



### ***Ahermodontus bischoffi*—rediscovery of an endemic dung beetle species (Coleoptera: Scarabaeidae: Aphodiinae) in Albania after more than 80 years**

ADAM BYK<sup>1</sup>, ALEŠ BEZDĚK<sup>2,4</sup>, TOMASZ GAZUREK<sup>1</sup>, DAVID KRÁL<sup>3</sup> & SEBASTIAN TYLKOWSKI<sup>1</sup>

<sup>1</sup>Department of Forest Protection and Ecology, Warsaw University of Life Sciences—SGGW, Nowoursynowska 159/34, PL-02 776 Warszawa, Poland. E-mail: adam\_byk@sggw.pl; togaspain@wp.pl; sebastiantylkowski@vp.pl

<sup>2</sup>Biology Centre CAS, Institute of Entomology, Branišovská 31, CZ-370 05 České Budějovice, Czech Republic.  
E-mail: bezdek@entu.cas.cz

<sup>3</sup>Charles University, Faculty of Science, Department of Zoology, Viničná 7, CZ-128 43 Praha 2, Czech Republic.  
E-mail: kral@natur.cuni.cz

<sup>4</sup>Corresponding author

The genus *Ahermodontus* Báguena, 1930 (Coleoptera: Scarabaeidae: Aphodiinae) is currently comprised of three species: *A. marini* Báguena, 1930 and *A. ambrosi* (Pardo Alcaide, 1936) from southern Spain and Morocco and *A. bischoffi* (Všetečka, 1939) from Albania (see e.g., Dellacasa *et al.* 2001, 2002, 2016). The distribution and bionomy of both of the western Mediterranean *Ahermodontus* species are relatively well known. Contrastingly, *A. bischoffi* was described using a single female specimen collected by A. Bischoff in Llogara, Albania in 1934 (Všetečka 1939) and additional specimens remained unknown until now. Geodesist Alfons Bischoff (1890–1942) was a famous Albanian speleologist and insect collector (Horn *et al.* 1990; Genest & Juberthie 1994; Zhalov 2015). He often made his insect material accessible to specialists on particular insect groups and several species is dedicated to him: for example, the Carabidae (Coleoptera) species *Duvalius bischoffi* Meschnigg, 1936, *Pterostichus bischoffianus* Jedlička, 1936, and *Zabrus bischoffi* Müller, 1936, and the paper wasp *Polistes bischoffi* Weyrauch, 1937 (Hymenoptera: Vespidae).

During recent entomological collecting trips to Albania, Czech coleopterist Martin Šlachta collected one male specimen of *A. bischoffi* in Llogara Pass in May 2015. In 2016, two independent trips to the same locality by the Czech Kamil Orszulik (May 2016) and by Polish entomologists Adam Byk, Tomasz Gazurek, and Sebastian Tylkowski (May–June 2016) were much more fruitful and resulted to more than 100 collected specimens of both sexes. Examination of these specimens allowed us to describe male of this species for the first time and to briefly discuss their bionomy.

The following acronyms identify the collections housing the material examined (the names of curators are in parentheses):

DFPE Department of Forest Protection and Ecology, Warsaw University of Life Sciences, Warszawa, Poland (Adam Byk)

IECA Institute of Entomology, Biology Centre CAS, České Budějovice, Czech Republic (Aleš Bezděk)

KOCF Kamil Orszulik collection, Frýdek-Místek, Czech Republic

NMPC National Museum, Praha, Czech Republic (Jiří Hájek)

Altogether, 128 specimens (62 males and 65 females, see material below) were studied. Genitalia of three males were dissected for examination. Specimens were examined with a Leica M205 FA stereomicroscope, measurements were taken with an ocular grid. The photographs were taken using digital camera Leica DFC 495. Exact label data are cited for the type material examined. Separate labels are indicated by double vertical bar “||”, lines within each label are separated by a single vertical bar “|”. Information in quotation marks indicates the original spelling. Our remarks and additional comments are placed in brackets.

For morphological terms used in the description of epipharyngeal structures we follow Dellacasa *et al.* (2001).

