

**Preliminary re-examination of genus-level taxonomy  
of the pollen beetle subfamily Meligethinae  
(Coleoptera: Nitidulidae)\***

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**Abstract.** The pollen beetle subfamily Meligethinae C. G. Thomson, 1859 (Nitidulidae), is distributed throughout the Holarctic, Afrotropical, Oriental, and Australasian Regions. Previously, the subfamily included fifteen genera and approximately seven hundred species, most of which were attributed to the widespread and paraphyletic genus *Meligethes* Stephens, 1830, and to a lesser extent the primarily Afrotropical genus *Pria* Stephens, 1830. Herein, twenty-two additional genera are described as new from Europe, Africa, North America and Asia; including the following: *Afrogethes*, *Aristogethes*, *Astrogethes*, *Bolbocerogethes*, *Boragogethes*, *Brassicogethes*, *Fabogethes*, *Genistogethes*, *Indogethes*, *Jelinekigethesthes*, *Lamiogethes*, *Lucanopria*, *Neolariopsis*, *Odontholariopsis*, *Paleogethes*, *Rubiogethes*, *Sagittogethes*, *Stachygethes*, *Tarchonanthogethes*, *Thymogethes*, *Xenostromylogethes*, and *Xerogethes*, all Audisio & Cline, gen. nov. Six previously recognized and/or described subgenera of *Meligethes* are elevated to generic rank; including *Acanthogethes* Reitter, 1871, *Clypeogethes* Scholz, 1932, *Idiogethes* Kirejtshuk, 1977, *Chromogethes* Kirejtshuk, 1989, *Lariopsis* Kirejtshuk, 1989, and *Astylogethes* Kirejtshuk, 1992 stat. nov. The new combinations for all transferred species are established. The type species of all recognized genera are fixed and/or indicated, a preliminary check list of inclusive described species

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\* For our late friend and colleague Marco Corti.

attributed to each of the resulting 43 Meligethinae genera is provided, and a new genus/species is described from Rwanda, i.e. *Lucanopria wagneri* Audisio & Cline, gen. nov. and sp. nov. One new synonymy is proposed: *Meligethes albens* Audisio & De Biase, 2004, = *Chromogethes formosus* (Kirejtshuk, 1989) syn. nov. A preliminary phylogenetic scenario of Meligethinae is discussed, based on selected morphological characters and evidence from partially published molecular data (i.e. COI, ITS2, and PEPCK genes) representing most Meligethinae genera. Also, the available bionomical data and larval host-plant associations of inclusive genera are summarized.

**Key words.** Nitidulidae, Meligethinae, genus-level taxonomy, new genus, new species, new combination, host-plants

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## Introduction

The pollen beetle subfamily Meligethinae C. G. Thomson, 1859, is widely distributed throughout the Holarctic, Afrotropical, and Oriental Regions, and marginally in the Australasian Region. Previously, the subfamily formally included fifteen genera and approximately seven hundred species (COOPER 1974, 1980, 1982; AUDISIO 1993b, and unpublished data; KIRK-SPRIGGS 1996; JELÍNEK 2000a,b; JELÍNEK & AUDISIO 2007; AUDISIO et al. 2008, 2009a; KIREJTSHUK 1992b, 2008). Most meligethine taxa were attributed to the speciose, widespread, and highly diversified genus *Meligethes* Stephens, 1830, as well as to the primarily Afrotropical genus *Pria* Stephens, 1830 (COOPER 1982; KIREJTSHUK 1996b, 2001). All meligethine species are anthophagous on flowering herbaceous plants, bushes, and trees with several species being monophagous to narrowly oligophagous as larvae (AUDISIO 1993b, AUDISIO et al. 2008).

Recent analyses (STRIKA 2004; STRIKA et al. unpublished data; AUDISIO et al. 2008, 2009a,b, and unpublished data; TRIZZINO et al. 2009) performed using the Second Internal Transcribed Spacer (ITS2) as a molecular marker, in conjunction with morphological (SEM analyses) and ecological (larval host-plant associations) characters, suggest a need to transform the systematic classification of Meligethinae. The results herein demonstrated that the present composition of several small tropical and subtropical Meligethinae genera (e.g., the southern African *Anthystrix* Kirejtshuk, 1981, the Palaeotropical *Meligethinus* Grouvelle, 1906), as well as *Meligethes* 'sensu lato' and the subgenus *Clypeogethes* Scholz, 1932 (as recently re-interpreted by KIREJTSHUK 1990, 1992b, 1996b, 2001, 2008; SPORNRAFT & KIREJTSHUK 1993, and KIREJTSHUK & VIKLUD 2002) is largely artificial, and these taxa are subsequently rendered paraphyletic or even polyphyletic (AUDISIO 1996) under systematic scrutiny. Species from some of the present-day recognized genera (e.g., *Anthystrix*, *Cyclogethes*, *Meligethinus*) were determined to be morphologically and molecularly nested within *Meligethes* s. l. (AUDISIO

et al. 2008, 2009a, and unpublished data; TRIZZINO et al. 2009), as previously suspected by JELÍNEK (2000a,b). To rectify this non-monophyletic situation, recent papers (AUDISIO et al. 2008, 2009a,b; TRIZZINO et al. 2009) have proposed raising the majority of currently defined subgenera and selected species-groups of *Meligethes* s. l. to generic rank, with the majority of small tropical and subtropical Meligethinae genera retaining generic rank. The description of *Sebastiangethes anthystrixoides* Audisio, Kirk-Spriggs & Cline, 2008 (AUDISIO et al. 2008) and revision of *Anthystrix* s.str. (AUDISIO et al. 2009a) represent the first steps of a multiphase project to complete a formal reinterpretation and revision of Meligethinae classification.

Given these premises, we therefore present the following taxonomic and classificatory emendations with the main objective to formally describe a set of new genera (all but one genus is based on previously recognized taxa within *Meligethes*), in a phylogenetic scenario supported by, or compatible with, the available and continuously growing morphological and molecular evidence (TRIZZINO et al. 2009; LAMANNA 2009, and unpublished data; AUDISIO et al. 2009a,b, and unpublished data).

Three additional sources of data are currently being pursued, and include: analysis of more molecular markers, using both nuclear and mitochondrial genes with markedly different evolutionary rates (e.g. based on the coding regions of single-copy nuclear genes Long-Wavelength [LW] opsin, Wingless, and Elongation Factor 1-alpha [EF-1 alpha], and of COI mitochondrial gene; LAMANNA et al. unpublished data; DE BIASE et al. unpublished data); larval morphology (HAYASHI 1978; LAWRENCE 1991; AUDISIO 1993b; DI GIULIO & AUDISIO unpublished data); and fine structure of endophallic sclerotized features via high magnification microscopy (400–800×) (AUDISIO et al. unpublished data). Results of these further analyses will be the subject of a series of separate contributions, which will be assembled in an upcoming monograph (AUDISIO et al. in preparation).

## Materials and methods

**Morphological analysis.** Specimens were acquired from several European, American, and African institutions, including:

- AMNH American Museum of Natural History, New York, USA;
- BMNH Natural History Museum, London, England;
- BMSA National Museum, Bloemfontein, South Africa;
- CAS California Academy of Sciences, San Francisco, USA;
- FMNH Finnish Museum of Natural History (Entomology), Helsinki, Finland;
- HNHM Hungarian Natural History Museum, Budapest, Hungary;
- MCNV Museo Civico di Storia Naturale, Venezia, Italy;
- MCST Museo Civico di Storia Naturale, Trieste, Italy;
- MCZR Museo Civico di Zoologia, Rome, Italy;
- MHNG Muséum d'Histoire Naturelle, Genève, Switzerland;
- MHNL Muséum d'Histoire Naturelle, Lyon, France;
- MNCN Museo Nacional de Ciencias Naturales, Madrid, Spain;
- MNHN Muséum National d'Histoire Naturelle, Paris, France;
- MRSN Museo Regionale di Scienze Naturali, Torino, Italy;
- MSGNG Museo Civico di Storia Naturale, Genova, Italy;
- MSNM Museo Civico di Storia Naturale, Milano, Italy;
- MSNV Museo Civico di Storia Naturale, Verona, Italy;

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| MZUF | Museo Zoologico “La Specola”, Firenze, Italy;                                       |
| MZLU | Zoological Museum, Lund University, Lund, Sweden;                                   |
| NHMB | Naturhistorisches Museum, Basel, Switzerland;                                       |
| NMW  | Naturhistorisches Museum Wien, Wien, Austria;                                       |
| NHRS | Naturhistoriska riksmuseet, Stockholm, Sweden;                                      |
| NMNW | National Museum of Namibia, Windhoek, Namibia;                                      |
| NMPC | National Museum (Natural History), Prague, Czech Republic;                          |
| SAMC | Iziko Museum of Cape Town (formerly South African Museum), Cape Town, South Africa; |
| SANC | South African National Collection of Insects, Pretoria, South Africa;               |
| SMF  | Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt-am-Main, Germany;         |
| SMNS | Staatliches Museum für Naturkunde, Stuttgart, Germany;                              |
| TMSA | Transvaal Museum, Pretoria, Gauteng, South Africa;                                  |
| USNM | National Museum of Natural History, Washington D.C., USA;                           |
| ZFMK | Zoologische Forschungsinstitut und Museum “Alexander Koenig”, Bonn, Germany;        |
| ZIN  | Russian Academy of Sciences, Zoological Institute, St. Petersburg, Russia;          |
| ZMHB | Museum für Naturkunde der Humboldt-Universität, Berlin, Germany;                    |
| ZSM  | Zoologische Staatssammlung, München, Germany.                                       |

Important additional material and bionomical records were obtained during intensive field work in Europe, North Africa, Near East, Asia, and southern Africa from 1975–2009 by Karl Spornraft, Penzberg (CSP, now in ZSM), Josef Jelínek (NMPC), Alexander G. Kirejtshuk (ZIN), Sadanari (†) and Sadatomo Hisamatsu, Ehime University, Japan (EUMJ), the authors, and other Italian entomologists. The latter material is mostly preserved in the senior author’s collection (CAR) in Zoological Museum of the Sapienza University, Rome.

Measurements of adult external anatomical features were made using a digital camera mounted on a WILD® MZ8 stereomicroscope (40–80×), and the image processing software package WINVISION® (Delta Sistemi®, Rome). Drawings were made with a drawing tube mounted on the same stereomicroscope. Measurements of tarsal, antennal, and genitalic characters were made using the same device/software and from accurate drawings made with a drawing tube, mounted on a BX50 OLYMPUS® upright microscope (200–1000×). Measurements of the subapical dilated portion of the prosternal process were not considered (when present) from the sloping portions of lateral expansions, which are typically more or less abruptly oriented dorso-laterally; rather only the main piece of prosternal process was considered, which is usually distinctly bordered laterally (Figs. 23h, k).

Scanning electron microscopy (SEM) was performed in the Museo Nazionale d’Arte Orientale, Servizio di Bioarcheologia e Microscopia, Rome, using a Leo® model 435-VP SEM under both ultrahigh vacuum or variable pressure condition (150–2000×). For high pressure conditions, adult specimens were mounted and coated with gold-palladium alloy, whereas for variable pressure conditions specimens were mounted without alloy coating.

Larval stages of most genera and species groups within *Meligethes* s. l. were intensively and specifically collected in the field (detailed SEM morphological studies on Meligethinae pre-imaginal stages are currently underway, but are not included herein).

Drawings of some tropical and subtropical genera, so far not studied by the authors, have been taken from the literature and here assembled to better summarize the available generic level Meligethinae iconographic information.

A preliminary cladistic analysis based on 72 adult morphological characters (i.e. those used in the generic descriptions or redescrptions below) of the 43 included genera was tentatively performed using TNT<sup>®</sup> software (GOLOBOFF et al. 2003, 2008). The initial results of this exploratory analysis are presented here as a preliminary tree represented in Fig. 43 (further technical details in AUDISIO et al. in press). Phylogenetic inference was also used for preliminary interpretations about inter-generic relationships among the studied taxa, which is discussed in 'Phylogenetic Position' section within each genus-level treatment as well as the Conclusions section.

**Morphological terminology.** Morphological descriptions include a few terms expressly used for Meligethinae taxa, most of which were introduced by the British meligethine specialist A. M. Easton (1907–1989) in his foundational papers on *Meligethes* s. l. (see BACCHUS & KIRK-SPRIGGS 1990).

*Caudal marginal lines of metacoxal cavities:* the lines representing the posterior margin of the anterior flat border of the first visible abdominal ventrite; usually paralleling the anterior margin of the same border, the latter posteriorly delimiting each metacoxal cavity (see Fig. 10g).

*Axillary space on first abdominal ventrite:* a typically small triangularly arcuate exposed area between the outer portion of each caudal marginal line of the metacoxal cavities and the contiguous proximal-lateral abdominal portion where each caudal marginal line turns towards the lateral edge of the abdomen (see Figs. 113s, t in AUDISIO 1993b, and Fig. 10g).

*Axillary angle of first abdominal ventrite:* the angle (acute, right, rounded or widely obtuse) formed by each caudal marginal line of the metacoxal cavities when turning back towards the lateral edge of the abdomen (see Figs. 1g, 4k, 9k, and 10g).

*Central point of ovipositor:* the approximately middle point of the ovipositor where the inner proximal portions of the basicoxites and valvifers converge (see Fig. 6b), and where a narrow proximally directed spicule is frequently located.

*Microsetae on posterior pronotal margin:* a row of marginal microscopic setae, usually bi- or multifurcate at apex; different in shape and size from all other pronotal setae; typically visible only under high magnification (200–1000×); margining the posterior pronotal edge (Figs. 1d, 7g, 10e, 21g).

**Molecular data.** Currently available molecular data for Meligethinae taxa are mainly restricted to the mitochondrial Cytochrome c Oxidase I (COI) and Control Region, and nuclear ITS2 and Phosphoenolpyruvate carboxykinase (PEPCK) genes; however, only the ITS2 and PEPCK markers were extensively analysed and are now available in sufficiently large datasets to adequately sample representatives for most inclusive Meligethinae taxa (MANCINI et al. 2008; TRIZZINO et al. 2009; AUDISIO et al. 2009a,b; DE BIASE et al. unpublished data; LAMANNA 2009, et unpublished data). Available COI data exhibit a low phylogenetic signal even at the intra-generic level (i.e. among related species in some ancestral lineages; e.g., among moderately related European species within the *Lamiogethes difficilis* species-group). Therefore, this marker is likely unsuitable (at least within Meligethinae) for phylogenetic studies above the species-groups or genus level (DE BIASE et al. unpublished data).

For mitochondrial and nuclear DNA extraction methods, as well as PCR methods and molecular phylogenetics analyses, refer to SAMBROOK & RUSSELL (2000), OLIVERIO & MARIOTTINI (2001), DE BIASE et al. (2003), DOWNIE et al. (2008), MANCINI et al. (2008), TRIZZINO et al. (2009), and AUDISIO et al. (2009b).

**Genus-level taxonomy.** Genera herein are treated in a tentative systematic order, according to one of the TNT trees generated from the above cited phylogenetic analysis (Fig. 43). Species attributed to each of the 43 considered genera are listed in alphabetical order and their distributions summarized at the end of each of the genus-level treatments. Complete generic descriptions/redescriptions are included in each of the genus-level treatments, with the exception of previously known members of the ‘*Microporum* generic assemblage’ (genera 39–43). For this assemblage, which is characterized by a complex taxonomic scenario and little available comparative material, we preferred to simply refer to original descriptions and diagnoses and/or to more or less recent contributions (LECHANTEUR 1955; COOPER 1974; ENDRÖDY-YOUNGA 1978; KIREJTSHUK 1980b, 2008). This generic assemblage will require a thorough and complete systematic revision before a true classification can be hypothesized, which is beyond the scope of this paper.

An identification key for the genera treated herein is not included. In fact, a complete systematic revision of the speciose genus *Pria* and of at least three problematic and speciose generic assemblages (i.e. the ‘*Microporum* generic complex’, the ‘*Anthystrix* generic complex’, and a large clade including *Afrogethes* and allied taxa of uncertain taxonomic position) is needed before true generic limits can be established for all Meligethinae genera. Likewise, short differential diagnoses were not included herein for each described genus, because most treated genera are only characterised by peculiar combinations of several different morphological characters (listed in descriptions/redescriptions), and only rarely by single autoapomorphic traits.

## Taxonomy

### 1. *Acanthogethes* Reitter, 1871 stat. nov.

(Figs. 1 a–h)

*Acanthogethes* Reitter, 1871: 155 (described as a subgenus of *Meligethes* Stephens, 1830).

**Type species.** *Sphaeridium fuscum* A. G. Olivier, 1790: 10 (subsequent designation by PARSONS (1943)) [= *Acanthogethes fuscus* (A. G. Olivier, 1790) comb. nov.]

**Generic redescription and diagnosis.** Inclusive species range greatly in size (1.2–4.3 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence usually short and fine, recumbent, golden to silvery-whitish, never obscuring the variably colored (brown, blackish, reddish, or blackish with orange spots on elytra, e.g. Fig. 1a) dorsal body surface; pronotal and elytral sides narrowly flattened, typically same color as disc, a few species with pale reddish sides. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each



seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid or trifid microsetae, microsetae uniformly distributed in middle region anterior to scutellum (Fig. 1d).

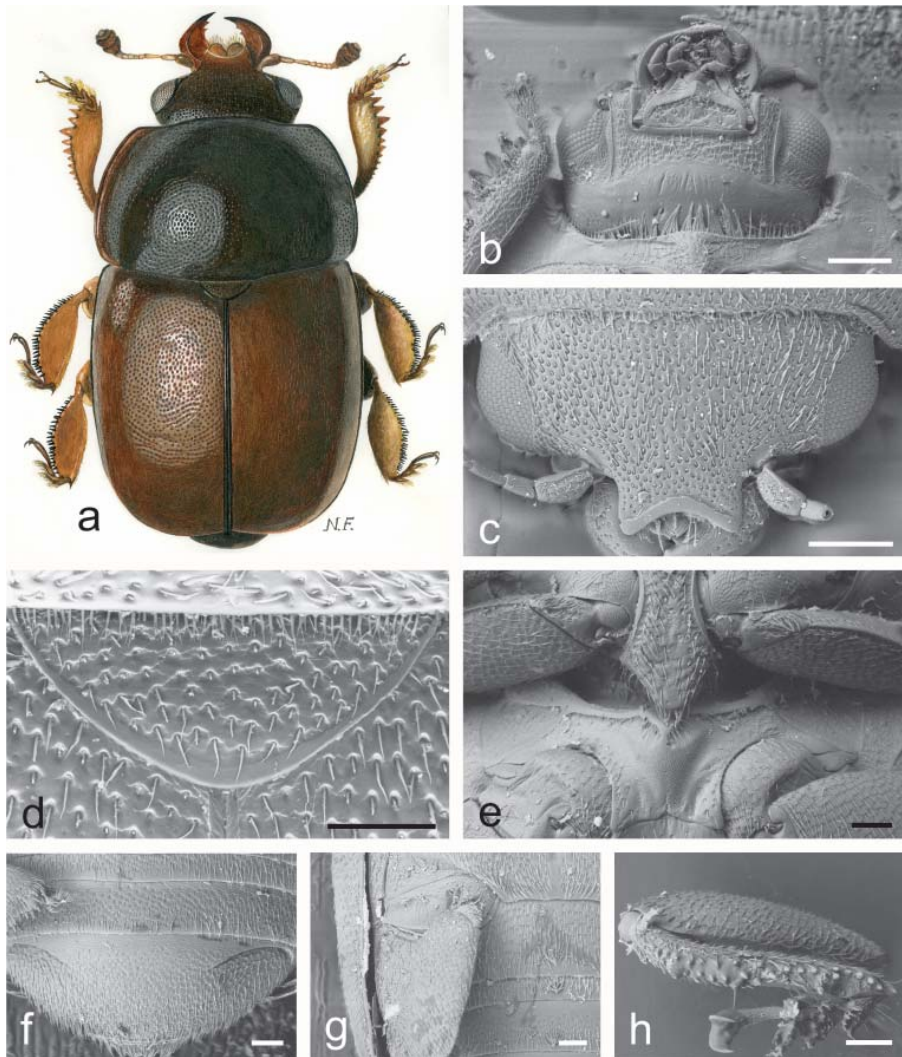
*Dorsal habitus*: body markedly convex, short, wide and oval (Fig. 1a); dorsal punctures on discal portion of pronotum as large as, or larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus always strongly arcuately emarginate, simple, i.e. without small distinct medial bulge, and distinctly bordered (Figs. 1a, c); circum-ocular furrows (occipital sulci) on dorsal side of head reduced, somewhat distinct anteriorly, absent posteriorly (Fig. 1c); eyes large and usually moderately projecting laterally (Figs. 1a, c); pronotum with faintly distinct posterior angles, rounded to obtuse and never directed posteriorly (Fig. 1a); scutellum regularly punctured on most of exposed portion; elytra with simple punctation, never transversely strigose, occasionally with faint traces of orange peel-like rugosity; elytral humeral angle bluntly rounded, not protruding laterally (Fig. 1a); elytral humeral striae faint; elytral pre-sutural striae visible, originating at scutellar vertex or slightly posterior, terminating at elytral apex, and delimited on each elytron by a faintly distinct, flat sutural border, widest at posterior third; border slightly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices faintly rounded in both sexes (Fig. 1a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 1a) or distinctly produced and distally faintly explanate in females (Fig. 125s in AUDISIO 1993b).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, or slightly diverging posteriorly; mentum subpentagonal (Fig. 1b); prosternal antennal furrows almost completely obliterated (Fig. 1b); prosternal process variably shaped, usually relatively narrow, subapical portion dilated, 2.7–3.0× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually blunt, not acute (Fig. 1e); lateral borders of prosternal process not delimiting shallowly impressed and distinct furrows, and distally terminating prior to predistal lateral expansions (Fig. 1e); posterior margin of mesoventrite distinctly incised at middle (Fig. 1e); usually distinct sexual dimorphism present, comprising shallow to deep impressions on meta-ventrite, more or less raised tubercles, or small lobes along posterior margin of metaventrte; first two visible abdominal ventrites usually simple in both sexes, without tufts of setae, but in males of the *A. fuscus* complex with faintly distinct, minute tufts of brown setae on first four abdominal ventrites; caudal marginal lines of metacoxal cavities always simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer ‘axillary’ line (Fig. 1g); ‘axillary’ space on first abdominal ventrite strongly reduced, ‘axillary’ angle acute (Fig. 1g); large shallowly impressed arched impressions on basal portion of last visible abdominal ventrite usually not covered by distal portion of penultimate visible abdominal ventrite (Fig. 1f).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 1a, b); 3<sup>rd</sup> antennomere in both sexes 2.8–3.0× as long as wide, 1.3–1.4× longer and distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 1a, c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes, never sexually dimorphic (Fig. 1a), much narrower than width of protibiae; labial palpi relatively short in both sexes (Fig. 1b), terminal segment 1.7–1.8× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 1b), terminal segment 2.3–2.4× as long as wide; mandible usually large (Fig. 1a), nearly 1.5–1.6×



longer than wide, with peculiarly acuminate apex and denticulate distal portion of inner margin, without evident differences in shape and size among sexes; tarsal claws strongly dentate at base (as in Fig. 17m); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 1a); protibiae with a series of usually very large, uneven, sharp or blunt teeth on lateral margin (Fig. 1a; see also Figs. 126a–e in AUDISIO 1993b); meso- and metatibiae



**Fig. 1.** *Acanthogethes* Reitter, 1871: **a–h** – *A. fuscus* (Olivier, 1790). **a** – male habitus (length 3.5 mm); **b** – ventral view of head and anterior portion of prosternum; **c** – dorsal view of head; **d** – scutellum and microsetae on posterior margin of pronotum; **e** – prosternal process and mesoventrite; **f** – exposed portion of last visible abdominal ventrite; **g** – caudal marginal lines of metacoxal cavities; **h** – middle leg illustrating outer margin of mesotibia. Scale bars: Figs. **b**, **c** = 200  $\mu$ m; Figs. **d**, **e**, **f**, **g**, **h** = 100  $\mu$ m.

on lateral margin bearing a nearly double and usually uneven row of large and robust blackish spurs (Figs. 1a, h), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually moderately flat but slender (Fig. 1a), never distinctly subtrapezoidal or axe-shaped; scarcely apparent sexual dimorphism in tibial shape; tarsal plates of prolegs slightly wider in males than females; posterior margin of metafemora simple in both sexes, without tubercles or projections.

**Male genitalia:** processes along inner side of parameres absent (Fig. 132 in AUDISIO 1993b), usually with deep and narrow excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to a medial distal V-shaped excision; median lobe of aedeagus variable, without emargination laterally, rounded, subtruncate to acute apically, without distal minute excision or emargination.

**Female genitalia (ovipositor):** variably shaped, usually large; styli usually short but distinct, simple, cylindrical, not distinctly pigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and unpigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 153a–f in AUDISIO 1993b), and a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids; ‘central point’ of ovipositor usually more distad than middle, with or without proximally directed spicule.

**Etymology.** The generic name is derived from a combination of the Greek ‘ακανθα’ (= spine), to emphasize the strongly toothed tarsal claws, and ‘-gethes’ which is indicative of the phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated with flowers of Cistaceae for larval development, especially on small bushes of the following genera: *Cistus* L., *Helianthemum* Miller, *Halimium* (Dunal) Spach (AUDISIO 1993b).

**Phylogenetic position.** Available morphological datasets suggest a likely monophyletic clade that includes *Acanthogethes*, members of the *Lariopsis* complex of genera, and likely *Clypeogethes* Scholz, 1932, and *Xerogethes* gen. nov. Molecular data weakly support these relationships. With regards to *Acanthogethes*, this genus possesses a combined series of several symplesiomorphic and few autapomorphic characters, and likely occupies a relatively basal phylogenetic position in Meligethinae.

**Taxonomy and geographic distribution.** *Acanthogethes* includes six described species distributed from the Canary Islands, western Europe and northern Africa to Caucasian areas, which were attributed to three formerly recognized species-complexes, the ‘*Meligethes fuscus*’, ‘*M. brevis*’, and ‘*M. solidus*’ species-complexes. Two additional species described from North Africa by EASTON (1955a), likely dubiously attributed to differentiated populations of *Acanthogethes lamii* (Rosenhauer, 1856), require further morphological and molecular analyses to definitively ascertain their true taxonomic status (AUDISIO 1986, 1993b).

*Acanthogethes brevis* (Sturm, 1845) **comb. nov.**  
*Acanthogethes fuscus* (A. G. Olivier, 1790) **comb. nov.**  
*Acanthogethes hercules* (Audisio, 1986) **comb. nov.**  
*Acanthogethes lamii* (Rosenhauer, 1856) **comb. nov.**  
*Acanthogethes reyi* (Guillebeau, 1885) **comb. nov.**  
*Acanthogethes solidus* (Kugelann, 1794) **comb. nov.**

Europe, N Turkey, Caucasus  
 W Mediterranean region, W Greece  
 Canary Islands: Tenerife  
 W Mediterranean region  
 S Europe, Turkey  
 Europe, N Turkey, Caucasus

## 2. *Asterogethes* Audisio & Cline, gen. nov.

(Figs. 2 a–n)

**Type species.** *Meligethes arcuatus* Reitter, 1872: 252 (by present designation) [= *Asterogethes arcuatus* (Reitter, 1872) comb. nov.].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.7–3.6 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence golden to silvery-whitish, moderately elongate, suberect, partially obscuring the variably colored (yellowish, reddish, brown, blackish-brown, or brown with yellow spots on elytra: Figs. 2a, b) dorsal body surface; pronotal and elytral sides strongly narrowed and flat, yellowish and frequently paler than pronotal disk. Lateral margin of pronotum and elytra with series of long, erect setae (Fig. 2d), each seta usually as long as those on elytral disc; posterior margin of pronotum comprising moderately long, usually distally trifid or tetrafid microsetae (Fig. 2m), microsetae also uniformly distributed on middle region anterior to scutellum.

*Dorsal habitus:* body moderately convex, variably shaped, moderately short and wide, oval, or more narrow and parallel-sided (Figs. 2a, b); dorsal punctures on pronotal disc larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus moderately arcuately emarginate, simple, i.e. without small distinct bulge at middle, and not bordered (Figs. 2a, b, c), with circum-ocular furrows (occipital sulci) on dorsal side of head absent (Fig. 2c); eyes large and usually moderately projecting laterally (Figs. 2a, b, c); pronotum with faintly distinct posterior angles, rounded to obtuse and never directed posteriorly (Figs. 2a, b); scutellum regularly punctate in most of exposed region; elytra with simple punctation, never transversely strigose; elytral humeral angle faintly distinct, not protruding laterally (Figs. 2a, b); elytral humeral striae not distinct; elytral pre-sutural striae visible, originating at scutellar vertex, terminating at elytral apex, and delimiting a faintly distinct, flat, not raised sutural border on each elytron, border widest at posterior third, slightly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 2a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 2a, b).

*Ventral habitus:* antennal furrows distinctly delimited, nearly parallel-sided, or slightly diverging posteriorly; mentum subpentagonal (Fig. 2d); antennal prosternal furrows on anterior margin of prosternum nearly obliterated (Fig. 2d); prosternal process relatively narrow, but subapical portion strongly dilated, 2.4–2.6× as wide as maximum width of 1<sup>st</sup> antennomere, with arcuately convex apex (Fig. 2n); posterior margin of mesoventrite simple, never incised at middle (Fig. 2n); lateral borders of prosternal process not delimiting furrows, terminating at base of prosternal process (Fig. 2n); sexual dimorphism variable but usually distinctly manifested, frequently with more or less distinct impressions on metaventrite in males; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities always simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer ‘axillary’ line (Fig. 2f); ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle widely obtuse (Fig. 2f); small, short, and shallowly impressed arched impressions on basal portion of last visible

abdominal ventrite, frequently covered by distal portion of penultimate visible abdominal ventrite (Fig. 2g).

*Appendages*: male 1<sup>st</sup> antennomere 0.7–0.9× as long as width of protibiae, excluding distal teeth (Figs. 2a, b, d); 3<sup>rd</sup> antennomere in both sexes usually only 1.9–2.0× as long as wide, 0.7–0.8× as long but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 2d); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, nearly as long as wide; antennal club compact, small, simple, no sexual dimorphism present, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere moderately widened, 0.6–0.7× as wide as 9<sup>th</sup> antennomere) (Fig. 2k), much narrower than width of protibiae; labial palpi moderately long in both sexes (Fig. 2d), terminal segment 1.8–1.9× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 2d), terminal segment 2.2–2.3× as long as wide; mandible usually small (Figs. 2a, b), ~1.2–1.3× longer than wide, comprising moderately acuminate apex, no sexual dimorphism present; tarsal claws simple, never toothed at base (as in Fig. 3d); tarsi of variable size and shape, 0.6–0.8× as long as corresponding tibiae (Figs. 2a, b); protibiae with a series of usually large, basally widened, uneven, more or less sharp teeth on lateral margin (Figs. 2a, b; Figs. 126a–e in KIREJTSHUK & AUDISIO 1995); meso- and metatibiae with lateral margin bearing a nearly double and usually uneven row of large and robust spurs (Fig. 2h), without U-shaped sinuosity at distal third; meso- and metatibiae moderately slender, flat (Figs. 2a, b), never distinctly subtrapezoidal or axe-shaped; sexual dimorphism variably expressed in metatibiae, i.e. simple or distinctly sinuate in males (Figs. 2a, b; Figs. 87–90 in KIREJTSHUK & AUDISIO 1995), and with tarsal plates of prolegs slightly wider in males; posterior margin of male metafemora with 2–3 minute tubercles (Fig. 2e; Figs. 101, 105 in KIREJTSHUK & AUDISIO 1995).

*Male genitalia*: processes along inner side of parameres absent (Figs. 21–24 and 27–28 in KIREJTSHUK & AUDISIO 1995), distal margin nearly transversely truncate, and without deep median longitudinal desclerotization from proximal portion of tegmen to medial distal V-shaped excision; median lobe of aedeagus without lateral emargination, bluntly acuminate anteriorly, without distal minute emargination.

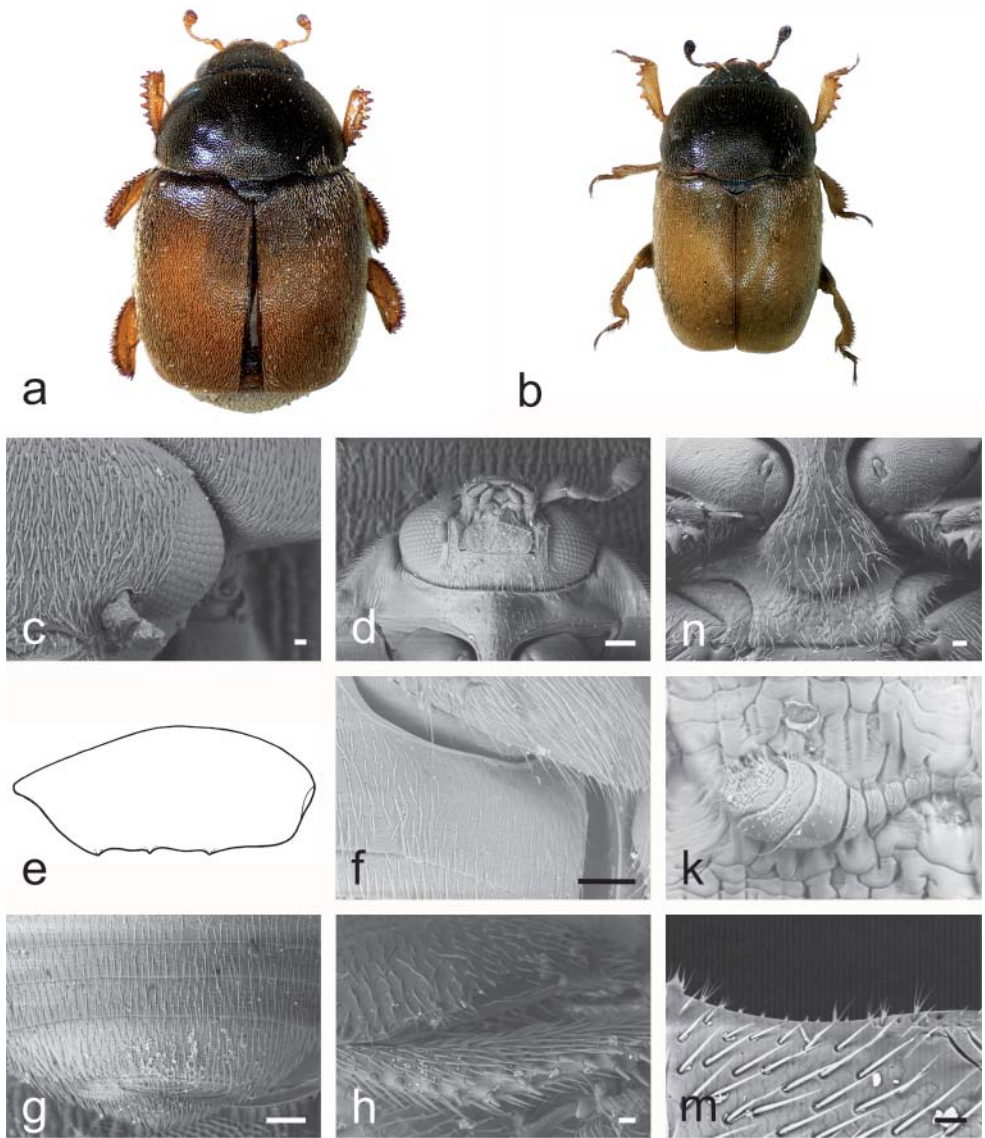
*Female genitalia (ovipositor)*: variably shaped, usually small; styli usually short but distinct, simple, cylindrical, subtruncate, not distinctly pigmented, inserted at apex of nearly contiguous gonostyloids; lateral portion of basicoxites simple, never indentate (Figs. 52–54 in KIREJTSHUK & AUDISIO 1995), and faintly distinct arcuate area along lateral subdistal portion of gonostyloids. ‘Central point’ of ovipositor centrally located, proximally directed spicule absent.

**Etymology.** The generic name is derived from the host-plant family of all inclusive species, i.e. Asteraceae, and from ‘-gethes’, emphasizing the association with this botanical family as well as its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The three inclusive species are strictly associated for larval development with inflorescences (capitula) of Asteraceae, in particular *Arctotis* L., *Osteospermum* L., *Dimorphoteca* Vaill. ex Moench, *Othonna* L., and allied genera (KIREJTSHUK & AUDISIO 1995; AUDISIO unpublished data).

**Phylogenetic position.** *Asterogethes* gen. nov. is closely related to *Odontholariopsis* gen. nov., *Neolariopsis* gen. nov., and *Lariopsis*, with which it forms the newly circumscribed *Lariopsis*-complex of genera. This complex is supported by evidence from both adult morphology and molecular data (TRIZZINO et al. 2009). But phylogenetic relationships of *Asterogethes* gen. nov. with *Acanthogethes*, *Clypeogethes*, and other ancestral Meligethinae remain unclear.





**Fig. 2.** *Asterogethes* Audisio & Cline, gen. nov.: **a** – *A. endroedyi* (Kirejtshuk & Audisio, 1995); **b–d, f–n** – *A. arcuatus* (Reitter, 1872); **e** – *A. rufiventris* (Reitter, 1872). **a, b** – male habitus (**a** – length 3.2 mm; **b** – length 2.4 mm); **c** – dorso-lateral view of head; **d** – ventral view of head and anterior portion of prosternum; **e** – outline of male metafemur (length 0.5 mm); **f** – caudal marginal lines of metacoxal cavities; **g** – exposed portion of last visible abdominal ventrite; **h** – middle leg with illustrating outer margin of mesotibia; **k** – antenna; **m** – pronotal setae and microsetae on posterior margin of pronotum; **n** – prosternal process and mesoventrite. Scale bars: Figs. **c, h, m, n** = 20µm; Figs. **d, f, g** = 100 µm.

**Taxonomy and geographic distribution.** *Asterogethes* gen. nov. includes three species with the following restricted distributions in Southern Africa (KIREJTSHUK & AUDISIO 1995).

|  |                                 |
|--|---------------------------------|
| <i>Asterogethes arcuatus</i> (Reitter, 1872) <b>comb. nov.</b>               | South Africa: W Cape            |
| <i>Asterogethes endroedyi</i> (Kirejtshuk & Audisio, 1995) <b>comb. nov.</b> | South Africa: W Cape, S Namibia |
| <i>Asterogethes rufiventris</i> (Reitter, 1872) <b>comb. nov.</b>            | South Africa: W Cape            |

### 3. *Odontholariopsis* Audisio & Cline, gen. nov.

(Figs. 3 a–h)

**Type species.** *Meligethes nebulosus* Reitter, 1872: 247 (by present designation) [= *Odontholariopsis nebulosus* (Reitter, 1872) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.4–2.8 mm length), and share the following combination of characters.

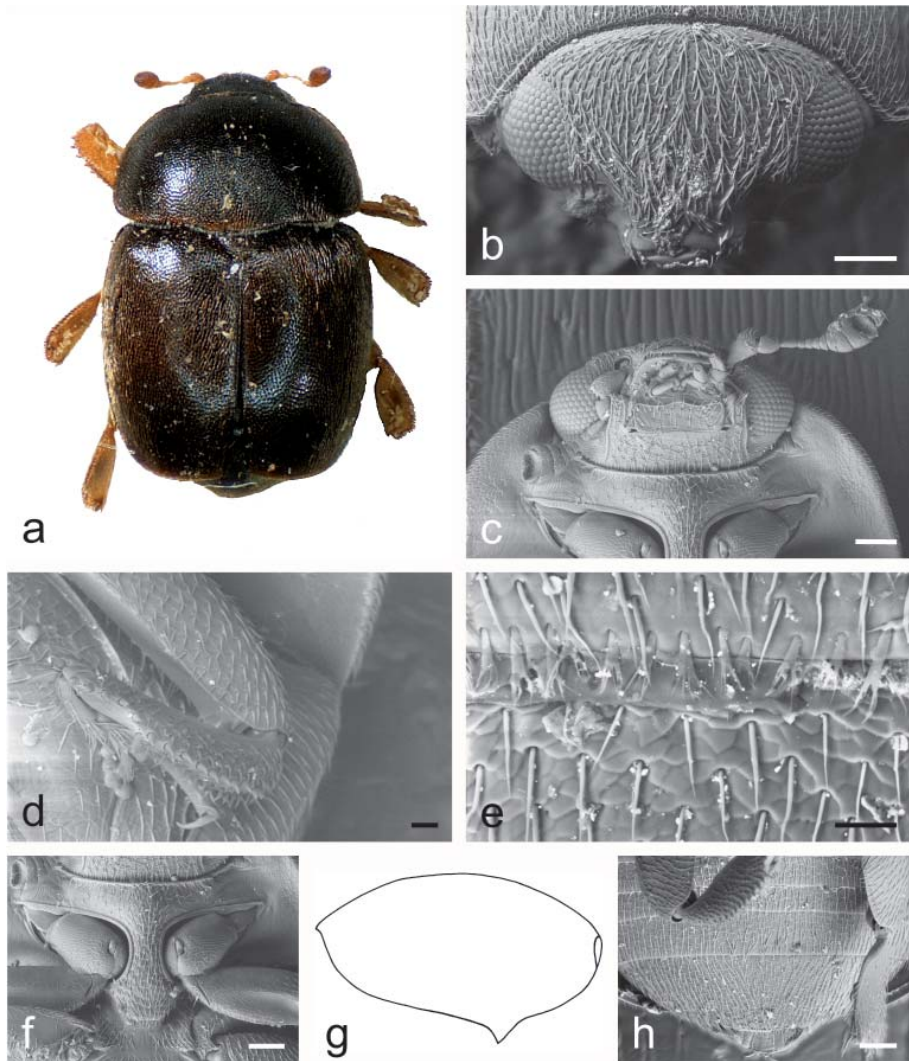
*Body color and pubescence:* pubescence golden to silvery-whitish or brownish, short and fine, recumbent, sparse, never obscuring the variably colored (reddish, brown, blackish, or brown with yellowish elytra: Figs. 3a; Figs. 129–130 in KIREJTSHUK & AUDISIO (1995)) dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disk. Lateral margin of pronotum and elytra with a series of usually distinct setae, each seta 0.7–0.8× as long as those on elytral disc; posterior margin of pronotum comprising moderately long, distally trifold or tetrafold microsetae, microsetae uniformly also along middle region anterior to scutellum (Fig. 3e).

*Dorsal habitus:* body moderately convex, variably shaped, usually moderately short and wide, oval, in some species exceptionally short and wide (Figs. 3a; Figs. 6–9 and 129–130 in KIREJTSHUK & AUDISIO 1995); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, shallowly impressed and densely distributed; anterior margin of clypeus slightly arcuately emarginate, simple, i.e. always without small distinct medial bulge, and not distinctly bordered (Fig. 3b), with circum-ocular furrows (occipital sulci) on dorsal side of head absent (Fig. 3b); eyes large and usually moderately projecting laterally (Figs. 3a, b); pronotum with faintly distinct posterior angles, rounded to obtuse and never directed posteriorly (Fig. 3a); scutellum regularly punctured in most of exposed portion; elytra with simple punctation, never transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Fig. 3a); elytral humeral striae usually not distinct; elytral pre-sutural striae visible, originating at scutellar vertex, terminating at elytral apex, and delimiting a faintly distinct, flat, not raised sutural border on each elytron, border widest at posterior third, slightly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 3a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 3a; Figs. 6–9 and 129–130 in KIREJTSHUK & AUDISIO 1995).

