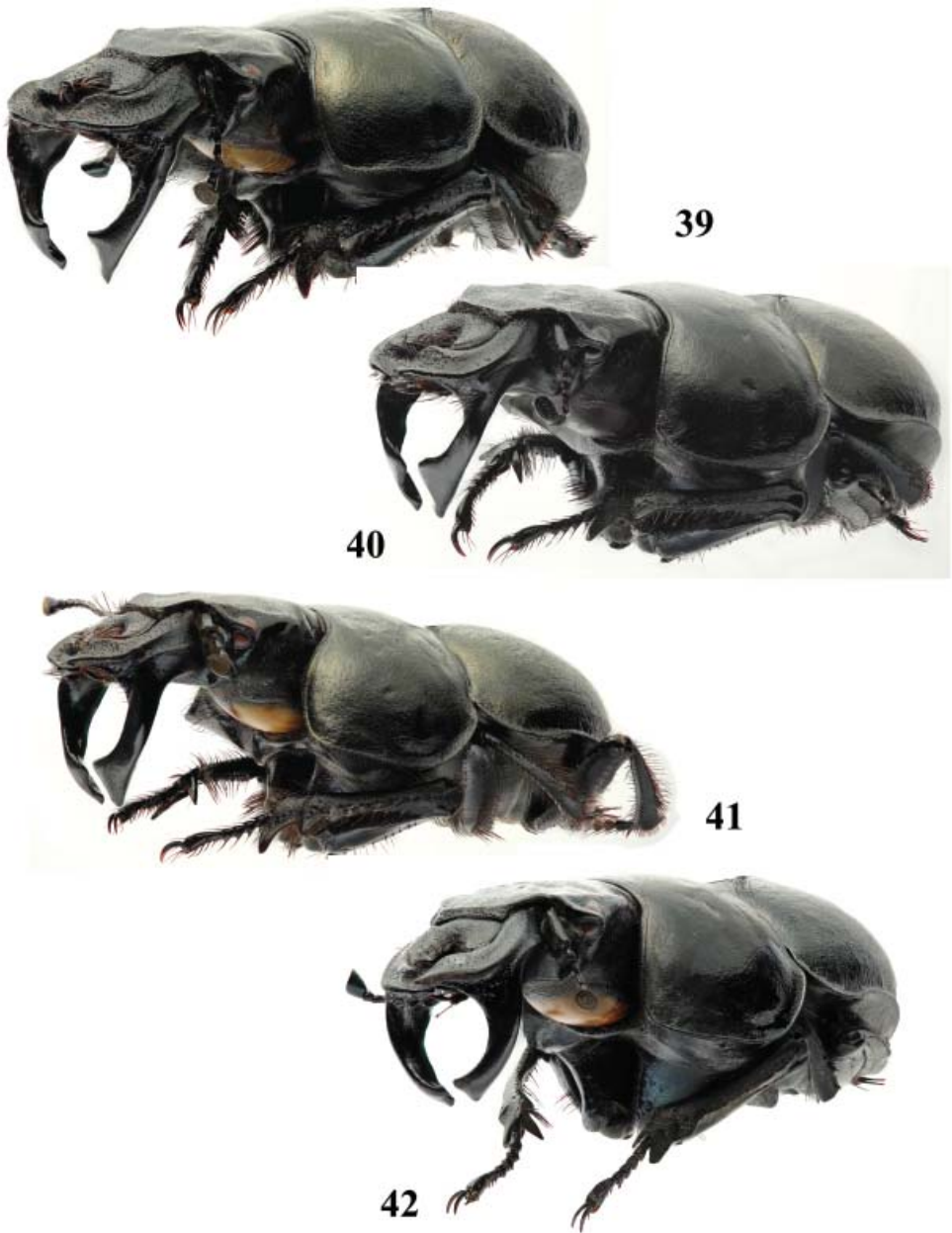
Lethrus (Lethrus) strymonensis sp. nov.

