

***Lethrus (Lethrus) ares* sp. n. (Coleoptera: Geotrupidae) from Greece**

***Lethrus (Lethrus) ares* sp. n. (Coleoptera: Geotrupidae) z Řecka**

David KRÁL¹⁾, Jiří REJSEK²⁾ & Jan SCHNEIDER³⁾

¹⁾Department of Zoology, Charles University, Viničná 7, CZ-128 44 Praha 2, Czech Republic; e-mail: kraldavid@centrum.cz

²⁾Polabské muzeum, Palackého 68, CZ-290 55 Poděbrady, Czech Republic; e-mail: rejsek@pmpodebrady.cz

³⁾Lípová 15, CZ-128 00 Praha 2, Czech Republic

Taxonomy, new species, Coleoptera, Scarabaeoidea, Geotrupidae, Lethrinae, *Lethrus*, Palaearctic region

Abstract. *Lethrus (Lethrus) ares* sp. n. from the Greek Thrace (Evros district) is described. The new species belongs to the species of the nominotypical subgenus having anterior pronotal angles evenly arcuate (not projecting considerably anteriorly) and lacking subbasal tooth of ventral mandible process in males. It is compared with closely related species *L. (L.) raymondi* Reitter, 1890 and *L. (L.) rotundicollis* Fairmaire, 1866. Relevant diagnostic characters (ventral mandible process in male), and external male genitalia of the new species are illustrated. The distribution of the new species is mapped.

INTRODUCTION

Over one hundred species of the geotrupid genus *Lethrus* Scopoli, 1777 have been described so far (Král & Olexa 1996; Nikolajev 1987, 1998; Semenov-Tian-Shanskij & Medvedev 1936). The highest species diversity (over 80 species) is known from Middle Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan); only a restricted number of species penetrates to Mongolia, north-eastern China, Afghanistan, Iran, Turkey, the Balkan peninsula, the Ukraine and central Europe (Baraud 1992, Nikolajev 1975, Reitter 1890, 1893, Semenov-Tian-Shanskij & Medvedev 1936). So far, eight species were known from the Balkan peninsula and the adjacent part of western Turkey, all classified in the nominotypical subgenus according to Nikolajev (1987). Their distribution areas are hitherto relatively very poorly known. Even recent literature (cf. Baraud 1992) repeats only old and imprecise data (sometimes only type localities) for most of these species.

Entomological investigations made by the authors in Greece during the spring of 2001 revealed a series of specimens of an undescribed species that also belongs to the nominotypical subgenus. In the present paper, this new species is described.

MATERIAL AND METHODS

The following codes (after Arnett et al. 1993) identify the collections housing the material examined:

DKCP – Czech Republic, Praha, Charles University, David Král collection;

JRCP – Czech Republic, Poděbrady, Jiří Rejsek collection;

JSCP – Czech Republic, Praha, Jan Schneider collection;

OHCb – Germany, Berlin, Oliver Hillert collection;

SMNS – Germany, Stuttgart, Staatliches Museum für Naturkunde (Wolfgang Schawaller).

Specimens of the presently described species are provided with one red printed label: "Lethrus (*Lethrus*) ares sp. n. HOLOTYPE, ALLOTYPUS or PARATYPUS [with No. and sex symbol for male or female] David Král, Jiří Rejsek & Jan Schneider det. 2001". Exact label data are cited for all specimens; individual labels are indicated by double slash (/). Remarks of the authors and comments are found in square brackets; [p] – data preceding this mark are printed; [h] – data preceding this mark are handwritten.

Genitalia of five males of the new species were dissected for examination.

TAXONOMIC PART

Lethrus (Lethrus) ares sp. n.