*Ventral habitus:* antennal furrows markedly delimited, nearly parallel-sided, or slightly divergent posteriorly; mentum subpentagonal (Fig. 3c); prosternal antennal furrows of anterior margin of prosternum scarcely raised and short, but distinct (Fig. 3c); prosternal process relatively narrow, but with strongly dilated subapical portion 2.3–2.5× as wide as maximum width of 1<sup>st</sup> antennomere, apex blunt (Fig. 3f); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating before predistal lateral expan-



sions (Fig. 3f); posterior margin of mesoventrite simple, never medially incised (Fig. 3f); moderately expressed sexual dimorphism on metaventrите, with variably developed impressions; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of



**Fig. 3.** *Odontholariopsis* Audisio & Cline, gen. nov.: **a, g** – *O. haagii* (Reitter, 1872); **b–f, h** – *O. nebulosus* (Reitter, 1872). **a** – male habitus (length 2.6 mm); **b** – dorsal view of head; **c** – ventral view of head and anterior portion of prosternum; **d** – middle leg illustrating outer margin of mesotibia; **e** – scutellum and microsetae on posterior margin of pronotum; **f** – prosternal process and mesoventrite; **g** – outline of male metafemur (length 0.5 mm); **h** – exposed portion of last visible abdominal ventrite. Scale bars: Figs. **b, c, f, h** = 100  $\mu$ m; Fig. **d** = 30  $\mu$ m; Fig. **e** = 20  $\mu$ m.

metacoxal cavities, without arched impression of outer 'axillary' line (as in Fig. 4k); 'axillary' space on first abdominal ventrite moderately developed, 'axillary' angle widely obtuse (as in Fig. 4k); small, short, and shallowly impressed arched impressions on basal portion of last visible abdominal ventrite mostly concealed by distal portion of penultimate visible abdominal ventrite (Fig. 3h).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as protibial width excluding distal teeth (Figs. 3a, c); 3<sup>rd</sup> antennomere in both sexes peculiarly short, usually only 1.7–1.8× as long as wide, and nearly 0.7× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 3a, c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, nearly as long as wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere moderately widened, nearly 0.7× as wide as 9<sup>th</sup> antennomere) (Figs. 3a, c), much narrower than width of protibiae, not sexually dimorphic; labial palpi short in both sexes (Fig. 3c), terminal segment 1.4–1.5× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 3c), terminal segment 1.9–2.0× as long as wide; mandible small-sized (Fig. 3c), apex typically acuminate, not sexually dimorphic; tarsal claws simple, never toothed at base (Fig. 3d); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Figs. 3a, d); protibiae with a series of usually moderately large, uneven, scarcely acuminate teeth on lateral margin (Figs. 3a; Figs. 78–80 in KIREJTSHUK & AUDISIO 1995); meso- and metatibiae on lateral margin bearing an apparently simple and usually even row of large and robust spurs, with peculiar U-shaped sinuosity at distal third, usually armed by additional outer spur (Fig. 3d; Figs. 91–92 in KIREJTSHUK & AUDISIO 1995); meso- and metatibiae of variable width, usually moderately wide and flat (Fig. 3a; Figs. 6–9 and 91–92 in KIREJTSHUK & AUDISIO 1995), never distinctly subtrapezoidal or axe-shaped; tarsal plates of prolegs moderately wider in males; strongly manifested sexual dimorphism in meso- and metafemoral shape, metafemoral margins in males bearing a single large, triangular or finger-like projection, reduced to a faintly distinct gibbosity in females (Fig. 3g; Figs. 100, 102–104 in KIREJTSHUK & AUDISIO 1995).

*Male genitalia*: processes along inner side of parameres absent (Figs. 25–26 and 39–44 in KIREJTSHUK & AUDISIO 1995), usually with shallow excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen and extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, rounded, subtruncate to obtusely emarginate distally.

*Female genitalia (ovipositor)*: variably shaped, usually small; styli usually long and relatively large, simple, cylindrical, moderately pigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and more darkly pigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 48–51 in KIREJTSHUK & AUDISIO 1995), and a single, variably shaped, pigmented and moderately sclerotized arcuate area along outer subdistal portion of gonostyloids. 'Central point' of ovipositor usually centrally located, without proximad directed spicule.

**Etymology.** The generic name is derived from a combination of the Greek 'οδούς, οδοντος' (= tooth), and *Lariopsis*, to emphasize the peculiarly shaped and toothed posterior margin of meso- and metafemora in males, and its placement within the *Lariopsis* generic complex. Gender masculine.

**Biology.** All species strictly associated for larval development with inflorescences of Mesembryanthemaceae, especially *Carpobrotus* N. E. Br., *Cephalophyllum* (Haw.) N. E. Br., *Ruschia* Schwant., *Lampranthus* N. E. Br., *Delosperma* N. E. Br., and allied genera (KIREJTSHUK & AUDISIO 1995, and unpublished data).

**Phylogenetic position.** *Odontholariopsis* gen. nov. is likely more closely related to *Asterogethes* gen. nov., and less so to *Lariopsis* and *Neolariopsis* gen. nov., but forming with them the newly defined *Lariopsis* generic complex, which is supported with evidence from both adult morphology and molecular datasets (TRIZZINO et al. 2009). Phylogenetic relationships of *Odontholariopsis* gen. nov. with *Acanthogethes*, *Clypeogethes*, and other ancestral Meliethinae genera remain unclear, and are only weakly supported by molecular data.

**Taxonomy and geographic distribution.** *Odontholariopsis* gen. nov. includes four described species distributed in Southern Africa (KIREJTSHUK & AUDISIO 1995).

|  |                                 |
|--|---------------------------------|
| <i>Odontholariopsis aurimaculatus</i> (Kirejtshuk & Audisio, 1995) <b>comb. nov.</b> | South Africa: W Cape            |
| <i>Odontholariopsis haagii</i> (Reitter, 1872) <b>comb. nov.</b>                     | South Africa: W Cape, S Namibia |
| <i>Odontholariopsis nebulosus</i> (Reitter, 1872) <b>comb. nov.</b>                  | South Africa: W Cape            |
| <i>Odontholariopsis sphaeroideus</i> (Kirejtshuk & Easton, 1988) <b>comb. nov.</b>   | South Africa: W and E Cape      |

#### 4. *Lariopsis* Kirejtshuk, 1989 stat. nov.

(Figs. 4 a–k)

*Lariopsis* Kirejtshuk, 1989: 86 (described as a subgenus of *Meligethes* Stephens, 1830).

**Type species.** *Meligethes variabilis* Reitter, 1872: 248 (by original designation) [= *Lariopsis variabilis* (Reitter, 1872) **comb. nov.**].

**Generic redescription and diagnosis.** Inclusive species vary greatly in size (2.3–3.5 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence golden to silvery-whitish, highly variable, 1) short, fine, and recumbent or 2) long, suberect, and partially obscuring the variably colored dorsal body surface (yellowish, reddish, brown, blackish, or blackish with orange spots on elytra: Fig. 4a); pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.6× as long as those on elytral disc; posterior margin of pronotum comprising moderately long, usually distally trifid or tetrafid microsetae, microsetae uniformly distributed along middle region anterior to scutellum (Fig. 4g).

*Dorsal habitus:* body more or less convex, variably shaped, usually moderately short and wide, oval, or narrower and more parallel-sided (Fig. 4a); dorsal punctures on discal portion of pronotum larger than eye facets, moderately to deeply impressed and densely distributed; anterior margin of clypeus moderately to strongly arcuately emarginate, simple, i.e. without small distinct bulge medially, and distinctly bordered (Fig. 4c), with circum-ocular furrows (occipital sulci) on dorsal side of head shallow but nearly completely developed anteriorly and posteriorly (Figs. 4b, c); eyes large and usually moderately projecting laterally (Figs. 4a, b, c); pronotum with faintly distinct posterior angles, rounded to obtuse and never directed posteriorly (Fig. 4a); scutellum regularly punctured on most of exposed portion; elytra with simple punctation, never transversely strigose; elytral humeral angle faintly distinct, not

protruding laterally (Fig. 4a); elytral humeral striae absent; elytral pre-sutural striae visible, originating at scutellar vertex, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, not raised sutural border, border widest at posterior third, slightly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 4a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 4a, h).

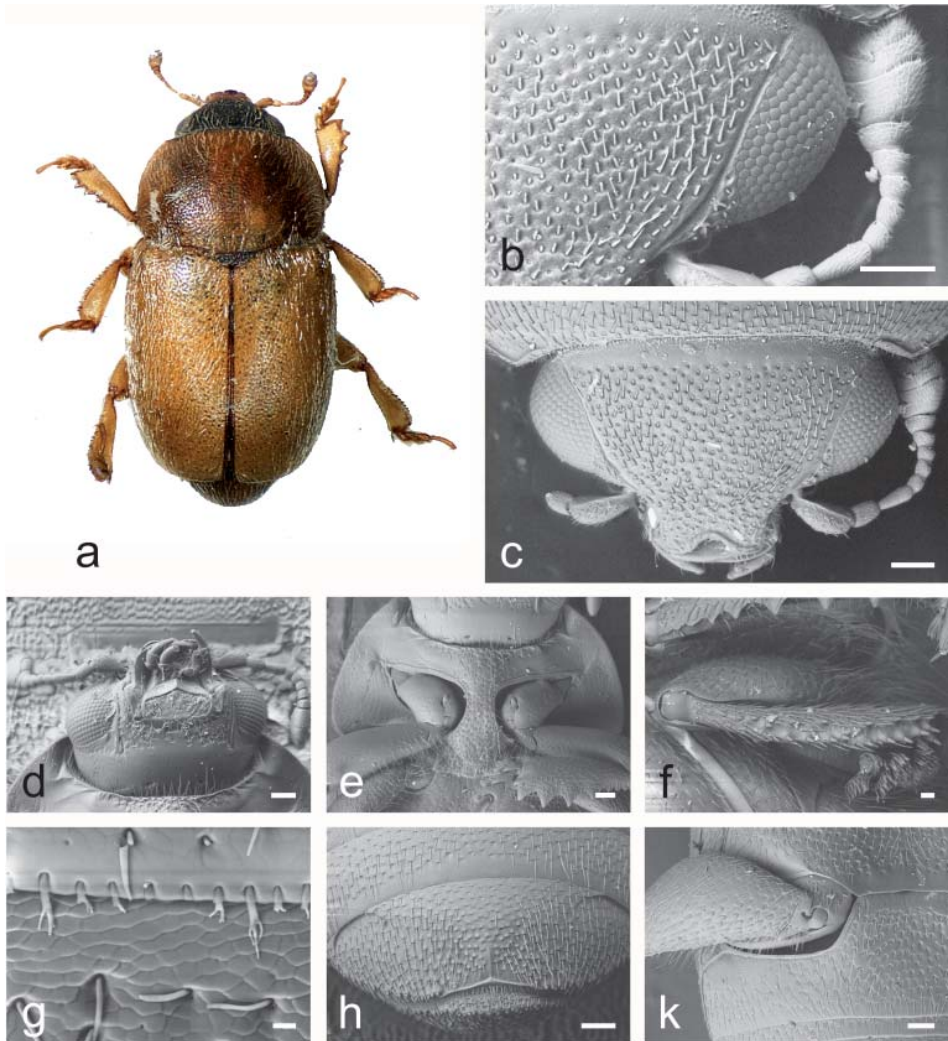
*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, or slightly divergent posteriorly; mentum subpentagonal (Fig. 4d); prosternal antennal furrows on anterior margin of prosternum almost completely obliterated (Fig. 4d); prosternal process relatively narrow, subapical portion strongly dilated, 2.3–2.5× as wide as maximum width of 1<sup>st</sup> antennomere, apex arcuately convex (Fig. 4e); lateral borders of prosternal process not delimiting furrows, terminating at base of prosternal process (Fig. 4e); posterior margin of mesoventrite simple, never incised medially, posteriorly slightly convex (Fig. 4e); variably developed male impressions on metaventrite and hypopygial tubercles (Fig. 4h); first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, without arched impression of outer ‘axillary’ line (Fig. 4k); ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle widely obtuse (Fig. 4k); moderately large, short and shallowly impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially obscured by distal portion of penultimate abdominal ventrite (Fig. 4h).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 4a, c); 3<sup>rd</sup> antennomere in both sexes usually 2.3–2.4× as long as wide, 1.2–1.3× longer and distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 4a, c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere moderately widened, 0.6× as wide as 9<sup>th</sup> antennomere) (Fig. 4b), much narrower than width of protibiae, sexual dimorphism absent; labial palpi moderately long (Fig. 4d), terminal segment 1.9–2.0× as long as wide; maxillary palpi moderately long and slender (Fig. 4d), terminal segment 2.5–2.6× as long as wide; mandible usually mid-sized (Fig. 4d), apex moderately acuminate, sexual dimorphism absent; tarsal claws strongly toothed at base (as in Fig. 17m); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 4a); protibiae with a series of large, wide at base, uneven, moderately sharp teeth on lateral margin (Figs. 4a, e; Fig. 74 in KIREJTSHUK & AUDISIO 1995); meso- and metatibiae on lateral margin bearing a nearly double and uneven row of large and robust brown spurs (Figs. 4f), U-shaped sinuosity absent at distal third; meso- and metatibiae moderately slender, flat (Fig. 4a), never distinctly subtrapezoidal or axe-shaped; sexual dimorphism variably expressed in metatibiae, i.e. more distinctly sinuate in males, and tarsal plates of prolegs moderately wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 17–20 in KIREJTSHUK & AUDISIO 1995), with nearly transversely truncate distal margin, and without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus without lateral emargination, subtruncate to bluntly acuminate distally, with arcuate shallow emargination distally.



*Female genitalia (ovipositor)*: moderately large; styli long and distinct, simple, cylindrical, more distinctly pigmented distally, inserted close to apex of contiguous gonostyloids; each gonostyloid moderately sclerotized and pigmented distally, with a simple, never indented outer portion of basicoxite (Fig. 47 in KIREJTSHUK & AUDISIO 1995), and a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor centrally located, without proximad directed spicule.



**Fig. 4.** *Lariopsis* Kirejtshuk, 1989: **a** – *L. vultuosus* (Kirejtshuk & Audisio, 1995); **b**–**k** – *L. variabilis* (Reitter, 1872). **a** – male habitus (length 3.3 mm); **b**, **c** – dorso-lateral view of head; **d** – ventral view of head and anterior portion of prosternum; **e** – prosternal process and mesoventrite; **f** – middle leg with outer margin of mesotibia; **g** – microsetae on middle posterior margin of pronotum; **h** – exposed portion of last visible abdominal ventrite; **k** – caudal marginal lines of metacoxal cavities. Scale bars: Figs. **b**, **c**, **d**, **e**, **h**, **k** = 100  $\mu$ m; Fig. **f** = 30  $\mu$ m; Fig. **g** = 10  $\mu$ m.

**Etymology.** The generic name was derived from *Laria* Scopoli, 1763, the ancient generic name of members of the present-day Meligethinae genus *Pria* Stephens, 1829, to emphasize the general aspect of a few, small-sized, and yellowish-colored species of *Neolariopsis* gen. nov. (previously included in *Lariopsis*) that superficially resemble members of *Pria*. Gender masculine.

**Biology.** The two inclusive species are strictly associated for larval development with inflorescences (capitula) of Asteraceae, e.g. those of *Arctotis* L., *Arctotheca* Wendl., and allied genera (KIREJTSHUK & AUDISIO 1995, and unpublished data).

**Phylogenetic position.** *Lariopsis* is more closely related to *Neolariopsis* gen. nov., *Odontholariopsis* gen. nov., and *Asterogethes* gen. nov.; collectively forming a newly defined *Lariopsis* generic complex, which is supported by both adult morphology and molecular data (TRIZZINO et al. 2009). Phylogenetic relationships of *Lariopsis* with *Acanthogethes*, *Chypeogethes*, and other ancestral lineages of Meligethinae remain unclear, and are only weakly supported with molecular data.

**Taxonomy and geographic distribution.** *Lariopsis* includes two described species distributed in Southern Africa (KIREJTSHUK & AUDISIO 1995).

*Lariopsis variabilis* (Reitter, 1872) **comb. nov.**

South Africa: W Cape

*Lariopsis vultuosus* (Kirejtshuk & Audisio, 1995) **comb. nov.**

South Africa: W and E Cape

### 5. *Neolariopsis* Audisio & Cline, gen. nov.

(Figs. 5 a–h)

**Type species.** *Meligethes cercoides* Reitter, 1872: 248 (by present designation) [= *Neolariopsis cercoides* (Reitter, 1872) **comb. nov.**].

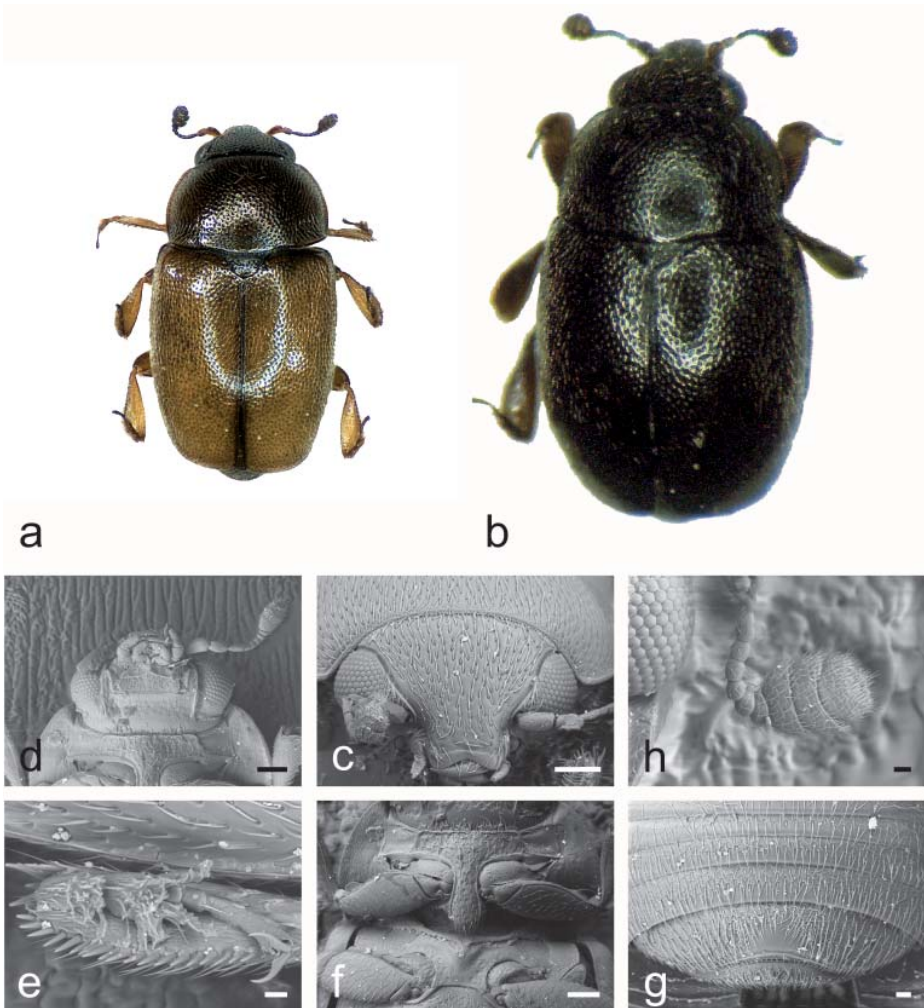
**Generic description and diagnosis.** Inclusive species vary moderately in size (1.6–2.2 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence golden to silvery-whitish, variable, short and fine, recumbent, or moderately long, suberect, never obscuring the variably colored dorsal body surface (yellowish, reddish, brown, blackish, frequently with metallic bronze iridescence, or blackish with orange spots on elytra: Figs. 5a, b); pronotal and elytral sides narrowly flattened, typically same color as disc. Lateral margin of pronotum and elytra typically with series of distinct setae, each seta 0.7–0.8× as long as those on elytral disc; posterior margin of pronotum comprising moderately long, usually distally trifold or tetrafid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (as in Fig. 3e).

*Dorsal habitus:* body more or less convex, variably shaped, usually moderately slender and oval (Figs. 5a, b); dorsal punctures on discal portion of pronotum as large as, or larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus moderately to strongly arcuately emarginate, simple, i.e. without small distinct bulge medially, distinctly and widely bordered (Fig. 5c), circum-ocular furrows (occipital sulci) on dorsal side of head almost complete, narrow, moderately to deeply impressed (Fig. 5c); eyes large and usually moderately projected laterally (Figs. 5a, c); pronotum with faintly distinct posterior angles, rounded to obtuse and never directed posteriorly (Figs. 5a, b); scutellum regularly punctured in most of exposed portion; elytra usually with simple punctuation, never completely transversely strigose, occasionally with faint traces of orange peel-like rugosity, or with



faint traces of uneven rugosity (e.g. *N. odiosus*); elytral humeral angle moderately distinct, not protruding laterally (Figs. 5a, b); elytral humeral striae absent; elytral pre-sutural striae visible, originating at scutellar vertex, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural border, border widest at posterior third and slightly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 5a); pygidium partially exposed, moderately convex, rounded apically in both sexes (Figs. 5a, g).



**Fig. 5.** *Neolariopsis* Audisio & Cline, gen. nov.: **a, c–h** – *N. cercoides* (Reitter, 1872); **b** – *N. thalyroides* (Kirejtshuk & Audisio, 1995). **a, b** – male habitus (**a** – length 2.1 mm, **b** – length 2.1 mm); **c** – dorsal view of head; **d** – ventral view of head and anterior portion of prosternum; **e** – middle leg with outer margin of mesotibia; **f** – prosternal process and mesoventrite; **g** – exposed portion of last visible abdominal ventrite; **h** – antenna. Scale bars: Figs. **c, d, f** = 100  $\mu$ m; Figs. **e, h** = 20  $\mu$ m; Fig. **g** = 30  $\mu$ m.

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, slightly convergent posteriorly, mentum subpentagonal (Fig. 5d); prosternal antennal furrows moderately raised and short at anterior margin of prosternum (Fig. 5d); prosternal process typically narrow, subapical dilated portion 1.6–1.8× as wide as maximum width of 1<sup>st</sup> antennomere, and usually apically bluntly acuminate (Fig. 5f); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions (Fig. 5f); posterior margin of mesoventrite simple, never incised medially (Fig. 5f); male impressions on metaventrite scarcely developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, without arched impression of outer ‘axillary’ line (as in Fig. 4k); ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle widely obtuse (as in Fig. 4k); relatively large but short and shallowly impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 5g).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 5a, b, d); 3<sup>rd</sup> antennomere in both sexes 2.0–2.1× as long as wide, 0.9–1.0× as long but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 5d); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, nearly as long as wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Figs. 5a, b, d), much narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 5d), terminal segment 1.7–1.8× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 5d), terminal segment 2.1–2.2× as long as wide; mandible mid-sized (Fig. 5c), apex moderately acuminate, no sexual dimorphism present; tarsal claws simple, never toothed at base (Fig. 5e); tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Figs. 5a, b, e); protibiae with a series of usually small, even, moderately sharp teeth on lateral margin (Figs. 5a, b; Figs. 81–85 in KIREJTSHUK & AUDISIO 1995); meso- and metatibiae on lateral margin bearing a single and usually even row of large and robust pegs (Fig. 5e), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually moderately slender and narrow (Figs. 5a, b), never subtrapezoidal or axe-shaped; no sexual dimorphism in tibial shape; tarsal plates of prolegs slightly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 29–38 and 45–46 in KIREJTSHUK & AUDISIO 1995), usually comprising moderately deep and narrow excision along distal margin, and always without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without emargination laterally, rounded, subtruncate to acuminate distally, without distal marked excision or emargination.

*Female genitalia (ovipositor)*: small; styli moderately long and distinct, simple, cylindrical, usually distinctly pigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid moderately sclerotized and more heavily pigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 55–59 in KIREJTSHUK & AUDISIO 1995), and a single, narrow, moderately pigmented and sclerotized arcuate area along outer subdistal por-

tion of gonostyloids. 'Central point' of ovipositor usually centrally located, with or without proximad directed spicule.

**Etymology.** The generic name is derived from a combination of the Greek 'νέος' (= new), and *Lariopsis*, emphasizing its relatively more derived position within the *Lariopsis* complex of genera. Gender masculine.

**Biology.** All species are likely to be strictly associated for larval development with inflorescences and flowers of Mesembryanthemaceae s. l. (including Aizoaceae), particularly with *Ruschia* Schwant. and allied genera, and with *Tetragonia* L. (KIREJTSHUK & AUDISIO 1995, and unpublished data).

**Phylogenetic position.** See discussion above regarding the phylogenetic placement of *Odontholariopsis* gen. nov.

**Taxonomy and geographic distribution.** *Neolariopsis* gen. nov. includes six described species distributed in Southern Africa (KIREJTSHUK & AUDISIO 1995), which are divided into two species groups (i.e. the *cercoides*, and *odiosus* species-groups). A few additional species still awaiting description are known to the authors from the same geographical area.

*Neolariopsis cercoides* (Reitter, 1872) **comb. nov.**

South Africa: W Cape

*Neolariopsis odiosus* (Reitter, 1872) **comb. nov.**

South Africa: W Cape

*Neolariopsis pulchellus* (Reitter, 1872) **comb. nov.**

South Africa: Free State, Gauteng, KwaZulu-Natal; Lesotho; ? Angola

*Neolariopsis serrula* (Kirejtshuk & Easton, 1988) **comb. nov.**

Lesotho

*Neolariopsis serruloides* (Kirejtshuk & Audisio, 1995) **comb. nov.**

South Africa: W Cape

*Neolariopsis thalycroides* (Kirejtshuk & Audisio, 1995)

South Africa: W Cape

**comb. nov.**

## 6. *Clypeogethes* Scholz, 1932 stat. nov.

(Figs. 6 a–e, k–n)

*Clypeogethes* Scholz, 1932: 97 (described as a subgenus of *Meligethes* Stephens, 1830).

**Type species.** *Meligethes (Clypeogethes) leonhardi* Scholz, 1932: 97 (by monotypy) [= *Meligethes elongatus* (Rosenhauer, 1856: 98) = *Clypeogethes elongatus* (Rosenhauer, 1856) comb. nov.].

**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.2–3.3 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence usually short and fine, recumbent, golden to silvery-whitish or leaden-brown, never obscuring the variably colored dorsal body surface (brown, blackish, reddish, dull bluish or blackish, in a few cases with orange spots on elytra) (Fig. 6a); pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid or rarely trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (as in Fig. 7g).

**Dorsal habitus:** body moderately convex, elongate, oval (Fig. 6a); dorsal punctures on discal portion of pronotum usually fine, nearly as large as eye facets, shallowly impressed and more or less densely distributed; anterior margin of clypeus more or less deeply sinuately emarginate,

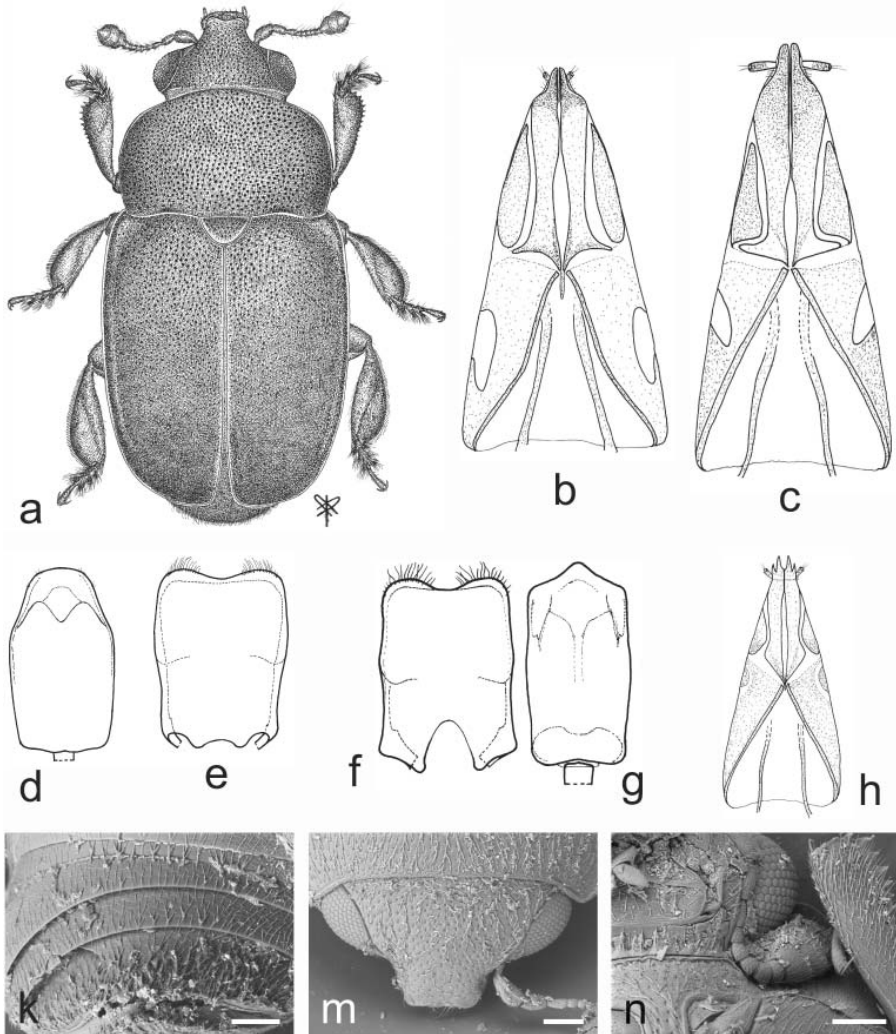
simple, i.e. without small distinct bulge medially, and distinctly bordered; circum-ocular furrows (occipital sulci) on dorsal side of head complete, fine but distinct (Fig. 6m); eyes large and usually moderately projected laterally (Figs. 6a, m); pronotum with faintly distinct posterior angles, rounded to obtuse and never directed posteriorly (Fig. 6a); scutellum regularly punctured in most of exposed portion; elytra with simple and fine punctation, never transversely strigose, occasionally with faint traces of orange peel-like rugosity; elytral humeral angle narrowly rounded, faintly distinct, not protruding laterally (Fig. 6a); elytral humeral striae usually indistinct; elytral pre-sutural striae visible, originating at scutellar vertex or slightly posterior to apex, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural border; border widest at posterior third, usually distinctly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 6a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 6a).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, or slightly divergent posteriorly; mentum subpentagonal (Fig. 6n); prosternal antennal furrows on anterior margin of prosternum moderately raised and short (Fig. 6n); prosternal process relatively narrow, subapical dilated portion 2.1–2.2× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly acuminate (as in Fig. 7d); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions; posterior margin of mesoventrite simple, never incised medially (as in Fig. 7d); male impressions on metaventrite moderately developed; first two visible abdominal ventrites usually simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities always simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer ‘axillary’ line (as in Fig. 7f); ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle obtuse (as in Fig. 7f); large and moderately deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 6k).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth; 3<sup>rd</sup> antennomere in both sexes usually 1.9–2.1× as long as wide, only 0.8–0.9× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 6a, m, n); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes, sexual dimorphism absent (Figs. 6a, n), distinctly narrower than width of protibiae; labial palpi relatively short in both sexes (as in Fig. 7c), terminal segment 1.7–1.8× as long as wide; maxillary palpi moderately long and slender in both sexes (as in Fig. 7c), terminal segment 2.4–2.7× as long as wide; mandible usually mid-sized (Fig. 6a), apex moderately acuminate, no sexual dimorphism; tarsal claws never toothed at base (as in Fig. 5e); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 6a); protibiae with a series of usually small, even, sharp teeth on lateral margin (Figs. 6a, n; Figs. 127d–f in AUDISIO 1993b); meso- and metatibiae on lateral margin bearing a moderately even row of fine pegs (Fig. 6a), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually moderately flat, but narrow and slender (Fig. 6a), never distinctly subtrapezoidal or axe-shaped; no sexual dimorphism in tibial shape; tarsal plates of prolegs slightly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.



*Male genitalia*: processes along inner side of parameres absent (Figs. 6d, e; Fig. 136 in AUDISIO 1993b), usually with arcuately emarginate distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without emargination laterally, rounded, subtruncate to acuminate distally, without distal minute excision or emargination.



**Fig. 6.** *Clyspeogethes* Scholz, 1932 and *Xerogethes* Audisio & Cline, gen. nov.: **a, c** – *C. chlorocyaneus* (Jelínek & Audisio, 1977); **b, d–e** – *C. elongatus* (Rosenhauer, 1856); **k–n** – *C. lepidii* (Miller, 1851); **f–g** – *X. osellai* (Audisio & Jelínek, 2000); **h** – *X. rotundicollis* (C. N. F. Brisout de Barneville, 1863). **a** – male habitus (length 2.5 mm); **b, c, h** – ovipositors; **d–e, f–g** – male genitalia; **k** – exposed portion of last visible abdominal ventrite; **m** – dorsal view of head; **n** – ventral view of head and anterior portion of prosternum. Figs. **b–h**: refer to AUDISIO (1993b) and AUDISIO et al. (2000) for scale. Scale bars: Figs. **k, m, n** = 100  $\mu$ m.

*Female genitalia (ovipositor)*: variably shaped, usually small; styli usually short but distinct, simple, cylindrical, frequently distinctly pigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and distally pigmented, with a simple, never indented outer portion of basicoxites (Figs. 6b, c; Figs. 155a–g in AUDISIO 1993b), and a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually centrally located, with or without proximad directed spicule.

**Etymology.** The generic name is derived from ‘clypeus’, to emphasize the markedly arcuately emarginate anterior margin of the clypeus, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated for larval development with flowers of Brassicaceae, especially *Alyssum* L., *Aurinia* Desv., *Moricandia* DC., *Hesperis* L., and *Matthiola* R.Br. (EASTON 1957a; AUDISIO 1993b, and unpublished data; AUDISIO et al. 2000).

**Phylogenetic position.** Available molecular and morphological datasets suggest a clearly monophyletic clade including *Clypeogethes* and *Xerogethes* gen. nov. (both genera developing on Brassicaceae). See comments within *Acanthogethes*, for possible relationships of *Clypeogethes* and *Xerogethes* gen. nov. with members of the *Lariopsis* generic complex and *Acanthogethes*.

**Taxonomy and geographic distribution.** Herein, *Clypeogethes* includes seven described species distributed from western Europe and North Africa to Middle Asia. Most known species are distributed in eastern Mediterranean countries (AUDISIO 1993b; AUDISIO et al. 2000; JELÍNEK & AUDISIO 2007).

|   |  |
|---|--|
| <i>Clypeogethes chlorocyaneus</i> (Jelínek & Audisio, 1977) <b>comb. nov.</b> | N Balkans, W and E Alps                  |
| <i>Clypeogethes coerulescens</i> (Kraatz, 1858) <b>comb. nov.</b>             | Greece                                   |
| <i>Clypeogethes elongatus</i> (Rosenhauer, 1856) <b>comb. nov.</b>            | Iberian Peninsula, N Africa, Middle East |
| <i>Clypeogethes lepidii</i> (Miller, 1851) <b>comb. nov.</b>                  | S Palaearctic Region, excluding N Africa |
| <i>Clypeogethes mithra</i> (Jelínek, 1978) <b>comb. nov.</b>                  | Near East                                |
| <i>Clypeogethes tener</i> (Reitter, 1873) <b>comb. nov.</b>                   | NE Mediterranean areas, Caucasus         |
| <i>Clypeogethes wittmeri</i> (Jelínek & Audisio, 1977) <b>comb. nov.</b>      | N Turkey, Armenia                        |

## 7. *Xerogethes* Audisio & Cline, gen. nov.

(Figs. 6 f–h, 7 a–g)

**Type species.** *Meligethes rotundicollis* C. N. F. Brisout de Barneville, 1863: 56, 97 (by present designation) [= *Xerogethes rotundicollis* (C. N. F. Brisout de Barneville, 1863) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.4–2.7 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence usually moderately long and fine, recumbent, golden to silvery-whitish, never obscuring the variably colored dorsal body surface (brown, blackish, reddish, or blackish with orange spots on elytra), *X. osellai* Audisio & Jelínek, 2000 possesses elongate, suberect, dense silvery pubescence; pronotal and elytral sides narrowly



flattened, typically the same color as disk, rarely pale reddish. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually  $0.3\text{--}0.5\times$  as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 7g).

*Dorsal habitus*: body markedly convex, short or slender, more or less oval (Fig. 7a); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, usually moderately deeply impressed and densely distributed; anterior margin of clypeus distinctly sinuately emarginate, simple, i.e. without small distinct bulge medially, and distinctly bordered (Figs. 7a, b); circum-ocular furrows (occipital sulci) on dorsal side of head complete and distinct (Fig. 7b); eyes large and usually moderately projected laterally (Figs. 7a, b); pronotum with faintly distinct posterior angles, rounded to obtuse and never posteriorly directed (Fig. 7a); scutellum regularly punctured in most of exposed portion; elytra with simple punctation, never transversely strigose; elytral humeral angles narrowly rounded, scarcely distinct, not protruding laterally (Fig. 7a); elytral humeral striae faintly distinct; elytral pre-sutural striae visible, originating at scutellar vertex or slightly posteriorly, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, not distinctly raised sutural border; border widest at posterior third, usually distinctly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 7a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 7a).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, or slightly divergent posteriorly; mentum subpentagonal (Fig. 7c); prosternal antennal furrows on anterior margin of prosternum moderately raised and short (Fig. 7c); prosternal process variably shaped, usually relatively narrow, subapical dilated portion  $2.0\text{--}2.1\times$  as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly acuminate (Fig. 7d); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions (Fig. 7d); posterior margin of mesoventrite simple, never incised medially (Fig. 7d); male impressions on metaventrte moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities always simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer 'axillary' line (Fig. 7f); 'axillary' space on first abdominal ventrite moderately developed, 'axillary' angle obtuse (Fig. 7f); large and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, usually not covered by distal portion of penultimate visible abdominal ventrite (Fig. 7e).

*Appendages*: male 1<sup>st</sup> antennomere  $0.8\text{--}1.0\times$  as long as width of protibiae excluding distal teeth (Figs. 7a, b, c); 3<sup>rd</sup> antennomere in both sexes  $1.9\text{--}2.1\times$  as long as wide, only  $0.8\text{--}0.9\times$  as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 7a, b, c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (Figs. 7a, c), much narrower than width of protibiae, sexual dimorphism absent; labial palpi moderately long in both sexes (Fig. 7c), terminal segment  $1.8\text{--}1.9\times$  as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 7c), terminal segment  $2.1\text{--}2.2\times$  as long as wide; mandible mid-sized (Fig.

7b), apex scarcely acuminate and simple, no sexual dimorphism present; tarsal claws simple, never toothed at base (as in Fig. 5e); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 7a); protibiae with a series of usually small, fine, rarely large and wide, moderately sharp teeth on lateral margin (Fig. 7a; Figs. 127a–c in AUDISIO 1993b); meso- and metatibiae on lateral margin bearing a moderately even row of fine pegs (Fig. 7a), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually moderately flat, but slender (Fig. 7a), never distinctly subtrapezoidal or axe-shaped; no sexual dimorphism in tibial shape; tarsal plates of prolegs slightly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 6f, g; Figs. 137a–l in AUDISIO 1993b), distal margin arcuately shaped or minutely incised, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without emargination laterally, rounded, distally subtruncate to acuminate, without distal minute excision or emargination.

*Female genitalia (ovipositor)*: uniformly shaped, usually small; styli moderately long, simple, cylindrical, not distinctly pigmented, inserted close to apex of peculiarly bifid and distally diverging gonostyloids, their combined divergence more or less widely V- or U-shaped (Fig. 6h; Figs. 155h–m in AUDISIO 1993b); each gonostyloid scarcely sclerotized and pigmented distally, with a simple, never indentate outer portion of basicoxites, and a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor centrally located or located more proximad than middle, with or without proximad directed short spicule.

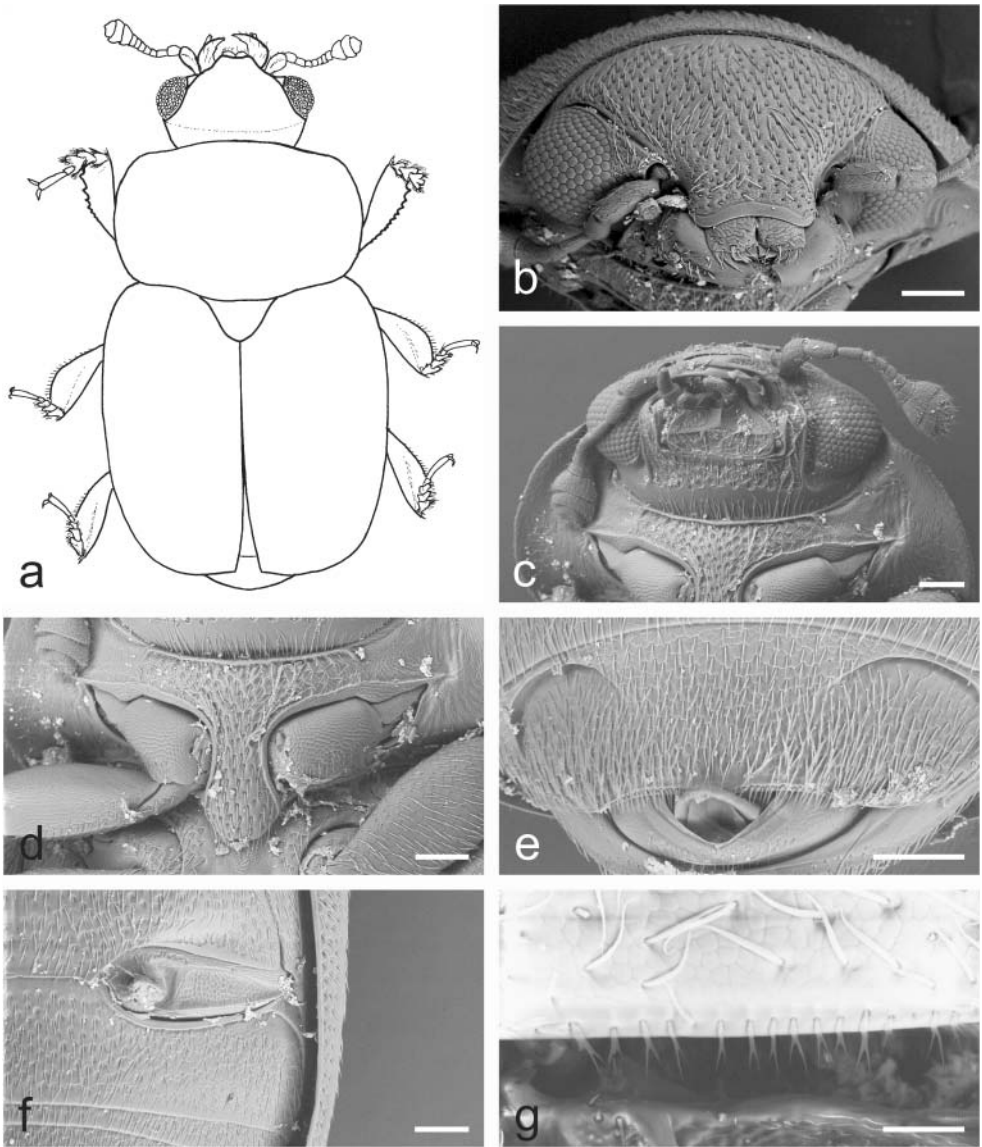
**Etymology.** The generic name is derived from the Greek ‘ξηρος’ (= dry, arid), to emphasize the association of most inclusive species with dry, xeric environments, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated for larval development with flowers of Brassicaceae, especially *Sisymbrium* L., *Erysimum* L., and allied genera (EASTON 1957a; AUDISIO 1993b, and unpublished data).