(Figs 10–12, 22–24, 34–36, 42, 46, 50)

Type locality. Greece, Sérés distr., N of Sérés (by road to Lailiás), 226 m [a. s. l.], 41°06.630'N 023°33.458'E (Fig. 50).

Type material (714 specimens). **GREECE: CENTRAL MACEDONIA PROVINCE:** HOLOTYPE (♂) and ALLOTYPE (♀) (DKCP), 'GR, Serrés distr., 15.iv.2003 / N of SERRÉS, 226m / 41°06.630N 023°33.458E / [GPS] David Král lgt. [p]'. PARATYPES: 33 ♂♂ 17 ♀♀ (DKCP), same data; 11 ♂♂ 5 ♀♀ (SJCP), same data but 'Radek Dunda lgt. [p]'; 64 ♂♂ 22 ♀♀ (JSCP), same data but 'Jan Schneider lgt. [p]'; 18 ♂♂ 3 ♀♀ (OHCB), 'Greece, (C. Macedonia) / 226m, N of Serres / N 41°06'63,0''E 023°33'45,8'' [GPS] / 15.IV.2003, lgt. O. Hillert [p]'; 1 ♂ 1 ♀ (ARCL), 1 ♂ 1 ♀ (DACB), 1 ♂ 1 ♀ (DEIC), 1 ♂ 1 ♀ (ERCS), 1 ♂ 1 ♀ (HKCS), 1 ♂ 1 ♀ (JSCB), 1 ♂ 1 ♀ (LSCN), 1 ♂ 1 ♀ (MHCM), 1 ♂ 1 ♀ (NNML), 1 ♂ 1 ♀ (SMNS), 1 ♂ 1 ♀ (SMTD), 1 ♂ 1 ♀ (USCK), 1 ♂ 1 ♀ (ZMHB), all same data; 2 ♂♂ 1 ♀ (DKCP), 'GR, Serés pr. / 5 km E of Serés / 17.5.2001, lgt. David Král [p]'; 18 ♂♂ 12 ♀♀ (JSCP), same data but 'Jan Schneider lgt. [p]'; 25 ♂♂ 37 ♀♀ (DKCP), 'Greece, Serrés prov. / 5 km E of Serrés / 10.v.2002, David Král lgt. [p]'; 3 ♂♂ 3 ♀♀ (JSCP), 4 ♂♂ 4 ♀♀ (OHCB), 3 ♂♂ 3 ♀♀ (SJCP), all same data; 12 ♂♂ 13 ♀♀ (VNCP), same data but 'V. Novák lgt. [p]'; 2 ♀♀ (TRCP), same data but 'lgt. T. Růžicka [p]'; 14 ♂♂ 21 ♀♀ (VVCK), same data same data but 'Vl. Vrabec lgt. [p]'; 6 ♂♂ 3 ♀♀ (DKCP), 'GR, Seres distr., 12.iv.2006 / N of SERÉS (road to Lailiás) / 282m, N41°07'47''E 023°32'13'' [GPS], David Král lgt. [p]'; 2 ♂♂ (RCCP), same data but 'Radek Červenka lgt. [p]'; 4 ♂♂ 1 ♀ (SJCP), same data but 'Radek Dunda lgt. [p]'; 4 ♂♂ (OHCB), same data but 'Oliver Hillert lgt. [p]'; 2 ♂♂ 2 ♀♀ (DKCP), 'GR, Seres distr., 12.iv.2006 / N of SERÉS (road to Ano Vrontou) / 226m, N41°06'63''E 023°33'46'' [GPS], David Král lgt. [p]'; 15 ♂♂ 9 ♀♀ (RCCP), same data but 'Radek Červenka lgt. [p]'; 5 ♂♂ 3 ♀♀ (SJCP), same data but 'Radek Dunda lgt. [p]'; 10 ♂♂ 5 ♀♀ (OHCB), same data but 'Oliver Hillert lgt. [p]'; 1 ♂ 1 ♀ (GNCA), 1 ♂ (NNML), 1 ♂ 1 ♀ (RPCM), 1 ♂ 1 ♀ (SZCM), 1 ♂ 1 ♀ (TBPC), 1 ♂ 1 ♀ (VMCP), all same data; 21 ♂♂ 19 ♀♀ (NMPC), 'GREECE – SERRES / ca. 3 km N SERRES / 41°07.4'N, 23°33.5'E; ca. 250 m / (field, pasture – steppe) / Jiří Hájek leg. 26.IV.2007 [p]'; 20 ♂♂ 12 ♀♀ (TRCP), same data but 'Tomáš Růžicka lgt. [p]'; 43 ♂♂ 32 ♀♀ (JSCP), same data but 'Jan Schneider lgt. [p]'; 23 ♂♂ 13 ♀♀ (RCCP), 'GR bor. MACEDONIA / SERRES distr. 26.4. 2007 / ca. 3 km N Serres (by rd. to Ano Vrontou) / 41°07.4'N, 23°33.5'E; ca. 250 m (field, pasture / - steppe) R. Červenka lgt. [p]'; 13 ♂♂ 8 ♀♀ (RCCP), 'GR bor. MACEDONIA, SERRES distr. 26.4. 2007, ca. 4 km N Serres (by rd. to Lailias, R. Červenka lgt. [p]'; 1 ♂ 1 ♀ (DKCP), 'GR, C Macedonia, Serres distr., 21.iv. / SERRES, 41°07.50'N 23°32.15'E / D. Král, D. Drožová, H. Podskalská / P. Šípek & A. Venderová lgt., 2009 [p]'; 1 ♂ 1 ♀ (DKCP), 'GR, C Macedonia, Serres distr., 21.iv. / SERRES, 41°06.61'N 23°33.45'E / D. Král, D. Drožová, H. Podskalská / P. Šípek & A. Venderová lgt., 2009 [p]'; 52 ♂♂ 50 ♀♀ (OHCB), 'GR, Seres distr. / 12.iv.2011, N of SERÉS (road to Lailiás) / O. Hillert lgt. [p]'.