(Figs 1, 4, 7, 10, 11)

Type material. Holotype (male), allotype (female) and paratypes Nos 1-3 (males) and 4-7 (females), labelled: GR [= Greece], Evros dist., Polía [41°27'N 26°14'E], 13.5.2001, David Král lgt. [p]; paratypes No. 8 (male) and 9-11 (females): the same but Jiří Rejsek lgt.; paratypes Nos 12, 13 (males) and 14-19 (females): the same but Jan Schneider lgt.; paratypes Nos 20-25 (males) and 26-34 (females): GR, Evros dist., Ládi [41°27'N 26°15'E], 14.5.2001, David Král lgt., [p]; paratypes Nos 35-38 (males) and 39-44 (females): the same but Jiří Rejsek lgt.; paratypes Nos 45-51 (males) and 52-71 (females): the same but Jan Schneider lgt.; and paratypes Nos 72, 73 (males): GR [Greece]: Thrakien, Nom. [= nomus = district] Evros, 10 km S Kyprinos [41°35'N 26°13'E] (22 km W Orestias) 25.4.1990 U. Bense leg. [p] // *Lethrus rotundicollis* F. [h] det. Hozman 1991 [p].

Holotype, allotype and paratypes Nos 1-7, 20-24 and 27-34 in DKCP; Nos 8-11 and 35-44 in JSCP; Nos 12-19 and 45-71 in JSCP; Nos 25 and 26 in OHCB; Nos 72 and 73 in SMNS.

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

Head (Figs 1, 4, 7). Labrum bilobed, asymmetrical, right lobe remarkably more developed; surface rugosely and coarsely, shallowly and sparsely punctate, each puncture bearing short recumbent seta; anterior margin with row of long, densely spaced setae. Clypeus transverse, trapezoidal with anterior angles rounded. 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 rounded, oblique keel above eyes absent. Pleurostomal process evenly arcuate, hardly exceeding ventrolateral mandible outline. Punctuation of clypeal and frontal surface 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; eye canthus distinctly rugose.

Mandibles symmetrical, external outline almost semicircular in dorsal aspect (Fig. 1). Ventral processes (Figs 4, 7) symmetrical, a slightly longer than length of mandible; base not thickened, not exceeding lateral mandible outline in dorsal aspect; longitudinal keel on base laterally present, subparallel to lateral mandible outline distally; posterobasal tooth absent; not broadened distad, anterior subapical tooth absent, apex arcuate apically and subapically in lateral aspect; subapical tooth absent, apical emargination vague to absent in frontal aspect.

Pronotum transverse, distinctly broader than base of elytra, broadest just behind middle; margin entirely bordered, not crenulate. Anterior angles not projecting anterolaterad, with evenly arcuate outline; lateral margin broadly arcuate to rounded 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.

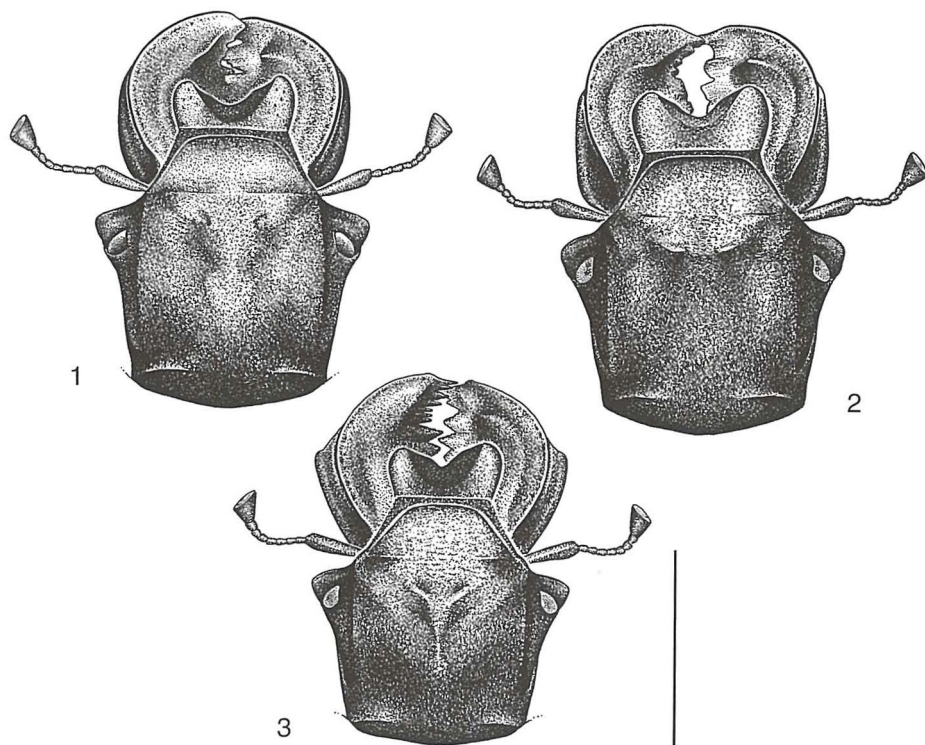
Scutellum widely triangular, finely chagrined.