**Phylogenetic position.** Available molecular and morphological datasets suggest a clearly monophyletic clade including *Xerogethes* gen. nov. and *Clypeogethes* (both genera developing on Brassicaceae). See above comments on *Acanthogethes* for discussion on possible relationships of *Xerogethes* gen. nov. and *Clypeogethes* with members of the *Lariopsis* generic complex and *Acanthogethes*.

**Taxonomy and geographic distribution.** *Xerogethes* gen. nov. includes five described species distributed from western Europe and North Africa to the Near East (AUDISIO 1993b; AUDISIO et al. 2000).

|  |  |
|--|--|
| <i>Xerogethes brisouti</i> (Reitter, 1871) <b>comb. nov.</b>                             | NW Africa, Iberian Peninsula, S France     |
| <i>Xerogethes discoideus</i> (Erichson, 1845) <b>comb. nov.</b>                          | SE Europe, Near East                       |
| <i>Xerogethes kraatzii</i> (Reitter, 1871) <b>comb. nov.</b>                             | SE Europe, Near East                       |
| <i>Xerogethes osellai</i> (Audisio & Jelinek, 2000) <b>comb. nov.</b>                    | Central Turkey                             |
| <i>Xerogethes rotundicollis</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | W Europe, N Africa, Near East, Middle East |



**Fig. 7.** *Xerogethes* Audisio & Cline, gen. nov.: **a** – *X. osellai* (Audisio & Jelínek, 2000); **b–g** – *X. rotundicollis* (C. N. F. Brisout de Barneville, 1863). **a** – male habitus (length 2.0 mm); **b** – dorso-lateral view of head; **c** – ventral view of head and anterior portion of prosternum; **d** – prosternal process and mesoventrite; **e** – exposed portion of last visible abdominal ventrite; **f** – caudal marginal lines of metacoxal cavities; **g** – microsetae on middle of posterior margin of pronotum. Scale bars: Figs. **b, c, d, e, f** = 100  $\mu$ m; **g** = 30  $\mu$ m.

### 8. *Idiogethes* Kirejtshuk, 1977 stat. restit.

(Figs. 8 a–e)

*Idiogethes* Kirejtshuk, 1977: 626 [originally described as a separate genus, but later considered a subgenus of *Meligethes* Stephens, 1830 (KIREJTSHUK 1980b), or a synonym of the subgenus *Clypeogethes* Scholz, 1932 in the genus *Meligethes* Stephens, 1830 (KIREJTSHUK 2008)].

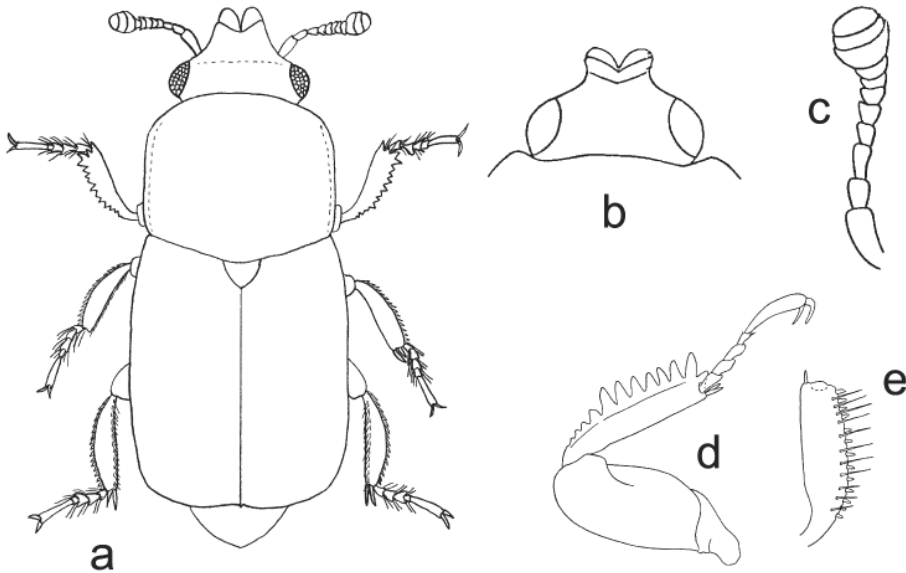
**Type species.** *Idiogethes angustitarsis* Kirejtshuk, 1977: 626 (by original designation).

**Generic redescription and diagnosis.** Inclusive species vary moderately in size (1.9–2.4 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence golden to silvery-whitish or brownish, relatively long and fine, recumbent, never obscuring the variably colored dorsal body surface (reddish, brown, or brown with yellowish elytra); pronotal sides narrowly flattened, elytral sides exceptionally narrowly margined and typically the same color as disc. Lateral margin of pronotum and elytra with a series of distinct, and relatively long setae, each seta usually 0.7–0.9× as long as those on elytral disc; posterior margin of pronotum with moderately long, distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum.

*Dorsal habitus:* body subcylindrical, transversally convex, peculiarly narrow and parallel-sided (Fig. 8a); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, shallowly impressed and densely distributed; anterior margin of clypeus with deep and widely V-shaped emargination, without small distinct bulge medially, and distinctly bordered (Figs. 8a, b); circum-ocular furrows (occipital sulci) on dorsal side of head absent; eyes small and faintly projecting laterally (Fig. 8a); pronotum with obtusely rounded posterior angles, never directed posteriorly (Fig. 8a); scutellum regularly punctured in most of exposed portion; elytra with simple punctation, never transversely strigose, with faint traces of orange peel-like rugosity; elytral humeral angle faintly distinct (Fig. 8a); elytral humeral striae usually indistinct; elytral pre-sutural striae visible, originating at scutellar vertex, terminating at elytral apex, and delimiting on each elytron a distinct, fine, narrow, slightly raised and even sutural border, much narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 8a); pygidium partially exposed, convex, rounded to shortly flatly lobed apically in males (Fig. 8a), more distinctly flatly lobed in females (Fig. 9 in KIREJTSHUK 1977a).

*Ventral habitus:* antennal furrows distinctly delimited, peculiarly short, nearly parallel-sided; mentum subpentagonal; prosternal antennal furrows of anterior margin of prosternum completely absent (as in Fig. 1b); prosternal process narrow (Fig. 7 in KIREJTSHUK 1977a), comprising moderately dilated subapical portion, 1.9–2.0× as wide as maximum width of 1<sup>st</sup> antennomere, apex blunt; lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating prior to predistal lateral expansions; posterior margin of mesoventrite simple, not incised medially; faintly developed male impressions on metaventrte; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, with moderately deep arched impression of outer ‘axillary’ line; ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle broadly obtuse; shallowly impressed arched impressions on basal portion of last visible abdominal ventrite wide



**Fig. 8.** *Idiogethes* Kirejtshuk, 1977: **a–e** – *I. angustitarsus* Kirejtshuk, 1977. **a** – male habitus (length 2.2 mm); **b** – dorsal view of head; **c** – antenna; **d** – anterior leg; **e** – mesotibia. Figs. **b–e**: refer to KIREJTSHUK (1977a) for scale.

but short, usually largely covered by distal portion of penultimate visible abdominal ventrite (as in Fig. 6k, but shorter; Fig. 9 in KIREJTSHUK 1977a).

**Appendages:** male 1<sup>st</sup> antennomere 0.9–1.0× as long as width of protibiae excluding distal teeth (Figs. 8a, c); 3<sup>rd</sup> antennomere in both sexes moderately short, usually only 1.8–1.9× as long as wide, nearly 1.0× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 8a, c); 4<sup>th</sup> antennomere in both sexes subequal, short, faintly as long as wide, 5<sup>th</sup> to 8<sup>th</sup> antennomeres peculiarly short, distinctly wider than long; antennal club compact, peculiarly small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, nearly 0.5× as wide as 9<sup>th</sup> antennomere) (Figs. 8a, c), distinctly narrower than protibial width, sexual dimorphism absent; labial palpi relatively short in both sexes (as in Fig. 7c), terminal segment 1.8–1.9× as long as wide; maxillary palpi moderately long and slender in both sexes, terminal segment 2.1–2.2× as long as wide; mandible small, apex acuminate, no sexual dimorphism present; tarsal claws simple, never toothed at base (as in Fig. 5e); tarsi peculiarly long and thin, middle and posterior tarsi 0.8–1.0× as long as corresponding tibiae (Figs. 8a, d); protibiae long and narrow, with a series of usually large, serrate, uneven, moderately acuminate teeth on lateral margin (Figs. 8a, d); meso- and metatibiae on lateral margin bearing long setae and a nearly simple and usually uneven row of relatively large pegs, without U-shaped sinuosity at distal third (Figs. 8a, e); meso- and metatibiae narrow, parallel-sided, usually flat and slender (Figs. 8a, e), never distinctly subtrapezoidal or axe-shaped; tarsal plates of prolegs narrow in both sexes, faintly wider in males; no sexual dimorphism in meso- and metafemoral shape, posterior margins simple, without projections or tubercles.



**Male genitalia:** processes along inner side of parameres absent (JELÍNEK 1982b), with deep excision along distal margin, and without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus without emargination laterally, obtusely acuminate or spatulate distally.

**Female genitalia (ovipositor):** small; styli usually short, simple, cylindrical, not pigmented, inserted at apex of apically narrowly separated gonostyloids, each gonostyloid faintly sclerotized and not darkly pigmented distally, with a simple, never indentate outer portion of basicoxites (Fig. 10 in KIREJTSHUK 1977b; JELÍNEK 1982b), and a single, variably shaped, unpigmented arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor located more proximad than middle, without proximally directed spicule.

**Etymology.** The generic name is derived from a combination of the Greek ‘ἴδιος’ (= peculiar, particular) to emphasize the peculiarly narrow body and tarsi, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** Species of *Idiogethes* are strictly associated for larval development with flowers of Boraginaceae, in particular with suberemic species of *Heliotropium* L.

**Phylogenetic position.** Available morphological datasets from imaginal stages provide weak evidence of a possibly natural clade including *Idiogethes* and *Boragogethes* gen. nov. (developing on Boraginaceae), with *Idiogethes* also likely being related to the *Lariopsis* generic complex (developing on Asteraceae and Mesembryanthemaceae) as well as *Acanthogethes* (developing on Cistaceae).

**Taxonomy and geographic distribution.** *Idiogethes* includes two described species distributed in Middle Asia (KIREJTSHUK 1977a; JELÍNEK 1982b; JELÍNEK & AUDISIO 2007).

*Idiogethes angustitarsus* Kirejtshuk, 1977 **comb. restit.**  
*Idiogethes bactrianus* (Jelínek, 1982) **comb. nov.**

Turkmenistan, Uzbekistan  
 Tajikistan, Turkmenistan

### 9. *Boragogethes* Audisio & Cline, gen. nov.

(Figs. 9 a–m)

**Type species.** *Nitidula symphyti* Heer, 1841: 405 (by present designation) [= *Boragogethes symphyti* (Heer, 1841) **comb. nov.**].

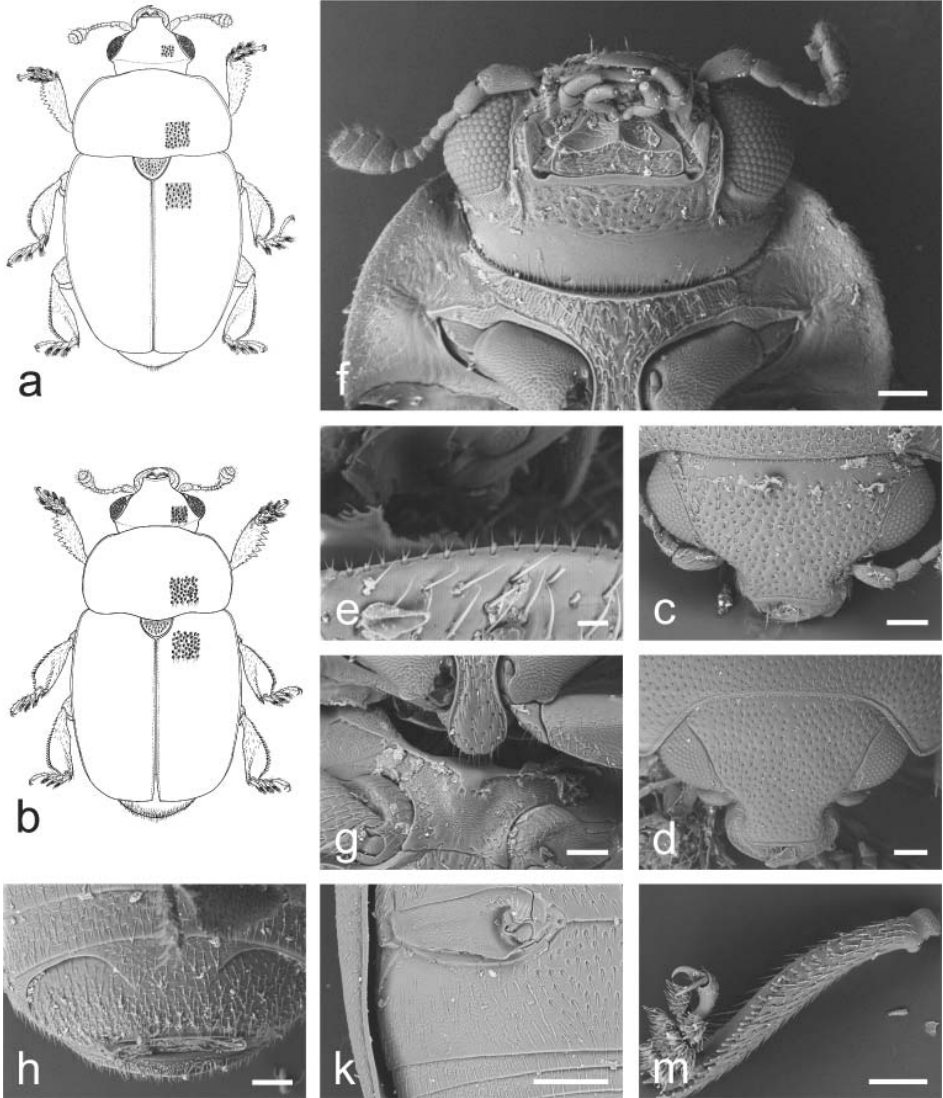
**Generic description and diagnosis.** Inclusive species vary greatly in size (2.0–3.2 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence usually moderately long and fine, recumbent, golden to silvery-whitish, never obscuring the variably colored dorsal body surface (brown, blackish, reddish, or blackish with orange spots on elytra); pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with short, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 9e).

**Dorsal habitus:** body markedly convex, short or slender, more or less oval (Figs. 9a, b); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, usually moderately deeply impressed and densely distributed; anterior margin of clypeus truncate, simple, without small distinct bulge medially, and distinctly bordered (Figs. 9c, d); circum-ocular furrows (occipital sulci) on dorsal side of head complete and distinct (Figs. 9 c, d);



eyes large and usually moderately projecting laterally (Figs. 9a–d); pronotum with faintly distinct posterior angles, rounded to bluntly obtuse, never directed posteriorly (Figs. 9a, b); scutellum regularly punctured in most of exposed portion; elytra with simple punctation, never transversely strigose; elytral humeral angles faintly narrowly rounded, not protruding



**Fig. 9.** *Boragogethes* Audisio & Cline, gen. nov.: **a, d, k, m** – *B. symphyti* (Heer, 1841); **b–c, e–h** – *B. rosenhaueri* (Reitter, 1871). **a, b** – male habitus (**a** – length 3.0 mm; **b** – length 2.5 mm); **c, d** – dorsal view of head; **e** – microsetae on posterior margin of pronotum; **f** – ventral view of head and anterior portion of prosternum; **g** – prosternal process and mesoventrite; **h** – exposed portion of last visible abdominal ventrite; **i** – exposed portion of last visible abdominal ventrite; **k** – caudal marginal lines of metacoxal cavities; **m** – outer margin of mesotibia. Scale bars: Figs. **c, d, f, g, h, m** = 100  $\mu$ m; Fig. **e** = 20  $\mu$ m; Fig. **k** = 200  $\mu$ m.

laterally (Figs. 9a,b); elytral humeral striae faint; elytral pre-sutural striae visible, originating at scutellar vertex or slightly posteriorly, terminating at elytral apex, and delimiting on each elytron a faintly distinct and raised sutural border, widest at posterior third, narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 9a, b); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 9a, b).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, or slightly divergent posteriorly; mentum subpentagonal (Fig. 9f); prosternal antennal furrows of anterior margin of prosternum moderately raised and short (Fig. 9f); prosternal process variably shaped, usually relatively narrow, subapical dilated portion 2.0–2.1× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly acuminate (Fig. 9g); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions (Fig. 9g); posterior margin of mesoventrite simple, never incised medially (Fig. 9g); male impressions on metaventrite moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities always simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer ‘axillary’ line (Fig. 9k); ‘axillary’ space on first abdominal ventrite reduced, ‘axillary’ angle bluntly right angled or slightly obtuse (Fig. 9k); large and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, usually not covered by distal portion of penultimate visible abdominal ventrite (Fig. 9h).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 9a, b); 3<sup>rd</sup> antennomere in both sexes 1.9–2.1× as long as wide, only 0.8–0.9× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 9a, b); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (Figs. 9a, b, f), much narrower than width of protibiae, sexual dimorphism absent; labial palpi moderately long in both sexes (Fig. 9f), terminal segment 1.7–1.9× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 9f), terminal segment 2.1–2.2× as long as wide; mandible mid-sized (Fig. 9f), apex faintly acuminate and simple, no sexual dimorphism present; tarsal claws simple, never toothed at base (Fig. 9m); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Figs. 9a, b, m); protibiae with a series of usually large, sharp, frequently uneven teeth on lateral margin (Figs. 9a, b; Figs. 129b–c, p in AUDISIO 1993b); meso- and metatibiae on lateral margin bearing a moderately even row of fine pegs (Fig. 9m), with or without sinuosity at distal third; meso- and metatibiae of variable width, usually moderately flat, but slender (Figs. 9a, b, m), never distinctly subtrapezoidal or axe-shaped; no sexual dimorphism in tibial shape; tarsal plates of prolegs slightly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 141a–h in AUDISIO 1993b), tegmen with arcuately shaped or deep median incision on distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variably shaped, without emargination laterally, rounded, distally subtruncate to acuminate, without distal minute excision or emargination.

*Female genitalia (ovipositor)*: small and faintly sclerotized; styli moderately long, simple, cylindrical, unpigmented, inserted at apex of contiguous gonostyloids (Figs. 158*f–i* in AUDISIO 1993b); each gonostyloid lightly sclerotized and never pigmented distally, with a simple, never indented outer portion of basicoxites, and a single, narrow, unpigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids; ‘central point’ of ovipositor nearly centrally located, without proximad directed spicule.

**Etymology.** The generic name is derived from the host-plant family of all inclusive species, i.e. Boraginaceae, and from ‘-gethes’, to emphasize both their association with this botanical family, and its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** Members of *Boragogethes* gen. nov. are all associated at larval stages with flowers of Boraginaceae, which likely colonized in a single ecological shift on members of *Symphytum* L. for the *B. symphyti* species-group, or on *Anchusa* L. for members of the *B. rosenhaueri* species-group (AUDISIO 1993b).

**Phylogenetic position.** Available molecular and morphological data provide only weak evidence for a possible monophyletic clade including *Boragogethes* gen. nov. in a relatively basal position, and related to *Idiogethes*, and likely to members of the *Lariopsis* generic complex. However, phylogenetic relationships between these taxa remain unclear.

**Taxonomy and geographic distribution.** *Boragogethes* gen. nov. includes five Palaearctic species, attributed to two formerly recognized species-groups, i.e. the ‘*Meligethes symphyti*’, and ‘*M. rosenhaueri*’ species-groups (AUDISIO 1993b).

|  |  |
|--|--|
| <i>Boragogethes intermedius</i> (Kirejtshuk, 1979) <b>comb. nov.</b>   | Kazakhstan                             |
| <i>Boragogethes mandibularis</i> (J. Sahlberg, 1913) <b>comb. nov.</b> | Turkey, Caucasus                       |
| <i>Boragogethes punctatissimus</i> (Reitter, 1896) <b>comb. nov.</b>   | Turkey, Armenia                        |
| <i>Boragogethes rosenhaueri</i> (Reitter, 1871) <b>comb. nov.</b>      | E Europe, Near East, W Middle Asia     |
| <i>Boragogethes symphyti</i> (Heer, 1841) <b>comb. nov.</b>            | Europe, Near East, N Africa: N Algeria |

## 10. *Afrogethes* Audisio & Cline, gen. nov.

(Figs. 10 a–h)

**Type species.** *Meligethes reticulatus* Reitter, 1872: 243, 253 (by present designation) [= *Afrogethes reticulatus* (Reitter, 1872) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.4–4.4 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish, highly variable, short and fine, faintly distinct to long and dense, recumbent, in a few species partly obscuring the blackish (rarely reddish-brown) dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral margin of pronotum and elytra with a series of more or less distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum comprising moderately long, usually distally trifid to multifid and stellate microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 10e).

*Dorsal habitus:* body more or less convex, highly variable in shape (Figs. 10a, k; Figs. 1–13, 15–16 in AUDISIO 1997b); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, usually deeply impressed and densely distributed, rarely fine,

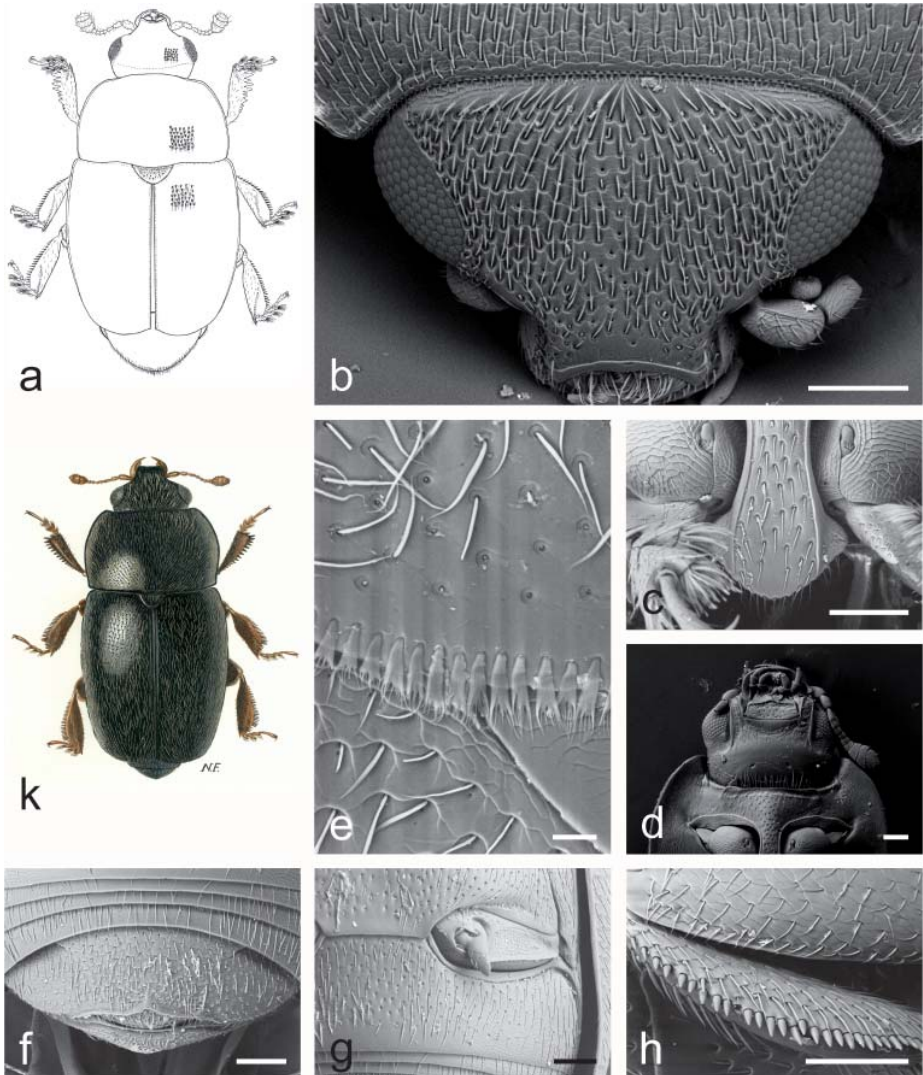
sparse, and shallow; anterior margin of clypeus usually moderately arcuately emarginate, distinctly and narrowly bordered (Fig. 10b), usually with a small, faintly distinct medial bulge, slightly protruding anteriorly; circum-ocular furrows (occipital sulci) on dorsal side of head not developed, absent or indistinct (Fig. 10b); eyes large and usually moderately projecting laterally (Figs. 10a, b, d, k); pronotum with distinct obtuse posterior angles, never posteriorly directed (Figs. 10a, k); scutellum more or less regularly and sparsely punctured at least in posterior half of exposed portion (Fig. 10k); elytra with highly variable punctation, completely transversely strigose or with simple punctures; elytral humeral angle moderately distinct, not protruding laterally (Figs. 10a, k); elytral humeral striae usually distinct; elytral pre-sutural striae visible, originating slightly posterior to scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a more or less distinct, flat, unraised sutural border, widest at posterior third and nearly as wide as proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Figs. 10a, k); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 10a, k).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, slightly divergent posteriorly; mentum subpentagonal (Fig. 10d); prosternal antennal furrows of anterior margin of prosternum more or less strongly raised but relatively short (Fig. 10d); prosternal process variable, usually relatively narrow, subapical dilated portion 2.0–2.5× as wide as maximum width of 1<sup>st</sup> antennomere, usually distally blunt (Fig. 10c); lateral borders of prosternal process delimiting moderately deeply impressed and distinct furrows, distally terminating over predistal lateral expansions, frequently nearly reaching posterior margin (Fig. 10c), which is usually microscopically denticulate; posterior margin of mesoventrite simple, never incised medially; male impressions on metaventrite moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, moderately narrowly paralleling metacoxal cavities, comprising moderately deep arched impression of outer ‘axillary’ line (Fig. 10g); ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle usually broadly obtuse (Fig. 10g); relatively large, long, and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, typically partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 10f).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Figs. 10a, k); 3<sup>rd</sup> antennomere in both sexes usually only 2.0–2.1× as long as wide, 0.9–1.0× as long but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 10d); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, nearly as long as wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.5–0.6× as wide as 9<sup>th</sup> antennomere) (Figs. 10a, d), slightly or distinctly narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 10d), terminal segment nearly 1.8× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 10d), terminal segment 2.1–2.2× as long as wide; mandible mid-sized (Fig. 10d), apex moderately acuminate, no sexual dimorphism present; tarsal claws highly variable, simple, bluntly toothed at base, or strongly and acutely toothed; tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Figs. 10a, k); protibiae with a series of usually large, uneven, long and variably shaped (blunt to sharply acuminate) teeth on lateral margin (Figs. 10a, k; Figs. 18–19 and 23–32 in EASTON 1960; Figs. 129f–l, m–n in AUDISIO



1993b; Figs. 17–29 in AUDISIO 1997b); meso- and metatibiae on lateral margin bearing a single and usually moderately even row of large and robust pegs (Fig. 10h), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually moderately slender and narrow (Figs. 10a, h, k), never subtrapezoidal or axe-shaped; male metatibiae more sinuate



**Fig. 10.** *Afrogethes* Audisio & Cline, gen. nov.: **a** – *A. tristis* (Sturm, 1845); **b–d, h** – *A. reticulatus* (Reitter, 1872); **e** – *A. alani* (Kirejtshuk, 1988); **f–g** – *A. planiusculus* (Heer, 1841); **k** – *A. isoplexidis* (Wollaston, 1854). **a, k** – male habitus (**a** – length 2.6 mm; **k** – length 2.5 mm); **b** – dorsal view of head; **c** – prosternal process; **d** – ventral view of head and anterior portion of prosternum; **e** – microsetae on middle posterior margin of pronotum; **f** – exposed portion of last visible abdominal ventrite; **g** – caudal marginal lines of metacoxal cavities; **h** – outer margin of mesotibia. Scale bars: Figs. **b, c, d, f, g, h** = 100  $\mu$ m; Fig. **e** = 20  $\mu$ m.



than in females; tarsal plates of prolegs usually distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

**Male genitalia:** processes along inner side of parameres absent (Figs. 70–73 and 76–93 in EASTON 1960; Figs. 140 and 141*m–p* in AUDISIO 1993b; Figs. 30–80 in AUDISIO 1997b), with more or less deeply incised or truncate distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, narrowed and variably shaped distally.

**Female genitalia (ovipositor):** highly variable in shape, usually large; styli long and pigmented, or short and unpigmented, simple, cylindrical. *Afrogethes howdeni* (Kirejtshuk, 1990) from South Africa with entire ovipositor absent and replaced by an unsclerotized tubular structure (AUDISIO 1997b). *Afrogethes africanus* (Kraatz, 1895) from Western Africa, with abruptly and widely truncate apex (AUDISIO unpublished data). Styli situated close to apex of usually contiguous gonostyloids, each gonostyloid lightly sclerotized and not darkly pigmented distally. Outer portion of basicoxites simple, never indented (Figs. 112–116 and 118–127 in EASTON 1960; Figs. 157*a–f* in AUDISIO 1993b; Figs. 81–93 in AUDISIO 1997b), with a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually more distad than middle, with or without proximad directed spicule.

**Etymology.** The generic name is derived from the Latin ‘*africanus*’ (= African), to emphasize the probable African origin of the ancestor for all inclusive species and species-groups, and from ‘*-gethes*’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The biology of most inclusive species is only partially known, and likely being heterogeneously expressed within this large taxon. Members of the large *Afrogethes reticulatus/forcipatus/coronatus* species-group are likely all associated with flowers of Verbenaceae, while members of the *A. planiusculus* species-group are all associated with the related Boraginaceae, in particular with *Echium* L., *Trichodesma* R. Brown and allied genera (AUDISIO 1993b; WILLIAMS 2002; AUDISIO et al. 2009b). Members of the large African *A. amplicollis* and *A. aethiopicus* species-groups are, on the contrary, all associated with Fabaceae, except the single southern African species, *A. breithenbachae* Audisio, 1997, which is likely associated (AUDISIO 1997b, AUDISIO & DE BIASE 2004a) with phylogenetically related Polygalaceae (JUDD et al. 1994, 2002).

**Phylogenetic position.** Available molecular and morphological datasets provide moderately concordant evidence for a possible monophyletic clade including *Afrogethes* gen. nov., as well as *Fabogethes* gen. nov., *Genistogethes* gen. nov., *Sagittogethes* gen. nov., and *Thymogethes* gen. nov. (AUDISIO et al. 2009b, TRIZZINO et al. 2009). However, phylogenetic relationships between these taxa and between this clade and *Aristogethes* gen. nov. are still unclear.

**Taxonomy and geographic distribution.** *Afrogethes* gen. nov. is the largest genus of the ‘*Meligethes* s. l.’ generic complex, including ~120 described and some additional 30 undescribed species. The genus is mainly distributed in Tropical Africa and Madagascar, with a few species-groups marginally penetrating into Europe, eastern Asia, and North America (AUDISIO et al. 2009b). The tentatively included species below are attributed to at least five formerly recognized species-groups, i.e. the ‘*Meligethes reticulatus/forcipatus/coronatus*’,

'*M. planiusculus*', '*M. aethiopicus*', '*M. voeltzkowi*', and '*M. amplicollis*' species-groups (EASTON 1954b, 1959b, 1960; AUDISIO 1994, 1997b; KIREJTSHUK 2001; AUDISIO et al. 2009b).

- Afrogethes abstractus* (Grouvelle, 1908) **comb. nov.** Ethiopia, Eritrea, Somaliland  
*Afrogethes adenensis* (Easton, 1954) **comb. nov.** S Arabian Peninsula  
*Afrogethes adversus* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes aethiopicus* (Grouvelle, 1908) **comb. nov.** Central and S Africa  
*Afrogethes africanus* (Kraatz, 1895) **comb. nov.** Togo  
*Afrogethes alani* (Kirejtshuk, 1988) **comb. nov.** South Africa: KwaZulu-Natal, Mpumalanga  
*Afrogethes alluaudi* (Grouvelle, 1896) **comb. nov.** Gambia, Senegal  
*Afrogethes altercatio* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes amplicollis* (Boheman, 1851) **comb. nov.** South Africa: KwaZulu-Natal, E Cape  
*Afrogethes amplimanus* (Easton, 1960) **comb. nov.** Tanzania  
*Afrogethes annae* (Kirejtshuk, 1996) **comb. nov.** South Africa: KwaZulu-Natal  
*Afrogethes arabicus* (Jelinek, 1988) **comb. nov.** Arabian Peninsula  
*Afrogethes arcopenis* (Kirejtshuk, 1996) **comb. nov.** Namibia  
*Afrogethes aspalathi* (Audisio & De Biase, 2004) **comb. nov.** South Africa: W and E Cape  
*Afrogethes assutus* (Easton, 1960) **comb. nov.** Kenya  
*Afrogethes astylus* (Easton, 1960) **comb. nov.** Kenya  
*Afrogethes attackus* (Kirejtshuk & Viklund, 2002) **comb. nov.** Kenya  
*Afrogethes basicollis* (Easton, 1964) **comb. nov.** South Africa: NW Province  
*Afrogethes bocaki* (Audisio, Jelinek & Cooter, 2005) **comb. nov.** S China  
*Afrogethes breitenbachae* (Audisio, 1997) **comb. nov.** South Africa: W Cape  
*Afrogethes brevisculus* (Kraatz, 1895) **comb. nov.** Tropical Africa  
*Afrogethes brittoni* (Easton, 1954) **comb. nov.** S Arabian Peninsula  
*Afrogethes buduensis* (Ganglbauer, 1899) **comb. nov.** E Mediterranean areas, SE Europe, Middle East, W Middle Asia  
*Afrogethes canadensis* (Easton, 1955) **comb. nov.** W North America  
*Afrogethes canariensis* (Kirejtshuk, 1997) **comb. nov.** Canary Islands  
*Afrogethes capensis* (Reitter, 1872) **comb. nov.** South Africa: E Cape, KwaZulu-Natal  
*Afrogethes chevrolati* (Reitter, 1872) **comb. nov.** South Africa: W Cape  
*Afrogethes clavatus* (Reitter, 1872) **comb. nov.** South Africa: W Cape  
*Afrogethes clypeonitens* (Easton, 1960) **comb. nov.** Kenya  
*Afrogethes colophonoides* (Audisio, 1997) **comb. nov.** South Africa: W Cape  
*Afrogethes conformis* (Spornraft & Kirejtshuk, 1993) **comb. nov.** South Africa: E Cape  
*Afrogethes cornutus* (Easton, 1960) **comb. nov.** Kenya, Tanzania, Uganda  
*Afrogethes coronatus* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes curtulus* (Grouvelle, 1916) **comb. nov.** Southern Central Africa  
(= *Meligethes tutimanus* Easton, 1964)  
*Afrogethes dahlgreni* (Audisio, 1997) **comb. nov.** South Africa: W Cape  
*Afrogethes debiasei* (Audisio, 1997) **comb. nov.** South Africa: E Cape, KwaZulu-Natal  
*Afrogethes dentellus* (Spornraft & Kirejtshuk, 1993) **comb. nov.** Swaziland  
*Afrogethes desperatoides* (Audisio, 1994) **comb. nov.** Sierra Leone  
*Afrogethes desperatus* (Easton, 1964) **comb. nov.** Congo  
*Afrogethes edwardsi* (Easton, 1960) **comb. nov.** Kenya, Uganda  
*Afrogethes elgonensis* (Easton, 1960) **comb. nov.** Uganda  
*Afrogethes exiguus* (Kirejtshuk, 1990) **comb. nov.** Ethiopia

- Afrogethes fistuca* (Kirejtshuk & Viklund, 2002) **comb. nov.** Kenya  
*Afrogethes floralimimus* (Audisio, 1997) **comb. nov.** South Africa: E Cape, KwaZulu-Natal  
*Afrogethes floralis* (Reitter, 1872) **comb. nov.** South Africa: E Cape, KwaZulu-Natal  
*Afrogethes forcipatus* (Kirejtshuk & Easton, 1988) **comb. nov.** South Africa: KwaZulu-Natal, Free State  
*Afrogethes fossilis* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes fritschii* (Reitter, 1872) **comb. nov.** South Africa: W Cape  
*Afrogethes fruticola* (Spornraft & Kirejtshuk, 1993) **comb. nov.** South Africa: W Cape  
*Afrogethes grandicollis* (Reitter, 1872) **comb. nov.** South Africa: E Cape ?  
*Afrogethes gurjevae* (Kirejtshuk, 1984) **comb. nov.** Mongolia, E Siberia: Yakutia  
*Afrogethes howdeni* (Kirejtshuk, 1990) **comb. nov.** South Africa: KwaZulu-Natal  
*Afrogethes imperator* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes inconspicuus* (Spornraft & Kirejtshuk, 1993) **comb. nov.** South Africa: Free State; Swaziland  
*Afrogethes isoplexidis* (Wollaston, 1854) **comb. nov.** Madeira  
*Afrogethes janczyki* (Kirejtshuk, 1988) **comb. nov.** Madagascar  
*Afrogethes johnstoni* (Easton, 1960) **comb. nov.** Uganda  
*Afrogethes kirkspriggsi* (Audisio, 1994) **comb. nov.** Sierra Leone  
*Afrogethes largus* (Spornraft & Kirejtshuk, 1993) **comb. nov.** South Africa: KwaZulu-Natal  
*Afrogethes latimanus* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes latissimus* (Reitter, 1872) **comb. nov.** S Africa: W and E Cape  
*Afrogethes lepellei* (Easton, 1960) **comb. nov.** Kenya  
*Afrogethes limifer* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes livens* (Grouvelle, 1908) **comb. nov.** Ethiopia  
*Afrogethes lividus* (Easton, 1959) **comb. nov.** Ethiopia, Kenya, Congo  
*Afrogethes lomaensis* (Audisio, 1994) **comb. nov.** Sierra Leone  
*Afrogethes maureenae* (Easton, 1959) **comb. nov.** Eritrea  
*Afrogethes mauritii* (Grouvelle, 1908) **comb. nov.** East Africa, Ethiopia  
*Afrogethes maynei* (Kirejtshuk, 1990) **comb. nov.** Congo, Sierra Leone  
*Afrogethes microclavatus* (Easton, 1964) **comb. nov.** Congo  
*Afrogethes micropunctatus* (Easton, 1959) **comb. nov.** Ethiopia  
*Afrogethes mimetes* (Grouvelle, 1910) **comb. nov.** Tanzania, Congo  
*Afrogethes mimoides* (Audisio, 1994) **comb. nov.** Sierra Leone  
*Afrogethes mimus* (Easton, 1964) **comb. nov.** Congo  
*Afrogethes montisatris* (Audisio, 1997) **comb. nov.** South Africa: W Cape  
*Afrogethes natalensis* (Spornraft & Kirejtshuk, 1993) **comb. nov.** South Africa: KwaZulu-Natal  
*Afrogethes obtusidentatus* (Spornraft & Kirejtshuk, 1993) **comb. nov.** South Africa: W Cape  
*Afrogethes pamirensis* (Kirejtshuk, 1979) **comb. nov.** Tajikstan, N Pakistan  
*Afrogethes paraproctatus* (Easton, 1960) **comb. nov.** Kenya  
*Afrogethes patiens* (Easton, 1960) **comb. nov.** Uganda, Kenya  
*Afrogethes pectinatus* (Schilsky, 1894) **comb. nov.** Turkey, Caucasus  
*Afrogethes planiusculus* (Heer, 1841) **comb. nov.** W Palaearctic areas  
*Afrogethes primigenius* (Audisio, 1997) **comb. nov.** South Africa: W Cape  
*Afrogethes profugus* (Easton, 1960) **comb. nov.** Tanzania: Zanzibar  
*Afrogethes pseudorimulosus* (Audisio, 1997) **comb. nov.** South Africa: W Cape  
*Afrogethes pygmaeus* (Reitter, 1872) **comb. nov.** South Africa: W Cape  
*Afrogethes regalis* (Easton, 1964) **comb. nov.** Congo, Sierra Leone  
*Afrogethes reticulatus* (Reitter, 1872) **comb. nov.** South Africa: W Cape

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| <i>Afrogethes rimulosus</i> (Reitter, 1872) <b>comb. nov.</b>  | South Africa: W and N Cape                  |
| <i>Afrogethes robertsoni</i> (Audisio, 1997) <b>comb. nov.</b>   | South Africa: W Cape                        |
| <i>Afrogethes roeri</i> (Kirejtshuk, 1998) <b>comb. nov.</b>   | N Namibia                                   |
| <i>Afrogethes rossii</i> (Audisio, 1994) <b>comb. nov.</b>   | Sierra Leone                                |
| <i>Afrogethes rugifer</i> (Spornraft & Kirejtshuk, 1993) <b>comb. nov.</b>                                 | South Africa: KwaZulu-Natal, Mpumalanga     |
| <i>Afrogethes rugipennis</i> (Spornraft & Kirejtshuk, 1993) <b>comb. nov.</b>                              | South Africa: W and E Cape, KwaZulu-Natal   |
| <i>Afrogethes rugipusillus</i> (Audisio, 1997) <b>comb. nov.</b>   | South Africa: W Cape                        |
| <i>Afrogethes saevus</i> (J. LeConte, 1859) <b>comb. nov.</b>  | N America                                   |
| <i>Afrogethes schilskyi</i> (Reitter, 1896) <b>comb. nov.</b>  | Middle Asia, N Africa ?                     |
| <i>Afrogethes schoutedeni</i> (Kirejtshuk, 1990) <b>comb. nov.</b>   | Congo                                       |
| <i>Afrogethes scotti</i> (Easton, 1954) <b>comb. nov.</b>  | S Arabian Peninsula, E Africa               |
| <i>Afrogethes serrator</i> (Reitter, 1872) <b>comb. nov.</b><br>(= <i>Meligethes cinctus</i> Easton, 1964) | subtropical Southern Africa, Central Africa |
| <i>Afrogethes sokolovi</i> (Kirejtshuk, 1990) <b>comb. nov.</b>  | Kenya                                       |
| <i>Afrogethes strigulosus</i> (Reitter, 1872) <b>comb. nov.</b>  | South Africa: W Cape                        |
| <i>Afrogethes subcaerulescens</i> (Grouvelle, 1908) <b>comb. nov.</b>                                      | E Africa                                    |
| <i>Afrogethes subexilis</i> (Grouvelle, 1908) <b>comb. nov.</b>  | Ethiopia                                    |
| <i>Afrogethes subfloralis</i> (Kirejtshuk, 1988) <b>comb. nov.</b>   | South Africa: W Cape                        |
| <i>Afrogethes subtristis</i> (Easton, 1957) <b>comb. nov.</b>  | Middle Asia                                 |
| <i>Afrogethes tatjanae</i> (Kirejtshuk, 1982) <b>comb. nov.</b>  | Uzbekistan                                  |
| <i>Afrogethes tenuirugatus</i> (Spornraft & Kirejtshuk, 1993) <b>comb. nov.</b>                            | South Africa: W and E Cape, KwaZulu-Natal   |
| <i>Afrogethes testudo</i> (Audisio, 1997) <b>comb. nov.</b>  | South Africa: Mpumalanga                    |
| <i>Afrogethes trapezicollis</i> (Kirejtshuk, 1990) <b>comb. nov.</b>                                       | Congo                                       |
| <i>Afrogethes tristis</i> (Sturm, 1845) <b>comb. nov.</b>  | Europe, N Caucasus                          |
| <i>Afrogethes univestis</i> (Spornraft & Kirejtshuk, 1993) <b>comb. nov.</b>                               | South Africa: E Cape                        |
| <i>Afrogethes upembanus</i> (Easton, 1964) <b>comb. nov.</b>   | Congo                                       |
| <i>Afrogethes vacca</i> (Easton, 1960) <b>comb. nov.</b>   | Uganda                                      |
| <i>Afrogethes voeltzkowi</i> (Grouvelle, 1913) <b>comb. nov.</b>   | Tropical E Africa, NE South Africa          |
| <i>Afrogethes yemenensis</i> (Easton, 1954) <b>comb. nov.</b>  | NE Africa, Arabian Peninsula, Jordan        |

**Species ‘*incertae sedis*’.** The placement of the following African and Indian species within *Afrogethes* gen. nov. or their assignment to separated genera remains uncertain, and requires further analyses. Members of the ‘*Meligethes*’ *perfectus* group (EASTON 1960, 1961) are likely not too distantly related from *Aristogethes* gen. nov. ‘*Meligethes*’ *rileyi* Easton, 1960 from E Africa, is the only known representative of Meligethinae known to be probably associated with Proteaceae (EASTON 1960). The isolated ‘*Meligethes*’ *heteropus* Gerstaecker, 1871 from Tropical Africa, is the only known ‘*Meligethes* s. l.’ associated with Poaceae (KIRK-SPRIGGS 1985).