Additional material examined (341 specimens). **GREECE: CENTRAL MACEDONIA PROVINCE:** 10 ♂♂ 8 ♀♀ (DKCP), NW of Neo Petritsi, 41°16.759'N 023°18.656'E, 98 m, 15.iv.2003, David Král leg.; 6 ♂♂ 4 ♀♀ (SJCP), same data but Radek Dunda leg.; 10 ♂♂ 6 ♀♀ (JSCP), same data but Jan Schneider leg.; 8 ♂♂ 7 ♀♀ (OHCB), S slope of Mt. Kerkiní, Neo Petritsi, 41°16'75.9"N 023°18'65.6"E, 98 m, 15.iv.2003, O. Hillert leg.; 12 ♂♂ 12 ♀♀ (DKCP), NW of Neo Petritsi env., 41°16'23"N 23°21'59"E, 98 m, 11.iv.2006, David Král leg.; 9 ♂♂ 11 ♀♀ (RCCP), same data but Radek Červenka leg.; 2 ♂♂ 3 ♀♀ (SJCP), same data but Radek Dunda leg.; 5 ♂♂ 1 ♀ (OHCB), same data but Oliver Hillert leg.; 8 ♂♂ 7 ♀♀ (DKCP), Kefalohóri env., 41°02'42"N 23°17'58"E, 110 m, 19.iv.2005, David Král leg.; 7 ♂♂ 5 ♀♀ (JSCP), same data but Jan Schneider leg.; 10 ♂♂ 8 ♀♀ (OHCB), same data but Oliver Hillert leg.; 2 ♂♂ 3 ♀♀ (DKCP), Néa Máditos env., 40°37'12"N 23°30'30"E, 120 m, 23.iv.2005, David Král leg.; 4 ♂♂ 4 ♀♀ (JSCP), same data but Jan Schneider leg.; 1 ♂ 1 ♀ (OHCB), same data but Oliver Hillert leg.; 10 ♂♂ 10 ♀♀ (LNCB), Mts. Kerkiní, Petrici, 41°16.959'N 023°19.441'E, 80 m, 8.iv.2007, László Náday leg.; 3 ♂♂ 3 ♀♀ (LNCB), Mts. Kerkiní, Petrici, 41°16.959'N 23°19.441'E, 80 m, 14.iv.2007, László Náday leg.; 2 ♂♂ 3 ♀♀ (NMPC), Therma env., thermal springs, 40°53.6'N, 23°33.0'E, ca. 70 m, pools near the river; steppe, 26.–27.iv.2007, Jiří Hájek leg.; 6 ♂♂ 4 ♀♀ (TRCP), same data but Tomáš Růžicka leg.; 7 ♂♂ 2 ♀♀ (JSCP), same data but Jan Schneider leg.; 1 ♂ 3 ♀♀ (VRCH), Petrici, 41°18'47"N, 23°20'16"E, 27.–29.v.2008, Vladislav Řebíček leg.; 9 ♂♂ 7 ♀♀ (VRCH), Petrici, 41°18'47"N 23°20'16"E, 28.–29.iv.2009, Vladislav Řebíček leg.; 7 ♂♂ 4 ♀♀ (JRCO), same data but Jaroslav Ryšánek leg.; 4 ♂♂ 2 ♀♀ (MTCK), same data but Miloslav Turčín leg.; 2 ♂♂ 2 ♀♀ (RECJ), same data but Richard Erben leg.; 13 spec. (IBCF), Gazoros env., 41°01'54"N 23°46'32"E, ca. 110 m, 4.v.2009, Ivo Boščík leg.; 9 spec. (LBCB), same data but Lukáš Bureš leg.; 5 ♂♂ 1 ♀ (PPCB), 2 ♂♂ (DKCP), same data but Pavel Průdek