#### ***Ahermodontus bischoffi* (Všetečka, 1939) (Figs 1A–G, 2A–F)**

*Aphodius* (*Ammoecius*) *bischoffi* Všetečka, 1939: 31 (original description); Balthasar 1964: 76, 79 (key, redescription); Baraud 1971: 64, 69 (subgeneric placement, key); Mikšić 1971: 68 (checklist); Baraud 1992: 142, 143 (key, diagnosis).

*Aphodius bischoffi*: Mikšić 1957: 152 (checklist).

*Aphodius (Ahermodontus) bischoffi*: Dellacasa 1988: 99, 367 (catalogue); Dellacasa & Dellacasa 2006: 105 (catalogue).

*Ahermodontus bischoffi*: Dellacasa & Dellacasa 1997: 415 (generic placement, key); Dellacasa *et al.* 2002: 279 (revision, key); Dellacasa *et al.* 2016: 105 (catalogue).

**Type locality.** “Albanien (Logara [= Llogara])”.

**Type material examined.** **Albania:** Holotype (female), labelled: “LOGARA [printed] || leg. Bischoff | Albania 1934 [printed] || Ammoecius | Bischoffi m. [handwritten] | det. Dr. Všeťka [printed] || Typus [printed, red label, black frame] || Mus. Nat. Pragae | Inv. 65 913 [handwritten, red label] || Ammoecius | bischoffi | Vsetecka, 1939 | Current status | AHERMODONTUS | bischoffi | (Vsetecka, 1939) | v. Dellacasa, 2001 [printed, ochreous label]”, in NMPC.

**Additional material examined.** **Albania:** S of Vlore, Llogara pass, 1050–1100 m, 18.v.2015, M. Šlachta, 1 male in NMPC; SE of Vlorë, Qafa e Llogarasë pass environs, approximately 950 m, 16.v.2016, K. Orszulik, 1 female in KOFC; county Vlorë, Llogara, Çikës Mountains, 1200 m, 26.–28.v.2016, A. Byk, T. Gazurek, S. Tylkowski, 60 males and 64 females in DFPE, 1 male and 1 female in IECA.

**Description of male.** Length 3.6–4.7 mm (mean 4.2 mm). Body stout, strongly convex (Fig. 1A). Dorsal side lustrous, glabrous, black except brownish-red margin of clypeus and sometimes 2 lateral elytral intervals. Ventral surface reddish brown, lustrous, with sparse macrosetation denser on abdominal ventrites. Head appendages and claws reddish brown to testaceous.

Head strongly convex. Anterior clypeal margin with 4 upward directed teeth, median pair longer, narrower than lateral pair; emargination between median teeth shallow, on both sides of them markedly emarginate, with narrow marginal rim between lateral teeth and eyes. Genae conspicuously projecting beyond eye outline, finely punctate and macrosetaceous beneath. Anterior part of head widely transversely carinate, surface steeply deflexed anteriorly, delicately rugose and finely granulate between carina and anterior clypeal margin, slightly convex and smooth behind. Frontal suture poorly marked, finely punctate near eyes.

Epipharynx (Fig. 1B) widely transverse, anterior margin shallowly bisinuate at middle, regularly rounded anteriolaterally. Epitorma subquadrate, sides nearly parallel. Corypha strongly protruding anteriorly, widened and emarginate apically. Acropariae with dense, long macrosetation; prophobae with 3 stout spinules. Chaetopariae with row of about 25 long, stout spinules. Nesium sclerotized; tormae long, asymmetrical.

Pronotum transverse (length to width 1.0:1.5), markedly convex, sides slightly convergent anteriorly, lateral margins bordered with narrow, marginal rim with short macrosetation. Anterior margin shallowly, basal broadly rounded. Transverse furrow before narrow basal marginal rim slightly widened laterally. Surface with dual punctation: fine punctures regularly distributed throughout, separated by approximately 2–4 times their diameters; coarse punctures dense, distance between them mostly twice their diameters on sides, sparse or sometimes lacking at middle. Anterior and posterior pronotal margin with macrosetae.

Scutellum small (approximately 1/12 of elytral length), triangular, slightly convex, smooth.