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| ‘ <i>Meligethes</i> ’ <i>braeti</i> Grouvelle, 1894      | N India         |
| ‘ <i>Meligethes</i> ’ <i>heteropus</i> Gerstaecker, 1871 | Tropical Africa |
| ‘ <i>Meligethes</i> ’ <i>imperfectus</i> Easton, 1960    | Tanzania        |
| ‘ <i>Meligethes</i> ’ <i>perfectus</i> Easton, 1960      | Tanzania        |
| ‘ <i>Meligethes</i> ’ <i>rileyi</i> Easton, 1960         | Kenya, Tanzania |
| ‘ <i>Meligethes</i> ’ <i>suppar</i> Easton, 1961         | Tanzania        |
| ‘ <i>Meligethes</i> ’ <i>waterhousei</i> Grouvelle, 1908 | N India         |

### 11. *Indogethes* Audisio & Cline, gen. nov.

(Figs. 11 a–m)

**Type species.** *Meligethes curvipes* Grouvelle, 1908: 373, 374 (by present designation) [= *Indogethes curvipes* (Grouvelle, 1908) comb. nov.].

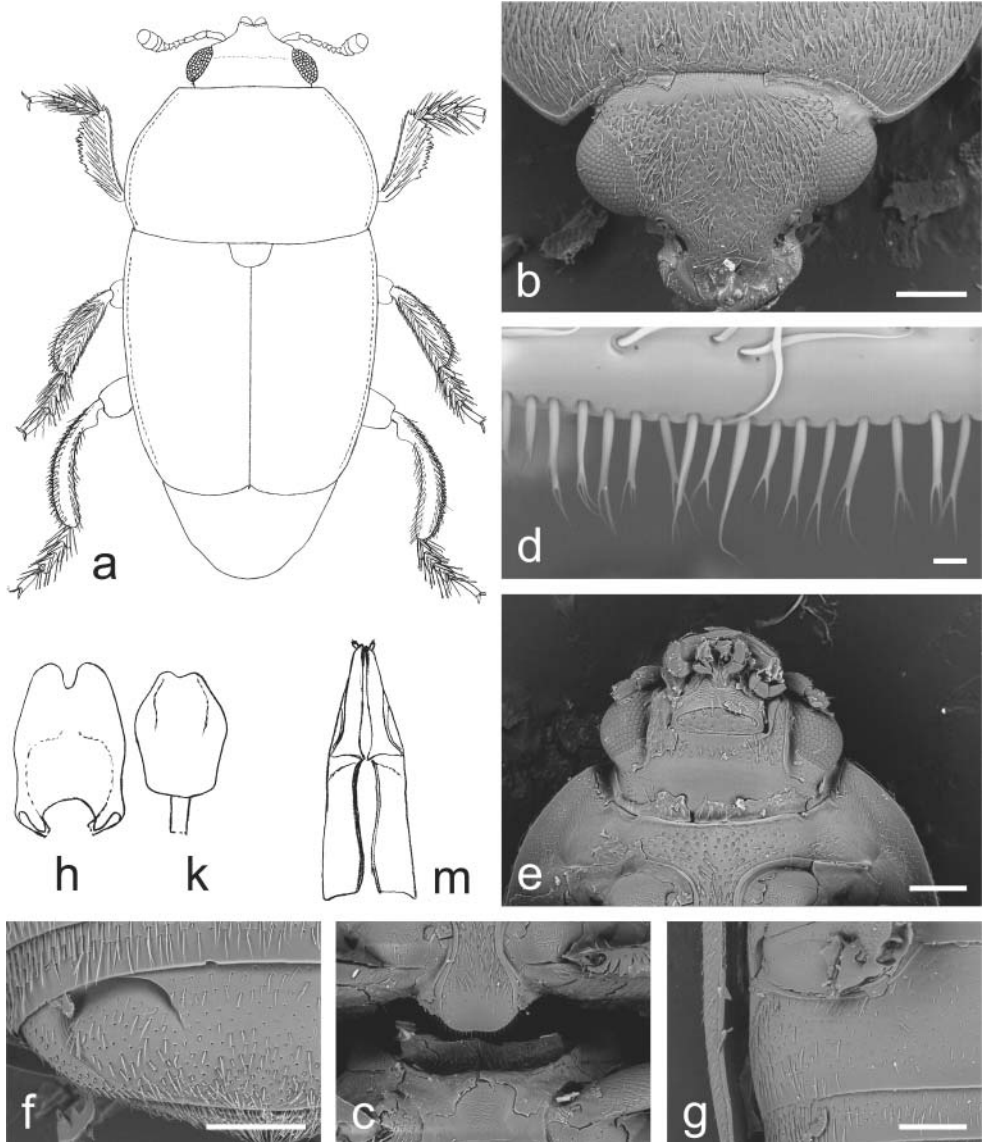
**Generic description and diagnosis.** Inclusive species vary moderately in size (2.8–4.0 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish, usually short, recumbent, never obscuring the blackish dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 11d).

*Dorsal habitus:* body moderately convex, variably shaped (Fig. 11a); dorsal punctures on discal portion of pronotum larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus usually moderately arcuately emarginate, distinctly but narrowly bordered (Fig. 11b), simple, i.e., without a small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head absent (Fig. 11b); eyes large and usually moderately projecting laterally (Figs. 11a, b); pronotum with obtusely rounded posterior angles, never directed posteriorly (Fig. 11a); scutellum regularly punctured on most of exposed portion; elytra with variable punctuation, with simple punctures, never transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Fig. 11a); elytral humeral striae not distinct; elytral pre-sutural striae visible, originating slightly posterior to the scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a usually distinct, flat, slightly raised sutural border, widest at posterior third, here nearly as wide as proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 11a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 11a).

*Ventral habitus:* antennal furrows markedly delimited, nearly parallel-sided, slightly divergent posteriorly; mentum peculiarly shaped, subelliptical (Fig. 11e); antennal furrows on anterior margin of prosternum faintly distinct or indistinctly raised (Fig. 11e); prosternal process wide, subapical dilated portion 2.8–3.6× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually blunt (Fig. 11c); lateral borders of prosternal process delimiting moderately shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions, nearly reaching the microscopically denticulate posterior margin (Fig. 11c); posterior margin of mesoventrite simple, not medially incised (Fig. 11c); male impressions on metaventrite moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, comprising moderately deep arched impression of outer ‘axillary’ line (Fig. 11g); ‘axillary’ space on first abdominal ventrite reduced, ‘axillary’ angle approximately right angled (Fig. 11g); large, long, and peculiarly deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 11f).





**Fig. 11.** *Indogethes* Audisio & Cline, gen. nov.: **a–m** – *I. curvipes* (Grouvelle, 1908). **a** – male habitus (pubescence and mandibles not illustrated; length 3.5 mm); **b** – dorsal view of head; **c** – prosternal process and mesoventrite; **d** – microsetae on middle of posterior margin of pronotum; **e** – ventral view of head and anterior portion of prothorax; **f** – exposed portion of last visible abdominal ventrite; **g** – caudal marginal line of metacoxal cavity; **h–k** – male genitalia (**h** – length 0.5 mm; **k** – 0.4 mm); **m** – ovipositor (length 0.7 mm). Scale bars: Figs. **b**, **c**, **e**, **f**, **g** = 200  $\mu$ m; Fig. **d** = 10  $\mu$ m.

**Appendages:** male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Figs. 11a, e); 3<sup>rd</sup> antennomere in both sexes usually 2.0–2.1× as long as wide, 0.9–1.0× as long but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 11a); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.5–0.6× as wide as 9<sup>th</sup> antennomere) (Fig. 11a), club markedly narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 11e), terminal segment nearly 1.8× as long as wide; maxillary palpi peculiarly short in both sexes (Fig. 11e), terminal segment only 1.5–1.8× as long as wide; mandible mid-sized (Fig. 11e), apex acuminate, no sexual dimorphism present; tarsal claws moderately to strongly toothed at base; tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Fig. 11a); protibiae with a series of usually large, uneven, long and variably shaped (blunt to sharply acuminate) teeth on lateral margin (Figs. 11a, c); meso- and metatibiae on lateral margin bearing a single and usually moderately even row of small robust spurs, without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually slender and narrow (Fig. 11a), never subtrapezoidal or axe-shaped; male metatibiae moderately to strongly sinuate (Fig. 11a); tarsal plates of prolegs distinctly wider in males; anterior margin of profemora usually with projections in males; posterior margin of metafemora in both sexes with gibbosities.

**Male genitalia:** processes along inner side of parameres absent (Figs. 11h–k), with more or less deeply incised distal margin, and without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, narrowed and variably shaped distally.

**Female genitalia (ovipositor):** variably shaped, large; styli usually short, simple, cylindrical, unpigmented, inserted close to apex of usually contiguous gonostyloids; each gonostyloid lightly sclerotized and moderately to darkly pigmented distally, with a simple, never indented outer portion of basicoxites (Fig. 11m), and a single, narrow, scarcely pigmented and unsclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually nearly centrally located, without proximal directed spicule.

**Etymology.** The generic name is derived from the Latin ‘*indicus*’ (= Indian), to emphasize the Indian distribution of all known species, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The biology of all inclusive species remains unknown.

**Phylogenetic position.** Morphological data provide weak evidence of a clade including *Indogethes* gen. nov. near to *Afrogethes* gen. nov. However, no molecular data are available for *Indogethes* gen. nov.

**Taxonomy and geographic distribution.** *Indogethes* gen. nov. includes five described species, which are all distributed on the Indian Subcontinent.

|  |       |
|--|-------|
| <i>Indogethes arrowi</i> (Grouvelle, 1908) <b>comb. nov.</b>   | India |
| <i>Indogethes cardoni</i> (Grouvelle, 1894) <b>comb. nov.</b>  | India |
| <i>Indogethes crassus</i> (Grouvelle, 1908) <b>comb. nov.</b>  | India |
| <i>Indogethes curvipes</i> (Grouvelle, 1908) <b>comb. nov.</b> | India |
| <i>Indogethes foedus</i> (Grouvelle, 1908) <b>comb. nov.</b>   | India |

## 12. *Bolbocerogethes Audisio & Cline, gen. nov.*

(Figs. 12 a–e)

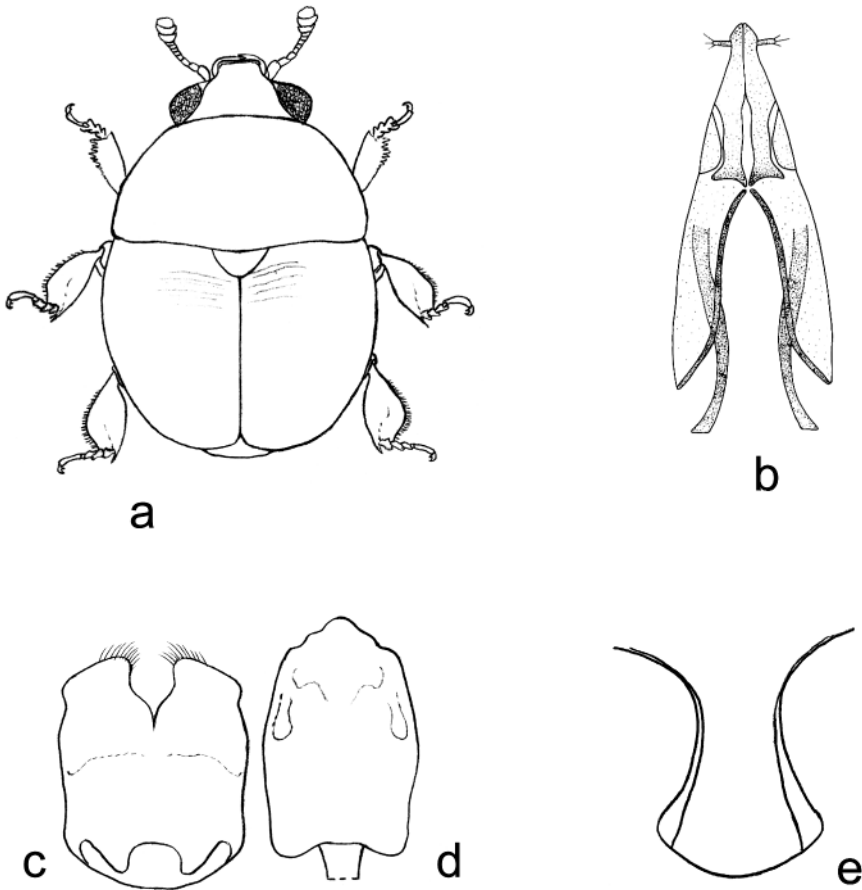
**Type species.** *Meligethes pallipes* Boheman, 1851: 574 (by present designation) [= *Bolbocerogethes pallipes* (Boheman, 1851) comb. nov.].

**Generic description and diagnosis.** The single known species (2.1–2.7 mm length; 1.5–1.9 mm width) exhibits the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish, short and fine, recumbent, not obscuring the reddish-brown dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with short, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum.

*Dorsal habitus:* body markedly convex (Fig. 12a), peculiarly short and wide; dorsal punctures on discal portion of pronotum larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus subtruncate, not bordered (Fig. 12a), without medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head shallowly impressed, narrow, well-developed anteriorly only; eyes large and usually moderately projecting laterally (Fig. 12a); pronotum with distinct obtuse posterior angles, not directed posteriorly (Fig. 12a); scutellum regularly punctured on most of exposed portion; elytra with moderately coarse punctuation, mostly organized with uneven transverse strigosity; elytral humeral angle scarcely distinct, not protruding laterally (Fig. 12a); elytral humeral striae indistinct; elytral pre-sutural striae faintly visible, originating slightly posteriorly the scutellar vertex, terminating close to elytral apex, and delimiting on each elytron an ill-defined, flat, sutural border, widest at posterior third, narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 12a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 12a).

*Ventral habitus:* antennal furrows markedly delimited, nearly parallel-sided, slightly diverging posteriorly; mentum subpentagonal, submental impression normally shaped; prosternal antennal furrows moderately raised and short on anterior margin; prosternal process peculiarly wide, subapical dilated portion 2.7–3.0× as wide as maximum width of 1<sup>st</sup> antennomere, apex arcuately convex; lateral borders of prosternal process delimiting moderately shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions, nearly reaching posterior margin; posterior margin of mesoventrite simple, not medially incised; male impressions on metaventrite moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, moderately narrow, subparallel and contiguous to posterior margin of metacoxal cavities, comprising moderately deep arched impression of outer ‘axillary’ line; ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle widely obtuse; wide and short arched impressions on basal portion of last visible abdominal ventrite moderately impressed, partially covered by distal portion of penultimate visible abdominal ventrite.



**Fig. 12.** *Bolbocerogethes* Audisio & Cline, gen. nov.: **a–e** – *B. pallipes* (Boheman, 1851). **a** – male habitus (length 2.6 mm); **b** – ovipositor (modified from SPORNRAFT & KIREJTSHUK (1993); length 0.6 mm); **c–d** – male genitalia (**c, d** – length 0.3 mm); **e** – prosternal process (width 0.3 mm).

*Appendages*: male 1<sup>st</sup> antennomere 0.7–0.8× as long as width of protibiae excluding distal teeth (Fig. 12a); 3<sup>rd</sup> antennomere in both sexes usually 1.9–2.0× as long as wide, 0.9–1.0× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 12a); 4<sup>th</sup> to 7<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide, peculiarly subquadrate; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.5–0.6× as wide as 9<sup>th</sup> antennomere) (Fig. 12a), much narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes, terminal segment nearly 1.8× as long as wide; maxillary palpi moderately short in both sexes, terminal segment only 1.8–1.9× as long as wide; mandible mid-sized (Fig. 12a), apex acuminate, no

sexual dimorphism; tarsal claws moderately to strongly toothed at base; tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Fig. 12a); protibiae with a series of relatively small, uneven teeth on distal third of lateral margin (Fig. 12a); meso- and metatibiae on lateral margin bearing a single and usually moderately even row of relatively long and fine pegs, without U-shaped sinuosity at distal third; meso- and metatibiae peculiarly short and wide (Fig. 12a), markedly and regularly arcuate along inner and outer margins; no sexual dimorphism in metatibial shape (Fig. 12a); tarsal plates of prolegs distinctly wider in males; posterior margin of metafemora in both sexes without gibbositities, spines, or tubercles.

**Male genitalia:** processes along inner side of parameres absent (Figs. 12c–d), tegmen comprising moderately deeply V-shaped excision on distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus short, peculiarly pyramidal distally, without lateral emargination.

**Female genitalia (ovipositor):** large; styli distinct, moderately long, unpigmented, simple, cylindrical, inserted away from apex of contiguous and moderately acuminate gonostyloids (Fig. 12b); each gonostyloid sclerotized but not darkly pigmented distally, with a simple, indentate outer portion of basicoxites, and a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor nearly centrally located, without proximad directed spicule.

**Etymology.** The generic name is derived from the subfamily Bolboceratinae (Coleoptera, Geotrupidae), to emphasize the peculiarly convex and short body shape and pale brown color of the type species (Fig. 12a) that strongly resembles members of this scarab subfamily, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The biology of the single known species remains unknown. The few known specimens were collected by grassnetting in wet meadows, at low and middle altitudes (0–800 m) (S. Endrödy-Younga, pers. comm. 1995; R. Danielsson, pers. comm. 2000). K. Spornraft collected (19.xi.1988) a single specimen of *B. pallipes* in South Africa, Eastern Cape, Umtata, on a small plant of the legume family (Fabaceae) with pink flowers, but no definitive larval host-plant relationships can be postulated from this single isolated record (K. Spornraft, pers. comm. 1993).

**Phylogenetic position.** The relationships of *Bolbocerogethes* gen. nov. with other taxa of the ‘*Meligethes* s. l.’ group of genera remain obscure. The genus could be related to *Afrogethes* gen. nov. and allied taxa, but this hypothesis is only weakly supported by adult morphological characters. SPORNRAFT & KIREJTSHUK (1993) included this taxon in their ‘*Meligethes convexus*-Gruppe’ (herein placed within *Lamiogethes* gen. nov.), but this placement was later reinterpreted as incorrect (AUDISIO 1996). No molecular data are available for this isolated and peculiar genus.

**Taxonomy and geographic distribution.** *Bolbocerogethes* gen. nov. includes the single type species, which is apparently one of the rarest African Meligethinae species (but curiously among the first described African species of *Meligethes*).

*Bolbocerogethes pallipes* (Boheman, 1851) **comb. nov.**

South Africa: eastern W Cape, E Cape, KwaZulu-Natal



### 13. *Genistogethes* Audisio & Cline, gen. nov.

(Figs. 13 a–h)

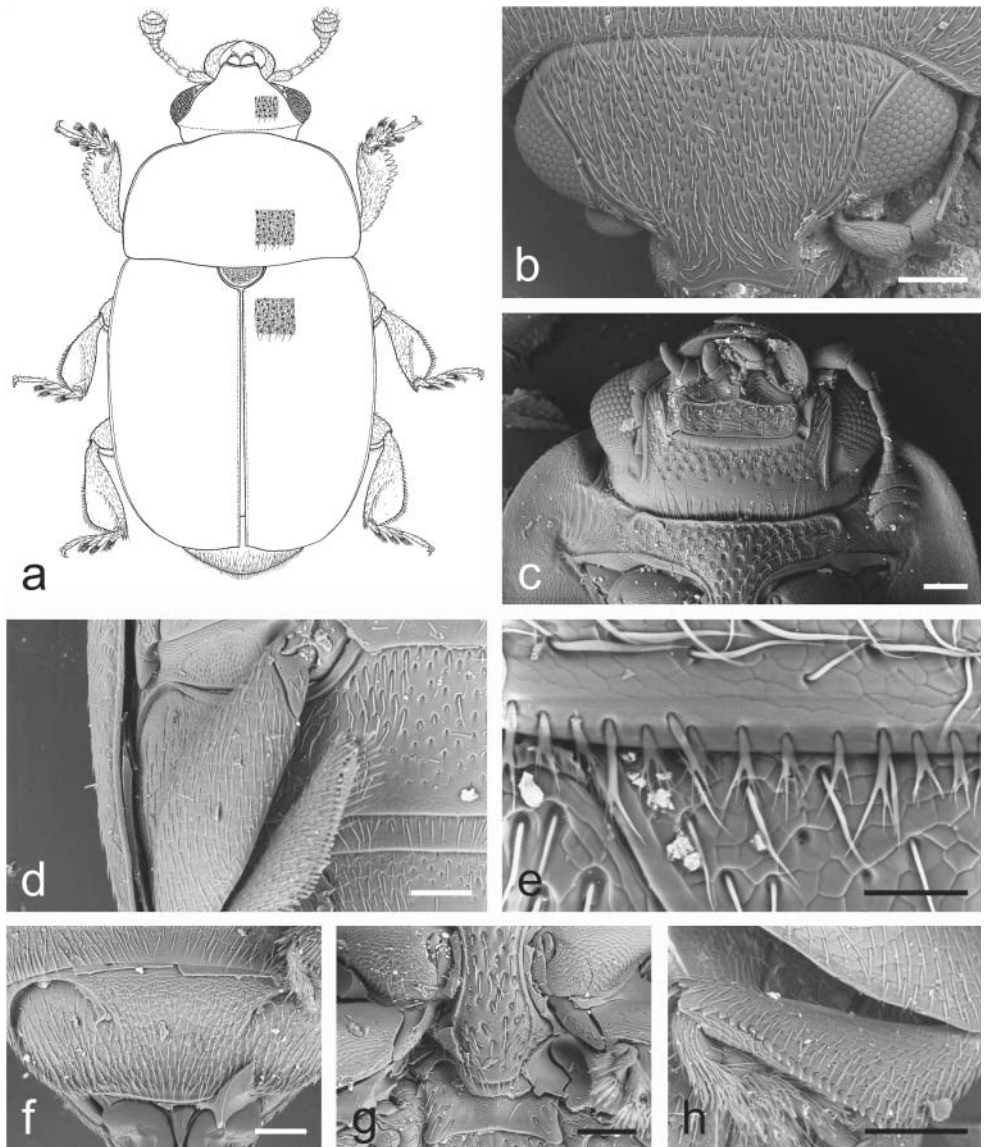
**Type species.** *Meligethes punctatus* C. N. F. Brisout de Barneville, 1863: 56 (by present designation) [= *Genistogethes punctatus* (C. N. F. Brisout de Barneville, 1863) comb. nov.].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.3–3.1 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish to golden, recumbent, usually short and fine, rarely more conspicuous, never obscuring the blackish dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc, rarely paler. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally trifold or multifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 13e).

*Dorsal habitus:* body moderately convex, usually long and slender (Fig. 13a); dorsal punctures on pronotal disc larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus usually moderately arcuately emarginate, distinctly but narrowly bordered (Fig. 13b), without small, faint, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head narrow, moderately to deeply impressed, complete (Fig. 13b); eyes large and usually moderately projecting laterally (Figs. 13a, b); pronotum with obtusely rounded posterior angles, never directed posteriorly (Fig. 13a); scutellum regularly punctured on most of exposed portion; elytra with variable punctuation, punctures simple, never transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Fig. 13a); elytral humeral striae scarcely distinct; elytral pre-sutural striae more or less distinct, originating at scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a slightly raised and narrow sutural border, border distinctly narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 13a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 13a), or with strong triangular expansions ventrally directed in males (Fig. 113l in AUDISIO 1993b).

*Ventral habitus:* antennal furrows markedly delimited, parallel-sided; mentum subpentagonal, normal shaped submental impression (Fig. 13c); antennal furrows on anterior margin of prosternum moderately raised and short (Fig. 13c); prosternal process relatively wide, subapical dilated portion 2.3–2.5× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually triangularly convex and blunt (Fig. 13g); lateral borders of prosternal process delimiting moderately shallowly impressed but distinct furrows, distally terminating over predistal widely developed lateral expansions, approximating smooth posterior margin (Fig. 13g); posterior margin of mesoventrite simple, not medially incised (Fig. 13g); variably developed male impressions on metaventrte, ridges, and tubercles (Figs. 6–9 in AUDISIO 2002); first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities variable, subparallel and partially contiguous to posterior margin of metacoxal cavities, or strongly deviating posteriorly in some species (Fig. 125j in AUDISIO 1993b; Figs. 6–9 in AUDISIO 2002), comprising moderately deep arched impression of outer ‘axillary’ line (Fig. 13d); ‘axillary’ space on first abdominal ventrite reduced, ‘axillary’ angle



**Fig. 13.** *Genistogethes* Audisio & Cline, gen. nov.: **a** – *G. immundus* (Kraatz, 1858); **b–h** – *G. punctatus* (C. N. F. Brisout de Barneville, 1863). **a** – male habitus (length 2.7 mm); **b** – dorso-lateral view of head; **c** – ventral view of head and anterior portion of prosternum; **d** – caudal marginal line of metacoxal cavity; **e** – anterior portion of scutellum and microsetae on middle of posterior margin of pronotum; **f** – exposed portion of last visible abdominal ventrite; **g** – prosternal process and mesoventrite; **h** – middle leg with outer margin of mesotibia. Scale bars: Figs. **b, c, d, f, g, h** = 100  $\mu$ m; Fig. **e** = 30  $\mu$ m.

bluntly right angled (Fig. 13d); large, long, and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 13f); last visible abdominal ventrite frequently expressing sexual dimorphism, males often with tubercles or raised median ridges posteriorly (Figs. 6–9 in AUDISIO 2002).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Fig. 13a); 3<sup>rd</sup> antennomere in both sexes long and slender, usually 3.3–3.6× as long as wide, 1.2–1.3× longer and distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 13a, b); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, mid-sized, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.5–0.6× as wide as 9<sup>th</sup> antennomere) (Fig. 13a), narrower than width of protibiae, sexual dimorphism absent; labial palpi short in both sexes (Fig. 13c), terminal segment nearly 1.6–1.7× as long as wide; maxillary palpi peculiarly short in both sexes (Fig. 13c), terminal segment 1.5–1.7× as long as wide; mandible mid-sized (Fig. 13a), distally acuminate, no sexual dimorphism; tarsal claws simple, never toothed at base (as in Fig. 5e); tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Fig. 13a); protibiae with a series of usually small, frequently uneven, variably shaped (blunt to sharply acuminate) teeth on lateral margin (Figs. 13a; Figs. 127n–q in AUDISIO 1993b), with a subdistal group of 5–10 longer teeth, perpendicular to tibial margin, first and penultimate teeth usually larger than others; meso- and metatibiae on lateral margin bearing a single and usually moderately even row of relatively small robust spurs, without U-shaped sinuosity at distal third (Figs. 13a, h); meso- and metatibiae of variable width, usually slender and narrow (Fig. 13a), never subtrapezoidal or axe-shaped; no sexual dimorphism in metatibial shape (Fig. 13a); tarsal plates of prolegs wider in males; anterior margin of profemora and posterior margin of metafemora in both sexes without gibbositities, tubercles, or spines.

*Male genitalia*: processes along inner side of parameres absent (Figs. 139a–l in AUDISIO 1993b), tegmen with shallowly incised or subtruncate distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without emargination laterally, narrowed, bluntly acuminate and variably shaped distally, usually with minute distal excision.

*Female genitalia (ovipositor)*: variably shaped, usually large; styli short, simple, cylindrical, unpigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and frequently more darkly pigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 156a–f in AUDISIO 1993b), and a single, narrow, lightly pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually located centrally or slightly more proximad than middle, with or without proximad directed short spicule.

**Etymology.** The generic name is derived from the Latin ‘*Genista*’ (= broom), to emphasize the larval association of some species with *Genista*, and ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated for larval development with flowers of Fabaceae, in particular *Genista* L., *Spartium* L., *Cytisus* L., *Coronilla* L., *Lotus* L., and allied genera (AUDISIO 1993b).

**Phylogenetic position.** Available molecular and morphological datasets provide strong and unequivocal evidence for the distinctness of this taxon (TRIZZINO et al. 2009). *Genistogethes* gen. nov. may be the sister taxon of *Fabogethes* gen. nov., however this hypothesis is only weakly supported by molecular data. Both genera are likely not distantly related to *Afrogethes* gen. nov. and allied genera. Phylogenetic relationships between these taxa are still unclear, and only partially supported by molecular data.

**Taxonomy and geographic distribution.** *Genistogethes* gen. nov. includes eight described species, formerly attributed to the '*Meligethes carinulatus*' species-group. Inclusive species are distributed in European and circum-Mediterranean areas (AUDISIO 1993b, 2002; JELÍNEK & AUDISIO 2007).

|  |  |
|--|--|
| <i>Genistogethes bidentatus</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | W Europe, Caucasus, E Turkey, NW Africa        |
| <i>Genistogethes carinulatus</i> (Förster, 1849) <b>comb. nov.</b>                       | W Palaearctic                                  |
| <i>Genistogethes coronillae</i> (Easton, 1962) <b>comb. nov.</b>                         | NW Africa, S Spain                             |
| <i>Genistogethes cyrenaicus</i> (Rebmann, 1940) <b>comb. nov.</b>                        | N Lybia  |
| <i>Genistogethes erichsonii</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | Europe, NW Turkey, NW Africa                   |
| <i>Genistogethes immundus</i> (Kraatz, 1858) <b>comb. nov.</b>                           | Circum-Mediterranean                           |
| <i>Genistogethes punctatus</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b>  | Central and E Mediterranean areas, Middle East |
| <i>Genistogethes zapparolii</i> (Audisio, 1989) <b>comb. nov.</b>                        | E Turkey, NW Iran, Syria                       |

#### 14. *Fabogethes* Audisio & Cline, gen. nov.

(Figs. 14 a–h)

**Type species.** *Meligethes nigrescens* Stephens, 1830: 47 (by present designation) [= *Fabogethes nigrescens* (Stephens, 1830) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.7–3.0 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish to golden, usually short and fine, recumbent, never obscuring the blackish dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc, or slightly paler. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally trifid or multifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 14d).

*Dorsal habitus:* body moderately convex, variably shaped, broadly oval to elongate and slender (Fig. 14a); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, usually deeply impressed and densely distributed; anterior margin of clypeus usually moderately arcuately emarginate to subtruncate, distinctly narrowly bordered (Fig. 14b), without small, faintly, medial bulge; narrow circum-ocular furrows (occipital sulci) present on dorsal side of head, moderately to deeply impressed, complete (Fig. 14b); eyes large and usually moderately projecting laterally (Figs. 14a, b); pronotum with obtuse to obtusely rounded posterior angles, never directed posteriorly (Fig. 14a); scutellum regularly

punctured on most of exposed portion (Fig. 14d); elytra with variable punctation, punctures simple, never transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Fig. 14a); elytral humeral striae scarcely distinct; elytral pre-sutural striae more or less distinct, originating at scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a more or less distinctly raised and narrow sutural border, usually distinctly narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 14a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 14a).

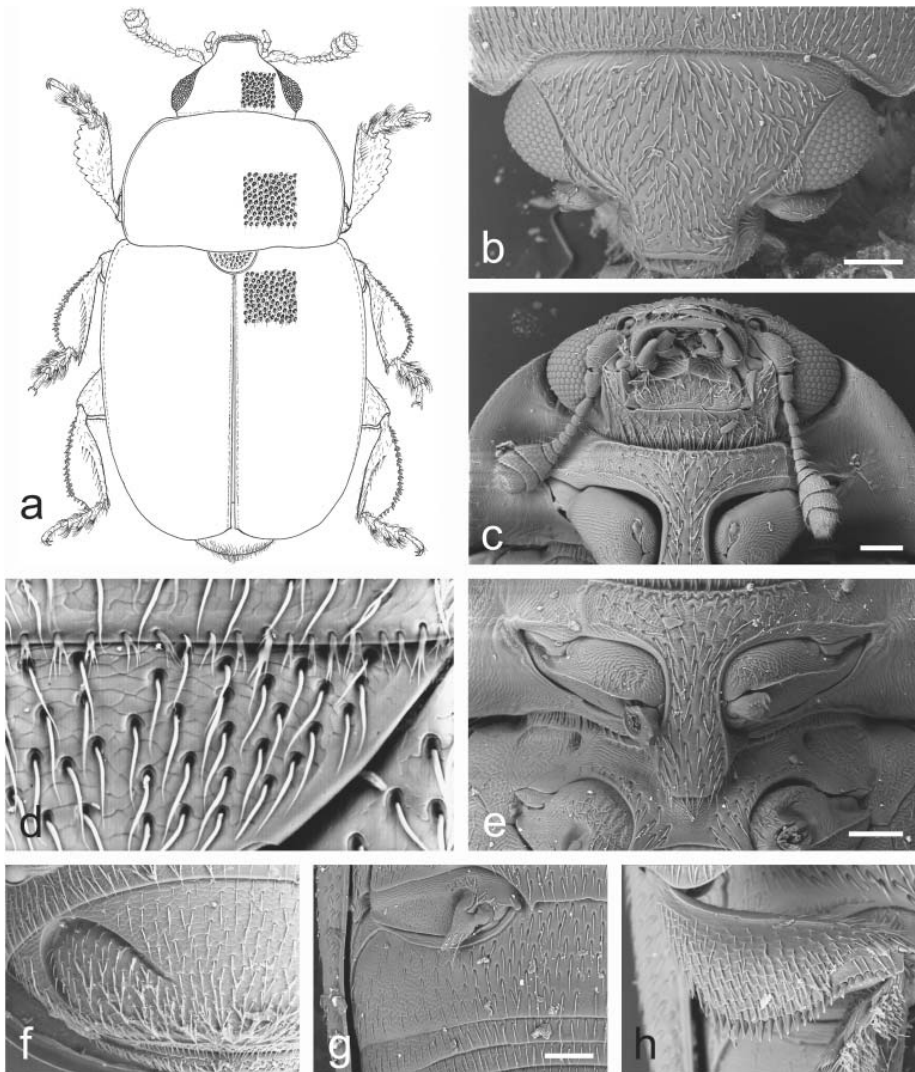
*Ventral habitus*: antennal furrows markedly delimited, parallel-sided; mentum subpentagonal, normal shaped submental impression (Fig. 14c); antennal furrows of anterior margin of prosternum moderately raised and short (Fig. 14c); prosternal process relatively wide, subapical dilated portion nearly 2.3–2.5× as wide as maximum width of 1<sup>st</sup> antennomere, usually bluntly convex distally (Fig. 14e); lateral borders of prosternal process delimiting moderately to shallowly impressed distinct furrows, distally terminating over predistal widely developed lateral expansions, near posterior margin (Fig. 14e), posterior margin not denticulate; posterior margin of mesoventrite simple, never medially incised (Fig. 14e); variably developed impressions on male metaventrite; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities variable, subparallel and partially contiguous to posterior margin of metacoxal cavities, or strongly deviating posteriorly (Fig. 125*k* in AUDISIO 1993b), comprising moderately deep arched impression of outer ‘axillary’ line (Fig. 14g); ‘axillary’ space on first abdominal ventrite reduced, ‘axillary’ angle bluntly right angled (Fig. 14g); large, long, and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, usually partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 14f); last visible abdominal ventrite in males frequently with tubercles or raised median posterior ridges.

*Appendages*: male 1<sup>st</sup> antennomere 0.7–0.8× as long as width of protibiae excluding distal teeth (Fig. 14a); 3<sup>rd</sup> antennomere in both sexes moderately long and slender, usually 2.0–2.1× as long as wide, and nearly 0.8–0.9× as long and distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 14a, c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, slightly longer than wide; antennal club compact, mid-sized, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, nearly 0.5× as wide as 9<sup>th</sup> antennomere) (Fig. 14c), narrower than width of protibiae, sexual dimorphism absent; labial palpi short in both sexes (Fig. 14c), terminal segment nearly 1.6–1.7× as long as wide; maxillary palpi moderately long in both sexes (Fig. 14c), terminal segment 2.1–2.3× as long as wide; mandible mid-sized (Fig. 14a), apex acuminate, no sexual dimorphism; tarsal claws simple, never toothed at base; tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Fig. 14a); protibiae with a series of variably shaped, usually moderately large, and frequently uneven (blunt to sharply acuminate) teeth on lateral margin (Fig. 14a; Figs. 127*g–m* in AUDISIO 1993b), without subdistal group of longer teeth perpendicular to the margin of each tibia; meso- and metatibiae with lateral margin usually without sinuosity at distal third, bearing a single and moderately even row of relatively small robust spurs; only *F. opacus* possesses an uneven double series of spurs (Fig. 14a) and on metatibiae a distinct predistal sinuosity (the latter trait shared also by *F. ciliatus*); meso- and metatibiae of variable width, usually slender and narrow (Figs. 14a, h), never subtrapezoidal or axe-shaped; usually with scarcely evident sexual dimorphism in



metatibial shape; tarsal plates of prolegs distinctly wider in males; anterior margin of profemora and posterior margin of metafemora in both sexes without gibbosities, tubercles, or spines.

*Male genitalia*: processes along inner side of parameres absent (Fig. 138 in AUDISIO 1993b), tegmen with shallowly incised or subtruncate distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision;



**Fig. 14.** *Fabogethes* Audisio & Cline, gen. nov.: **a** – *F. opacus* (Rosenhauer, 1856); **b–h** – *F. nigrescens* (Stephens, 1830). **a** – male habitus (length 2.7 mm); **b** – dorso-lateral view of head; **c** – ventral view of head and anterior portion of prosternum; **d** – anterior portion of scutellum and microsetae on middle of posterior margin of pronotum; **e** – prosternal process and mesoventrite; **f** – exposed portion of last visible abdominal ventrite; **g** – caudal marginal line of metacoxal cavity; **h** – middle leg with outer margin of mesotibia. Scale bars: Figs. **b, c, e, g** = 100  $\mu$ m.

median lobe of aedeagus variable, without lateral emargination, narrow, bluntly acuminate and variably shaped distally, usually with minute distal excision.

*Female genitalia (ovipositor)*: variably shaped, usually large; styli usually short, simple, cylindrical, frequently more darkly pigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and frequently more darkly pigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 156g–m in AUDISIO 1993b), and a single, narrow, lightly pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually nearly centrally located, with proximad directed short spicule.

**Etymology.** The generic name is derived from the host-plant family of all inclusive species, i.e. Fabaceae, and from ‘-gethes’, to emphasize both an association with this botanical family and a phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated for larval development with flowers of Fabaceae, in particular *Trifolium* L., *Onobrychis* Miller, *Ononis* L., *Lotus* L., and allied genera (AUDISIO 1993b).

**Phylogenetic position.** Available molecular and morphological datasets provide weak evidence for a monophyletic clade including *Fabogethes* gen. nov. as sister to *Genistogethes* gen. nov., with both clades being probably marginally related to *Afrogethes* gen. nov. and allied genera. However, phylogenetic relationships between these taxa remain unclear.

**Taxonomy and geographic distribution.** *Fabogethes* gen. nov. includes nine described Palearctic species (one subsequently introduced to North America) (KIREJTSHUK 1992B; AUDISIO 1993b; AUDISIO et al. 2003a) formerly attributed to the ‘*Meligethes nigrescens*’ and ‘*M. opacus*’ species-groups.

|  |  |
|--|--|
| <i>Fabogethes brachialis</i> (Erichson, 1845) <b>comb. nov.</b>      | Europe, Caucasus, W Siberia                |
| <i>Fabogethes capucinus</i> (Robert, 1909) <b>comb. nov.</b>         | N Algeria                                  |
| <i>Fabogethes ciliatus</i> (Easton, 1956) <b>comb. nov.</b>          | N Algeria, N Tunisia                       |
| <i>Fabogethes circularis</i> (J. Sahlberg, 1903) <b>comb. nov.</b>   | E Siberia, N Korea, China, Mongolia        |
| <i>Fabogethes diversus</i> (Schilsky, 1893) <b>comb. nov.</b>        | E Turkey, Caucasus, W Middle Asia          |
| <i>Fabogethes himalayaensis</i> (Kirejtshuk, 1980) <b>comb. nov.</b> | N India, Nepal                             |
| <i>Fabogethes nigrescens</i> (Stephens, 1830) <b>comb. nov.</b>      | Palearctic Region, introduced to N America |
| <i>Fabogethes opacus</i> (Rosenhauer, 1856) <b>comb. nov.</b>        | W Mediterranean, S Ukraine: Crimea         |
| <i>Fabogethes varicollis</i> (Wollaston, 1854) <b>comb. nov.</b>     | Canary Islands, Madeira, W Mediterranean   |

### 15. *Thymogethes* Audisio & Cline, gen. nov.

(Figs. 15 a–k)

**Type species.** *Meligethes lugubris* Sturm, 1845: 49 (by present designation) [= *Thymogethes lugubris* (Sturm, 1845) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.5–2.9 mm length), and share the following combination of characters.

*Body color and pubescence*: pubescence silvery-whitish, usually short and fine, recumbent, in some species setae much longer and denser and obscuring the blackish dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral

margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally trifid or multifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 15d).

*Dorsal habitus*: body moderately convex, usually long and slender (Figs. 15a, b); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, usually deeply impressed and densely distributed; anterior margin of clypeus faintly to strongly arcuately emarginate, distinctly narrowly bordered (Fig. 15e), usually with small, faintly distinct, medial bulge slightly protruding anteriorly; narrow circum-ocular furrows (occipital sulci) present on dorsal side of head, moderately to deeply impressed, complete (Fig. 15e); eyes large and moderately projecting laterally (Figs. 15a, b); pronotum with right angled to obtusely rounded posterior angles, never directed posteriorly (Figs. 15a, b); scutellum regularly punctured on posterior part of exposed portion (Fig. 15d); elytra with variable punctation, punctures simple or frequently distinctly transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Figs. 15a, b); elytral humeral striae scarcely distinct; elytral pre-sutural striae distinct, originating at scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a slightly raised and narrow sutural border, usually narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 15a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 15a, b).