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 almost not indicated, vanishing in rugosities.

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

Aedeagus of typical shape of nominotypical subgenus (Fig. 10).

Variability in males. Body length 21-29 mm. Mandible processes in small (weakly developed) males (e.g., paratypes Nos 3, 24, 25) short, more or less straight and simply rounded to almost acute apically.

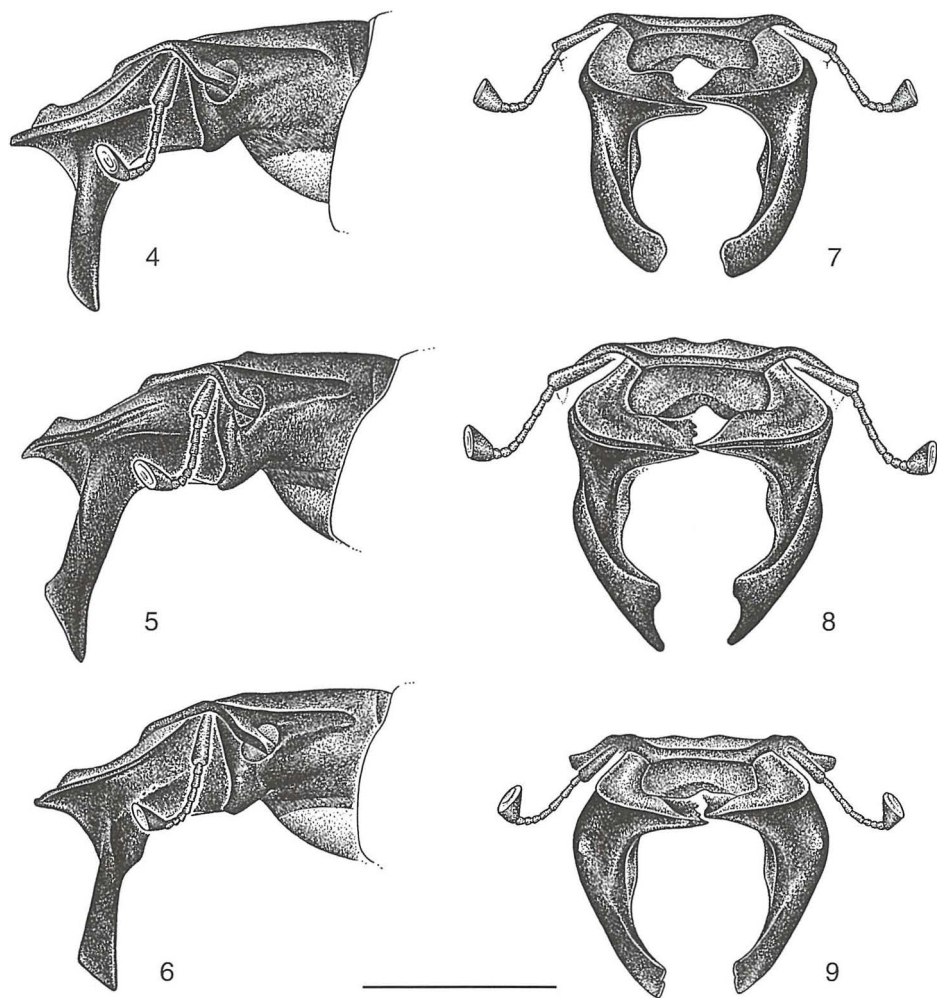


Figs 1-3. Head, dorsal aspect. 1 – *Lethrus (Lethrus) ares* sp. n. (holotype), 2 – *L. (L.) raymondi* Reitter (Greece: Thessaloniki – DKCP), 3 – *L. (L.) rotundicollis* Fairmaire (Turkey: Dikili – DKCP) (scale – 4.0 mm).