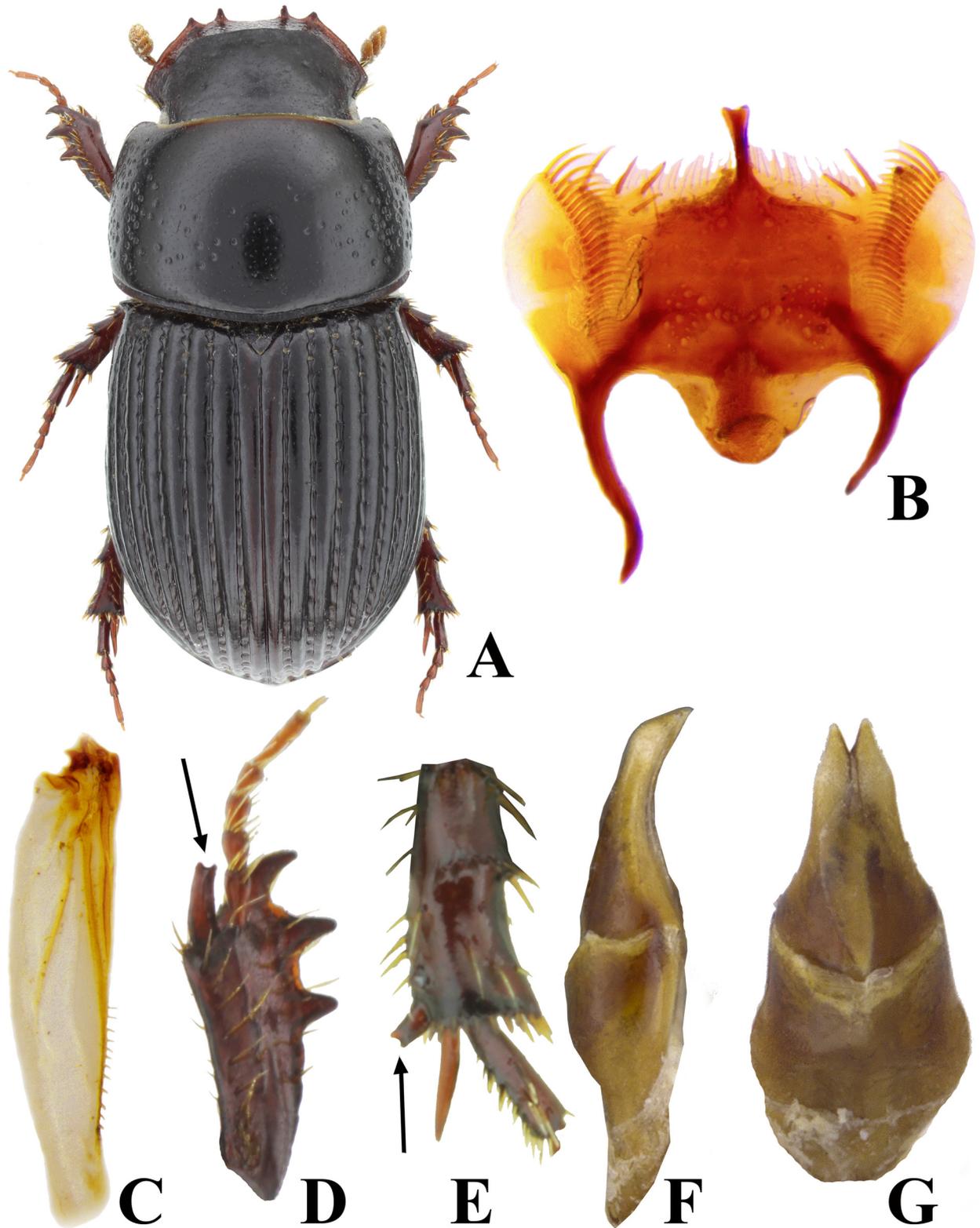
Elytra strongly convex, somewhat widened posteriorly, length to width 1:1.1; humeral tooth sharply pointed. Surface with 10 wide and deep, coarsely punctate (wider, deeper, and coarser posteriolaterally) striae separated by wide, convex, smooth intervals. Intervals 8 and 9 joined basally forming smooth humeral tubercle; striae 6, 8, and 9 shortened, not reaching elytral apex. Epipleura punctate and shortly macrosetaceous in basal part, gradually narrowed towards apices. Metathoracic wings reduced (Fig. 1C), narrow, hind margin slightly emarginate apically.