*Ventral habitus*: antennal furrows markedly delimited, parallel-sided, slightly divergent posteriorly; mentum subpentagonal, submental impression normal shaped (Fig. 15c); antennal furrows of anterior margin of prosternum strongly raised and moderately long (Figs. 15c, f); prosternal process relatively wide, subapical dilated portion nearly 2.3–2.5× as wide as maximum width of 1<sup>st</sup> antennomere, usually bluntly convex distally (Fig. 15f); lateral borders of prosternal process delimiting moderately to shallowly impressed distinct furrows, distally terminating over predistal widely developed lateral expansions, close to faintly microscopic denticulate posterior margin (Fig. 15f); posterior margin of mesoventrite simple, never medially incised (Fig. 15f); male impressions on metaventrite and tubercles variably developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities medially slightly and regularly deviating posteriorly, only partially subparallel and contiguous to posterior margin of metacoxal cavities (Fig. 15g), arched impression of outer ‘axillary’ line exceptionally deep; ‘axillary’ space on first abdominal ventrite markedly reduced, ‘axillary’ angle bluntly acute (Fig. 15g); relatively small, short, but deeply impressed arched impressions on basal portion of last visible abdominal ventrite, usually partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 15h); last visible abdominal ventrite in males frequently with tubercles or raised median ridges posteriorly.

*Appendages*: male 1<sup>st</sup> antennomere 0.7–0.8× as long as width of protibiae excluding distal teeth (Figs. 15a, b); 3<sup>rd</sup> antennomere long and slender in both sexes, usually 2.5–2.7× longer than wide, and nearly 0.8–0.9× as long and distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 15a, c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, slightly longer than wide; antennal club compact, mid-sized, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, nearly 0.5× as wide as 9<sup>th</sup> antennomere) (Fig. 15c), distinctly

narrower than width of protibiae, sexual dimorphism absent; labial palpi short in both sexes (Fig. 15c), terminal segment nearly 1.6–1.7× as long as wide; maxillary palpi moderately long in both sexes (Fig. 15c), terminal segment 2.1–2.3× as long as wide; mandible mid-sized (Figs. 15a, b), apex acuminate, no sexual dimorphism; tarsal claws simple, never toothed at base; tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Figs. 15a, b); protibiae with a series of variably shaped, usually moderately large, and frequently uneven (more or less sharply acuminate) teeth on lateral margin (Figs. 15a, b; Figs. 128*h–i* and *n–q* in AUDISIO 1993b), with subdistal group of longer teeth perpendicular to tibial margin with the first and penultimate teeth usually larger than others; lateral margin of meso- and metatibiae bearing a single and usually moderately even row of relatively small robust spurs, without sinuosity at distal third (Figs. 15a, b); meso- and metatibiae of variable width, usually slender and narrow (Figs. 15a, b), never subtrapezoidal or axe-shaped; faint sexual dimorphism in metatibial shape (Figs. 15a, b); tarsal plates of prolegs distinctly wider in males; anterior margin of profemora and posterior margin of metafemora in both sexes without gibbositities, tubercles, or spines.

**Male genitalia:** processes along inner side of parameres absent (Fig. 144 in AUDISIO 1993b), tegmen with shallowly to deeply incised distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus long and slender, without lateral emargination, narrow, bluntly acuminate and variably shaped distally, usually with minute distal excision.

**Female genitalia (ovipositor):** variably shaped, usually small; styli short, simple, cylindrical, frequently more darkly pigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and frequently more darkly pigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 160*e–n* in AUDISIO 1993b), and a single, narrow, lightly pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually nearly centrally located, or placed slightly more distad than middle, without proximad directed spicule.

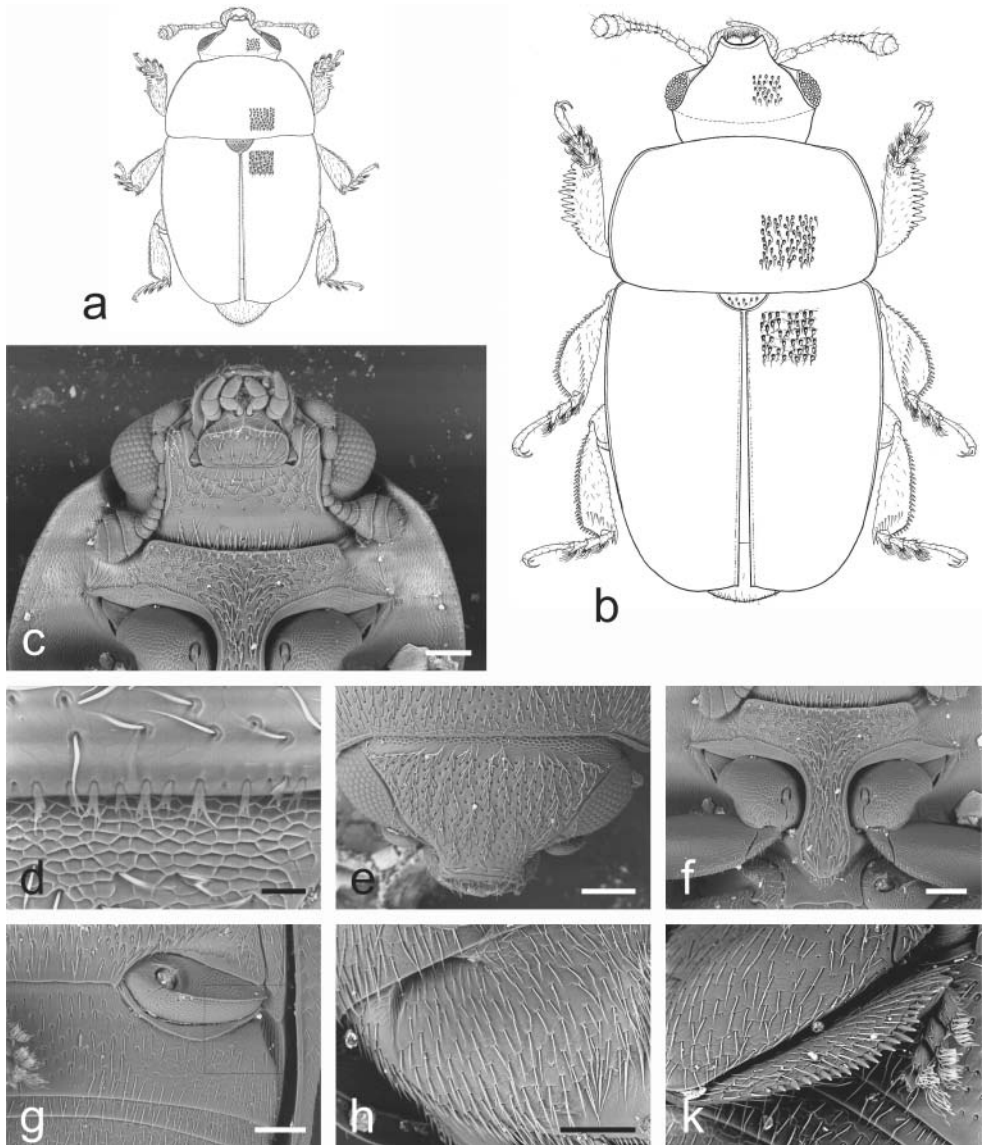
**Etymology.** The generic name is derived from the Latin *Thymus* (= thyme), to emphasize the characteristic larval association of several species with members of this Lamiaceae genus and related genera, and ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated for larval development with flowers of Lamiaceae, in particular members of the *Thymogethes lugubris* species-group are associated with *Thymus* L., *Mentha* L., or *Dracocephalum* L., whereas members of the *T. exilis* species-group are associated with *Thymus* L., *Rosmarinus* L., *Lavandula* L., or *Satureja* L. (AUDISIO 1993b).

**Phylogenetic position.** Available molecular and morphological datasets provide evidence for a monophyletic clade including *Thymogethes* gen. nov. as sister to *Sagittogethes* gen. nov., both being moderately related to *Afrogethes* gen. nov. and allied genera. However, phylogenetic relationships of these taxa remain unclear, and only partially supported with molecular data.

**Taxonomy and geographic distribution.** *Thymogethes* gen. nov. includes 20 described species and one currently under description, mostly distributed in the southwestern Palearctic





**Fig. 15.** *Thymogethes* Audisio & Cline, gen. nov.: **a, h** – *T. egenus* (Erichson, 1845); **b** – *T. subfumatus* (Ganglbauer, 1899); **c–g, k** – *T. nigritus* (Lucas, 1849). **a, b** – male habitus (**a** – length 2.5 mm; **b** – length 2.7 mm); **c** – ventral view of head and anterior portion of prosternum; **d** – anterior portion of scutellum and microsetae on middle of posterior margin of pronotum; **e** – dorsal view of head; **f** – prosternal process and mesoventrite; **g** – caudal marginal line of metacoxal cavity; **h** – exposed portion of last visible abdominal ventrite; **k** – middle leg with outer margin of mesotibia. Scale bars: Figs. **c, e, f, g, h** = 100  $\mu$ m; Fig. **d** = 20  $\mu$ m.



(EASTON 1954a; KIREJTSHUK 1992b; AUDISIO 1993b; JELÍNEK & AUDISIO 2007; AUDISIO et al. in press). *Thymogethes* species are attributed to two formerly recognized species-groups, i.e. the ‘*Meligethes lugubris*’ and ‘*M. exilis*’ species-groups.

|  |  |
|--|--|
| <i>Thymogethes abiens</i> (Kirejtshuk, 1979) <b>comb. nov.</b>                         | E European Russia                                  |
| <i>Thymogethes acicularis</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | S Europe, Turkey                                   |
| <i>Thymogethes egenus</i> (Erichson, 1845) <b>comb. nov.</b>                           | S Europe, Near East                                |
| <i>Thymogethes exilis</i> (Sturm, 1845) <b>comb. nov.</b>                              | Europe, N Turkey, N Morocco                        |
| <i>Thymogethes fumatus</i> (Erichson, 1845) <b>comb. nov.</b>                          | S Europe   |
| <i>Thymogethes funereus</i> (Jelínek, 1967) <b>comb. nov.</b>                          | S Europe, Near East                                |
| <i>Thymogethes gagathinus</i> (Erichson, 1845) <b>comb. nov.</b>                       | Palearctic Region, excluding N Africa              |
| <i>Thymogethes grenieri</i> (C. N. F. Brisout de Barneville, 1872) <b>comb. nov.</b>   | SW Mediterranean                                   |
| <i>Thymogethes intermixtus</i> (Kirejtshuk, 1979) <b>comb. nov.</b>                    | Kyrgyzstan   |
| <i>Thymogethes klapperichi</i> (Easton, 1957) <b>comb. nov.</b>                        | Middle Asia, Iran                                  |
| <i>Thymogethes lugubris</i> (Sturm, 1845) <b>comb. nov.</b>                            | Europe, Caucasus, Turkey, N Middle Asia, E Siberia |
| <i>Thymogethes nigritus</i> (Lucas, 1849) <b>comb. nov.</b>                            | W Mediterranean                                    |
| <i>Thymogethes nitidicollis</i> (Reitter, 1873) <b>comb. nov.</b>                      | Japan, E Siberia, N Korea                          |
| <i>Thymogethes normandi</i> (Easton, 1954) <b>comb. nov.</b>                           | SW Europe, N Africa                                |
| <i>Thymogethes norvegicus</i> (Easton, 1959) <b>comb. nov.</b>                         | S Scandinavian and Baltic areas                    |
| <i>Thymogethes oreophilus</i> (Audisio, 1984) <b>comb. nov.</b>                        | N and Central Italy, SW Switzerland                |
| <i>Thymogethes otini</i> (Easton, 1954) <b>comb. nov.</b>                              | N Africa, S Iberian Peninsula                      |
| <i>Thymogethes rebmanni</i> (Easton, 1957) <b>comb. nov.</b>                           | Middle Asia  |
| <i>Thymogethes subfumatus</i> (Ganglbauer, 1899) <b>comb. nov.</b>                     | SE France and NW Italy: Maritime Alps              |
| <i>Thymogethes submetallicus</i> (Sainte-Claire Deville, 1908) <b>comb. nov.</b>       | S Europe, N Middle Asia, S Siberia                 |

## 16. *Sagittogethes* Audisio & Cline, gen. nov.

(Figs. 16 a–k)

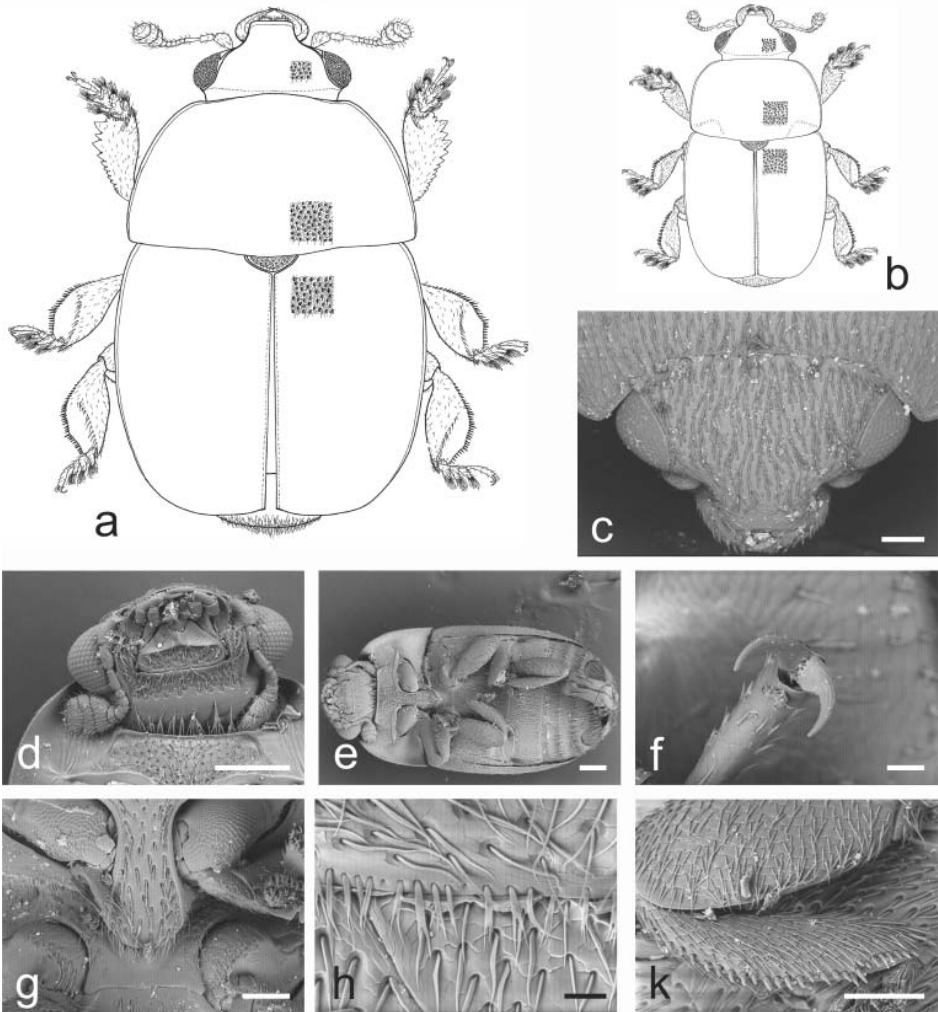
**Type species.** *Meligethes maurus* Sturm, 1845: 36 (by present designation) [= *Sagittogethes maurus* (Sturm, 1845) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.3–3.7 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence silvery-whitish to golden, short and fine, recumbent, never obscuring the blackish dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 16h).

**Dorsal habitus:** body moderately convex, variably shaped (Figs. 16a, b); dorsal punctures on discal portion of pronotum larger than eye facet, usually deeply impressed and densely distributed; anterior margin of clypeus typically truncate and faintly narrowly bordered (Fig. 16c), rarely faintly emarginate and more distinctly bordered, without small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head almost complete,

narrow, moderately impressed (Fig. 16c); eyes large and usually moderately projecting laterally (Figs. 16a, b, c); pronotum with distinct obtuse posterior angles, never directed posteriorly (Figs. 16a, b); scutellum regularly punctured on most of exposed portion (Fig. 16h); elytra with variable punctuation, punctures simple, never transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Figs. 16a, b); elytral humeral striae moderately



**Fig. 16.** *Sagittogethes* Audisio & Cline, gen. nov.: **a** – *S. ater* (C. N. F. Brisout de Barneville, 1863); **b** – *S. lindbergi* (Rebmann, 1940); **c**, **f–g** – *S. maurus* (Sturm, 1845); **d–e**, **h–k** – *S. obscurus* (Erichson, 1845). **a**, **b** – male habitus (**a** – length 2.9 mm; **b** – length 2.5 mm); **c** – dorsal view of head; **d** – ventral view of head and anterior portion of prosternum; **e** – ventral view of body; **f** – last tarsomere of a middle leg; **g** – prosternal process and mesoventrite; **h** – anterior portion of scutellum and microsetae on middle posterior margin of pronotum; **k** – middle leg with outer margin of mesotibia. Scale bars: Figs. **c**, **g**, **k** = 100  $\mu$ m; Figs. **d**, **e** = 200  $\mu$ m; Fig. **f** = 20  $\mu$ m; Fig. **h** = 30  $\mu$ m.

to faintly distinct; elytral pre-sutural striae distinct, originating posteriorly to scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a slightly raised and narrow sutural border, usually distinctly narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Figs. 16a, b); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 16a, b).

*Ventral habitus*: antennal furrows distinctly delimited, nearly parallel-sided, slightly convergent posteriorly; mentum subpentagonal, submental impression normal shaped (Fig. 16d); antennal furrows on anterior margin of prosternum strongly raised and moderately long (Fig. 16d); prosternal process relatively wide, subapical dilated portion 2.3–2.8× as wide as maximum width of 1<sup>st</sup> antennomere, usually bluntly convex distally (Fig. 16g); lateral borders of prosternal process delimiting moderately to deeply impressed furrows, distally terminating over predistal lateral expansions, nearly reaching distinctly microscopic denticulate posterior margin (Fig. 16g); posterior margin of mesoventrite simple, never medially incised (Fig. 16g); male impressions, ridges, or tubercles on metaventrte frequently well-developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, or more or less strongly and regularly deviating posteriorly medially (Figs. 125v, x, y in AUDISIO 1993b), usually with deep arched impression of outer ‘axillary’ line (Fig. 16e); ‘axillary’ space on first abdominal ventrite reduced, ‘axillary’ angle subacute (Fig. 16e); moderately large, and peculiarly deeply impressed arched impressions on basal portion of last visible abdominal ventrite, rarely covered by distal portion of penultimate visible abdominal ventrite (Fig. 16e).

*Appendages*: male 1<sup>st</sup> antennomere 0.6–0.7× as long as width of protibiae excluding distal teeth (Figs. 16a, b); 3<sup>rd</sup> antennomere usually 2.2–2.3× longer than wide in both sexes, 0.9–1.0× as long but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 16d); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.5–0.6× as wide as 9<sup>th</sup> antennomere) (Fig. 16d), distinctly narrower than width of protibiae, sexual dimorphism absent; labial palpi typically short in both sexes (Fig. 16d), terminal segment 1.1–1.6× as long as wide; maxillary palpi moderately long in both sexes (Fig. 16d), terminal segment 2.2–2.3× as long as wide; mandible mid-sized (Figs. 16a, b), apex acuminate, no sexual dimorphism; tarsal claws simple (Fig. 16f); tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Figs. 16a, b); protibiae with a series of variably shaped, frequently uneven, and more or less sharply acuminate perpendicular teeth on lateral margin (Figs. 16a, b; Figs. 128a–g in AUDISIO 1993b), with or without a group of larger teeth in distal position; lateral margin on meso- and metatibiae bearing a single and usually moderately even row of relatively small but robust spurs, without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually slender and narrow (Figs. 16a, b), never subtrapezoidal or axe-shaped; meta- and/or protibiae frequently sexually dimorphic (Figs. 16a, b); protibiae and tarsal plates of prolegs usually markedly wider in males; posterior margin of metafemora in both sexes without tubercles, spines, or gibbosities.

*Male genitalia*: processes along inner side of parameres absent (Figs. 146e–r, 147, 148 in AUDISIO 1993b), with more or less deeply incised distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped

excision; median lobe of aedeagus variable, without lateral emargination, narrowed and variably shaped distally, most species with arrow-like or arcuately truncate distal projections.

**Female genitalia (ovipositor):** variably shaped, usually large, needle-shaped in *S. lindbergi* (Rebmann, 1940); styli usually short, simple, cylindrical, moderately pigmented, inserted close to apex of usually contiguous gonostyloids, or styli absent (Figs. 160*a–d*, and 161 in AUDISIO 1993b); each gonostyloid lightly sclerotized and occasionally moderately to darkly pigmented distally, completely and heavily pigmented in *S. minutus* (C. N. F. Brisout de Barneville, 1863), with a simple, never indentate outer portion of basicoxites, and a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually nearly centrally located, without proximad directed spicule.

**Etymology.** The generic name is derived from the Latin ‘*sagitta*’ (= arrow), to emphasize the characteristic arrow-like shape of the aedeagal apex of most inclusive species, and from ‘-gethes’, to emphasize a phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are apparently strictly associated for larval development with flowers of Lamiaceae, in particular, members of the *Sagittgethes umbrosus* species-group are mainly associated with *Salvia* L., *Prunella* L., *Glechoma* L., *Lallemantia* Fisch. & C. A. Mey., and related taxa, whereas members of the *S. obscurus* species-group are exclusively associated with *Teucrium* L. (AUDISIO 1993b).

**Phylogenetic position.** Available molecular and morphological datasets provide evidence for a monophyletic clade including *Sagittgethes* gen. nov. as sister to *Thymogethes* gen. nov., both being marginally related to *Afrogethes* gen. nov. and allied genera. However, phylogenetic relationships between these taxa remain uncertain, and are only partially supported with molecular data.

**Taxonomy and geographic distribution.** *Sagittgethes* gen. nov. includes 28 described species, mostly distributed in the southwestern Palaearctic (KIREJTSHUK 1992b; AUDISIO 1993b). Inclusive species were formerly attributed to two recognized species-groups, i.e. the ‘*Meligethes umbrosus*’ and ‘*M. obscurus*’ species-groups (KIREJTSHUK 1978; JELÍNEK & SPORNRAFT 1979; JELÍNEK 1982c; AUDISIO & JELÍNEK 1990; AUDISIO 1993b). The latter group also tentatively contains *S. minutus*, a strongly isolated member of the genus.

|   |  |
|---|--|
| <i>Sagittgethes ancestor</i> (Kirejtshuk, 1980) <b>comb. nov.</b>                 | NE China                                     |
| <i>Sagittgethes astacus</i> (Easton, 1957) <b>comb. nov.</b>                      | Japan  |
| <i>Sagittgethes ater</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | S France, NE Italy, SE Europe                |
| <i>Sagittgethes biondii</i> (Audisio, 1988) <b>comb. nov.</b>                     | E Turkey                                     |
| <i>Sagittgethes devillei</i> (Grouvelle, 1912) <b>comb. nov.</b>                  | S Europe, Caucasus, N Turkey, NW Middle Asia |
| <i>Sagittgethes distinctus</i> (Sturm, 1845) <b>comb. nov.</b>                    | Europe, Near East                            |
| <i>Sagittgethes hladili</i> (Jelínek, 1982) <b>comb. nov.</b>                     | Turkey, Caucasus, Near East                  |
| <i>Sagittgethes hoffmanni</i> (Reitter, 1871) <b>comb. nov.</b>                   | S Palaearctic                                |
| <i>Sagittgethes holzschuhi</i> (Jelínek & Spornraft, 1979) <b>comb. nov.</b>      | SE Turkey                                    |
| <i>Sagittgethes incanus</i> (Sturm, 1845) <b>comb. nov.</b>                       | Europe, N Africa, Near East                  |
| <i>Sagittgethes initialis</i> (Kirejtshuk, 1979) <b>comb. nov.</b>                | E China                                      |
| <i>Sagittgethes interjectus</i> (Jelínek & Spornraft, 1979) <b>comb. nov.</b>     | N Turkey, Caucasus                           |

|   |   |
|---|---|
| <i>Sagittogethes jordanis</i> (Jelinek & Spornraft, 1979)<br><b>comb. nov.</b>        | Pontic areas, Near East                   |
| <i>Sagittogethes kvaki</i> (Kirejtshuk, 1977) <b>comb. nov.</b>                       | Middle Asia                               |
| <i>Sagittogethes lindbergi</i> (Rebmann, 1940) <b>comb. nov.</b>                      | W Mediterranean areas, W Balkans          |
| <i>Sagittogethes maurus</i> (Sturm, 1845) <b>comb. nov.</b>                           | Europe, Near East, Middle Asia, E Siberia |
| <i>Sagittogethes minutus</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | S Europe, N Africa                        |
| <i>Sagittogethes mus</i> (Reitter, 1884) <b>comb. nov.</b>                            | Japan                                     |
| <i>Sagittogethes nuragicus</i> (Audisio & Jelinek, 1990) <b>comb. nov.</b>            | Sardinia, Corsica                         |
| <i>Sagittogethes obscurus</i> (Erichson, 1845) <b>comb. nov.</b>                      | W Europe, N Africa                        |
| <i>Sagittogethes ovatus</i> (Sturm, 1845) <b>comb. nov.</b>                           | Europe, Caucasus                          |
| <i>Sagittogethes perceptus</i> (Jelinek & Spornraft, 1979) <b>comb. nov.</b>          | NW Iran                                   |
| <i>Sagittogethes pharetra</i> (Easton, 1957) <b>comb. nov.</b>                        | Middle Asia, N Iran                       |
| <i>Sagittogethes privus</i> (Kirejtshuk, 1977) <b>comb. nov.</b>                      | Middle Asia, ? Near East                  |
| <i>Sagittogethes subater</i> (Kirejtshuk, 1980) <b>comb. nov.</b>                     | NE China                                  |
| <i>Sagittogethes tauricus</i> (Jelinek & Spornraft, 1979) <b>comb. nov.</b>           | E Pontic areas, Turkey, Caucasus          |
| <i>Sagittogethes umbrosus</i> (Sturm, 1845) <b>comb. nov.</b>                         | Europe, N Africa, Near East, W Siberia    |
| <i>Sagittogethes vomer</i> (Kirejtshuk, 1978) <b>comb. nov.</b>                       | Circum-Pontic areas                       |

### 17. *Aristogethes* Audisio & Cline, gen. nov.

(Figs. 17 a–m)

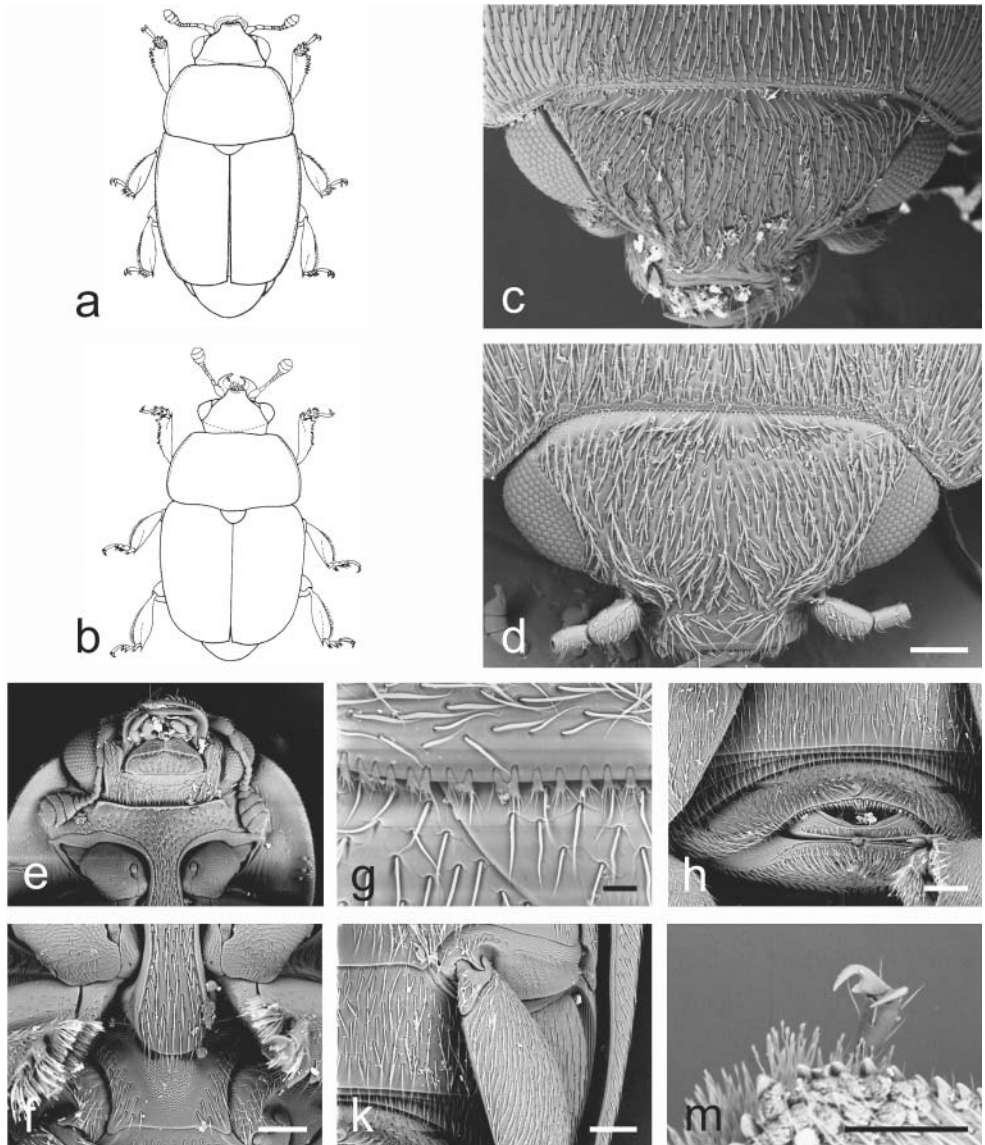
**Type species.** *Meligethes translatus* Grouvelle, 1913: 393 (by present designation) [= *Meligethes* (*Acanthogethes*) *atratus* Reitter, 1872: 244, 259, nec *Nitidula atrata* A. G. Olivier, 1790: 18]; = *Aristogethes translatus* (Grouvelle, 1913) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.8–3.7 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence silvery-whitish to golden, in most species strongly developed, long and dense, recumbent, frequently partially obscuring the variably colored dorsal body surface (black to reddish-brown); pronotal and elytral sides narrowly flattened, typically same color as disc. Lateral margin of pronotum and elytra fimbriate, each seta usually 0.5–0.6× as long as those on elytral disc; posterior margin of pronotum with moderately long, usually distally multifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 17g).

**Dorsal habitus:** body moderately convex, variably shaped (Figs. 17a, b); dorsal punctures on discal portion of pronotum larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus truncate or moderately emarginate, narrowly bordered (Figs. 17c, d), without small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head in most species complete, narrow, and deeply impressed (Fig. 17c), absent in a few species, (i.e. AUDISIO et al. 1998; Fig. 17d); eyes large and usually moderately projecting laterally (Figs. 17a–d); pronotum with distinct obtuse posterior angles, never directed posteriorly (Figs. 17a, b); scutellum regularly punctured on most of exposed portion (Fig. 17g); elytra with punctures simple or completely transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Figs. 17a, b); elytral humeral striae not





**Fig. 17.** *Aristogethes* Audisio & Cline, gen. nov.: **a** – *A. translatus* (Grouvelle, 1913); **b** – *A. pecten* (Audisio, Kirk-Spriggs & Kirejtshuk, 1998); **c, e–k** – *A. pubescens* (Reitter, 1872); **d, m** – *A. marshalli* (Grouvelle, 1914). **a, b** – male habitus (**a** – length 2.6 mm; **b** – length 2.4 mm); **c, d** – dorsal view of head; **e** – ventral view of head and anterior portion of prosternum; **f** – prosternal process and mesoventrite; **g** – anterior portion of scutellum and microsetae on middle of posterior margin of pronotum; **h** – exposed portion of last visible abdominal ventrite; **k** – caudal marginal line of metacoxal cavity; **m** – last tarsomere of middle leg. Scale bars: Figs. **d, f, h, k, m** = 100  $\mu$ m; Fig. **g** = 20  $\mu$ m.

distinct; elytral pre-sutural striae faintly distinct, originating at scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a flat, poorly defined narrow sutural border, usually narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 17a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 17a, b).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, slightly convergent posteriorly; mentum subpentagonal, submental impression short and transverse (Fig. 17e); antennal furrows on anterior margin of prosternum moderately to strongly raised but relatively short (Fig. 17e); prosternal process relatively wide, subapical dilated portion 2.3–2.6× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually blunt (Fig. 17f); lateral borders of prosternal process delimiting moderately deep and narrowly impressed furrows, distally terminating over predistal lateral expansions, nearly reaching the smooth posterior margin (Fig. 17f); posterior margin of mesoventrite simple, never medially incised (Fig. 17f); male impressions on metaventrite more or less strongly developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities nearly simple, slightly and regularly deviating postero-medially from posterior margin of metacoxal cavities (Fig. 17k), with deep arched impression of outer ‘axillary’ line (Fig. 17k); ‘axillary’ space on first abdominal ventrite reduced, ‘axillary’ angle usually subacute (Fig. 17k); relatively wide and short, deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 17h).

*Appendages*: male 1<sup>st</sup> antennomere 0.7–0.8× as long as width of protibiae excluding distal teeth (Figs. 17a, b); 3<sup>rd</sup> antennomere in both sexes usually 2.5–2.6× longer than wide, 0.9–1.0× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 17e); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, slightly longer than wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.5–0.6× as wide as 9<sup>th</sup> antennomere) (Fig. 17e), distinctly narrower than width of protibiae, sexual dimorphism absent; labial palpi moderately long in both sexes (Fig. 17e), terminal segment nearly 1.6–1.8× as long as wide; maxillary palpi long in both sexes (Fig. 17e), terminal segment 2.6–3.0× as long as wide; mandible mid-sized (Figs. 17a, b), apex acuminate, no sexual dimorphism present; tarsal claws simple, bluntly toothed, or strongly and acutely toothed at base (Fig. 17m; Figs. 55–57 in AUDISIO et al. 1998); tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Figs. 17a, b); protibiae with a series of variably shaped, frequently uneven, and more or less sharply acuminate, perpendicular or oblique teeth on lateral margin (Figs. 17a, b; Figs. 9–18 in AUDISIO et al. 1998), with or without a group of larger distal teeth; meso- and metatibiae on lateral margin bearing a single and usually even row of relatively long and robust spurs, without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually slender and narrow (Figs. 17a, b), never subtrapezoidal or axe-shaped; tibial sexual dimorphism present in a few species (Fig. 19 in AUDISIO et al. 1998); tarsal plates of prolegs usually distinctly wider in males; posterior margin of metafemora in both sexes without tubercles, spines, or gibbositities.

*Male genitalia*: processes along inner side of parameres absent (Figs. 22–44 in AUDISIO et al. 1998), with more or less deeply incised or subtruncate distal margin, and always without deep

median longitudinal desclerotization from proximal portion of tegmen extending to medial distal excision; median lobe of aedeagus variable, without lateral emargination, narrowed and variably shaped distally, most species with acuminate or truncate distal projections.

*Female genitalia (ovipositor)*: variably shaped, usually large; styli moderately long or short, simple, cylindrical, usually unpigmented, inserted close to apex of contiguous gonostyloids (Figs. 45–52 in AUDISIO et al. 1998); each gonostyloid lightly sclerotized and occasionally moderately to darkly pigmented distally, with a simple, never indented outer portion of basicoxites, and a single, narrow, lightly pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually nearly centrally located, with or without proximad directed spicule.

**Etymology.** The generic name is derived from a combination of the Greek ‘αριστος’ (= excellent, the best), to emphasize the usually long and elegant dorsal pubescence of most inclusive species, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The biology of inclusive species is only partially known, but appears to be similar throughout the genus. Members of *Aristogethes* gen. nov. are likely all associated as larvae with flowers of Sterculiaceae. This specialization likely occurred in a single ecological shift followed by a marked radiation and morphological diversification. Members of the speciose genus *Hermannia* L. are the recognized larval host-plants of most described Southern African species (AUDISIO et al. 1998, and unpublished data; AUDISIO & DE BIASE 2007).

**Phylogenetic position.** Available morphological and molecular (TRIZZINO et al. 2009) datasets provide weak support for tentative placement of *Aristogethes* gen. nov. within Meligethinae, with potential relationships with *Afrogethes* gen. nov. and allied taxa, or with ‘*Meligethes*’ *perfectus* Easton, 1960 and allied species in the group of African-Indian species with uncertain generic affinities (see *Afrogethes* gen. nov.).

**Taxonomy and geographic distribution.** *Aristogethes* gen. nov. includes 19 described African species, which were attributed to three formerly recognized species-groups, i.e. the ‘*Meligethes pubescens/plumbeus*’, ‘*M. incognitus*’, and ‘*M. eremita*’ species-groups (AUDISIO et al. 1998, and unpublished data; AUDISIO & DE BIASE 2007).

|  |   |
|--|---|
| <i>Aristogethes argentarius</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b> | South Africa: E Cape, KwaZulu-Natal                 |
| <i>Aristogethes aurivestis</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b>  | South Africa: W Cape                                |
| <i>Aristogethes bisignifer</i> (Kirejtshuk, 1996) <b>comb. nov.</b>                          | N Namibia   |
| <i>Aristogethes colonnellii</i> (Audisio & De Biase, 2007) <b>comb. nov.</b>                 | South Africa: W Cape                                |
| <i>Aristogethes confertus</i> (Reitter, 1872) <b>comb. nov.</b>                              | South Africa: W and E Cape                          |
| <i>Aristogethes eremita</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b>     | South Africa: W Cape, NW Province, S Namibia        |
| <i>Aristogethes fuerschi</i> (Spornraft & Audisio, 1995) <b>comb. nov.</b>                   | South Africa: Mpumalanga, Free State, KwaZulu-Natal |
| <i>Aristogethes hermanniae</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b>  | South Africa: E Cape                                |
| <i>Aristogethes incognitus</i> (Grouvelle, 1910) <b>comb. nov.</b>                           | Tanzania  |
| <i>Aristogethes marshalli</i> (Grouvelle, 1914) <b>comb. nov.</b>                            | South Africa: E Cape, KwaZulu-Natal                 |

|   |                                  |
|---|----------------------------------|
| <i>Aristogethes massivus</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b>     | South Africa: Limpopo            |
| <i>Aristogethes namaqwaensis</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b> | South Africa: W Cape             |
| <i>Aristogethes pecten</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b>       | South Africa: W Cape, Free State |
| <i>Aristogethes pilosus</i> (Easton, 1960) <b>comb. nov.</b>                                  | Kenya, Cameroon                  |
| <i>Aristogethes plumbeus</i> (Reitter, 1872) <b>comb. nov.</b>                                | South Africa: W Cape             |
| <i>Aristogethes pubescens</i> (Reitter, 1872) <b>comb. nov.</b>                               | South Africa: W Cape             |
| <i>Aristogethes rufofuscus</i> (Audisio, Kirk-Spriggs & Kirejtshuk, 1998) <b>comb. nov.</b>   | South Africa: Limpopo; Namibia   |
| <i>Aristogethes translatus</i> (Grouvelle, 1913) <b>comb. nov.</b>                            | South Africa: W Cape             |
| <i>Aristogethes verniceus</i> (Kirejtshuk, 1990) <b>comb. nov.</b>                            | Namibia                          |

### 18. *Jelinekigethes* Audisio & Cline, gen. nov.

(Figs. 18 a–e)

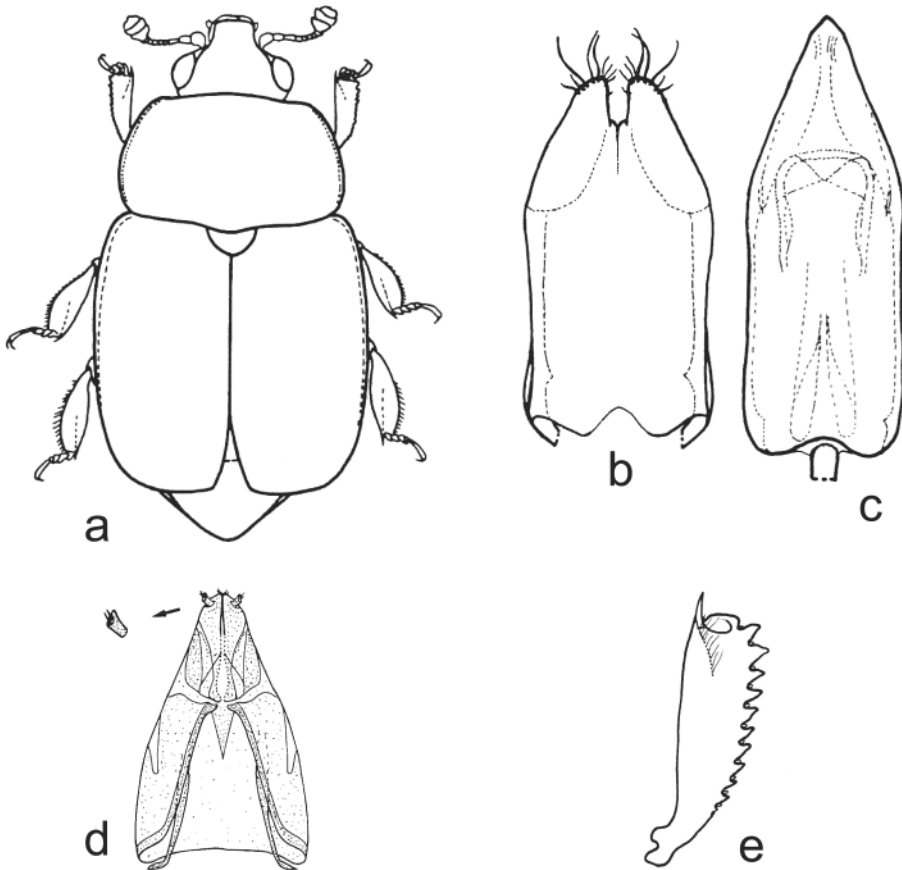
**Type species.** *Meligethes danielssoni* Audisio, 1995: 1 (by present designation) [= *Jelinekigethes danielssoni* (Audisio, 1995) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary moderately in size (1.7–2.1 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence golden to silvery-whitish, moderately long and fine, recumbent, never obscuring the blackish or bicolored (blackish-brown elytra and reddish head and pronotum) and usually shining dorsal body surface; pronotal and elytral sides narrowly flattened, typically same color as disc; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with peculiarly long, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (as in Fig. 13e).

*Dorsal habitus:* body more or less convex, variably shaped, short or moderately slender and oval (Fig. 18a); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, usually moderately and densely impressed; anterior margin of clypeus truncate, or slightly convex anteriorly, not bordered (Fig. 18a), without small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head faintly distinct above antennal insertion, absent posteriorly and around eyes; pronotum with completely rounded posterior angles (Fig. 18a); scutellum regularly punctured on most of exposed portion; elytra finely, almost completely, transversely strigose; elytral humeral angle moderately distinct, not protruding laterally (Fig. 18a); elytral humeral striae faint; elytral pre-sutural striae almost indistinct anteriorly, faintly visible in posterior half, terminating at elytral apex, and delimiting posteriorly, on each elytron, a faintly distinct, flat, unraised sutural border, narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 18a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 18a).