Figs 39–42. Habitus in frontolateral aspect. 39 – *Lethrus (Lethrus) halkidikiensis* sp. nov. (holotype), 40 – *L. (L.) perun* sp. nov. (holotype), 41 – *L. (L.) raymondi* Reitter, 1890 (Greece: Néa Filadélfia – OHCB, body length: 28 mm), 42 – *L. (L.) strymonensis* sp. nov. (holotype).

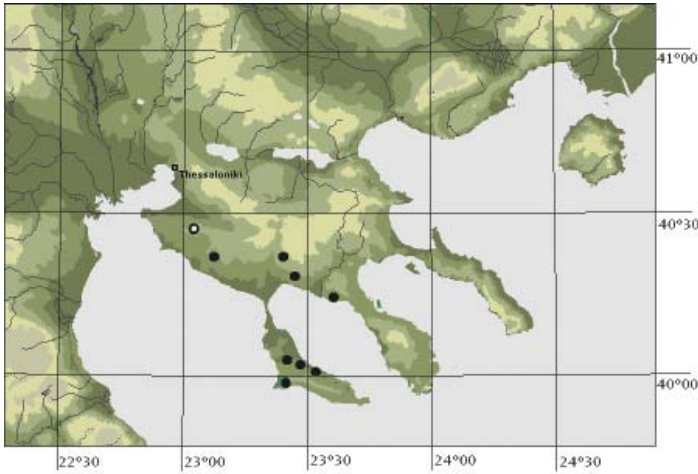


Fig. 43. Sketch map of the Khalkidiki Peninsula (Greece) with marked distribution of *Lethrus (L.) halkidikiensis* sp. nov., empty dot represents the type locality.