Obr. 1-3. Hlava, dorzální pohled. 1 – *Lethrus (Lethrus) ares* sp. n. (holotypus), 2 – *L. (L.) raymondi* Reitter (Řecko: Soluň – DKCP), 3 – *L. (L.) rotundicollis* Fairmaire (Turecko: Dikili – DKCP) (měřítko – 4,0 mm).

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

Differential diagnosis. Among the representatives of the nominotypical subgenus distributed in the Balkan peninsula and Turkey, only *Lethrus (Lethrus) ares* sp. n., *L. (L.) raymondi* Reitter, 1890 and *L. (L.) rotundicollis* Fairmaire, 1866 possess evenly arcuate (not projecting considerably anteriad) anterior pronotal angles and lack the anterior subbasal tooth of ventral mandible



Figs 4-9. Head, left lateral aspect (4-6), frontal aspect (7-9). 4, 7 - *Lethrus (Lethrus) ares* sp. n. (holotype), 5, 8 - *L. (L.) raymondi* Reitter (Greece: Thessaloniki - DKCP), 6, 9 - *L. (L.) rotundicollis* Fairmaire (Turkey: Dikili - DKCP) (scale - 4.0 mm).

Obr. 4-9. Hlava, levý laterální pohled (4-6), frontální pohled (7-9). 4, 7 - *Lethrus (Lethrus) ares* sp. n. (holotypus), 5, 8 - *L. (L.) raymondi* Reitter (Řecko: Soluň - DKCP), 6, 9 - *L. (L.) rotundicollis* Fairmaire (Turecko: Dikili - DKCP) (měřítko - 4,0 mm).

process in male. A detailed study of ventral mandible processes revealed several diagnostic morphological characters clearly separating the three species. The comparison is presented below (useful for large males with well-developed ventral mandible processes only).

Species character	<i>L. (L.) ares</i> sp. n.	<i>L. (L.) raymondi</i>	<i>L. (L.) rotundicollis</i>
ventral mandible process in dorsal aspect	base of ventral mandible process not thickened, not exceeding lateral mandible outline (Fig. 1)	base of ventral mandible process not thickened, not exceeding lateral mandible outline (Fig. 2)	base of ventral mandible process remarkably thickened, distinctly exceeding lateral mandible outline (Fig. 3)
lateral longitudinal keel on base of ventral mandible process	present, subparallel to lateral mandible outline distally (Fig. 4)	present, parallel to lateral mandible outline distally (Fig. 5)	absent (Fig. 6)
posterobasal tooth of ventral mandible process	absent (Fig. 4)	absent (Fig. 5)	present (Fig. 6)
shape of ventral mandible process in lateral view	not broadened distad, anterior subapical tooth absent; apex arcuate apically and subapically (Fig. 4)	broadened distad in anterior subapical tooth, apex acute (Fig. 5)	slightly broadened distad, anterior subapical tooth absent, apex acute (Fig. 6)
shape of ventral mandible process in frontal view	subapical tooth absent, apical emargination vague to absent (Fig. 7)	subapical tooth distinct, apical emargination remarkably deep (Fig. 8)	subapical tooth absent, apical emargination vague to absent (Fig. 9)

The three closely related species seem to have allopatric distribution areas. *Lethrus* (*L.*) *raymondi* was described from Thessaloniki and it is so far known only from the region of the Axiós (= Vardar) river in Greece and Macedonia (Baraud 1992; Mikšić 1958, 1959, 1970; Reitter 1890, 1893). The type series of the new species originates from the Greek part of the Thracian lowlands (basin of the Evros (= Maritsa) river) (Fig. 11). Finally *Lethrus* (*L.*) *rotundicollis* was described from "Smyrne" [= nowadays Izmir] (Fairmaire 1866) and probably occurs only in the Izmir province in the western Turkey (D. Král, unpublished data); its records from Greece and Syria