*Ventral habitus:* antennal furrows markedly delimited, nearly parallel-sided; mentum sub-pentagonal; prosternal antennal furrows on anterior margin of prosternum markedly raised but short; prosternal process usually relatively narrow, subapical dilated portion 2.0–2.3× as wide as maximum width of 1<sup>st</sup> antennomere, apex bluntly rounded; lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating over predi-



**Fig. 18.** *Jelinekigethes* Audisio & Cline, gen. nov.: **a–e** – *J. danielssoni* (Audisio, 1995). **a** – male habitus; **b–c** – male genitalia; **d** – ovipositor; **e** – male protibia. Figs. **a–e** – refer to AUDISIO (1995) for scale.

stal lateral expansions, nearly approximating prosternal posterior margin; posterior margin of mesoventrite simple, not medially incised; male impressions on metaventrte moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and narrowly contiguous to posterior margin of metacoxal cavities, with moderately distinct arched impression of outer ‘axillary’ line; ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle broadly obtuse; relatively large, long, and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite.

*Appendages*: male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Fig. 18a); 3<sup>rd</sup> antennomere in both sexes usually only 2.0–2.2× as long as wide, 0.9–1.0× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 18a); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, moderately short, slightly longer than wide; antennal club compact,



mid-sized, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Figs. 18a), nearly as wide as width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes, terminal segment nearly 1.8× as long as wide; maxillary palpi moderately long and slender in both sexes, terminal segment 2.1–2.2× as long as wide; mandible mid-sized (Fig. 18a), apex moderately acuminate, no sexual dimorphism; tarsal claws simple, never toothed at base; tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 18a); protibiae with a series of relatively small, even, serrate, and moderately sharp and fine teeth on lateral margin (Figs. 18a, e); meso- and metatibiae on lateral margin bearing a single and usually even row of fine, long pegs (Fig. 18a), without U-shaped sinuosity at distal third; meso- and metatibiae slender and relatively narrow (Fig. 18a), never subtrapezoidal or axe-shaped; sexual dimorphism scarcely expressed in metatibiae; tarsal plates of prolegs distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 18b, c), with narrowly incised distal margin, and without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus narrowly acuminate or spatulate distally, without distal excision or emargination.

*Female genitalia (ovipositor)*: small, wide; styli peculiarly shaped, asymmetrical, trapezoidal, relatively flat (Fig. 18d), inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and lightly pigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 5–6 in AUDISIO, 1995), and a single, narrow, scarcely pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor located slightly more distad than middle, with large proximad directed spicule.

**Etymology.** The new genus is named for our dear friend and colleague Josef Jelinek (recognized World specialist on Nitidulid beetles, and author of numerous important and thorough papers on Meligethinae taxonomy), and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The biology of the two recognized species is not well-known. Newly acquired field data suggest that at least the type species from southwestern South Africa (Western Cape Province) could be associated with male flowers of small bushes of the phylogenetically isolated Montiniaceae (AUDISIO et al. in prep.). However, a second, undescribed species from northeastern South Africa (Limpopo Region) could be associated with flowering shrubs belonging to an unidentified family of the Celastraceae/Cornaceae group (AUDISIO et al. in prep.).

**Phylogenetic position.** Available molecular and morphological datasets provide contradictory evidence on the placement and relationships of *Jelinekigethes* gen. nov. Molecular data (TRIZZINO et al. 2009) suggest placement of *Jelinekigethes* gen. nov. in a relatively basal position near *Lamiogethes* gen. nov. and allied genera. However, phylogenetic relationships of these taxa also remain unclear, and are only weakly supported with morphological data. The shape of male genitalia (Figs. 18b, c) may also suggest closer relationships with members of the *Chromogethes* + (*Anthystrix* and allied genera) clade. The very peculiar shape of the female ovipositor, with unique, moderately long but asymmetrical, non-cylindrical styli, and arcuately convergent gonostyloid apices (Fig. 18d), further obscures the phylogenetic position of this isolated taxon.

**Taxonomy and geographic distribution.** *Jelinekigethes* gen. nov. thus far includes only one described species from southwestern South Africa; a second, peculiar, undescribed species was recently discovered in northeastern South Africa, Limpopo Province (AUDISIO et al. in prep.) and awaits formal description.

*Jelinekigethes danielssoni* (Audisio, 1995) **comb. nov.** SW South Africa: W Cape

### 19. *Astylogethes* Kirejtshuk, 1992 stat. nov.

(Figs. 19 a–h)

*Astylogethes* Kirejtshuk, 1992: 168 (described as a subgenus of *Meligethes* Stephens, 1830).

**Type species.** *Nitidula subrugosa* Gyllenhal, 1808: 236 (by original designation) [= *Astylogethes subrugosus* (Gyllenhal, 1808) **comb. nov.**].

**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.4–3.0 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish, short and fine, recumbent, never obscuring the blackish and usually shining dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta usually 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum comprising moderately long, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 19g).

*Dorsal habitus:* body more or less convex, variably shaped, usually moderately slender and oval (Fig. 19a); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, usually deeply impressed and densely distributed; anterior margin of clypeus truncate, and distinctly narrowly bordered (Fig. 19b), without small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head almost complete, narrow, moderately to deeply impressed (Fig. 19b); eyes large and usually moderately projecting laterally (Figs. 19a, b, c); pronotum with distinct obtuse posterior angles, never directed posteriorly (Fig. 19a); scutellum regularly punctured in most of exposed portion (Fig. 19g); elytra completely transversely strigose (Fig. 19g), or with simple punctation, faint traces of orange peel-like rugosity present; elytral humeral angle moderately distinct, not protruding laterally (Fig. 19a); elytral humeral striae variable, faintly distinct to indistinct; elytral pre-sutural striae distinct, originating at scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a scarcely raised and narrow sutural border, border narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 19a); pygidium partially exposed, moderately convex, usually apically rounded in both sexes (Fig. 19a), *A. caudatus* with lobed median protrusion directed posteriorly (Fig. 118f in AUDISIO 1993b), more developed in females than in males.

*Ventral habitus:* antennal furrows markedly delimited, nearly parallel-sided, slightly sinuate; mentum subpentagonal (Fig. 19c); prosternal antennal furrows of anterior margin of prosternum strongly raised but short (Fig. 19c); prosternal process usually relatively narrow, subapical dilated portion 2.0–2.1× as wide as maximum width of 1<sup>st</sup> antennomere, usually

bluntly acuminate distally (Fig. 19d); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions, approaching posterior margin (Fig. 19d); posterior margin of mesoventrite simple, never medially incised; male impressions on metaventrite scarcely developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, with moderately deep arched impression of outer 'axillary' line (Fig. 19h); 'axillary' space on first abdominal ventrite reduced, 'axillary' angle subacute (Fig. 19h); relatively large, long, and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 19f).

*Appendages:* male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Figs. 19a, c); 3<sup>rd</sup> antennomere in both sexes usually 2.0–2.1× as long as wide, 0.9–1.0× as long but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 19c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres in both sexes subequal, short, nearly as long as wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Figs. 19a, c), slightly narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 19c), terminal segment nearly 1.8× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 19c), terminal segment 2.1–2.2× as long as wide; mandible mid-sized (Fig. 19c), apex moderately acuminate, no sexual dimorphism; tarsal claws simple, never toothed at base; tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 19a); protibiae with a series of small, even, short and rounded teeth on lateral margin (Figs. 19a, e; Figs. 126*i–l* in AUDISIO 1993b); lateral margin of meso- and metatibiae bearing a single and usually even row of large and robust pegs (Fig. 19h), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually moderately slender and narrow (Figs. 19a, h), never subtrapezoidal or axe-shaped; sexual dimorphism scarcely expressed in metatibiae; tarsal plates of prolegs only moderately wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

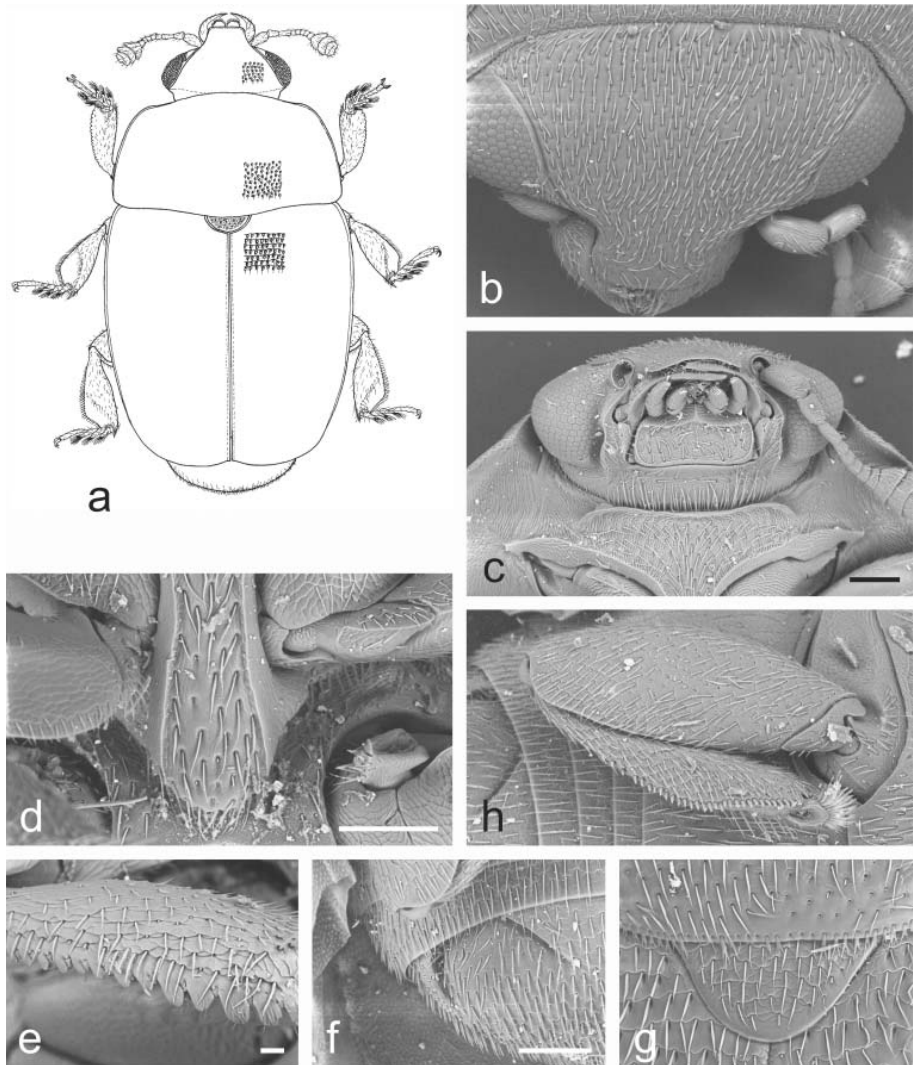
*Male genitalia:* processes along inner side of parameres absent (Figs. 137*m–p* in AUDISIO 1993b), distal margin subtruncate, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, narrowed and subtruncate distally, without distal marked excision or emargination.

*Female genitalia (ovipositor):* long and narrow, relatively large; styli absent, replaced by two small sensorial setae close to apex of contiguous or very narrowly divergent gonostyloids (Figs. 157*g–h* in AUDISIO 1993b); gonostyloids moderately sclerotized and lightly pigmented distally, with a simple, never indentate outer portion of basicoxites, and a single, narrow, lightly pigmented and sclerotized arcuate area along the outer subdistal portion of gonostyloids. 'Central point' of ovipositor usually located more distad than middle, without proximad directed spicule.

**Etymology.** The generic name is derived from a combination of the Greek 'α', having a privative meaning, combined with Latin 'stilus', to emphasize the peculiar absence of distal styli on ovipositors in inclusive species, and from '-gethes', to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated for larval development with flowers of Campanulaceae (EASTON 1951a; KIREJTSHUK 1992b; AUDISIO 1993b, and unpublished data), in particular *Campanula* L. and *Jasione* L.

**Phylogenetic position.** Available molecular and morphological datasets provide combined evidence of a possible clade that includes *Astylogethes*, *Lamiogethes* gen. nov., *Rubiogethes*



**Fig. 19.** *Astylogethes* Kirejtshuk, 1992: **a–h** – *A. subrugosus* (Gyllenhal, 1808). **a** – male habitus (length 2.4 mm); **b** – dorsal view of head; **c** – ventral view of head and anterior portion of prosternum; **d** – prosternal process and mesoventrite; **e** – outer margin of protibia; **f** – exposed portion of last visible abdominal ventrite; **g** – scutellum and microsetae on middle of posterior margin of pronotum; **h** – caudal marginal line of metacoxal cavity. Scale bars: Figs. **c**, **d**, **f** = 100  $\mu$ m; Fig. **e** = 20  $\mu$ m.

gen. nov., and potentially *Stachygethes* gen. nov. and *Paleogethes* gen. nov. *Lamiogethes* gen. nov. and *Stachygethes* gen. nov. develop on Lamiaceae, whereas *Rubiogethes* gen. nov. is known from Rubiaceae, and *Paleogethes* gen. nov. from Boraginaceae. Clearly defined phylogenetic relationships between these taxa remain elusive, and are only weakly supported with molecular data.

**Taxonomy and geographic distribution.** *Astylogethes* includes three described species distributed in the Palaearctic Region, and which were formerly attributed to the '*Meligethes subrugosus*' species-group.

*Astylogethes caudatus* (Guillebeau, 1897) **comb. nov.**

Europe, N Turkey (Boreal or mountain areas)

*Astylogethes corvinus* (Erichson, 1845) **comb. nov.**

Palaearctic Region, excluding N Africa

*Astylogethes subrugosus* (Gyllenhal, 1808) **comb. nov.**

Palaearctic Region

## 20. *Stachygethes* Audisio & Cline, gen. nov.

(Figs. 20 a–k)

**Type species.** *Nitidula ruficornis* Marsham, 1802: 131 (= *Meligethes ruficornis* (Marsham, 1802) (by present designation) [= *Stachygethes ruficornis* (Marsham, 1802) comb. nov.].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.5–3.8 mm length), and share the following combination of characters.

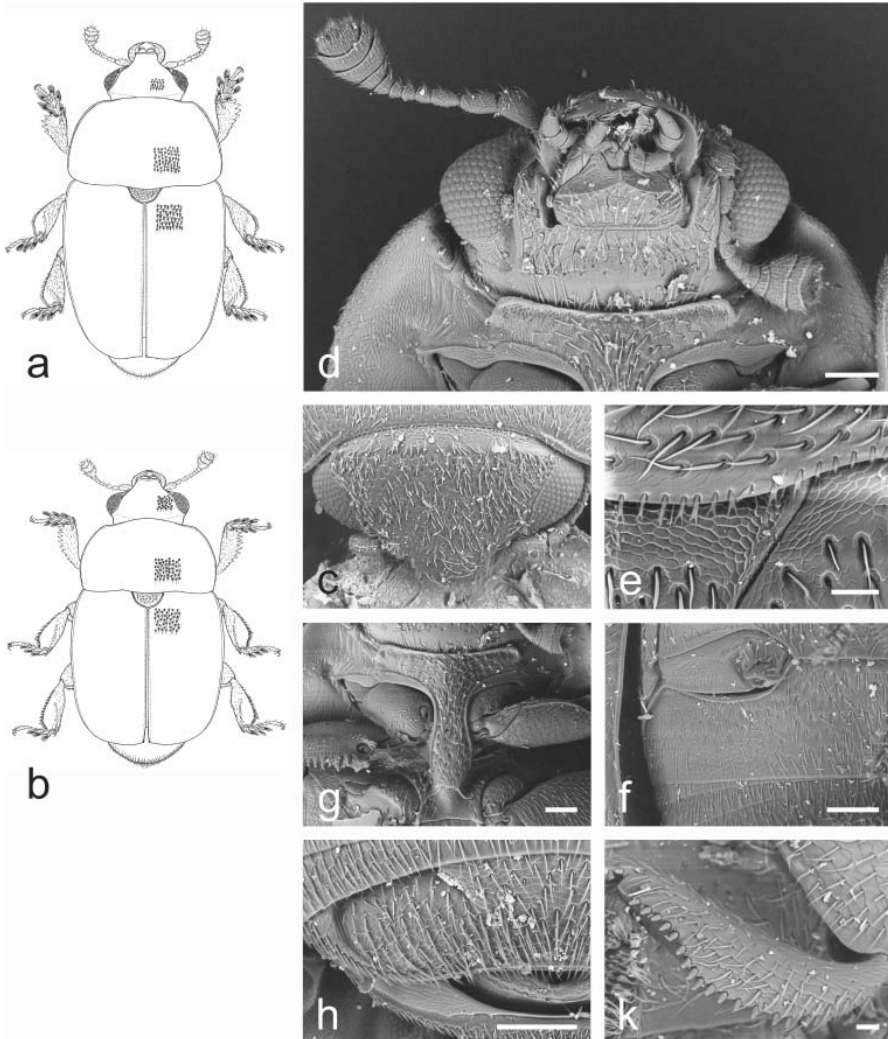
**Body color and pubescence:** pubescence silvery-whitish, variably developed, recumbent, never obscuring the blackish or dark brown and usually shining dorsal body surface; pronotal and elytral sides narrowly flattened, typically the same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid or trifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 20e).

**Dorsal habitus:** body more or less convex, variably shaped, usually moderately slender and oval (Figs. 20a, b); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, usually deeply impressed and densely distributed; anterior margin of clypeus truncate, and distinctly narrowly bordered (Fig. 20c), without small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head narrow, moderately impressed, and anteriorly developed (Fig. 20c); eyes large and usually moderately projecting laterally (Figs. 20a, b, c); pronotum with obtusely distinct or almost completely rounded posterior angles, never directed posteriorly (Figs. 20a, b); scutellum regularly punctured on posterior half of exposed portion (Fig. 20e); elytra never transversely strigose, punctuation simple, occasionally with faint traces of orange peel-like rugosity; elytral humeral angle moderately distinct, not protruding laterally (Figs. 20a, b); elytral humeral striae faint; elytral pre-sutural striae distinct, originating posteriorly to scutellar vertex, terminating close to elytral apex, delimiting on each elytron a flat and narrow sutural border, narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 20a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 20a, b).

**Ventral habitus:** antennal furrows markedly delimited, nearly parallel-sided; mentum sub-pentagonal (Fig. 20d); prosternal antennal furrows on anterior margin of prosternum strongly raised and relatively long (Fig. 20d); prosternal process usually relatively narrow, subapical



dilated portion 2.3–2.8× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly acuminate (Fig. 20g); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating over predistal lateral expansions near posterior margin (Fig. 20g); posterior margin of mesoventrite simple, never medially incised (Fig. 20g); male impressions on metaventrите scarcely developed; first two visible abdominal ventrites simple in



**Fig. 20.** *Stachygethes* Audisio & Cline, gen. nov.: **a, c, f, k** – *S. ruficornis* (Marsham, 1802); **b** – *S. variolosus* (Easton, 1964); **d, e, g, h** – *S. assimilis* (Sturm, 1845). **a, b** – male habitus (**a** – length 2.5 mm; **b** – length 2.5 mm); **c** – dorsal view of head; **d** – ventral view of head and anterior portion of prosternum; **e** – scutellum and microsetae on middle of posterior margin of pronotum; **f** – caudal marginal line of metacoxal cavity; **g** – prosternal process and mesoventrite; **h** – exposed portion of last visible abdominal ventrite; **k** – outer margin of mesotibia. Scale bars: Figs. **d, f, g, h** = 100  $\mu$ m; Fig. **e** = 30  $\mu$ m; Fig. **k** = 20  $\mu$ m.

both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, comprising moderately deep arched impression of outer 'axillary' line (Fig. 20f); 'axillary' space on first abdominal ventrite reduced, 'axillary' angle nearly right angled (Fig. 20f); relatively large, long, and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 20h).

*Appendages*: male 1<sup>st</sup> antennomere 0.7–0.9× as long as width of protibiae excluding distal teeth (Figs. 20a, b, d); 3<sup>rd</sup> antennomere in both sexes 1.6–1.8× as long as wide, 0.8–0.9× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 20d); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, nearly as long as wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Figs. 20a, b, d), narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 20d), terminal segment ~1.7× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 20d), terminal segment 2.0–2.1× as long as wide; mandible mid-sized (Fig. 20d), apex moderately acuminate, no sexual dimorphism; tarsal claws simple, never toothed at base; tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Figs. 20a, b); protibiae with a series of variable, even or uneven, large or small, sharp or blunt teeth on lateral margin (Figs. 20a, b, g; Figs. 129a, 131g–q, s–u in AUDISIO 1993b); lateral margin of meso- and metatibiae bearing a single usually even row of large and robust pegs (Fig. 20k), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually moderately slender and narrow (Figs. 20a, b), never subtrapezoidal or axe-shaped; sexual dimorphism rarely expressed in male metatibiae; tarsal plates of prolegs distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 139q–r, 142a–o, 143 in AUDISIO 1993b), with variably incised distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, narrowed and subtruncate or acuminate distally, without distal marked excision or emargination.

*Female genitalia (ovipositor)*: variably shaped, usually large; styli short to long, simple, cylindrical, inserted in variable position prior to apex of contiguous or divergent gonostyloids (Figs. 158b–e, m, 159a–l in AUDISIO 1993b); each gonostyloid moderately sclerotized and frequently more darkly pigmented distally, with a simple, never indented outer portion of basicoxites, and a single, narrow, lightly pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. 'Central point' of ovipositor usually centrally located, without proximad directed spicule.

**Etymology.** The generic name is derived from *Stachys* L. (Lamiaceae), to emphasize the strict larval relationships of several species with members of this widespread plant genus and allied genera, and from '-gethes', to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** Biology of inclusive species is incompletely known, but homogeneous within the genus. Members of *Stachygethes* gen. nov. are all associated as larvae with flowers of Lamiaceae (= Labiatae), in particular *Salvia* L., *Stachys* L., *Ballota* L., *Marrubium* L., and allied genera in Palearctic areas (EASTON 1964a; AUDISIO 1993b, and unpublished data).

**Phylogenetic position.** Available morphological datasets provide evidence of a possible clade including *Stachygethes* gen. nov., *Lamiogethes* gen. nov., and potentially *Rubiogethes* gen. nov., *Paleogethes* gen. nov., *Jelinekigethes* gen. nov., and *Astylogethes*. However, phylogenetic relationships between these taxa remain unclear, and are only partially supported with molecular data (TRIZZINO et al. 2009).

**Taxonomy and geographic distribution.** *Stachygethes* gen. nov. includes 17 described species, as well as some identified but undescribed species. The genus is mainly distributed in Europe, Anatolia, and Middle Asia (KIREJTSHUK 1992b; AUDISIO 1993b, and unpublished data; JELÍNEK & AUDISIO 2007). Inclusive species are attributed to two formerly recognized species-groups, i.e. the '*Meligethes ruficornis*', and '*M. assimilis*' species-groups.

|   |  |
|---|--|
| <i>Stachygethes assimilis</i> (Sturm, 1845) <b>comb. nov.</b>                         | Europe                                     |
| <i>Stachygethes dilutipes</i> (Easton, 1957) <b>comb. nov.</b>                        | Middle Asia                                |
| <i>Stachygethes khnzoriani</i> (Kirejtshuk, 1979) <b>comb. nov.</b>                   | Turkey, Caucasus                           |
| <i>Stachygethes lederi</i> (Reitter, 1871) <b>comb. nov.</b>                          | N Africa, S Iberian Peninsula              |
| <i>Stachygethes maroccanus</i> (Easton, 1956) <b>comb. nov.</b>                       | Morocco                                    |
| <i>Stachygethes nanus</i> (Erichson, 1845) <b>comb. nov.</b>                          | Europe, N Africa, Near East, W Middle Asia |
| <i>Stachygethes nigerrimus</i> (Rosenhauer, 1856) <b>comb. nov.</b>                   | N Africa, SW Europe                        |
| <i>Stachygethes rotroui</i> (Easton, 1952) <b>comb. nov.</b>                          | N Africa                                   |
| <i>Stachygethes ruficornis</i> (Marsham, 1802) <b>comb. nov.</b>                      | Europe, N Africa, Near East, W Middle Asia |
| <i>Stachygethes saxatilis</i> (Audisio, 1988) <b>comb. nov.</b>                       | E Turkey, W Iran                           |
| <i>Stachygethes scholzi</i> (Easton, 1960) <b>comb. nov.</b>                          | S Italy, Sicily, W Balkans                 |
| <i>Stachygethes strejceki</i> (Jelínek, 1982) <b>comb. nov.</b>                       | Uzbekistan                                 |
| <i>Stachygethes syriacus</i> (C. N. F. Brisout de Barneville, 1872) <b>comb. nov.</b> | Middle East                                |
| <i>Stachygethes turcicus</i> (Jelínek, 1982) <b>comb. nov.</b>                        | Turkey                                     |
| <i>Stachygethes variolosus</i> (Easton, 1964) <b>comb. nov.</b>                       | S Europe, Caucasus, Turkey                 |
| <i>Stachygethes villosus</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | Europe, N Africa                           |
| <i>Stachygethes zarudnyi</i> (Kirejtshuk, 1984) <b>comb. nov.</b>                     | SE Turkey, NW Iran                         |

## 21. *Paleogethes* Audisio & Cline, gen. nov.

(Figs. 21 a–k)

**Type species.** *Meligethes wollastoni* Easton, 1950: 309 (by present designation) [= *Meligethes virescens* Wollaston, 1864: 113, non *Meligethes virescens* C. G. Thomson, 1862: 154; = *Paleogethes wollastoni* (Easton, 1950) **comb. nov.**].

**Generic description and diagnosis.** The single known species (1.7–2.2 mm length; 0.7–1.0 mm width) exhibits the following combination of characters.

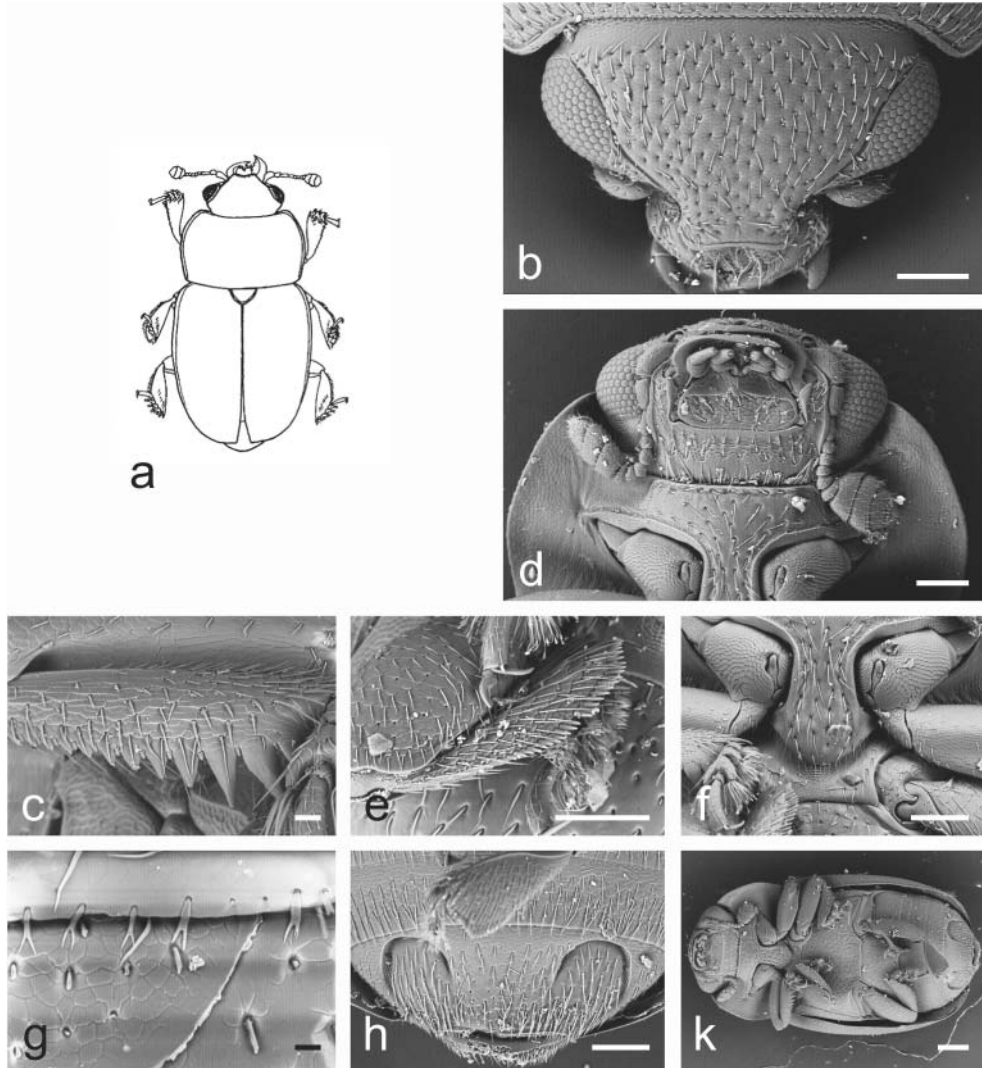
*Body color and pubescence:* pubescence silvery-whitish, fine, moderately developed, recumbent, never obscuring the bright metallic green or rarely bicolored (head and pronotum orange-yellowish, with metallic green elytra) dorsal body surface; pronotal and elytral sides narrowly flattened, typically same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.4× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid microsetae, microsetae uniformly distributed on middle region anterior to scutellum (Fig. 21g).

*Dorsal habitus*: body moderately convex, long and slender (Fig. 21a); dorsal punctures on discal portion of pronotum larger than eye facet, usually deeply impressed and densely distributed (Fig. 21b); anterior margin of clypeus slightly emarginate and distinctly bordered (Fig. 21b), without small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head narrow, strongly impressed, almost complete (Fig. 21b); eyes large and usually moderately projecting laterally (Figs. 21a, b); pronotum with obtusely distinct posterior angles, never directed posteriorly (Fig. 21a); scutellum regularly but sparsely punctured on most of exposed portion (Fig. 21g); elytra never transversely strigose, punctation simple, occasionally with faint traces of orange peel-like rugosity; elytral humeral angle moderately distinct, not protruding laterally (Fig. 21a); elytral humeral striae not distinct; elytral pre-sutural striae visible, originating at scutellar vertex, terminating at elytral apex, and delimiting on each elytron a faintly distinct and moderately raised sutural border, slightly widest at posterior third, narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 21a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 21a, h).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, slightly sinuate; mentum subpentagonal, markedly transverse (Fig. 21d); prosternal antennal furrows on anterior margin of prosternum strongly raised and relatively long (Fig. 21d); prosternal process relatively wide, subapical dilated portion 2.8–2.9× as wide as maximum width of 1<sup>st</sup> antennomere, apex bluntly acuminate (Fig. 21f); lateral borders of prosternal process delimiting shallowly impressed but wide and distinct furrows, distally terminating over predistal lateral expansions (Fig. 21f); posterior margin of mesoventrite simple, not medially incised (Fig. 21f); male impressions on metaventrite moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, comprising moderately deep arched impression of outer ‘axillary’ line (Fig. 21k); ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle bluntly obtuse (Fig. 21k); large, long, and peculiarly deeply impressed arched impressions present on basal portion of last visible abdominal ventrite, rarely partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 21h).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Fig. 21a); 3<sup>rd</sup> antennomere 2.1–2.2× as long as wide in both sexes, 0.8–0.9× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 21d); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, nearly as long as wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Figs. 21a, d), narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 21d), terminal segment ~1.7× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 21d), terminal segment 2.0–2.1× as long as wide; mandible mid-sized (Figs. 21a, d), apex moderately acuminate, sexual dimorphism absent; tarsal claws simple, not toothed at base, with a minute and obtuse angulation (Fig. 21e); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Figs. 21a, e); protibiae with a series of variable, uneven, large and sharp teeth on distal portion of lateral margin (Figs. 21a, c; Fig. 129o in AUDISIO 1993b); meso- and metatibiae on lateral margin bearing a single and usually even row of long and robust pegs (Fig. 21e),

without U-shaped sinuosity at distal third; meso- and metatibiae slender and narrow (Figs. 21a, e), never subtrapezoidal or axe-shaped; scarcely apparent sexual dimorphism in meso- and metatibiae; tarsal plates of prolegs distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.



**Fig. 21.** *Paleogethes* Audisio & Cline, gen. nov.: **a–k** – *P. wollastoni* (Easton, 1950). **a** – male habitus (length 1.9 mm); **b** – dorsal view of head; **c** – protibia; **d** – ventral view of head and anterior portion of prosternum; **e** – middle leg with outer margin of mesotibia; **f** – prosternal process and mesoventrite; **g** – anterior portion of scutellum and microsetae on middle of posterior margin of pronotum; **h** – exposed portion of last visible abdominal ventrite; **k** – ventral view of body. Scale bars: Figs. **b, d, e, f, h** = 100  $\mu$ m; Fig. **c** = 20  $\mu$ m; Fig. **g** = 10  $\mu$ m; Fig. **k** = 200  $\mu$ m.



**Male genitalia:** processes along inner side of parameres absent (Figs. 141*i–l* in AUDISIO 1993b), with narrowly and deeply incised distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus slender, without lateral emargination, narrowed and obtuse distally, without marked excision or emargination.

**Female genitalia (ovipositor):** small, short; styli long and pigmented, cylindrical, inserted close to apex of contiguous gonostyloids (Fig. 158*l* in AUDISIO 1993b); each gonostyloid lightly sclerotized and darkly pigmented distally, with a simple, never indentate outer portion of basicoxites, and a single, narrow, more or less pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor centrally located, without proximad directed spicule.

**Etymology.** The generic name is derived from a combination of the Greek name ‘παλαιός’ (= ancient), to emphasize the isolated position and likely ancient origin of the single Macaronesian species, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The single known species is strictly associated for its larval development with flowers of *Ceballosia fruticosa* (L. fil.) Kunkel (= *Messerschmidia fruticosa* L. fil.; Boraginaceae) (WOLLASTON 1864, EASTON 1956, AUDISIO 1993b).

**Phylogenetic position.** Available morphological datasets provide weak evidence for considering *Paleogethes* gen. nov. as a possible sister group to the clade containing *Lamiogethes* gen. nov., *Rubiogethes* gen. nov., and allied genera. *Paleogethes wollastoni* appears, in fact, to be a relictual species that is likely not too distantly related to east African members of *Lamiogethes* gen. nov. in the *L. ruficollis/gloriosus* group (EASTON 1960, AUDISIO 1993b). Phylogenetic relationships between these taxa remain unclear, and are only partially supported with molecular data (TRIZZINO et al. 2009).

**Taxonomy and geographic distribution.** This new genus includes a single species from the Canary Islands (Tenerife, Gomera, Hierro and La Palma; MACHADO & OROMI 2000).

*Paleogethes wollastoni* (Easton, 1950) **comb. nov.** Canary Islands

## 22. *Rubiogethes* Audisio & Cline, gen. nov.

(Figs. 22 a–k)

**Type species.** *Meligethes newtoni* Kirejtshuk, 1990: 89 (by present designation) [= *Rubiogethes newtoni* (Kirejtshuk, 1990) **comb. nov.**].

**Generic description and diagnosis.** Inclusive species vary moderately in size (1.6–2.4 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence silvery-whitish, fine, scarcely developed, recumbent, never obscuring the usually brown or blackish-brown dorsal body surface; pronotal and elytral sides narrowly flattened, typically same color as disc. Lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid microsetae, absent (or nearly so) on short middle portion anterior to scutellum (Fig. 22d).

*Dorsal habitus*: body moderately strongly convex, long and slender and relatively parallel-sided (Fig. 22a), or shortly oval; dorsal punctures on discal portion of pronotum larger than eye facet, usually deeply impressed and densely distributed (Fig. 22b); anterior margin of clypeus slightly sinuate medially, faintly bordered, lateral angles blunt (Fig. 22b), without small, faintly distinct, medial bulge; circum-ocular furrows (occipital sulci) on dorsal side of head narrow, shallowly impressed, and slightly obliterated posteriorly, incomplete (Fig. 22b); eyes large and usually moderately projecting laterally (Figs. 22a, b); pronotum with obtusely distinct posterior angles, never directed posteriorly (Fig. 22a); scutellum minutely punctured on posterior half of exposed portion (Fig. 22d); elytra always more or less strongly transversely strigose (Fig. 22d); elytral humeral striae indistinct; elytral pre-sutural striae faintly distinct, originating posteriorly to scutellar vertex, terminating close to elytral apex, delimiting on each elytron a flat and narrow sutural border, narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 22a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 22a).

*Ventral habitus*: antennal furrows markedly delimited, nearly parallel-sided, slightly sinuate, slightly divergent posteriorly; mentum subpentagonal (Fig. 22c), strongly transverse, trapezoidal; prosternal antennal furrows on anterior margin of prosternum strongly raised and relatively long (Figs. 22c, e); prosternal process usually moderately wide, subapical dilated portion 2.6–2.9× as wide as maximum width of 1<sup>st</sup> antennomere, with apex blunt and microscopically crenulate on posterior margin (Fig. 22e); lateral borders of prosternal process delimiting shallowly impressed but wide and distinct furrows, distally terminating over predistal lateral expansions (Fig. 22e); posterior margin of mesoventrite never medially incised, slightly arcuately convex posteriorly (Fig. 22e); male impressions on metaventrite moderately developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, comprising moderately deep arched impression of outer ‘axillary’ line (Fig. 22g); ‘axillary’ space on first abdominal ventrite well developed, ‘axillary’ angle obtuse (Fig. 22g); large, long, and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, rarely partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 22f).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Fig. 22c); 3<sup>rd</sup> antennomere in both sexes usually moderately short, 2.1–2.2× as long as wide, 0.7–0.8× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 22c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, nearly as long as wide; antennal club compact, small, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Fig. 22c), narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 22c), terminal segment 1.4–1.5× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 22c), terminal segment 2.1–2.2× as long as wide; mandible small- to mid-sized (Fig. 22c), apex moderately acuminate, no sexual dimorphism; tarsal claws simple, not toothed at base (Fig. 22h); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 22h); protibiae with a series of variable, uneven, large and sharp teeth on distal portion of lateral margin (Fig. 22k); lateral margin of meso- and metatibiae bearing a single and usually even

row of long and robust pegs (Fig. 22h), without U-shaped sinuosity at distal third; meso- and metatibiae moderately slender and relatively narrow (Fig. 22h), never subtrapezoidal or axe-shaped; meso- and metatibiae with scarce sexual dimorphism; tarsal plates of prolegs distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

**Male genitalia:** processes along inner side of parameres absent (Figs. 26–27 in EASTON 1959b; Figs. 44–45, 50–53 in EASTON 1960; Figs. 19–20 in AUDISIO 1996), distal margin variably incised, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variably shaped, some species exhibit a slight subdistal lateral emargination bearing a short, flat distally projecting lobule, narrowed and obtuse distally, without distal marked excision or emargination.

**Female genitalia (ovipositor):** small, slender; styli usually long and pigmented, cylindrical, inserted at apex of contiguous gonostyloids (Fig. 59 in EASTON 1959b; Fig. 103 in EASTON 1960; Fig. 42 in EASTON 1964b; Fig. 23 in AUDISIO 1996); each gonostyloid lightly sclerotized and typically darkly pigmented distally, with a simple, never indentate outer portion of narrow basicoxites, and a single, narrow, lightly pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor centrally located, without proximad directed spicule.

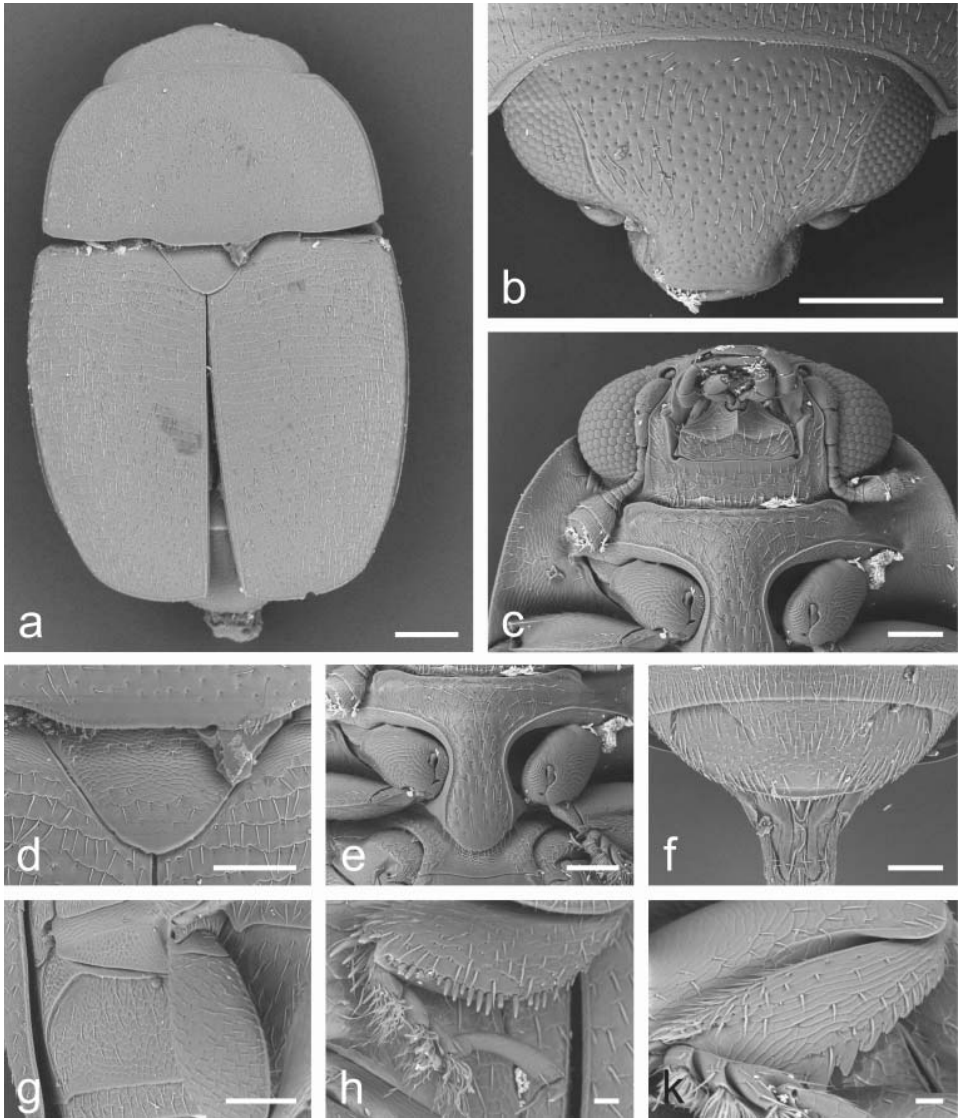
**Etymology.** The generic name is derived from the host-plant family of all inclusive species, i.e. Rubiaceae, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are likely to be strictly associated for larval development with flowers of herbaceous Rubiaceae, in particular *Pentas* Benth., *Pentanisia* Harv., and allied genera (EASTON 1960, AUDISIO unpublished data). The presumed association of several adult specimens of *Meligethes newtoni* (Kirejtshuk, 1990) with *Striga* Lour. (Scrophulariaceae) in South Africa (see KIREJTSHUK 1990) was probably due to an occasional availability of flowers of this plant genus (adult Meligethinae are usually polyphagous when their true host plants are not in flower), or to a misidentification of the plants; in fact, this southern African species is strictly associated as larvae with *Pentanisia* spp., specifically the widespread *P. prunelloides* (Klotzsch ex Eckl. & Zeyh.) Walp. (AUDISIO unpublished data).