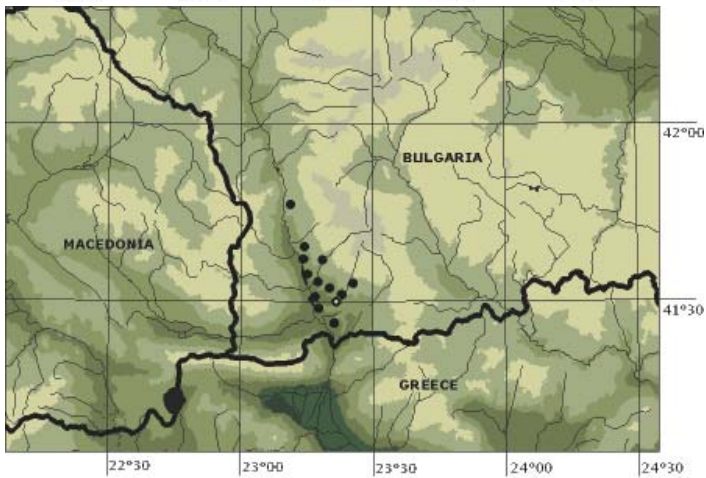


Fig. 44 Sketch map of the Struma river basin (Bulgaria) with marked distribution of *Lethrus (L.) perun* sp. nov., empty dot represents the type locality.

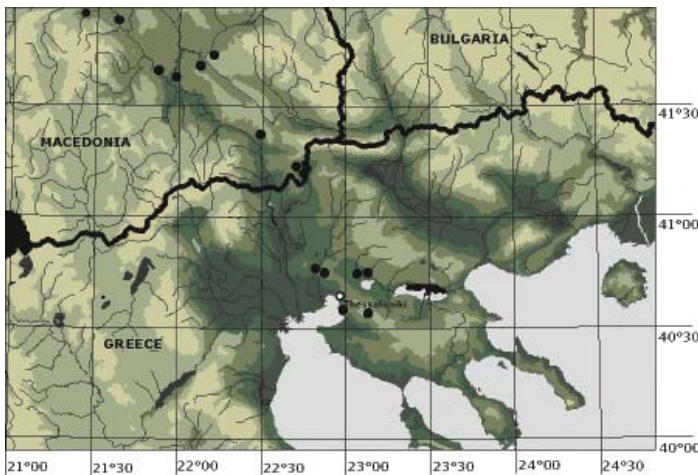


Fig. 45. Sketch map of the Vardar / Axiós river basin (Macedonia, Greece) with marked distribution of *Lethrus (L.) raymondi* Reitter, 1890 empty dot represents the type locality.

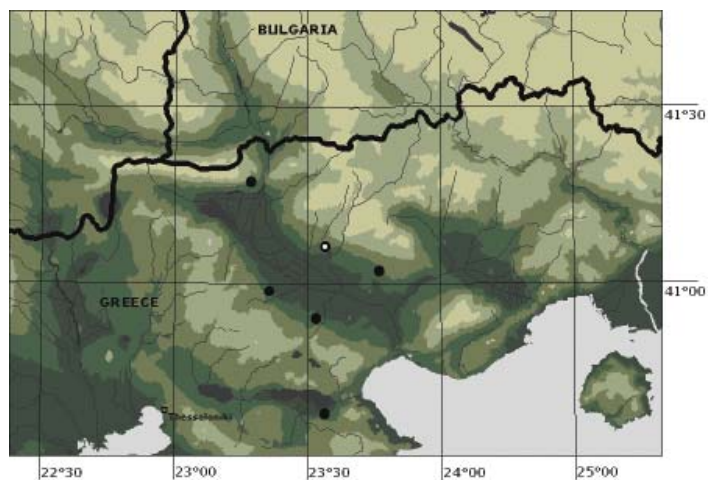


Fig. 46. Sketch map of the Strymonas river basin (Greece) with marked distribution of *Lethrus (L.) strymonensis* sp. nov., empty dot represents the type locality.