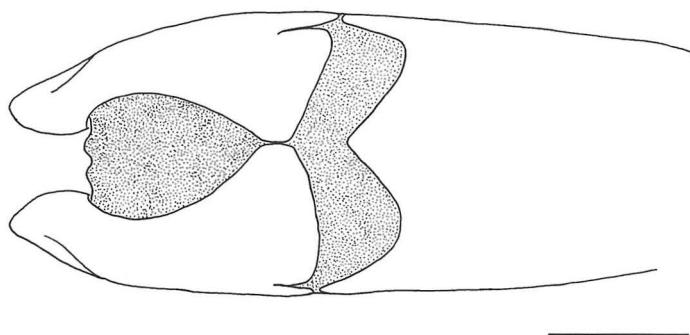


Fig. 10. *Lethrus* (*Lethrus*) *ares* sp. n. – aedeagus of holotype in dorsal aspect (scale – 1.0 mm).
Obr. 10. *Lethrus* (*Lethrus*) *ares* sp. n. – aedeagus holotypu, dorzální pohled (měřítko – 1,0 mm).

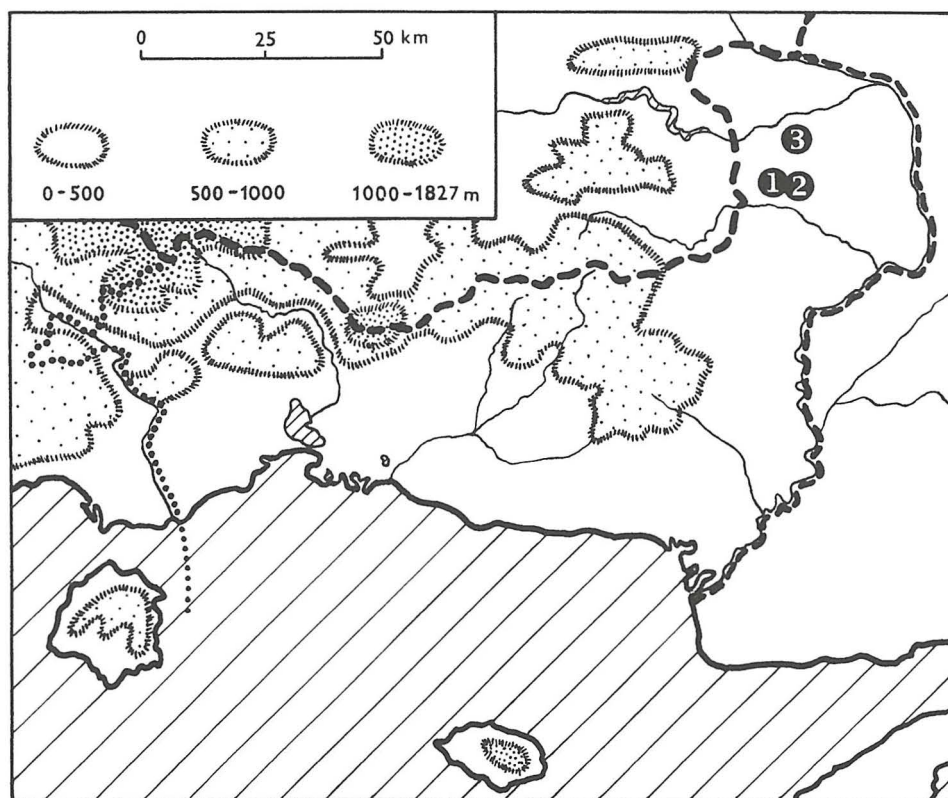


Fig. 11. Sketch map of the Greek province of Thráki with marked distribution of *Lethrus (Lethrus) ares* sp. n., 1 – Polía (type locality), 2 – Ládi, 3 – Kyprinos.

Obr. 11. Mapa řecké provincie Thráki s vyznačeným rozšířením druhu *Lethrus (Lethrus) ares* sp. n., 1 – Polía (typová lokalita), 2 – Ládi, 3 – Kyprinos.

(cf. Baraud 1992; Reitter 1890, 1893; Semenov-Tian-Shanskij & Medvedev 1936) are almost improbable from the zoogeographical point of view and those from Greece may concern *L. (L.) ares* sp. n.

Collection circumstances. All specimens of *L. (L.) ares* sp. n. coming from the localities Polía and Ládi were found on gradual, south-oriented, loess slopes above the left bank of the river Eridropótamos, where they seemed to prefer uncultivated field margins and balks between them; they were rarely found in sparse wood-steppe biotopes as well, mostly in places with very sparse herbaceous layer.