**Phylogenetic position.** Available morphological datasets provide evidence for a monophyletic clade including *Rubiogethes* gen. nov. and *Lamiogethes* gen. nov., both of which are marginally related to *Paleogethes* gen. nov., *Jelinekigethes* gen. nov., and *Astylogethes*. However, phylogenetic relationships between these taxa remain unclear, and are only partially supported with molecular data (TRIZZINO et al. 2009).

**Taxonomy and geographic distribution.** *Rubiogethes* gen. nov. includes eight described Afrotropical species (EASTON 1959b, 1960, 1964b; KIREJTSHUK 1990; AUDISIO unpublished data). EASTON (1959b, 1960) first identified an isolated ‘*Meligethes spissus*’ species-group, correctly hypothesizing larval relationships of inclusive species with Rubiaceae, but later were attributed other species to this group that were actually members of *Lamiogethes* gen. nov. These species exhibited superficial parallelisms with *Rubiogethes* gen. nov., which were the cause for the misplacement. On the contrary, *Meligethes impexus* (Kirejtshuk & Viklund, 2002) was originally included in the *M. ruficollis* species-group (a group now included in *Lamiogethes* gen. nov.), but is probably a member of *Rubiogethes* gen. nov. The true taxonomic

placement of *Meligethes culminis* Easton, 1959 from ‘Abyssinia’ (not recently re-examined by the authors) requires further analysis to definitively confirm placement in *Rubiogethes* gen. nov., but within which it is currently placed.



**Fig. 22.** *Rubiogethes* Audisio & Cline, gen. nov.: **a–k** – *R. newtoni* (Kirejtshuk, 1990). **a** – female habitus; **b** – dorsal view of head; **c** – ventral view of head and anterior portion of prosternum; **d** – scutellum and microsetae on middle of posterior margin of pronotum; **e** – prosternal process and mesoventrite; **f** – exposed portion of last visible abdominal ventrite; **g** – caudal marginal line of metacoxal cavity; **h** – middle leg with outer margin of mesotibia; **k** – protibia. Scale bars: Figs. **a**, **b** = 200  $\mu$ m; Figs. **c**, **d**, **e**, **f**, **g** = 100  $\mu$ m; Figs. **h**, **k** = 20  $\mu$ m.

|  |   |
|--|---|
| <i>Rubiogethes culminis</i> (Easton, 1959) <b>comb. nov.</b>                 | Ethiopia  |
| <i>Rubiogethes impexus</i> (Kirejtshuk & Viklund, 2002)<br><b>comb. nov.</b> | Kenya   |
| <i>Rubiogethes kulalensis</i> (Easton, 1960) <b>comb. nov.</b>               | Kenya   |
| <i>Rubiogethes newtoni</i> (Kirejtshuk, 1990) <b>comb. nov.</b>              | South Africa: Limpopo, KwaZulu-Natal,<br>Mpumalanga |
| <i>Rubiogethes pentasi</i> (Easton, 1960) <b>comb. nov.</b>                  | Tanzania  |
| <i>Rubiogethes spissus</i> (Grouvelle, 1908) <b>comb. nov.</b>               | Ethiopia, Kenya, Tanzania                           |
| <i>Rubiogethes suffuscus</i> (Easton, 1964) <b>comb. nov.</b>                | Congo   |
| <i>Rubiogethes undosus</i> (Easton, 1964) <b>comb. nov.</b>                  | Congo   |
| <i>Rubiogethes varus</i> (Easton, 1960) <b>comb. nov.</b>                    | Kenya   |

### 23. *Lamiogethes* Audisio & Cline, gen. nov.

(Figs. 23 a–n)

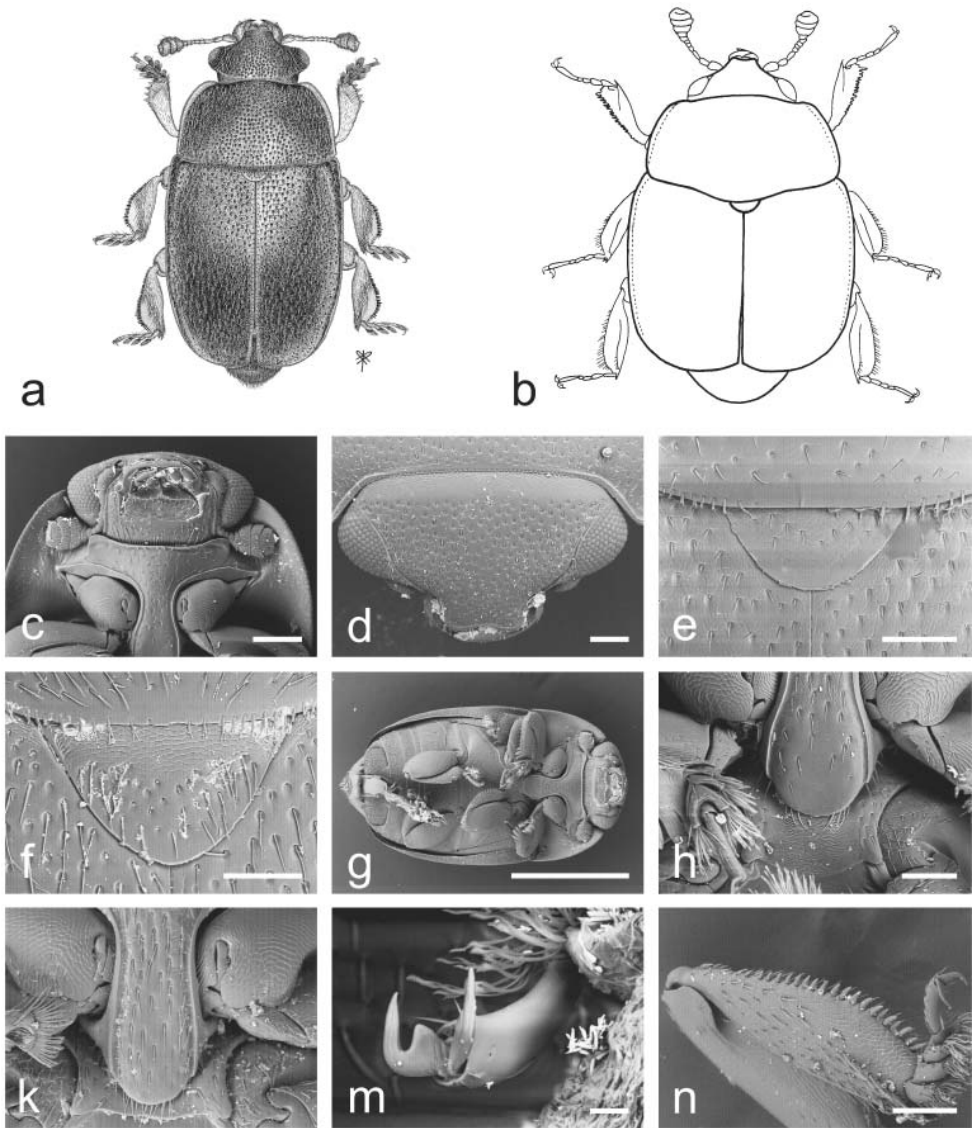
**Type species.** *Meligethes ruficollis* Reitter, 1872: 244, 258 (by present designation) [= *Lamiogethes ruficollis* (Reitter, 1872) comb. nov.].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.4–3.3 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish or golden, fine, usually not well-developed, recumbent, never obscuring the usually brown, blackish-brown, or reddish-brown dorsal body surface; pronotal and elytral sides narrowly flattened, frequently paler than disc; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum typically with long, usually distally bifid microsetae (frequently reduced in members of *Lamiogethes convexus* species-group), frequently absent at least along narrow middle portion anterior to scutellum (Figs. 23e, f) in Afrotropical species-groups.

*Dorsal habitus:* body highly convex to relatively flat, even within members of the same species-group (AUDISIO 1996), variably shaped, shortly oval to long and parallel-sided (Figs. 23a, b); dorsal punctures on discal portion of pronotum usually larger than eye facet, and typically moderately to deeply impressed and densely distributed (Fig. 23d), but depth and distribution highly variable; anterior margin of clypeus truncate, slightly or distinctly sinuate medially, usually without small, faintly distinct, medial bulge, faintly distinctly bordered, lateral angles rounded or obtuse (Fig. 23d); circum-ocular furrows (occipital sulci) on dorsal side of head narrow, moderately to deeply impressed, usually obliterated posteriorly, incomplete (Fig. 23d); eyes large and usually moderately projecting laterally (Figs. 23a, b, d); pronotum with obtusely distinct to rounded posterior angles, never directed posteriorly (Figs. 23a, b); areas adjacent to posterior outer portions of pronotum usually impunctate and glabrous; scutellum minutely punctured on exposed portion (Figs. 23e, f); elytra with simple to more or less distinctly transversely strigose punctures (Figs. 23a, e, f); elytral humeral striae usually indistinct; elytral pre-sutural striae distinct, originating at scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a flatly raised and narrow sutural border, border largest at posterior third but narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices





**Fig. 23.** *Lamiiogethes* Audisio & Cline, gen. nov.: **a** – *L. paschalis* (Spornraft, 1975); **b** – *L. convexus* (Boheman, 1851); **c–e, g–h, m** – *L. ruficollis* (Reitter, 1872); **k, f, n** – *L. difficilis* (Heer, 1841). **a, b** – male habitus (**a** – length 3.0 mm; **b** – length 2.7 mm); **c** – ventral view of head and of anterior portion of prosternum; **d** – dorsal view of head; **e–f** – scutellum and microsetae on middle of posterior margin of pronotum; **g** – ventral view of body; **h–k** – prosternal process and mesoventrite; **m** – last tarsomere of middle leg; **n** – outer margin of mesotibia. Scale bars: Figs. **c, d, e, f, h, n** = 100  $\mu$ m; Fig. **g** = 1 mm; Fig. **m** = 20  $\mu$ m.

truncately rounded in both sexes (Fig. 23a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 23a, b).

*Ventral side:* antennal furrows markedly delimited, nearly parallel-sided, slightly sinuate, slightly divergent posteriorly; mentum subpentagonal (Fig. 23c), transverse, trapezoidal; prosternal antennal furrows on anterior margin of prosternum strongly raised and relatively long (Fig. 23c); prosternal process variably shaped, subapical dilated portion 2.0–3.6× as wide as maximum width of 1<sup>st</sup> antennomere, usually bluntly convex and microscopically indistinctly crenulate distally (Figs. 23h, k); lateral borders of prosternal process delimiting shallowly impressed but wide and distinct furrows, distally terminating over predistal lateral expansions (Figs. 23h, k); posterior margin of mesoventrite never medially incised, frequently slightly to markedly arcuately convex posteriorly (Figs. 23h, k); male impressions on metaventrite and tubercles variably developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities nearly simple, usually subparallel and more or less narrowly contiguous to posterior margin of metacoxal cavities, with shallow arched impression of outer ‘axillary’ line (Fig. 23g); ‘axillary’ space on first abdominal ventrite usually large, ‘axillary’ angle usually widely obtuse (Fig. 23g); large, long, and deeply impressed arched impressions present on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 23g); apex of last abdominal ventrite frequently more or less distinctly emarginate in males with shining tubercles or arcuate ridges.

*Appendages:* male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth (Figs. 23 a, b); 3<sup>rd</sup> antennomere usually moderately short in both sexes, 2.1–2.2× as long as wide, 0.8–1.0× as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 23c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, nearly as long as wide; antennal club compact, mid-sized, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Fig. 23c), narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively short in both sexes (Fig. 23c), terminal segment ~1.6–1.8× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 23c), terminal segment 2.2–2.3× as long as wide; mandible mid-sized (Fig. 23a, b, c), apex moderately acuminate, no sexual dimorphism; tarsal claws variable, simple, not toothed at base (Fig. 23n), bluntly toothed, or strongly and sharply toothed (Fig. 23m); tarsi of variable size and shape, 0.5–0.8× as long as corresponding tibiae (Figs. 23a, b, n); protibiae with a series of variable, uneven, small and blunt to large and sharp teeth on distal portion or on most of lateral margin (Figs. 23a, b, g); meso- and metatibiae on lateral margin bearing a single and usually even row of long and robust pegs (Figs. 23a, b, n), without U-shaped sinuosity at distal third; meso- and metatibiae moderately slender and relatively narrow (Figs. 23a, b, n), never subtrapezoidal or axe-shaped; sexual dimorphism only rarely expressed in metatibial shape; tarsal plates of prolegs distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia:* processes along inner side of parameres absent (Figs. 24–25 in EASTON 1959b; Figs. 54–57, 58–69 in EASTON 1960; Figs. 149–152 in AUDISIO 1993b; Figs. 1–18

in AUDISIO 1996), distal margin variably incised, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variably shaped, without lateral emargination, narrowed and obtuse, acuminate or spatulate distally, rarely with minute excisions or emarginations.

*Female genitalia (ovipositor)*: small or large, variably shaped; styli short to long, cylindrical, inserted close to apex of contiguous gonostyloids (Fig. 58 in EASTON 1959b; Figs. 105–111 in EASTON 1960; Figs. 162–163 in AUDISIO 1993b; Figs. 21–22 and 24–29 in AUDISIO 1996); each gonostyloid lightly sclerotized and rarely darkly pigmented distally, with a simple, never indentate outer portion of narrow basicoxites, and a single, narrow, more or less pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually centrally located, or placed slightly more distad than middle, usually without or rarely with proximad directed spicule.

**Etymology.** The generic name is derived from the host-plant family of inclusive species, i.e. Lamiaceae, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** The biology of inclusive species is incompletely known, but appears to be homogeneous. Members of *Lamiogethes* gen. nov. are likely all associated as larvae with flowers of Lamiaceae (= Labiatae), in particular *Lamium* L., *Salvia* L., *Stachys* L., *Becium* Lindl., *Leucas* Burm. ex R. Br., *Leonotis* R. Br., and allied genera in Palaearctic and Afrotropical areas (EASTON 1960; AUDISIO 1993b, 1996, and unpublished data).

**Phylogenetic position.** Available morphological datasets provide good evidence for a clade including *Lamiogethes* gen. nov., *Rubiogethes* gen. nov., *Paleogethes* gen. nov., *Astylogethes*, and *Stachygethes* gen. nov. However, phylogenetic relationships between these taxa are only partially supported with molecular data (TRIZZINO et al. 2009).

**Taxonomy and geographic distribution.** *Lamiogethes* gen. nov. is numerically the second largest Meligethinae genus, including nearly one hundred described species as well as ~20 additional identified but undescribed species, mainly distributed in Tropical Africa, Madagascar, the Indian Subcontinent, Europe, Anatolia, and the Eastern Palaearctic (KIREJTSHUK 1992b; AUDISIO 1993b, 1996; JELÍNEK & AUDISIO 2007). Inclusive species are attributed to four or five formerly recognized species-groups, i.e. the ‘*Meligethes difficilis*’, ‘*M. ruficollis/gloriosus*’, ‘*M. convexus*’, and ‘*M. politus/phalacroides*’ species-groups.

|  |   |
|--|---|
| <i>Lamiogethes abductus</i> (Audisio, Jelínek & Cooter, 2005)          | NE China  |
| <b>comb. nov.</b>  |   |
| <i>Lamiogethes accretus</i> (Kirejtshuk, 1988) <b>comb. nov.</b>       | South Africa: Mpumalanga, NW Province, KwaZulu-Natal, Free State, E Cape; Lesotho |
| <i>Lamiogethes aeneoviridinitens</i> (Audisio, 1993) <b>comb. nov.</b> | NE Turkey, Caucasus   |
| <i>Lamiogethes amabilis</i> (Kirejtshuk, 1988) <b>comb. nov.</b>       | India   |
| <i>Lamiogethes amei</i> (Audisio & Kirejtshuk, 1988) <b>comb. nov.</b> | N Turkey, Caucasus  |
| <i>Lamiogethes andrewesi</i> (Grouvelle, 1908) <b>comb. nov.</b>       | India   |
| <i>Lamiogethes angustatus</i> (Küster, 1848) <b>comb. nov.</b>         | S Europe  |
| <i>Lamiogethes asignifer</i> (Kirejtshuk, 1996) <b>comb. nov.</b>      | N Namibia   |
| <i>Lamiogethes assamensis</i> (Kirejtshuk, 1980) <b>comb. nov.</b>     | N India, Assam  |

|  |   |
|--|---|
| <i>Lamiogethes atomus</i> (Grouvelle, 1904) <b>comb. nov.</b>                        | Congo, Zanzibar   |
| <i>Lamiogethes atramentarius</i> (Förster, 1849) <b>comb. nov.</b>                   | Central Europe  |
| <i>Lamiogethes atrovirens</i> (Jelinek, 1982) <b>comb. nov.</b>                      | N Turkey, Caucasus  |
| <i>Lamiogethes becivorus</i> (Audisio, 1996) <b>comb. nov.</b>                       | South Africa: NW Province                                     |
| <i>Lamiogethes besucheti</i> (Kirejtshuk, 1988) <b>comb. nov.</b>                    | Sri Lanka   |
| <i>Lamiogethes bidens</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b>   | Europe, Caucasus  |
| <i>Lamiogethes bolognai</i> (Audisio, 1977) <b>comb. nov.</b>                        | N Turkey, Caucasus  |
| <i>Lamiogethes brunnicornis</i> (Sturm, 1845) <b>comb. nov.</b>                      | Europe, W Siberia, Middle Asia, N Africa                      |
| <i>Lamiogethes bucciarellii</i> (Audisio, 1976) <b>comb. nov.</b>                    | SE Europe, Turkey, Caucasus, Middle East                      |
| <i>Lamiogethes buyssoni</i> (C. N. F. Brisout de Barneville, 1882) <b>comb. nov.</b> | Europe, Anatolia, Caucasus                                    |
| <i>Lamiogethes byrrhoides</i> (Audisio, 1996) <b>comb. nov.</b>                      | South Africa: NW Province; Namibia; Botswana                  |
| <i>Lamiogethes candidus</i> (Easton, 1964) <b>comb. nov.</b>                         | Congo   |
| <i>Lamiogethes chlorocupreus</i> (Audisio, Jelinek & Cooter, 2005) <b>comb. nov.</b> | S China   |
| <i>Lamiogethes conjungens</i> (Grouvelle, 1910) <b>comb. nov.</b>                    | S China   |
| <i>Lamiogethes convexus</i> (Boheman, 1851) <b>comb. nov.</b>                        | South Africa: KwaZulu-Natal, Free State                       |
| <i>Lamiogethes cooteri</i> (Audisio, 1989) <b>comb. nov.</b>                         | Montenegro  |
| <i>Lamiogethes cribrosus</i> (Grouvelle, 1908) <b>comb. nov.</b>                     | India   |
| <i>Lamiogethes descarpentriensi</i> (Kirejtshuk, 1980) <b>comb. nov.</b>             | India   |
| <i>Lamiogethes desolatus</i> (Easton, 1964) <b>comb. nov.</b>                        | Congo   |
| <i>Lamiogethes dieckmanni</i> (Audisio & Jelinek, 1984) <b>comb. nov.</b>            | N Turkey, N Iran, Caucasus                                    |
| <i>Lamiogethes difficilis</i> (Heer, 1841) <b>comb. nov.</b>                         | Palearctic Region   |
| <i>Lamiogethes difficiloides</i> (Audisio, Jelinek & Cooter, 2005) <b>comb. nov.</b> | S China   |
| <i>Lamiogethes equus</i> (Easton, 1960) <b>comb. nov.</b>                            | Kenya   |
| <i>Lamiogethes fairmairei</i> (Grouvelle, 1913) <b>comb. nov.</b>                    | Madagascar  |
| <i>Lamiogethes gibbulus</i> (Spornraft & Kirejtshuk, 1993) <b>comb. nov.</b>         | South Africa: KwaZulu-Natal, Free State, NW Province; Lesotho |
| <i>Lamiogethes glebi</i> (Kirejtshuk, 1988) <b>comb. nov.</b>                        | Sri Lanka   |
| <i>Lamiogethes gloriosus</i> (Grouvelle, 1910) <b>comb. nov.</b>                     | Tanzania  |
| <i>Lamiogethes grouvellei</i> (Plavilstshikov, 1924) <b>comb. nov.</b>               | Madagascar  |
| <i>Lamiogethes haemorrhoidalis</i> (Förster, 1849) <b>comb. nov.</b>                 | Europe, Near East, W Middle Asia                              |
| <i>Lamiogethes imitans</i> (Kirejtshuk, 1988) <b>comb. nov.</b>                      | Namibia   |
| <i>Lamiogethes instabilis</i> (Grouvelle, 1906) <b>comb. nov.</b>                    | Madagascar  |
| <i>Lamiogethes jelineki</i> (Audisio, 1976) <b>comb. nov.</b>                        | S Europe, Caucasus  |
| <i>Lamiogethes kasparyani</i> (Kirejtshuk, 1984) <b>comb. nov.</b>                   | SE Siberia, NE China  |
| <i>Lamiogethes kaszabi</i> (Audisio, 1979) <b>comb. nov.</b>                         | Georgian Caucasus   |
| <i>Lamiogethes kirejtshuki</i> (Audisio, 1979) <b>comb. nov.</b>                     | N Turkey, Caucasus  |
| <i>Lamiogethes kunzei</i> (Erichson, 1845) <b>comb. nov.</b>                         | Europe, Caucasus, N Turkey                                    |
| <i>Lamiogethes leati</i> (Easton, 1956) <b>comb. nov.</b>                            | Sicily, N Africa, N Iran                                      |
| <i>Lamiogethes leileri</i> (Kirejtshuk, 2002) <b>comb. nov.</b>                      | Kenya   |
| <i>Lamiogethes leucasi</i> (Easton, 1960) <b>comb. nov.</b>                          | Kenya <sup>1)</sup>   |
| <i>Lamiogethes levis</i> (Kirejtshuk, 1995) <b>comb. nov.</b>                        | Sri Lanka   |
| <i>Lamiogethes lornae</i> (Easton, 1960) <b>comb. nov.</b>                           | Kenya   |
| <i>Lamiogethes luminosus</i> (Reitter, 1873) <b>comb. nov.</b>                       | India   |

<sup>1)</sup> It is likely that *L. leucasi* (Easton, 1960) is a junior synonym of *L. similis* (Grouvelle, 1899).

- Lamiogethes luteolus* (Reitter, 1873) **comb. nov.**  
*Lamiogethes madagascariensis* (Grouvelle, 1896) **comb. nov.**  
*Lamiogethes madurensis* (Kirejtshuk, 1988) **comb. nov.**  
*Lamiogethes medvedevi* (Kirejtshuk, 1978) **comb. nov.**  
*Lamiogethes merkli* (Kirejtshuk, 2001) **comb. nov.**  
*Lamiogethes mirator* (Kirejtshuk, 1979) **comb. nov.**  
*Lamiogethes mitis* (Kirejtshuk, 1996) **comb. nov.**  
*Lamiogethes mixtus* (Grouvelle, 1908) **comb. nov.**  
*Lamiogethes montivagus* (Easton, 1960) **comb. nov.**  
*Lamiogethes morosus* (Erichson, 1845) **comb. nov.**  
*Lamiogethes nakanei* (Easton, 1957) **comb. nov.**  
*Lamiogethes nigriceps* (Easton, 1964) **comb. nov.**  
*Lamiogethes nobilis* (Easton, 1964) **comb. nov.**  
*Lamiogethes oberprieleri* (Audisio, 1996) **comb. nov.**  
*Lamiogethes ochropus* (Sturm, 1845) **comb. nov.**  
*Lamiogethes opacidorsum* (Kirejtshuk, 1996) **comb. nov.**  
*Lamiogethes paraconvexus* (Audisio, 1996) **comb. nov.**  
*Lamiogethes paschalis* (Spornraft, 1975) **comb. nov.**  
*Lamiogethes pedicularius* (Gyllenhal, 1808) **comb. nov.**  
*Lamiogethes perparvulus* (Grouvelle, 1913) **comb. nov.**  
*Lamiogethes persicus* (Faldermann, 1835) **comb. nov.**
- Lamiogethes phalacroides* (Grouvelle, 1896) **comb. nov.**  
*Lamiogethes politus* (Motschulsky, 1863) **comb. nov.**  
*Lamiogethes potanini* (Kirejtshuk, 1979) **comb. nov.**  
*Lamiogethes pubiusculus* (Kirejtshuk, 1988) **comb. nov.**  
*Lamiogethes relativus* (Kirejtshuk & Viklund, 2002) **comb. nov.**  
*Lamiogethes rubiginosus* (Grouvelle, 1909) **comb. nov.**  
*Lamiogethes rubricollis* (Grouvelle, 1903) **comb. nov.**  
*Lamiogethes ruficollis* (Reitter, 1872) **comb. nov.**  
*Lamiogethes rufithorax* Grouvelle, 1894 **comb. nov.**  
*Lamiogethes rufulus* (Grouvelle, 1916) **comb. nov.**  
*Lamiogethes sellaris* (Easton, 1960) **comb. nov.**  
*Lamiogethes serripes* (Gyllenhal, 1827) **comb. nov.**  
*Lamiogethes shimoyamai* (Sadan. Hisamatsu, 1964) **comb. nov.**  
*Lamiogethes shrilankaensis* (Kirejtshuk, 1988) **comb. nov.**  
*Lamiogethes similis* (Grouvelle, 1899) **comb. nov.**  
*Lamiogethes simillimus* (Kirejtshuk, 1984) **comb. nov.**  
*Lamiogethes simulans* (Easton, 1959) **comb. nov.**  
*Lamiogethes spadix* (Easton, 1954) **comb. nov.**  
*Lamiogethes subglobosus* (Reitter, 1875) **comb. nov.**  
*Lamiogethes sulcatus* (C. N. F. Brisout de Barneville, 1863) **comb. nov.**  
*Lamiogethes tilmani* (Easton, 1968) **comb. nov.**  
*Lamiogethes verdcourtii* (Easton, 1960) **comb. nov.**  
*Lamiogethes vietnamensis* (Kirejtshuk, 1979) **comb. nov.**  
*Lamiogethes xyphosuroides* (Kirejtshuk, 1989) **comb. nov.**
- India  
Madagascar  
India  
NE Turkey, Caucasus  
Kenya  
Russian Far East: Primorie  
Namibia  
India  
Tanzania  
Palearctic Region  
E Siberia, Japan, NE China  
Congo  
Congo  
South Africa: W Cape  
Europe, Siberia, N Korea  
Namibia  
South Africa: Mpumalanga  
Central and southern Italy  
Europe, Siberia, N Middle Asia  
Madagascar  
Europe, Near East, W Siberia, N Middle Asia, NW China  
Madagascar  
Sri Lanka  
China: Sichuan  
South Africa: KwaZulu-Natal  
Kenya  
Tanzania, Zanzibar  
India  
Tropical Africa, South Africa  
India  
Congo  
Kenya  
Europe, Siberia, N Middle Asia  
Japan  
Sri Lanka  
Ethiopia, Kenya<sup>1)</sup>  
Russian Far East, NE China  
Ethiopia  
S Arabian Peninsula  
South Africa: W Cape  
Europe, Near East, Siberia  
Nepal, SW China: Tibet, N Pakistan, NW India  
Kenya  
Vietnam  
South Africa: NW Province, Mpumalanga



## 24. *Chromogethes* Kirejtshuk, 1989 stat. nov.

(Figs. 24 a–h)

*Chromogethes* Kirejtshuk, 1989: 85 (described as a subgenus of *Meligethes* Stephens, 1830).

**Type species.** *Meligethes splendidulus* Reitter, 1873: 50 (by original designation) [= *Chromogethes splendidulus* (Reitter, 1873) comb. nov.].

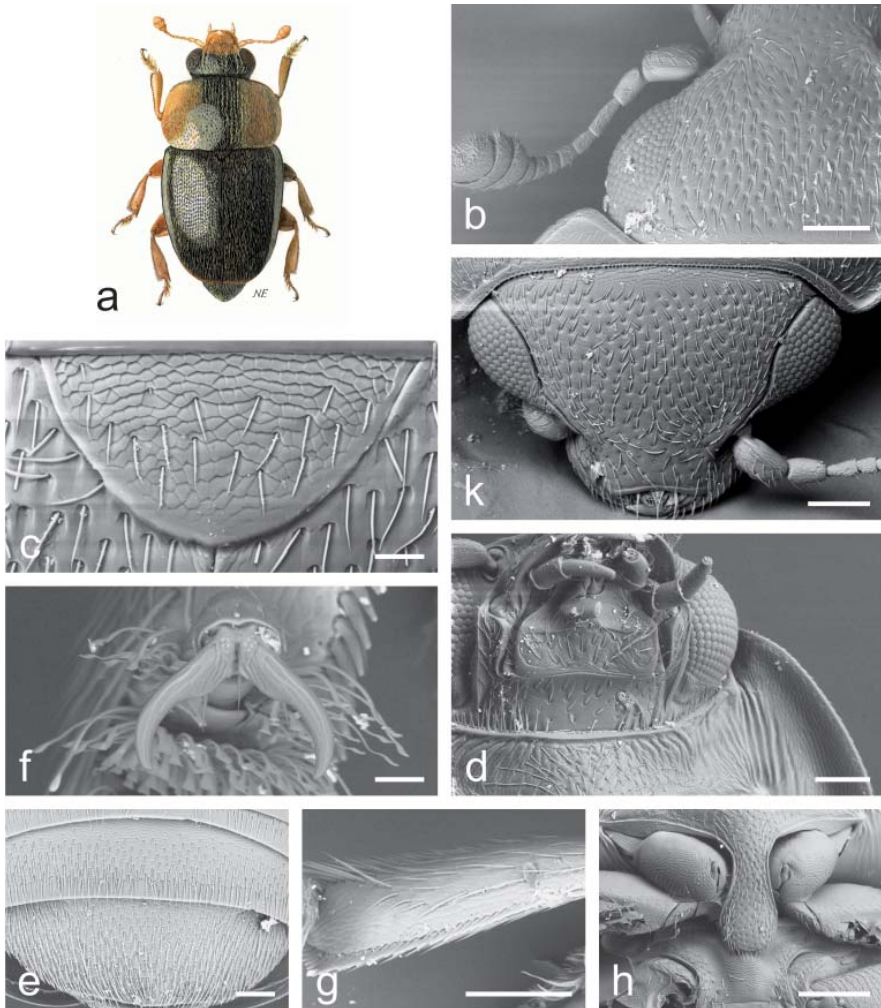
**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.3–3.5 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence variable, usually short and fine, recumbent, long and prostrate in a few species (Fig. 24a), golden to silvery-whitish and dense, rarely partially obscuring the predominantly metallic green dorsal body surface; pronotal and elytral sides narrowly to widely flattened, usually same color as disc, several species with pale, orange to reddish sides (Fig. 24a); lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid microsetae, absent medially anterior to scutellum (Fig. 24c).

**Dorsal habitus:** body moderately convex, oval, usually long and narrow, rarely relatively short and wide (Fig. 24a; Figs. 2, 16, 17 in AUDISIO & DE BIASE 2004b); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, usually moderately to deeply impressed (Figs. 24a, k); anterior margin of clypeus truncate to markedly emarginate medially, simple, without small distinct medial bulge, and usually distinctly bordered (Figs. 24b, k); circum-ocular furrows (occipital sulci) on dorsal side of head variable, deeply impressed and complete in most species (Fig. 24k), scarcely evident and almost obliterated anteriorly in a few species (Fig. 24b); eyes large and usually moderately projecting laterally (Fig. 24a); posterior angles of pronotum distinct, blunt, usually obtuse (Fig. 24a), never directed posteriorly, except in the Southern African *C. venustus* (Kirejtshuk, 1988); scutellum uniformly punctured on most of exposed portion (Fig. 24c); elytral punctures simple, never transversely strigose, a few species with confused and reticulate longitudinal orange-peel like rugosity; elytral humeral angle faintly distinct, widely obtuse, never protruding laterally (Fig. 24a); elytral humeral stria usually indistinct; elytral pre-sutural striae distinct, originating at scutellar vertex, terminating close to elytral apex, and delimiting on each elytron a moderately raised and narrow sutural border, markedly narrower than proximal portion of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 24a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 24a).

**Ventral habitus:** antennal furrows markedly delimited, and moderately convergent posteriorly; mentum subpentagonal (Fig. 24d); prosternal antennal furrows on anterior margin of prosternum faintly distinct in most species, more distinctly delimited in a few species, moderately divergent posteriorly, short, scarcely raised, never reaching anterior margin of procoxal cavity (Fig. 24d); prosternal process variably shaped, usually narrow, subapical portion 1.6–2.2× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly rounded (Fig. 24h); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, never distally terminating over predistal lateral expansions (Fig. 24h); posterior margin of mesoventrite simple, never medially incised (Fig. 24h); usually marked sexual dimorphism in impressions on metaventricle and/or tubercles; first two visible abdominal ventrites simple in

both sexes, without tufts of setae, caudal marginal lines of metacoxal cavities always simple, subparallel and contiguous to posterior margin of metacoxal cavities, with shallowly arched impression of outer 'axillary' line; 'axillary' space on first abdominal ventrite highly reduced, 'axillary' angle nearly right angled; usually short and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, frequently partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 24e).



**Fig. 24.** *Chromogethes* Kirejtshuk, 1989: **a** – *C. formosus* (Kirejtshuk, 1989); **b–h** – *C. mastax* (Audisio & De Biase, 2004); **k** – *C. splendidulus* (Reitter, 1873). **a** – male habitus (length 2.0 mm); **b, k** – dorsal view of head; **c** – scutellum and microsetae on middle of posterior margin of pronotum; **d** – ventral view of head and anterior portion of pronotum; **e** – exposed portion of last visible abdominal ventrite; **f** – tarsal claws of middle leg; **g** – outer margin of mesotibia; **h** – prosternal process and mesoventrite. Scale bars: Figs. **b, d, e, g, k** = 100  $\mu$ m; Fig. **c, f** = 30  $\mu$ m; Fig. **h** = 200  $\mu$ m.

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 24a, b); 3<sup>rd</sup> antennomere in both sexes usually 2× as long as wide, nearly as long as but much thinner than 2<sup>nd</sup>; 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, moderately short, slightly longer than wide (Fig. 24b); antennal club compact, peculiarly small, simple, comprising last 3 antennomeres in both sexes (Fig. 24b), usually slightly narrower than width of protibiae, sexual dimorphism absent; labial palpi relatively long and slender in both sexes (Fig. 24d), terminal segment 1.5–1.6× as long as wide; maxillary palpi moderately long and slender in both sexes (Fig. 24d), terminal segment 2.0–2.3× as long as wide; mandible mid-sized, length variable and apex moderately acuminate, sexual dimorphism usually absent (Fig. 24d); tarsal claws simple, never toothed at base (Fig. 24f); tarsi of normal size and shape, 0.7–0.9× as long as corresponding tibiae (Fig. 24a); protibiae usually with reduced teeth on outer margins (Fig. 24a), a single much longer and isolated subapical narrow and spine-like tooth present in a few species; lateral margin on meso- and metatibiae bearing a single and regular row of long and thin, yellowish pegs (Fig. 24g), without U-shaped sinuosity at distal third; meso- and metatibiae triangular, of variable width, usually long and slender (Fig. 24a), rarely wider and shorter, never subtrapezoidal or axe-shaped; sexual dimorphism expressed in sinuate meso- and metatibiae (rarely protibiae); tarsal plates of prolegs more or less distinctly wider in males; posterior margin of meso- and metafemora usually simple in both sexes, without tubercles or projections, rarely with blunt teeth or gibbosities in males.

*Male genitalia*: variable, processes along inner side of parameres absent (Figs. 3–10 in AUDISIO & DE BIASE 2004b), usually with moderately deep and narrow V-shaped excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, rounded, subtruncate to acuminate distally, usually with distal minute excision or emargination; main sclerites of internal sac (flagellum) small, relatively arcuate, usually S-shaped in lateral view, and moderately sclerotized, typically 3–4× shorter than aedeagus.

*Female genitalia (ovipositor)*: variably shaped, usually large; styli usually long and distinct, simple, frequently at least partially pigmented, inserted close to apex of contiguous gonostyloids, each gonostyloid lightly sclerotized and often markedly pigmented distally, with a simple, never indentate outer portion of basicoxites (Figs. 11–15 in AUDISIO & DE BIASE 2004b), and a single, small, pigmented and more sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually located more distad than middle, without proximad directed spicule.

**Etymology.** The generic name is obviously derived from Greek ‘χρῶμα’ (= color), which is indicative of the usually bright metallic green color characterizing the body surface of almost all inclusive species, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are apparently strictly associated for larval development with inflorescences of Asteraceae, in particular with the tribes Inuleae, Senecioneae, and Gnaphalieae, specifically on the following genera *Helichrysum* Mill., *Senecio* L., and *Metalasia* R. Br. (AUDISIO & DE BIASE 2004b, and unpublished data), and allied genera.

**Phylogenetic position.** Available molecular and morphological datasets provide strong evidence of the robustness of a relatively large monophyletic clade that includes the ‘*Anthystrix*

complex of genera' (*Anthystrix*, *Sebastiangethes*, *Tarchonanθοgethes* gen. nov., *Xenostromylogethes* gen. nov., and *Cyclogethes*; AUDISIO et al. 2008, TRIZZINO et al. 2009) and *Chromogethes*. The shared larval host plant family (Asteraceae) of the entire clade ['*Anthystrix* complex of genera' + (*Chromogethes*)] also supports a common phylogenetic origin for this assemblage. With regards to *Chromogethes*, this genus exhibits a combined series of both autapomorphic and symplesiomorphic characters, which further suggests its placement in a relatively basal phylogenetic position in Meligethinae clade.

**Taxonomy and geographic distribution.** This taxon includes 31 described Afrotropical species, distributed from Somaliland to South Africa (AUDISIO & KIREJTSHUK 1995, KIREJTSHUK 2001, AUDISIO & DE BIASE 2004b). Several other new species, still awaiting description, are also known from East, Central, and Southern Africa (AUDISIO unpublished data). Inclusive species are tentatively attributed to three formerly recognized species-groups, i.e. the '*Meligethes splendidulus*', '*M. illustris*', and '*M. sjoestedti*' species-groups, besides a few more isolated southern African species.

|  |   |
|--|---|
| <i>Chromogethes amicus</i> (Kirejtshuk, 2001) <b>comb. nov.</b>  | Kenya   |
| <i>Chromogethes basilewskyi</i> (Audisio & Kirejtshuk, 1995) <b>comb. nov.</b>   | Tanzania  |
| <i>Chromogethes brincki</i> (Kirejtshuk, 1995) <b>comb. nov.</b>   | South Africa: W Cape                                  |
| <i>Chromogethes cavifrons</i> (Kirejtshuk & Easton, 1988) <b>comb. nov.</b>  | South Africa: E Cape, Mpumalanga                      |
| <i>Chromogethes clarkei</i> (Audisio & Kirejtshuk, 1995) <b>comb. nov.</b>   | Ethiopia  |
| <i>Chromogethes cultus</i> (Kirejtshuk, 2001) <b>comb. nov.</b>  | Kenya   |
| <i>Chromogethes favus</i> (Easton, 1960) <b>comb. nov.</b>   | Kenya   |
| <i>Chromogethes flaccus</i> (Kirejtshuk, 1995) <b>comb. nov.</b>   | South Africa: W and E Cape                            |
| <i>Chromogethes formosus</i> (Kirejtshuk, 1989) <b>comb. nov.</b><br>= <i>Meligethinus formosus</i> Kirejtshuk, 1989<br>= <i>Meligethes albens</i> Audisio & De Biase, 2004,<br><b>syn. nov.</b> | South Africa: KwaZulu-Natal, Mpumalanga <sup>2)</sup> |
| <i>Chromogethes gemma</i> (Easton, 1960) <b>comb. nov.</b>   | Tanzania, Uganda                                      |
| <i>Chromogethes illustris</i> (Grouvelle, 1899) <b>comb. nov.</b>  | South Africa: W and E Cape                            |
| <i>Chromogethes illustroides</i> (Audisio & De Biase, 2004) <b>comb. nov.</b>  | South Africa: KwaZulu-Natal, Free State               |
| <i>Chromogethes involutus</i> (Kirejtshuk, 2001) <b>comb. nov.</b>   | South Africa: KwaZulu-Natal, Mpumalanga, Lesotho      |
| <i>Chromogethes longiceps</i> (Easton, 1959) <b>comb. nov.</b>   | Ethiopia  |
| <i>Chromogethes malkini</i> (Spornraft & Kirejtshuk, 1994) <b>comb. nov.</b>   | South Africa: W and E Cape                            |
| <i>Chromogethes mastax</i> (Audisio & De Biase, 2004) <b>comb. nov.</b>  | South Africa: KwaZulu-Natal, Free State               |
| <i>Chromogethes paropunctatus</i> (Kirejtshuk, 1995) <b>comb. nov.</b>   | South Africa: W Cape                                  |
| <i>Chromogethes perpusillus</i> (Spornraft & Kirejtshuk, 1993) <b>comb. nov.</b>   | South Africa: W and E Cape                            |

<sup>2)</sup> In a recent contribution on some southern African species of *Meligethes* (subg. *Chromogethes*), *M. (C.) albens* Audisio & De Biase, 2004 was described obviously overlooking the previous description (in Russian) of *Meligethinus formosus* Kirejtshuk, 1989, erroneously originally attributed, in fact, to a relatively distantly related genus. Therefore, the new synonymy is established here.

|   |   |
|---|---|
| <i>Chromogethes profundopunctatus</i> (Kirejtshuk, 2001)<br><b>comb. nov.</b>       | South Africa: KwaZulu-Natal, Mpumalanga, E Free State |
| <i>Chromogethes schulzei</i> (Kirejtshuk, 2001) <b>comb. nov.</b>                   | South Africa: W and E Cape                            |
| <i>Chromogethes sjoestedti</i> (Grouvelle, 1910) <b>comb. nov.</b>                  | Tanzania, Kenya, Uganda                               |
| <i>Chromogethes splendidulus</i> (Reitter, 1873) <b>comb. nov.</b>                  | South Africa: W Cape                                  |
| <i>Chromogethes subcaeruleus</i> (Grouvelle, 1910) <b>comb. nov.</b>                | Tanzania, Kenya, Uganda                               |
| <i>Chromogethes subillustris</i> (Kirejtshuk, 1995) <b>comb. nov.</b>               | South Africa: KwaZulu-Natal, Mpumalanga               |
| <i>Chromogethes venustus</i> (Kirejtshuk, 1988) <b>comb. nov.</b>                   | South Africa: KwaZulu-Natal, E Cape                   |
| <i>Chromogethes violascens</i> (Kirejtshuk, 2001) <b>comb. nov.</b>                 | Ethiopia  |
| <i>Chromogethes viridicolor</i> (Spornraft & Kirejtshuk, 1993)<br><b>comb. nov.</b> | South Africa: E Cape                                  |
| <i>Chromogethes vitabundus</i> (Kirejtshuk, 2001) <b>comb. nov.</b>                 | Tanzania  |
| <i>Chromogethes voluptarius</i> (Kirejtshuk, 1989) <b>comb. nov.</b>                | South Africa: E Cape                                  |
| <i>Chromogethes vulpinoides</i> (Audisio & De Biase, 2004)<br><b>comb. nov.</b>     | South Africa: W Cape                                  |
| <i>Chromogethes vulpinus</i> (Spornraft & Kirejtshuk, 1993)<br><b>comb. nov.</b>    | South Africa: KwaZulu-Natal, Mpumalanga               |

**Species ‘incertae sedis’ likely related to *Chromogethes*.** The following Meligethinae taxa from the Indian Subcontinent, thus far classified as *Meligethes* s. l., have not been attributed with certainty to any of the herein discussed genera. Both species are probably not distantly related to *Chromogethes*, however a separate, new genus may need to be erected to accommodate them. Pending more detailed morphological analyses, field data on larval biology, and molecular data, we are unable to insert these taxa in this new preliminary taxonomic classification.