Metaventral plate (Fig. 2F) with medial rhomboidal depression distinctly punctate and macrosetaceous anteriorly.

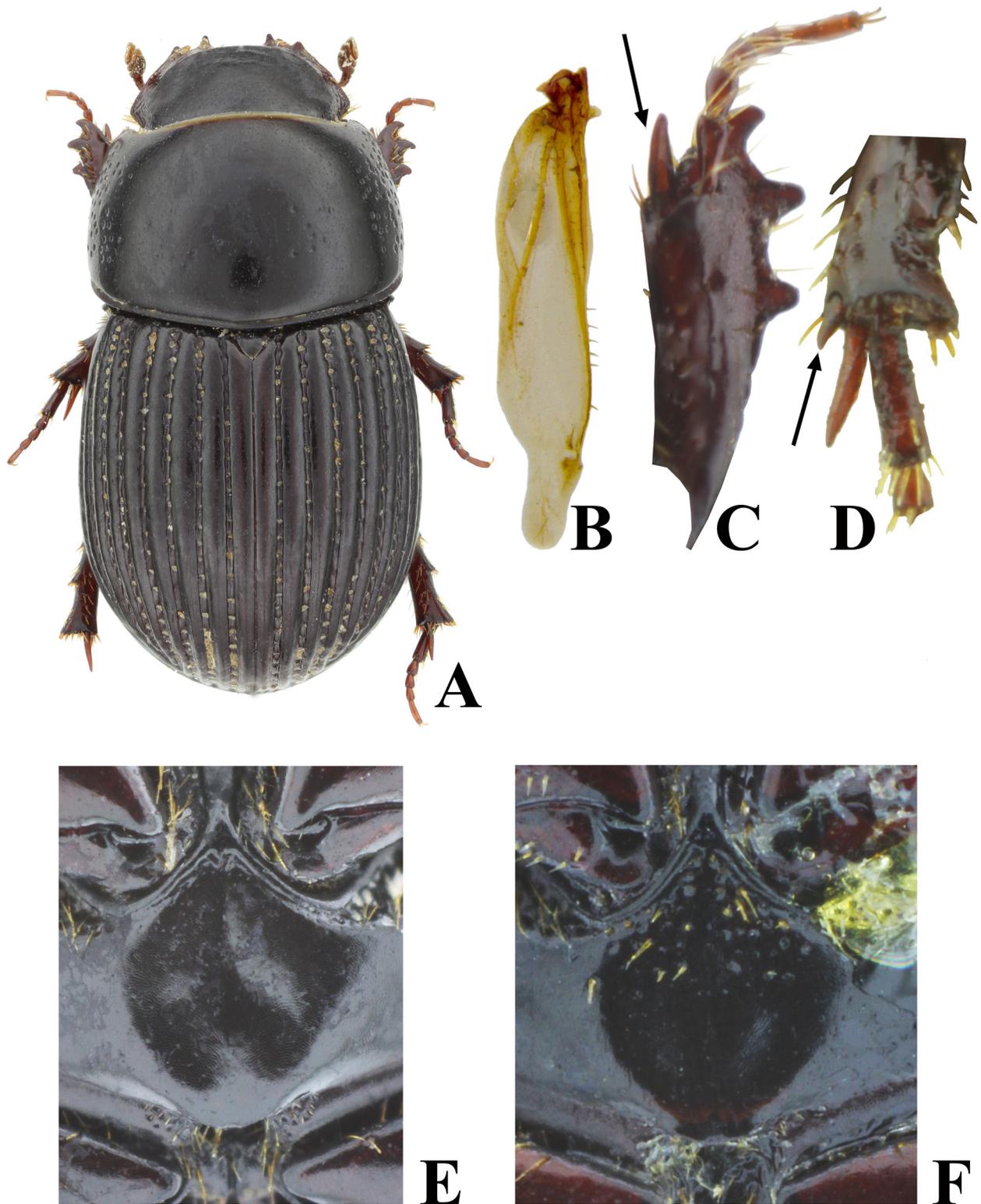
Protibiae with 3 large, external teeth, ventromedial edge with longitudinal carina bearing large tooth situated subbasally. Terminal protibial spur somewhat flattened, slightly bent downwards and distinctly forked apically (Fig. 1D). Outer surface of mesotibiae and metatibiae with 2 transverse carinae; macrosetae on carinae and apical margin uniformly short. Mesotibial superior terminal spur straight and sharp, as long as mesotarsomere 1 and equal to length of mesotarsomeres 2 and 3 combined; inferior spur strongly flattened, bluntly terminated, hooked inwards (Fig. 1E). Both metatibial terminal spurs straight and sharp; superior spur equal in length to metatarsomere 1 and to length of metatarsomeres 2 and 3 combined.