Fig. 47. Type locality of *Lethrus (L.) halkidikiensis* sp. nov. (Greece: Tagarades, April 2003; photo David Král).



Fig. 48. Type locality of *Lethrus (L.) perun* sp. nov. (Bulgaria: Khotovo, April 2006; photo David Král).



Fig. 49. Collecting habitat of *Lethrus* (*L.*) *raymondi* Reitter, 1890 (Greece: Néa Filadélfia, April 2006; photo David Král).



Fig. 50. Type locality of *Lethrus* (*L.*) *strymonensis* sp. nov. (Greece: Séres, April 2003; photo David Král).

leg.; 14 spec. (PVCP), same data but Petr Včelička leg.; 25 ♂♂ 7 ♀♀ (OHCb), S slope of Mt. Kerkini, Neo Petritsi, 12.iv.2011, O. Hillert leg.

Description of holotype. Maximally developed (hyperthelic) male with well developed ventral mandibular processes. Total body length 28 mm. Oblong, strongly convex; dorsal surface black, except moderately shiny pronotum almost alutaceous; ventral surface black with fine blue tinge, moderately shiny, claws black-brown; setation black.

Head (Figs 10, 22, 34, 42). Labrum bilobed, asymmetrical, right lobe remarkably more developed; surface rugosely and coarsely, shallowly and sparsely punctate, each puncture bearing short recumbent macroseta; anterior margin with dense row of long macrosetae. Clypeus transverse, trapezoidal with anterior angles round. Frontal impressions vague, frontal tubercles indistinct. Frontoclypeal suture present only laterally; keels separating eye canthus from frons only slightly developed but distinct, slightly divergent posteriad. Eye

canthus exceeding eyes, projecting anterolaterad, almost rectangular, lateral margins divergent posteriad, anterolateral angle round, oblique keel above eyes absent. Pleurostomal process evenly arcuate, hardly exceeding ventrolateral mandibular outline. Punctuation of frons double, consisting of coarse, transversally rugose and densely distributed punctures, intermixed with fine, irregularly distributed ones; coarse punctures separated by approximately less than their diameter, punctuation becoming distinctly sparser posteriad and on occiput; clypeus and eye canthus distinctly rugose.

Mandibles symmetrical, external outline pointed subapically, in dorsal aspect obogival (Figs 34, 42), maximum width at anterior third of mandibular length.

Ventral mandibular processes (Figs 10, 22, 42) symmetrical, distinctly longer than length of mandible; base thickened, not exceeding lateral mandibular outline in dorsal aspect, with approximately straight external outline in basal third in frontal aspect; longitudinal keel on base laterally present, in dorsal aspect straight and approximately parallel to lateral mandibular outline, not as broad as maximum width of mandibular outline basally; in lateral aspect very weakly arcuate, approximately parallel to lateral mandibular outline; anterior subbasal tooth absent; posterior subbasal tooth absent (lateral aspect); inferiobasal tooth absent; both processes bent inward approximately in basal third of mandibular length in frontal view; anterior subapical tooth present, visible in lateral aspect, distinctly extended in frontal aspect; apical emargination present; apical tooth simply round, not extended apically.

Pronotum transverse, distinctly broader than base of elytra, broadest just behind middle; margin entirely bordered, slightly crenulate in anterior parts. Anterior angles not projecting anterolaterad, with evenly arcuate outline; lateral margin approximately straight to round posterior angle; posterior margin straight. Punctuation of dorsal surface simple, consisting of deep, sparsely and irregularly distributed punctures; punctures separated by approximately two to four their diameters discally, surface near lateral margins considerably shagreened and alutaceous.

Scutellar shield widely triangular, finely shagreened.

Elytra almost semicircular, apices not prominent, each apex forming independent arcus. Epipleuron strongly narrowed apicad, epipleural keel not reaching elytron apex. Whole surface alutaceous, finely transversally rugose; striae not indicated, entirely vanishing in rugosities.