Distribution. Greece: Thráki [= Thracia] province (Fig. 11).

Name derivation. Ares is the name of the Greek god of war who came from Thracia; noun in apposition.

ACKNOWLEDGEMENTS. Thanks are due to the following persons: Oliver Hillert and Wolfgang Schawaller enabled us to study material in SMNS, Zuzana Čadová (scientific illustrator, Charles University, Praha) executed all drawings except Figs 10

and 11, Vladimír Vohralík (Charles University, Praha) helped with artwork of the map, Jan Růžička (Czech Agricultural University, Praha) and Jitka Vilímová (Charles University, Praha) very kindly read and commented the manuscript. The study was supported in part by grants from the Charles University Grant Agency (GAUK 262/1999) and the Ministry of Education (MŠMT ČR J13/98113100004).

REFERENCES

- ARNETT H. R. Jr., SAMUELSON G. A. & NISHIDA G. M. 1993: *The insect and spider collections of the world. Flora and Fauna Handbook No. 11, Second Edition*. Sandhill Crane Press, Gainesville, 308 pp.
- BARAUD J. 1992: *Coléoptères Scarabaeoidea d'Europe. Faune de France, France et régions limitrophes* 78. Féd. Fr. Soc. Sci. Natur. & Soc. Linn. Lyon, Paris & Lyon, 856 pp.
- FAIRMAIRE L. 1866: Notice sur les Coléoptères récoltés par M. J. Lederer sur le Bosz-Dagh (Asie Mineure). *Ann. Soc. Entomol. Fr.*, 1866: 249-280.
- KRÁL D. & OLEXA A. 1996: New and otherwise noteworthy Lethrus species from Central Asia and Afghanistan (Coleoptera: Geotrupidae). *Folia Heyrovskyana*, 4: 49-65.
- MIKŠIĆ R. 1958: *Scarabaeidae Jugoslavije [Scarabaeidae of Yugoslavia]*. Grada, Knjiga 6, Odjeljenje privredno-tehničkih nauka, Knjiga 2. Naučno društvo NR Bosne i Hercegovine, Sarajevo, 150 pp (in Serbian).
- MIKŠIĆ R. 1959: Dritter Nachtrag zur "Fauna Insectorum Balcanica - Scarabaeidae". *Godišnjak Biol. Inst. Univ. Sarajevu*, 12: 47-136.
- MIKŠIĆ R. 1970: *Katalog der Lamellicornia Jugoslawiens*. Institut za šumarstvo, Sarajevo, 71 pp.
- NIKOLAJEV G. V. 1975: Neue und wenig bekannte Scarabaeidae-Arten aus dem palaearktischen Faunengebiet (Coleoptera). *Ann. Hist.-Natur. Mus. Nat. Hung.*, 67: 147-179.
- NIKOLAJEV G. V. 1987: *Plastinchatusye zhuki (Coleoptera: Scarabaeoidea) Kazakhstana i Srednei Azii [Scarabaeoidea (Coleoptera) of Kazakhstan and Middle Asia]*. Izd. Nauka KazSSR, Alma-Ata, 232 pp (in Russian).
- NIKOLAJEV G. V. 1998: [New and poorly known insects species of Central Asia (Insecta: Mantoptera, Raphidioptera, Neuroptera, Coleoptera, Mecoptera)]. *Vestnik Kazakh. Gos. Univ., Ser. Biol.*, 5: 38-46 (in Russian).
- REITTER E. 1890: Analytische Uebersicht der bekannten Lethrus – Arten. *Deutsche Entomol. Zeitschr.*, 1890: 289-295.
- REITTER E. 1893: Bestimmungs-Tabelle der Lucaniden und coprophagen Lamellicornen des palaearctischen Faunengebietes (Fortsetzung aus dem XXX. Bande der Verhandlungen des naturf. Vereines in Brünn). *Verhandl. Naturforsch. Ver. Brünn*, 30(1892): 3-109.
- SEMENOV-TIAN-SHANSKIY A. & MEDVEDEV S. 1936: *Opređelitel zhukov-kravchikov (triba Lethrini sem. Scarabaeidae). (Synopsis des genres et espèces de la tribu Lethrini (fam. Scarabaeidae)). Opređeliteli po faune SSSR, izdavaemiye zoologicheskim institutom akedemiye nauk* 18 [Keys to identification of the USSR fauna, published by the Institute of Zoology 18]. Izdatelstvo ANSSR, Moskva-Leningrad, 104 pp (in Russian, French title).