Aedeagus as in Figs 1F–G.

**Sexual dimorphism.** In general habitus male of *A. bischoffi* is similar to female (Fig. 2A) – relevant diagnostic sexual characters are listed in Table 1.



**FIGURES 1A–G.** *Ahermodontus bischoffi*, male. A—habitus, dorsal view; B—epipharynx; C—metathoracic wing; D—protibia, ventral view; E—apex of mesotibia, ventral view; F—aeagus, lateral view; G—aeagus, dorsoapical view. Not to scale.



**FIGURES 2A–F.** *Ahermodontus bischoffi*, female (A–E), male (F). A—habitus, dorsal view; B—metathoracic wing; C—protibia, ventral view; D—apex of mesotibia, ventral view; E,F—metaventral plate.

**TABLE 1.** Morphological differences between male and female of *Ahermodontus bischoffi*.

Male	Female
Total body length 3.6–4.7 mm (mean 4.2 mm)	Total body length 3.9–5.2 mm (mean 4.5 mm)
Terminal spur of protibia distinctly forked apically (Fig. 1D)	Terminal spur of protibia sharp or (in old specimens) worn apically (Fig. 2C)
Inferior terminal spur of mesotibia strongly flattened, blunt, hooked inwards (Fig. 1E)	Inferior terminal spur of mesotibia straight and sharp (Fig. 2D)
Rhomboidal depression of metaventral plate deeper, distinctly punctate, and macrosetaceous anteriorly (Fig. 2F)	Rhomboidal depression of metaventral plate shallow, smooth, and glabrous (Fig. 2E)
Posterior margin of metathoracic wing slightly emarginate apically (Fig. 1C)	Posterior margin of metathoracic wing markedly emarginate apically (Fig. 2B)

Specimens collected by A.B., T.G. & S.T. in 2016 were found in fragments and edges of old relict pine forests (*Pinus heldreichii* H. Christ) (Fig. 3) and less frequently in shady places or open terrain, always between 900–1400 m – having never been encountered below or above this elevation. All specimens were collected in old, dry excrement of cattle and goat, with no fresh dung noted at this locality. There were two nearby pastures about 200 m away with both fresh and old excrement of horses, donkeys and cows, but no specimens of *A. bischoffi* were found there. Both specimens collected by Martin Šlachta in 2015 and Kamil Orszulik in 2016, respectively, were taken from under stones on a meadow situated near the place described above. During our studies (end of May) the species was numerous, but despite intensive search it has not been found beyond the Çikës Mountains or in immediate vicinity. Because no specimens were found in fresh dung, *A. bischoffi* seems to be facultative saprophagous rather than coprophagous species.

**FIGURE 3.** Albania, Çikës Mountains, biotope of *Ahermodontus bischoffi*, May 2016 (photograph by S. Tylkowski).

In light of these observations, population of *A. bischoffi* presents itself as numerous but geographically restricted: the species is locally distributed and as such endangered. Its effective preservation will require care for conserving the habitat, old pine forests on the Çikës Mountains, which does not seem possible without attempts to artificially develop a new generation of trees under the canopy of the old trees.

### Acknowledgements

We are very grateful to Jiří Hájek (NMPC) for the opportunity to study the material in his care. Martin Šlachta (České Budějovice, Czech Republic) and Kamil Orszulik (Frýdek-Místek, Czech Republic) provided us with specimens collected during their expeditions to Albania. Richard Sehnal (Czech University of Life Sciences Prague, Czech Republic) kindly took digital photographs of habitus of *A. bischoffi*.