Legs. Profemur not armed, protibia with nine gradually diminishing external denticles proximad, and with row of tubercles on ventromedial edge.

Aedeagus of typical shape of species closely related to *L. raymondi* (see Figs 37–38).

Variability in males. Body length 20–28 mm. Mandibular processes in medium developed (Figs 11, 23, 35) and underdeveloped (hypothelic) males (Figs 12, 24, 36) short, more or less straight with only indicated teeth or entirely without them, simply round to almost acute apically.

Females (body length 19–28 mm, allotype 28 mm) differ from males as follows: external outline of mandibles almost straight, in apical quarter round in dorsal aspect; ventral mandibular process absent; protibia broader, row of tubercles on ventromedial edge less pronounced.

Differential diagnosis. For differential diagnosis see the character matrix (Table 1).

Etymology. Derived from the area of origin for the new species, the Strymónas (Στρυμόνας) river.

Collecting circumstances. The type series was collected on an uncultivated field and adjacent partially abandoned vineyard and surrounding sparse pine forest with shrubs. The substrate consisted of a relatively deep layer of loess soil (Fig. 50).

Distribution. Greece: the Strymónas river basin south of the defile between the Kerkíni and the Orvilos mountain ranges (Fig. 46).

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Appendix: Gazetteer

| Locality | Coordinates | Altitude (ca. m a.s.l.) |
|------------------------------------|-----------------|----------------------------|
| Bulgaria | | |
| Chotovo, see Khotovo | | |
| Demjanica, see Damyanitsa | | |
| Damyanitsa, Дамяница | 41°26'N 23°23'E | 100 |
| Dolno Spančevo see Dolno Spanchevo | | |
| Dolno Spanchevo, Долно Спанчево | 41°25'N 23°23'E | 170 |
| Ilindenci, see Ilindentsi | | |
| Ilindentsi, Илindenци | 41°39'N 23°15'E | 350 |
| Khotovo, Хотово | 41°30'N 23°20'E | 190 |
| Kresna, Кресна | 41°46'N 23°10'E | 170 |
| Kalimantsi, Калиманци | 41°28'N 23°28'E | 300 |
| Katuntsi, Катунци | 41°26'N 23°26'E | 170 |
| Leshnitsa, Лешница | 41°32'N 23°17'E | 180 |
| Levunovo, Левуново | 41°29'N 23°17'E | 140 |
| Liljanovo, see Lilyanovo | | |
| Lilyanovo, Лилянново | 41°37'N 23°20'E | 550 |
| Lozenica, see Lozenitsa | | |
| Lozenitsa, Лозеница | 41°30'N 23°22'E | 350 |
| Melnik, Мелник | 41°31'N 23°22'E | 400 |
| Sandanski, Сандански | 41°33'N 23°17'E | 220 |
| Sklave, Склаве | 41°31'N 23°19'E | 200 |
| Strumjani, see Strumyani | | |
| Strumyani, Струмяни | 41°38'N 23°12'E | 150 |
| Greece | | |
| Anthófito, Ανθόφυτο | 40°51'N 22°43'E | 40 |
| Gázoros, Γάζωρος | 41°02'N 23°46'E | 115 |
| Gerakini, Γερακινή | 40°17'N 23°26'E | 15 |