SOUHRN

V současné době známe přes sto druhů chrobáků rodu *Lethrus* Scopoli, 1777 (Král & Olexa 1996; Nikolajev 1987, 1998; Semenov-Tian-Shanskij & Medvedev 1936). Nejvyšší druhovou diverzitu (přes 80 druhů) nacházíme v oblasti střední Asie (Kazachstán, Kyrgyzstán, Tádžikistán, Turkmenistán a Uzbekistán), omezený počet druhů proniká do Mongolska, severozápadní Číny, Afghánistánu, Íránu, Turecka, na Balkánský poloostrov a přes Ukrajinu do střední Evropy (Baraud 1992, Nikolajev 1975, Reitter 1890, 1893, Semenov-Tian-Shanskij & Medvedev 1936). Z Balkánského poloostrova a přilehlé části západního Turecka bylo dosud známo osm druhů, které jsou všechny klasifikovány podle Nikolajeva (1987) do nominotypického podrodu. Jejich areály rozšíření jsou zatím relativně velmi málo známy. I recentní literatura (cf. Baraud 1992) se u většiny druhů omezuje na opakování starších, nekonkrétních údajů, někdy dokonce jen typových lokalit.

Během entomologické exkurze do Řecka na jaře roku 2001 se autorům podařilo objevit sérii kusů dalšího, dosud neznámého druhu. Patří též k nominotypickému podrodu a jeho popis je uveden v této práci.

Mezi druhy nominotypického podrodu rodu *Lethrus*, které jsou rozšířeny na Balkánském poloostrově a v Turecku, pouze druhy *Lethrus (Lethrus) ares* sp. n., *L. (L.) raymondi* a *L. (L.) rotundicollis* jsou charakteristické pravidelně zaokrouhlenými (směrem dopředu neprotáženými) předními rohy štítu a absencí předního subbazálního zubu ventrálních výběžků kusadel samce. Na základě detailní studie ventrálních výběžků kusadel samců byly stanoveny diagnostické morfologické znaky, které jasně odlišují tyto tři druhy od sebe (viz tabulka v diferenciální diagnóze a obr. 1-9; platí pouze pro velké samce se zřetelně vyvinutými ventrálními výběžky kusadel).

Tyto tři velmi příbuzné druhy vykazují na základě současných znalostí navíc striktně alopatrické areály rozšíření. *Lethrus (L.) raymondi* Reitter, 1890 byl popsán ze Soluně a je dosud znám z oblasti kolem řeky Vardar z Řecka a Makedonie (Baraud 1992; Mikšić 1958, 1959, 1970; Reitter 1890, 1893). Typová série nového druhu pochází z řecké části Trácké nížiny (řeka Marica) (obr. 11). Druh *L. (L.) rotundicollis* byl popsán z lokality „Smyrne“ [dnes Izmir] (Fairmaire 1866) a pravděpodobně se vyskytuje jen v provincii Izmir (západní Turecko) (D. Král, nepublikováno). Údaje o rozšíření tohoto druhu v Řecku a Sýrii (Baraud 1992; Reitter 1890, 1893; Semenov-Tian-Shanskij & Medvedev 1936) jsou ze zoogeografického hlediska jen velmi málo pravděpodobné. V Řecku by mohlo jít o záměnu s druhem *L. (L.) ares* sp. n.

Kusy typové série nového druhu pocházející z lokalit Polía a Ládi byly nalezeny na jižně orientovaných, povlovných sprašových svazích nad levým břehem řeky Eridropótamós. Současný stav znalostí ukazuje, že druh zde dává přednost prostředí nekultivovaných okrajů polí a mezi nimi; vzácněji byli brouci nalézáni též v řídkých lesostepních biotopech, a to většinou na místech s velmi sporým bylinným patrem.

Nový druh je pojmenován podle řeckého boha války Área (první pád Áres), který pocházel z Trácie.