### References cited

- Balthasar, V. (1964) *Monographie der Scarabaeidae und Aphodiidae der palaearktischen und orientalischen Region. Coleoptera: Lamellicornia. Band 3. Aphodiidae*. Verlag der Tschechoslowakischen Akademie der Wissenschaften, Prag, 652 pp.
- Baraud, J. (1971) Révision des *Aphodius* paléarctiques du sous-genre *Ammoecius* Muls. *Bulletin de la Société Entomologique de France*, 76, 63–71.
- Baraud, J. (1992) *Coléoptères Scarabaeoidea d'Europe. Faune de France et régions limitrophes, Vol. 78*. Fédération Française des Sociétés de Sciences Naturelles & Société Linnéenne de Lyon, Paris, 856 pp.
- Dellacasa, G. & Dellacasa, M. (1997) *Pseudoahermodontus benesi*: a new genus and new species of Aphodiini with large scutellum, and systematic redefinition of the genus-group *Ahermodontus* Báguena, 1930. *Bollettino del Museo Regionale di Scienze Naturali di Torino*, 15, 407–416.
- Dellacasa, G. & Dellacasa, M. (2006) Aphodiini Leach, 1815. In: Löbl, I. & Smetana, A. (Eds.), *Catalogue of Palaearctic Coleoptera. Vol. 3. Scarabaeoidea – Scirtoidea – Dascilloidea – Buprestoidea – Byrrhoidea*. Apollo Books, Stenstrup, pp. 105–143.
- Dellacasa, G., Bordat, P. & Dellacasa, M. (2001) A revisional essay of world genus-group taxa of Aphodiinae. *Memorie della Società Entomologica Italiana*, 79, 1–482. [2000]
- Dellacasa, M. (1988) Contribution to a world-wide catalogue of Aegialiidae, Aphodiidae, Aulonocnemidae, Termitotrogidae (Coleoptera Scarabaeoidea). *Memorie della Società Entomologica Italiana*, 66, 3–229. [1987]
- Dellacasa, M., Dellacasa, G. & Bordat, P. (2002) Systematic redefinition of taxa belonging to the genera *Ahermodontus* Báguena, 1930 and *Ammoecius* Mulsant, 1842, with description of the new genus *Vladimirellus* (Coleoptera: Aphodiidae). *Acta Zoologica Academiae Scientiarum Hungaricae*, 48, 269–316.
- Dellacasa, M., Dellacasa, G., Král, D. & Bezděk, A. (2016) Aphodiini Leach, 1815. In: Löbl, I. & Löbl, A. (Eds.), *Catalogue of Palaearctic Coleoptera. Vol. 3. Scarabaeoidea – Scirtoidea – Dascilloidea – Buprestoidea and Byrrhoidea. Revised and Updated Edition*. Brill, Leiden, pp. 98–155.
- Genest, L.-C. & Juberthie, C. (1994) Albanie. In: Juberthie, C. & Decu, V. (Eds.), *Encyclopaedia Biospeologica. Tome I*. Société de Biospéologie, Moulis, pp. 591–594.
- Horn, W., Kahle, I., Friese, G. & Gaedike, R. (1990) *Collectiones entomologicae. Eine Kompendium über den Verbleib entomologischer Sammlungen der Welt bis 1960. Teil I. A bis K*. Akademie der Landwirtschaftswissenschaften der DDR, Berlin, 220 pp.
- Mikšić, R. (1957) Zweiter Nachtrag zur “Fauna Insectorum Balcanica-Scarabaeidae”. *Acta Musei Macedonici Scientiarum Naturalium*, 4, 139–214.
- Mikšić, R. (1971) Übersicht den gegenwärtigen Standes der Kenntnisse der Scarabaeiden-Fauna Albaniens. *Acta Entomologica Jugoslavica*, 7, 67–73.
- Všetečka, K. (1939) *Aphodius (Ammoecius) bischoffi* n. sp. *Časopis České Společnosti Entomologické*, 36, 31.
- Zhalov, A. (2015) History of karst and cave exploration in Albania. In: Zhalov, A. (Ed.), *Bulgarian Speleological Studies in Albania 1991–2013. Berliner Höhlenkundliche Berichte*, 58, 16–25.