(continues on the next page)

| Locality | Coordinates | Altitude (ca. m a.s.l.) |
|--|-----------------|----------------------------|
| Griorigi, see Kriorigi | | |
| Hortiátis, Χορτιάτης [mts] | 40°34'N 23°07'E | 500 |
| Kalamariá, Καλαμαριά | 40°35'N 22°57'E | 40 |
| Kalándra, Καλάνδρα | 39°58'N 23°24'E | 70 |
| Kassándria, Κασσάνδρεια | 40°03'N 23°25'E | 50 |
| Kassándria, Κασσάνδρεια env. | 40°02'N 23°26'E | 90 |
| Kassandra, Κασσάνδρα [peninsula] mer. | | |
| Kefalohóri, Κεφαλοχώρι | 41°03'N 23°28'E | 550 |
| Keretschkoï [*]; see Thessaloniki] | | |
| Kolhikó, Κολχικό | 40°44'N 23°08'E | 135 |
| Kolchikon, see Kolhikó | | |
| Kortatsch, see Hortiátis | | |
| Kriorigi, Κρυοπηγή | 40°03'N 23°28'E | 110 |
| Langadás, Λανκαδάς | 40°45'N 23°04'E | 100 |
| Metamórfosi, Μεταμόρφωση | 40°14'N 23°36'E | 20 |
| Mont Prophéte Élie | not located | |
| Néa Filadélfia, Νέα Φιλαδέλφεια | 40°47'N 22°50'E | 80 |
| Néa Máditos, Νέα Μάδυτος | 40°37'N 23°31'E | 80 |
| Néa Goniá / Néa Silata, Νέα Γονιά / Νέα Σιλατα | 40°21'N 23°07'E | 90 |
| Petrici, see Néο Petrítsi | | |
| Néο Petrítsi, Νέο Πετρίτσι | | |
| Petrotó, Πετρωτό | 40°49'N 22°52'E | 80 |
| Polígiros, Πολύγυρος | 40°23'N 23°26'E | 630 |
| Políhrono, Πολίχρονο | 40°00'N 23°31'E | 20 |
| Polychronon, see Políhrono | | |
| Salonick, see Thessaloniki | | |
| Salonicki, see Thessaloniki | | |
| Salonik, see Thessaloniki | | |
| Saloniki, see Thessaloniki | | |
| Salonique, see Thessaloniki | | |
| Saripazar, see Anthófito | | |
| Séres, Σέρρες (road to Lailiás, Λαϊλιάς) | 41°07'N 23°32'E | 230 |
| Séres (road to Vrontoú, Βροντού) | 41°06'N 23°33'E | 230 |
| Serrés, see Séres (road to Vrontoú) | | |
| Solun, see Thessaloniki | | |
| Tagarades, Ταγαράδες | 40°28'N 23°00'E | 70 |
| Thermá, Θερμιά | 40°54'N 23°33'E | 70 |
| Thessaloníki, Θεσσαλονίκη | 40°38'N 22°57'E | 50 |
| Thessalonique, see Thessaloníki | | |
| Macedonia | | |
| Doiran, see Dojran | | |
| Dojran, Дојран | 41°13'N 22°42'E | 170 |
| Gevgelija, Γεβγελίγια | 41°08'N 22°30'E | 60 |

(continues on the next page)

| Locality | Coordinates | Altitude (ca. m a.s.l.) |
|------------------------------------|-----------------|----------------------------|
| Kalučkovо, Калучково | 41°22'N 22°23'E | 330 |
| Nogaevci / Ubogo, Ногаевци / Убого | 41°38'N 21°54'E | 180 |
| Penuš, Пенуш | 41°42'N 22°06'E | 260 |
| Plavuša pl[anina]. [mts] | 41°23'N 22°30'E | 550 |
| Skorje, Скопје | 42°00'N 21°26'E | 260 |
| Skoplje, see Skorje | | |
| Štip, Штип | 41°45'N 22°12'E | 330 |
| Veles, Велес | 41°43'N 21°47'E | 180 |
| Vodno, Водно | 41°58'N 21°24'E | 600 |
| Vodno – Neresi, see Vodno | | |
| Wodno, see Vodno | | |
| Uskub, see Skorje | | |
| Usküb, see Skorje | | |
| Üsküb, see Skorje | | |

*) According to ЯСОВИ (1902) Keretschkoi means 'Kalkdorf [= lime village]' situated near Thessaloniki.