‘*Meligethes*’ *micros* Kirejtshuk, 1980

Sri Lanka

‘*Meligethes*’ *topali* Kirejtshuk, 1988

India

## 25. *Cyclogethes* Kirejtshuk, 1979

(Figs. 25 a–v)

*Cyclogethes* Kirejtshuk, 1979: 359.

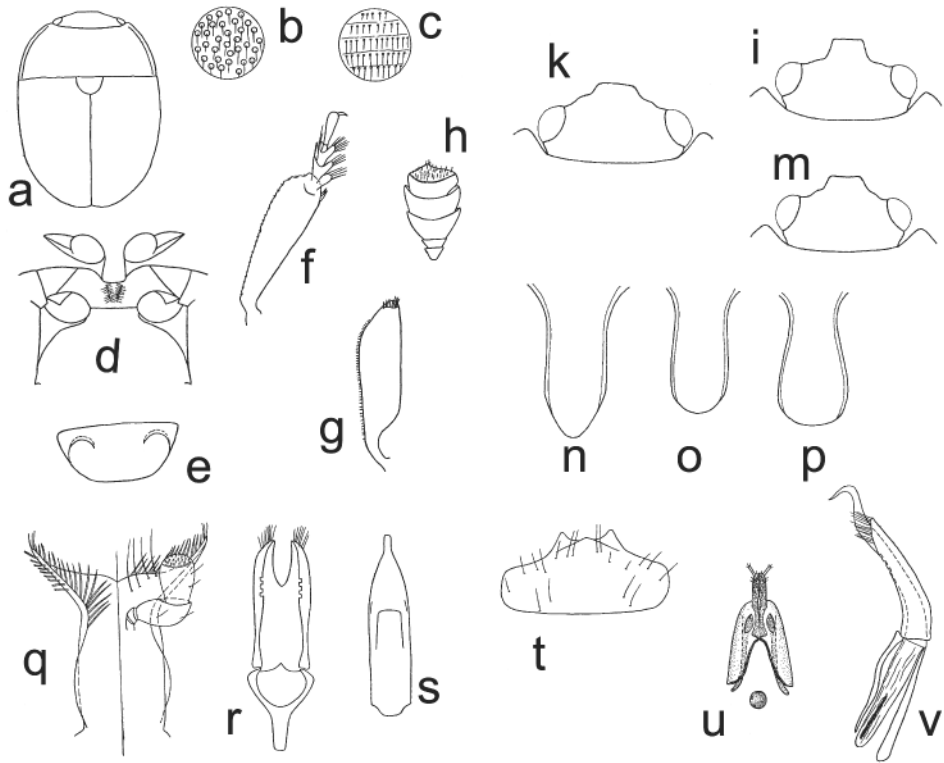
**Type species.** *Cyclogethes orientalis* Kirejtshuk, 1979: 362 (by original designation).

**Generic redescription and diagnosis.** Inclusive species vary moderately in size (1.7–2.4 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence variable, short, golden to silvery-whitish and moderately dense, recumbent, never obscuring the predominantly orange-brown to blackish-brown dorsal body surface, pronotal and elytral sides narrowly flattened and frequently paler than disc; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, distally bifid or trifid microsetae, microsetae also present along middle portion anterior to scutellum.

*Dorsal habitus:* body moderately convex, oval, moderately wide (Fig. 25a); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, moderately to deeply impressed (Fig. 25b); anterior margin of clypeus medially truncate, simple, i.e. without small distinct medial bulge (Figs. 25 i, k, m), not bordered; circum-ocular furrows (occipital sulci) on head absent; eyes large and usually markedly projecting laterally; posterior angles of





**Fig. 25.** *Cyclogethes* Kirejtshuk, 1979: **a–h, k, p–v** – *C. orientalis* Kirejtshuk, 1979; **i, o** – *C. abnormis* Kirejtshuk, 1979; **m** – *C. fuscipennis* Jelínek, 2000; **n** – *C. aldridgei* Kirejtshuk, 1980. **a** – male habitus; **b–c** – punctation of pronotum and elytra; **d** – prosternal process, mesoventrite, and metaventrite; **e** – exposed portion of last visible abdominal ventrite; **f** – protibia; **g** – mesotibia; **h** – antennal club; **k, i, m** – dorsal view of head; **n, o, p** – prosternal process; **q** – labium and left palp; **r–s** – dorsal view of male genitalia; **t** – labrum; **u** – ovipositor; **v** – lateral view of male genitalia. Drawings **a–h, k, q–v** from KIREJTSHUK (1979a); drawings **i, m–p** from JELÍNEK (2000b); refer to KIREJTSHUK (1979a) and to JELÍNEK (2000b) for scale.

pronotum distinct, blunt, obtuse, not directed posteriorly; scutellum uniformly punctured on most of exposed portion; elytra finely and completely transversely strigose (Fig. 25c); elytral humeral angle distinct, obtuse, never protruding laterally (Fig. 25a); elytral humeral striae indistinct; elytral pre-sutural striae faintly visible, originating at scutellar vertex or slightly posterior, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural border, widest at posterior third, narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices obtusely rounded in both sexes (Fig. 25a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 25e).

*Ventral habitus*: antennal furrows markedly delimited, moderately convergent posteriorly; mentum subpentagonal (Fig. 25t); prosternal antennal furrows on anterior margin of prosternum distinctly delimited, faintly raised, slightly divergent, variable in length, never reaching posteriorly to the anterior margin of procoxal cavity; prosternal process variably shaped,

moderately to markedly wide, subapical portion 2.0–2.5× as wide as maximum width of 1<sup>st</sup> antennomere, apex bluntly acuminate to rounded (Figs. 25n, o, p); lateral borders of prosternal process delimiting shallowly impressed distinct furrows, distally terminating over predistal lateral expansions (as in Fig. 27g); posterior margin of mesoventrite simple, never medially incised (Fig. 25d); scarcely evident sexual dimorphism in impressions on metaventrite; first two visible abdominal ventrites simple in both sexes, without tufts of setae, caudal marginal lines of metacoxal cavities always simple, subparallel and moderately contiguous to posterior margin of metacoxal cavities, ‘axillary’ impression nearly absent; ‘axillary’ space on first abdominal ventrite variably developed (e.g. larger in *C. orientalis* and allied species, more reduced in *C. abnormis* and allied species), ‘axillary’ angle widely obtuse in *C. orientalis* and allied species, nearly right angled in *C. abnormis* and allied species; moderately marked arched impressions on basal portion of last visible abdominal ventrite (Fig. 25e), occasionally partially covered by distal portion of penultimate visible abdominal ventrite.

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.1× as long as width of protibiae excluding distal teeth; 3<sup>rd</sup> antennomere 2.2–2.4× as long as wide in both sexes, distinctly longer and thinner than 2<sup>nd</sup>, 4<sup>th</sup> and 5<sup>th</sup> antennomeres usually subequal in both sexes, relatively short, usually moderately longer than wide; antennal club moderately compact, nearly symmetric, comprising the last 3 antennomeres in both sexes (Fig. 25h; Fig. 8 in JELÍNEK 2000b), sexual dimorphism absent; labial palpi short in both sexes (Fig. 25q), terminal segment 1.2–1.4× as long as wide; maxillary palpi long and slender in both sexes, terminal segment ~2.0–2.2× as long as wide; mandible mid-sized, moderately short, apex bifid and moderately acuminate, sexual dimorphism absent; tarsi of normal size and shape, 0.5–0.7× as long as corresponding tibiae (Fig. 25f); tarsal claws variable, bluntly angulate to simple, not toothed at base; protibiae with simple and crenulate teeth on outer margins (Fig. 25f); meso- and metatibiae on lateral margin bearing a single and regular row of long and thin, yellowish pegs, without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, abruptly dilated inwards in basal portion, subparallel-sided (Fig. 25g; Figs. 11, 22, 23 in JELÍNEK 2000b); sexual dimorphism nearly absent in tibial shape; tarsal plates of prolegs wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: tegmen variably shaped, processes along inner side of parameres absent (Fig. 25r; Figs. 12, 16, 18, 20 in JELÍNEK 2000b), without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variably shaped, without lateral emargination, acuminate, spatulate or emarginated distad (Fig. 25s; Figs. 14, 17, 19, 21 in JELÍNEK 2000b).

*Female genitalia (ovipositor)*: variably shaped, usually small; styli long and distinct, simple and usually pigmented, inserted not far from blunt apex of contiguous gonostyloids, each gonostyloid lightly sclerotized and distally pigmented, with a simple, never indentate outer portion of narrow basicoxites (Fig. 25u; Figs. 37, 43 in KIREJTSHUK 1979a), single pigmented and more sclerotized arcuate area present along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor located more proximad than middle, without proximad directed spicule.

**Etymology.** The generic name was obviously derived from Greek ‘κύκλος’ (= circle), which is indicative of the short, wide, and markedly arcuated at sides body shape of the type species,

and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** Larval biology remains unknown. There is a morphological similarity of *Cyclogethes* (especially members of the *M. abnormis* species-group) with some members of southern and eastern African *Tarchonanthogethes* gen. nov., which is suggestive that larval development may be analogously (see below) associated with male inflorescences of arboreal Asteraceae, however this assumption is speculative and requires further fieldwork to substantiate. Adults have been collected in tropical and subtropical forest habitats, frequently on whitish flowers of *Castanopsis* (Fagaceae), and on other forest trees that are attractive to beetles generally (S. Bílý, pers. comm. 2008).

**Phylogenetic position.** Morphological data suggests a relatively close phylogenetic relationship of *Cyclogethes* with African members of the ‘*Anthystrix* complex of genera’ (i.e. *Anthystrix*, *Sebastiangethes*, *Tarchonanthogethes* gen. nov., and *Xenostromylogethes* gen. nov.; AUDISIO et al. 2008, and this paper; TRIZZINO et al. 2009), especially to some undescribed species of *Tarchonanthogethes* gen. nov. from southern and eastern Africa. However, discovery of larval host-plants and comparison of molecular data on members of this genus have not yet been accomplished and would undoubtedly allow for a more robustly supported phylogenetic placement of this taxon.

**Taxonomy and geographic distribution.** As reported by JELÍNEK (2000b), this genus is so far represented by five species manifesting a transformation series involving several characters, and are to be separated into two amply distinct groups, i.e. the ‘*orientalis*’, and ‘*abnormis*’ species-groups.

|   |  |
|---|--|
| <i>Cyclogethes abnormis</i> Kirejtshuk, 1979    | Vietnam; Thailand; S China: Yunnan <sup>3)</sup> ; N India: Darjeeling |
| <i>Cyclogethes aldridgei</i> Kirejtshuk, 1980   | N India, Nepal, S China: Yunnan  |
| <i>Cyclogethes fuscipennis</i> Jelínek, 2000    | Thailand   |
| <i>Cyclogethes orientalis</i> Kirejtshuk, 1979  | Vietnam, Thailand  |
| <i>Cyclogethes spathulatus</i> Kirejtshuk, 1979 | Vietnam  |

## 26. *Anthystrix* Kirejtshuk, 1981

(Figs. 26 a–m)

*Anthystrix* Kirejtshuk, 1981: 133.

**Type species.** *Pria squamosa* Grouvelle, 1899: 146 (by original designation) [= *Anthystrix squamosa* (Grouvelle, 1899)].

**Generic redescription and diagnosis.** Inclusive species vary moderately in size (2.0–2.7 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence always long, golden to silvery-whitish and dense, recumbent, partially obscuring the predominantly dark brown dorsal body surface, not always obscuring the narrowly flattened and frequently pale pronotal and elytral sides (Fig. 26a); lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum

<sup>3)</sup> Recently examined material in NHMB collections (AUDISIO unpublished data).

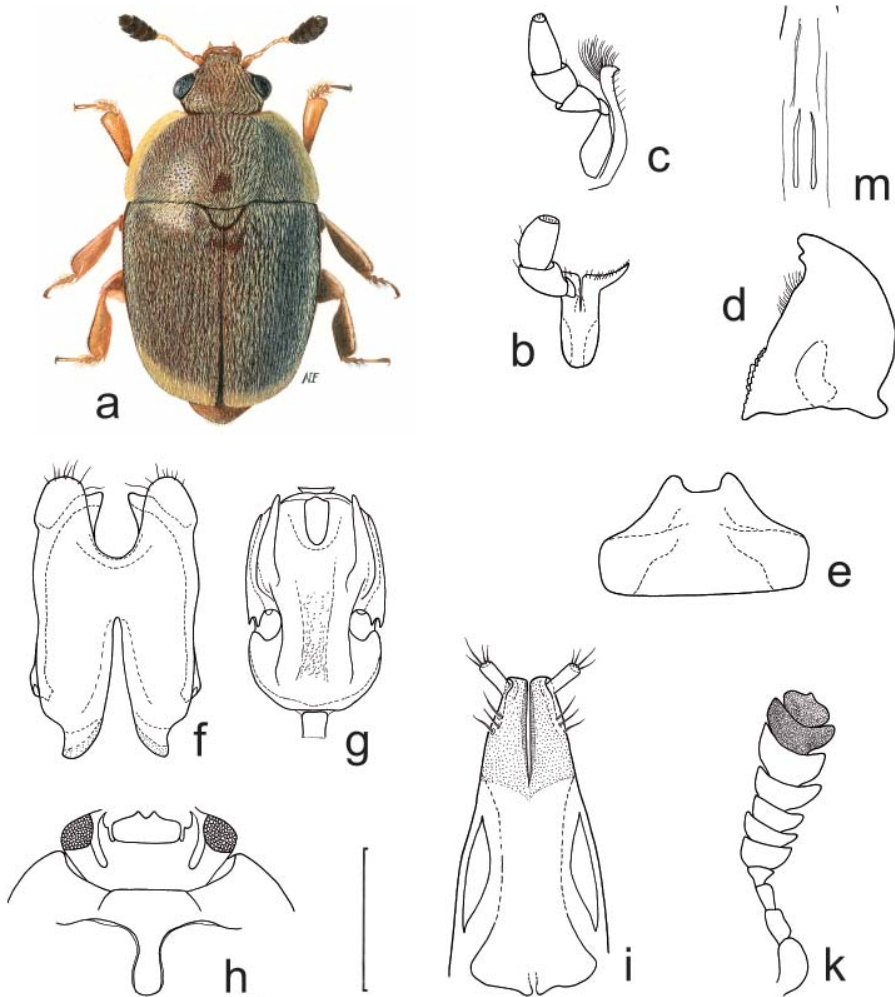
with relatively short, distally multifid microsetae, also present on middle portion anterior to scutellum (as in Fig. 27f).

*Dorsal habitus*: body moderately convex, oval (Fig. 26a; Figs. 1–5 in AUDISIO et al. 2009a); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, moderately to deeply impressed (Fig. 26a); anterior margin of clypeus medially truncate, simple, i.e. without small distinct medial bulge, and usually distinctly bordered (Fig. 26a); circum-ocular furrows (occipital sulci) on head deeply impressed and complete (as in Fig. 27i); eyes large and usually markedly projecting laterally (Fig. 26a); posterior angles of pronotum distinct, blunt, obtuse, never directed posteriorly (Fig. 26a); scutellum uniformly punctured on most of exposed portion (as in Fig. 27f); elytra with simple punctures, never transversely strigose; elytral humeral angle faintly distinct, widely obtuse, never protruding laterally (Fig. 26a); elytral humeral striae indistinct; elytral pre-sutural striae faintly visible, originating at scutellar vertex or slightly posterior, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural border, more distinct at distal fourth, narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 26a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 26a).

*Ventral habitus*: antennal furrows markedly delimited, moderately convergent posteriorly; mentum subpentagonal (Figs. 26e, h); prosternal antennal furrows on anterior margin of prosternum strongly delimited and raised, distinctly divergent posteriorly, never extending posteriorly to anterior margin of procoxal cavity (Fig. 26h); prosternal process moderately wide, subapical portion 1.9–2.1× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly rounded (Fig. 26h); lateral borders of prosternal process delimiting shallowly impressed and faintly distinct furrows, never distally terminating over predistal lateral expansions (as in Fig. 27g); posterior margin of mesoventrite simple, never medially incised; moderate to marked sexual dimorphism in impressions on metaventrite; first two visible abdominal ventrites simple in both sexes, without tufts of setae, caudal marginal lines of metacoxal cavities simple, subparallel and contiguous to posterior margin of metacoxal cavities, with moderately deep arched impression of outer ‘axillary’ line; ‘axillary’ space on first abdominal ventrite reduced, ‘axillary’ angle nearly right angled; strongly marked and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, only partially covered by distal portion of penultimate visible abdominal ventrite (as in Fig. 27g).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 26a, k); 3<sup>rd</sup> antennomere usually 2× as long as wide in both sexes, nearly as long as and slightly thinner than 2<sup>nd</sup>; 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in females, moderately short and slightly longer than wide, but strongly modified in males when associated with antennal club (Fig. 26k); male antennal club compact, comprising last 4 to 9 antennomeres, spectacular but apparently never allometric development (Figs. 26a, k), 3-jointed in females; labial palpi relatively short in both sexes (Fig. 26b), terminal segment 1.5–1.7× as long as wide; maxillary palpi relative long and slender in both sexes (Fig. 26c), terminal segment 1.8–2.0× as long as wide; mandible mid-sized, moderately short, apex bifid, moderately acuminate, sexual dimorphism absent (Fig. 26d); tarsi of normal size and shape, 0.7–0.9× as long as corresponding tibiae (Fig. 26a); tarsal claws simple, never toothed at base (as in Fig. 24f); protibiae usually with reduced teeth on outer margins (Fig. 26a); lateral margin

of meso- and metatibiae bearing a single and regular row of long, thin, yellowish pegs (Fig. 26a), without U-shaped sinuosity at distal third; meso- and metatibiae variably shaped, long and slender to wider and shorter, subtrapezoidal (Fig. 26a; Figs. 1–5 in AUDISIO et al. 2009a); sexual dimorphism variably developed in meso- and metatibiae (rarely protibiae); tarsal plates of prolegs more or less distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.



**Fig. 26.** *Anthystrix* Kirejtshuk, 1981: **a, f–g, i** – *A. squamosa* Kirejtshuk, 1981; **b–e, h, k, m** – *A. longiclava* Kirejtshuk & Easton, 1988. **a** – male habitus (length 2.5 mm); **b** – labium and right labial palpus; **c** – right maxilla and palpus; **d** – left mandible; **e** – labrum; **f–g** – male genitalia; **h** – ventral view of head and anterior portion of prosternum; **i** – distal portion of ovipositor; **k** – male antennal club; **m** – major sclerites of male endophallus. Drawings **b–m**: refer to AUDISIO et al. (2009a) for scale.



**Male genitalia:** peculiarly shaped, with more or less developed and characteristic processes along inner side of parameres (Fig. 26f), and with deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus violin-shaped, with strong lateral emargination, and peculiarly shaped cup-like distal projection (Fig. 26g); main sclerites of internal sac (flagellum) small, linear, and lightly sclerotized, typically 4–5× shorter than aedeagus (Fig. 26m).

**Female genitalia (ovipositor):** uniformly shaped, large; styli usually long and distinct, simple, unpigmented, inserted near to apex of contiguous gonostyloids, each gonostyloid lightly sclerotized and moderately pigmented distally, with a simple, never indentate outer portion of basicoxites (Fig. 26i), and a single, small, pigmented and more sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually located more distad than middle, without proximad directed spicule.

**Etymology.** KIREJTSHUK (1981) did not specify the etymology of his newly described genus *Anthystrix*. The generic name is obviously derived from Greek ‘ὄστρηξ’ (*hystrix* in Latin) meaning a hedgehog, which is indicative of the long, spine-like, and colored setae covering most of the body surface, and is likely combined with the Greek suffix ‘ἀντί’, also meaning ‘similar to’, or ‘to be compared with’. The gender of this genus was implicitly (but erroneously) considered to be masculine in the original description (KIREJTSHUK 1981), but was later correctly considered feminine (KIREJTSHUK & EASTON 1988) according to the recognized feminine gender of *Hystrix* Linnaeus, 1758 (Mammalia, Rodentia; the Old World porcupines).

**Biology.** All species are apparently strictly associated for larval development with male inflorescences of Asteraceae within the phylogenetically isolated tribe Tarchonantheae, in particular with *Tarchonanthus* L. (AUDISIO et al. 2008, 2009a).

**Phylogenetic position.** See the above discussion regarding the phylogenetic position of *Chromogethes* and members of the ‘*Anthystrix* complex of genera’. With regards to *Anthystrix* sensu stricto, this genus exhibits a series of autapomorphic characters, listed above in the generic diagnosis, which clearly suggests a relatively isolated phylogenetic position in the [‘*Anthystrix* complex of genera’ + (*Chromogethes*)] clade. The peculiar antennal morphology of *Anthystrix* species is likely a recent product of an evolutionary radiation mainly driven by sexual selection (KODRIC-BROWN et al. 2006), and associated with hyperthelic development of antennal characters in males, which is unusual in members of the *Meligethes*-complex of genera (JELÍNEK 2000a).

**Taxonomy and geographic distribution.** This taxon includes six southern African species, attributed to three formerly recognized species-groups, i.e. the ‘*squamosa*’, ‘*longiclava*’, and ‘*endroedyi*’ species-groups (AUDISIO et al. 2009a).

|   |   |
|---|---|
| <i>Anthystrix endroedyi</i> Audisio & Cline, 2009<br>(= <i>Anthystrix martini</i> auct., nec Grouvelle, 1899) | South Africa: Kwa Zulu-Natal, NW Region |
| <i>Anthystrix flabellicornis</i> Audisio & Cline, 2009  | South Africa: E Western Cape            |
| <i>Anthystrix longiclava</i> Kirejtshuk & Easton, 1988  | South Africa: Eastern Cape              |
| <i>Anthystrix megalocera</i> Audisio & Cline, 2009  | South Africa: E Western Cape            |
| <i>Anthystrix nigroclava</i> Kirejtshuk & Easton, 1988  | South Africa: SE Western Cape           |
| <i>Anthystrix squamosa</i> (Grouvelle, 1899)  | South Africa: SW Western Cape           |

## 27. *Tarchonanthogethes* Audisio & Cline, gen. nov.

(Figs. 27 a–k)

**Type species.** *Pria martini* Grouvelle, 1899: 147, 148 (partim), nec *Anthystrix martini* sensu KIREJTSHUK & EASTON (1988): 42, 46 (partim) (by present designation) [= *Tarchonanthogethes martini* (Grouvelle, 1899) comb. nov.]. See AUDISIO et al. (2009a).

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.6–2.7 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence variable, usually long, golden to silvery-whitish and dense, recumbent, partially obscuring the predominantly orange-brown dorsal body surface; pronotal and elytral sides flattened and usually paler than disc (Fig. 27a); a few isolated species possess much finer and shorter pubescence, not obscuring the dorsal body surface (Fig. 27b); lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with relatively short, distally multifid microsetae, microsetae also on middle portion anterior to scutellum (Fig. 27f).

*Dorsal habitus:* body moderately convex, oval (Figs. 27a, b); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, moderately to deeply impressed (Figs. 27a, b); anterior margin of clypeus truncate to slightly emarginate medially, simple, without small distinct medial bulge, and more or less distinctly bordered (Figs. 27a, b, i); circum-ocular furrows (occipital sulci) on head deeply impressed and complete (Fig. 27i); eyes large and usually markedly projecting laterally (Figs. 27a, b); posterior angles of pronotum distinct, blunt, obtuse (Figs. 27a, b), never directed posteriorly; scutellum uniformly punctured on most of exposed portion (Fig. 27f); elytra with strongly variable punctuation, normal and not transversely strigose, or confusedly orange peel-like sculpturing, or finely and completely transversely strigose sculpturing; elytral humeral angle distinct, broadly obtuse, never laterally protruding (Figs. 27a, b); elytral humeral striae not distinct; elytral pre-sutural striae faintly visible, originating at scutellar vertex or slightly posterior, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural border, more distinct at distal fourth, distinctly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 27a), only the isolated *T. rotundiclava* possesses elytra faintly obtusely lobed posteriorly in females; pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 27a, b).

*Ventral habitus:* antennal furrows markedly delimited, and moderately convergent posteriorly or nearly subparallel; mentum subpentagonal (Fig. 27g); prosternal antennal furrows on anterior margin of prosternum strongly delimited and raised, moderately divergent, never extending posteriorly to anterior margin of procoxal cavity (Fig. 27g); prosternal process variably shaped, moderately to markedly wide, subapical portion 2.0–2.7× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly rounded (Fig. 27g); lateral borders of prosternal process delimiting deeply impressed and distinct furrows, distally terminating over predistal lateral expansions (Fig. 27g); posterior margin of mesoventrite simple, never medially incised; scarce sexual dimorphism expressed in male impressions on metaventrite; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, subparallel and contiguous to posterior margin

of metacoxal cavities, with moderately deep arched impression of outer 'axillary' line; 'axillary' space on first abdominal ventrite moderately developed, 'axillary' angle more or less obtuse; strongly marked and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, usually partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 27g).

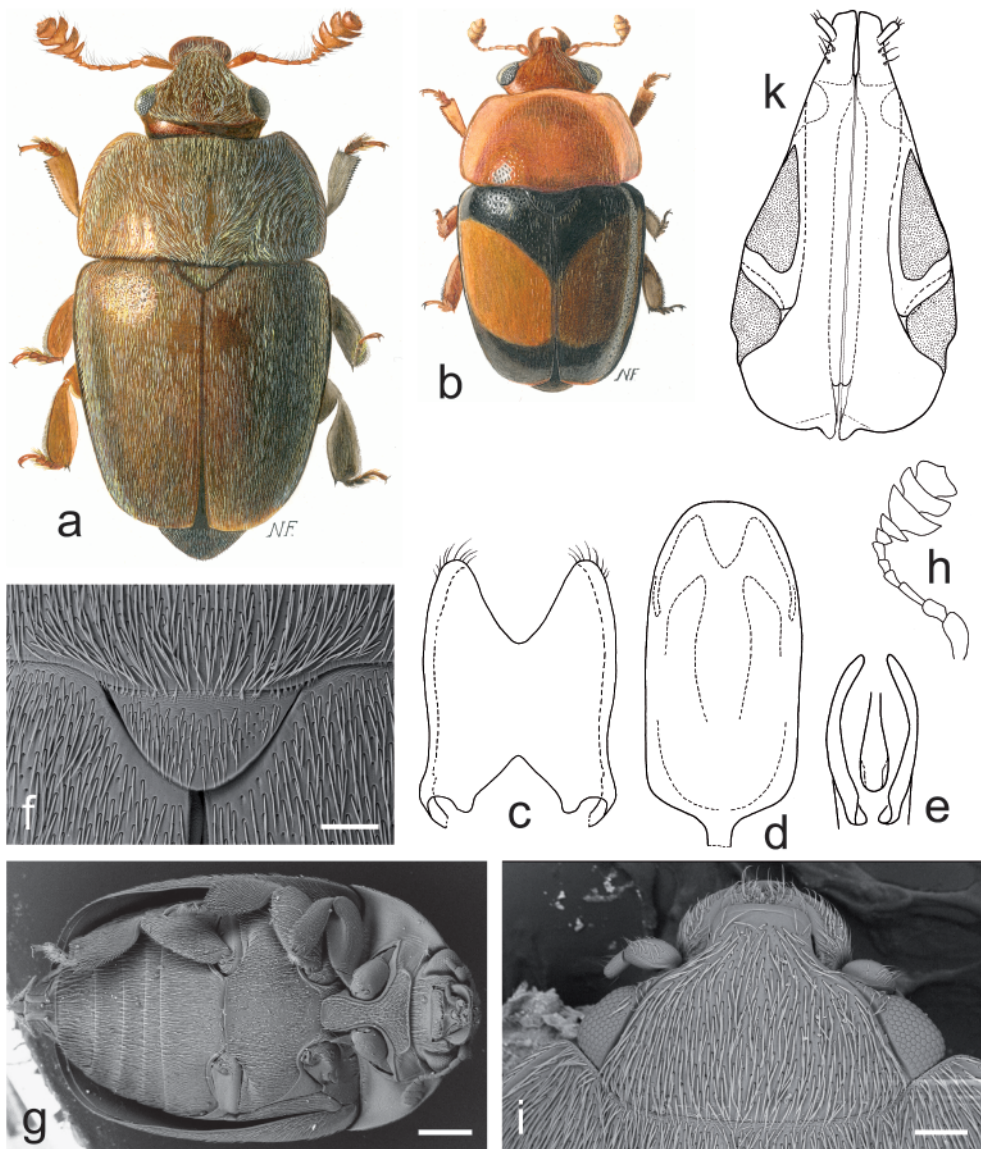
*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.1× as long as width of protibiae excluding distal teeth (Figs. 27g, h); 3<sup>rd</sup> antennomere 2.0–3.0× as long as wide in both sexes, distinctly longer and much thinner than 2<sup>nd</sup>, 4<sup>th</sup> and 5<sup>th</sup> antennomeres usually subequal in both sexes, relatively short, moderately longer than wide (Fig. 27h); male and female antennal club moderately compact, nearly symmetric, comprising last 3 antennomeres, only the isolated *T. rotundiclava* with 4-jointed male antennal club (Figs. 27a, h); labial palpi relatively short in both sexes (as in Fig. 26b), terminal segment 1.6–1.7× as long as wide; maxillary palpi relatively long and slender in both sexes (as in Fig. 26c), terminal segment 1.8–1.9× as long as wide; mandible mid-sized, moderately short, apex bifid and moderately acuminate, no sexual dimorphism; tarsi of normal size and shape, 0.7–0.9× as long as corresponding tibiae (Figs. 27a, b, g); tarsal claws simple, never toothed at base; protibiae with highly variable teeth on outer margins, simple, small and crenulate (Fig. 27a) to strongly developed and serrate; lateral margin of meso- and metatibiae bearing a single and regular row of long and thin, yellowish pegs (Figs. 27a, b, g), without U-shaped sinuosity at distal third; meso- and metatibiae triangular, of variable width, long and slender to subtrapezoidal; usually scarce sexual dimorphism in tibial shape; tarsal plates of prolegs wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: tegmen variably shaped, usually without processes along inner side of parameres (Fig. 27c; Plate 2, Figs. 7–8, 10–11, 13–14, 16–17 in KIREJTSHUK & EASTON 1988), and without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variably shaped, without lateral emargination, apex variable (Fig. 27d); main sclerites of internal sac (flagellum) usually large, markedly sclerotized, ~2× shorter than aedeagus (Fig. 27e).

*Female genitalia (ovipositor)*: variably shaped, usually large; styli usually long and distinct, simple, unpigmented, inserted near narrow but frequently minutely subtruncate apex of contiguous or distally narrowly divergent (known from a single case, i.e. Plate 2, Fig. 15 in KIREJTSHUK & EASTON 1988) gonostyloids, each gonostyloid usually lightly sclerotized and moderately pigmented distally, with a simple, never indented outer portion of basicoxites (Fig. 27k), and a single or frequently double, pigmented and sclerotized arcuate area(s) along outer subdistal portion of gonostyloids. 'Central point' of ovipositor usually located more distad than middle, without proximad directed spicule.

**Etymology.** The generic name is derived from the host-plant tribe of all inclusive species, i.e. Tarchonantheae, and from '-gethes', to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** All species are strictly associated for larval development with male inflorescences of trees and bushes of Asteraceae, within the phylogenetically isolated tribe Tarchonantheae (specifically with the genera *Brachylaena* R. Br. and *Tarchonanthus* L.) (AUDISIO et al. unpublished data).



**Fig. 27.** *Tarchonanthogethes* Audisio & Cline, gen. nov.: **a, c–i** – *T. rotundiclava* (Kirejtshuk & Easton, 1988); **b** – *T. sp.*; **k** – *T. martini* (Grouvelle, 1899). **a, b** – male habitus (**a** – length 2.6 mm; **b** – length 2.0 mm); **c–d** – male genitalia (**c** – length 0.43 mm; **d** – length 0.38 mm); **e** – major sclerites of male endophallus (length 0.20 mm); **f** – scutellum and microsetae on middle of posterior margin of pronotum; **g** – ventral view of body; **h** – male antenna (length 0.65 mm); **i** – dorsal view of head; **k** – distal portion of ovipositor (length 0.4 mm). Scale bars: Figs. **f, i** = 100  $\mu$ m; Fig. **g** = 300  $\mu$ m.

**Phylogenetic position.** This genus is relatively large and heterogeneous when compared to other genera within the *Anthystrix* generic complex, and appears to be more closely related to *Anthystrix* based on some features and to *Cyclogethes* based on other characters. Some of the described species have been previously erroneously attributed to the more distantly related genera *Meligethinus* and *Meligethes* (see below).

**Taxonomy and geographic distribution.** *Tarchonanthogethes* gen. nov. includes 6 described species and more than 10 species awaiting formal description. The genus exhibits an expression of a transformation series involving several morphological characters, and may be separated at least into five distinct groups, i.e. the ‘*martini*’, ‘*rotundiclava*’, ‘*capeneri*’, ‘*flavus*’, and ‘*singularis*’ species-groups. An upcoming paper is devoted to a complete taxonomic revision of the genus (AUDISIO et al. in prep.).

|   |  |
|---|--|
| <i>Tarchonanthogethes capeneri</i> (Kirejtshuk & Easton, 1988)<br><b>comb. nov.</b> (from <i>Meligethinus</i> )   | South Africa: Limpopo, NW Province                                 |
| <i>Tarchonanthogethes flavus</i> (Kirejtshuk & Easton, 1988)<br><b>comb. nov.</b> (from <i>Meligethinus</i> )   | South Africa: Limpopo, NW Province                                 |
| <i>Tarchonanthogethes hirtus</i> (Kirejtshuk & Easton, 1988)<br><b>comb. nov.</b> (from <i>Meligethinus</i> )   | South Africa: KwaZulu-Natal, Mpumalanga                            |
| <i>Tarchonanthogethes martini</i> (Grouvelle, 1899)<br><b>comb. nov.</b><br>= <i>Pria martini</i> Grouvelle, 1899, nec <i>Anthystrix martini</i> sensu KIREJTSHUK & EASTON (1988) | South Africa: KwaZulu-Natal, Mpumalanga                            |
| <i>Tarchonanthogethes rotundiclava</i> (Kirejtshuk & Easton, 1988) <b>comb. nov.</b> (from <i>Anthystrix</i> )  | South Africa: Eastern Cape, KwaZulu-Natal                          |
| <i>Tarchonanthogethes singularis</i> (Grouvelle, 1919)<br><b>comb. nov.</b> (from <i>Meligethes</i> )   | South Africa or Zimbabwe (localization of type locality uncertain) |

## 28. *Sebastiangethes* Audisio, Kirk-Spriggs & Cline, 2008

(Figs. 28 a–i)

*Sebastiangethes* Audisio, Kirk-Spriggs & Cline, 2008: 421.

**Type species.** *Sebastiangethes anthystrixoides* Audisio, Kirk-Spriggs & Cline, 2008: 425 (by original designation).

**Generic redescription and diagnosis.** The single known species (1.8–2.7 mm length; 0.8–1.3 mm width) exhibits the following combination of characters.

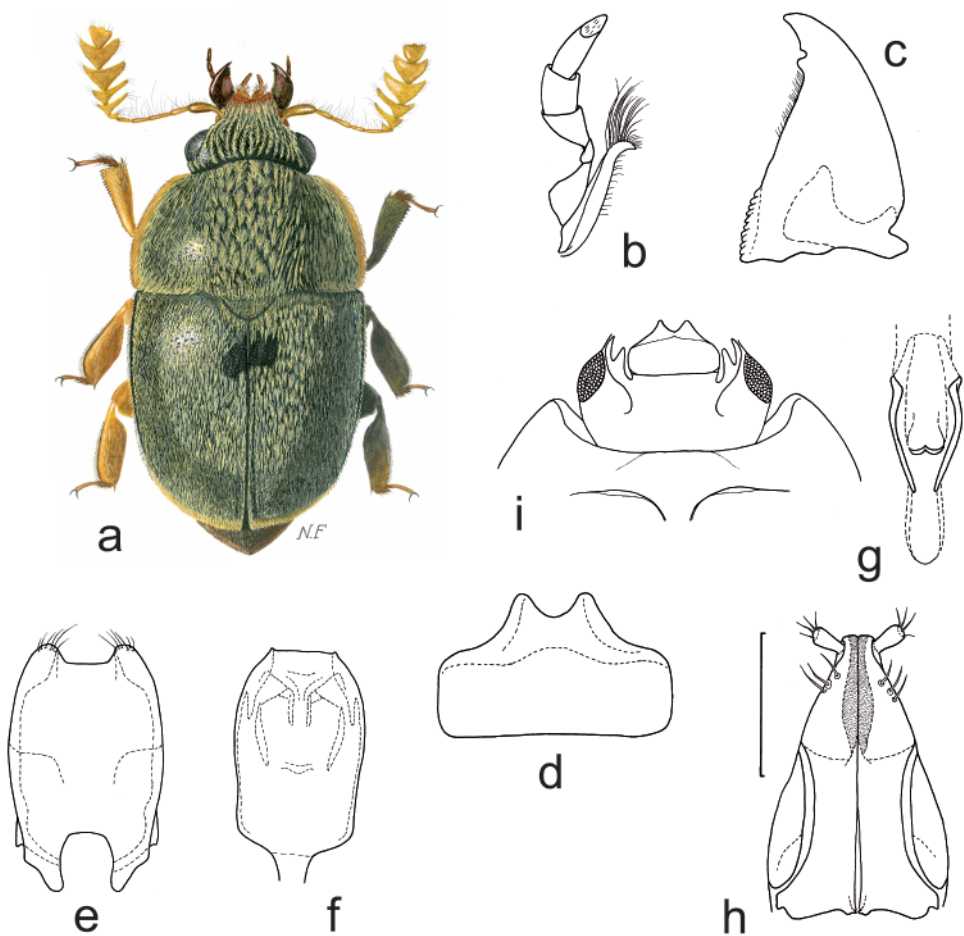
*Body color and pubescence:* pubescence long, golden to silvery-whitish and dense, recumbent, partially obscuring the predominantly dark brown dorsal body surface, usually not obscuring the narrowly flattened, paler pronotal and elytral sides (Fig. 28a); lateral margins of elytra with a series of distinct long setae, 0.9–1.0× as long as those on elytral disc; posterior margin of pronotum with relatively short, distally multifid microsetae, microsetae also present on middle portion anterior to scutellum (as in Fig. 27f).

*Dorsal habitus:* body moderately convex, oval (Fig. 28a); dorsal punctures on discal portion of pronotum as large as or larger than eye facets, moderately to deeply impressed (Fig. 28a); anterior margin of clypeus strongly sinuate in middle and distinctly bordered (Fig. 28a), simple, i.e. without small distinct medial bulge; circum-ocular furrows (occipital sulci) on dorsal head surface almost obliterated and indistinct; eyes large and markedly projecting laterally (Fig. 28a); posterior angles of pronotum distinct, blunt, obtuse (Fig. 28a),



not directed posteriorly; scutellum uniformly punctured on most of exposed portion (as in Fig. 27f); elytra with normal punctures, never transversely strigose; elytral humeral angle distinct, widely obtuse, not protruding laterally (Fig. 28a); elytral humeral striae indistinct; elytral pre-sutural striae faintly visible, almost indistinct anteriorly, originating posterior to scutellar vertex, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural border, more distinct at distal fourth, narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 28a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 28a).

*Ventral habitus*: antennal furrows distinct and moderately to strongly convergent, inner margins well-delimited, mentum subtrapezoidal (Figs. 28d, i); prosternal antennal furrows on anterior



**Fig. 28.** *Sebastiangethes* Audisio, Kirk-Spriggs & Cline, 2008: **a-i** – *S. anthystrixoides* Audisio, Kirk-Spriggs & Cline, 2008. **a** – male habitus (length 2.7 mm); **b** – right maxilla and palpus; **c** – left mandible; **d** – labrum; **e-f** – male genitalia; **g** – major sclerites of male endophallus; **h** – distal portion of ovipositor; **i** – ventral view of head and anterior portion of prosternum. Drawings **b-i** refer to AUDISIO et al. (2008) for scale.

margin of prosternum indistinct, reduced to flattened traces, almost completely obliterated in females, prosternal process narrow and parallel-sided (Fig. 28i), subapical portion 1.5–1.7× as wide as maximum width of 1<sup>st</sup> antennomere, bluntly convex distally; lateral borders of prosternal process delimiting shallowly impressed distinct furrows, distally terminating at predistal lateral expansions; posterior margin of mesoventrite simple, not medially incised; male impressions on metaventrite faint; first two visible abdominal ventrites simple in both sexes, without tufts of setae, caudal marginal lines of metacoxal cavities simple, subparallel and contiguous to posterior margin of metacoxal cavities, with shallow arched impression of outer ‘axillary’ line; ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle bluntly obtuse; moderately distinct and scarcely impressed arched impressions on last abdominal ventrite, partially covered by distal portion of penultimate visible abdominal ventrite.

*Appendages*: male 1<sup>st</sup> antennomere 1.0–1.2× as long as width of protibiae excluding distal teeth (Fig. 28a); 3<sup>rd</sup> antennomere in males ~3× as long as wide, 1.1–1.3× as long as and markedly thinner than 2<sup>nd</sup>; 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in males, usually long, 2.0–2.3× as long as wide (Fig. 28a); male antennal club variable, with usually allometric development; large, loose, markedly asymmetrical and comprising last 5–6 antennomeres in large males (Fig. 28a), but smaller, short, nearly symmetrical, and composed of the last 3 antennomeres in some small-sized males; but several observed small males (1.9–2.1 mm) exhibit ‘normal’ antennae, with strongly enlarged and six-jointed antennal club; antennal club simple and 3-jointed in females; labial palpi long and thin, especially in males, terminal segment 2.3–2.8× as long as wide; maxillary palpi long and thin, especially in males (Fig. 28b), terminal segment 2.8–3.2× as long as wide; mandible large, moderately long, ~1.6–1.8× longer than wide in large males, shorter in small males and females, apex bifid and acuminate (Fig. 28c); tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Fig. 28a); tarsal claws simple, not toothed at base (as in Fig. 24f); protibiae with reduced teeth on outer margins (Fig. 28a); meso- and metatibiae on lateral margin bearing a single and regular row of long and thin, yellowish pegs, without U-shaped sinuosity at distal third; meso- and metatibiae subtrapezoidal, especially in males, abruptly dilated inwards at basal portion, subparallel-sided (Fig. 28a); moderate sexual dimorphism in tibial shape; tarsal plates of prolegs faintly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: peculiarly shaped, processes along inner side of parameres absent (Fig. 28e), without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision, tegmen with weak, distal arcuate emargination; median lobe of aedeagus without lateral emarginations and distally subtruncate (Fig. 28f); main sclerites of internal sac (flagellum) peculiarly large, forceps-shaped, sclerotized, typically 0.6–0.7× shorter than aedeagus (Fig. 28g).

*Female genitalia (ovipositor)*: large; styli moderately long and distinct, simple, unpigmented, inserted near apex of contiguous gonostyloids, each gonostyloid lightly sclerotized and moderately pigmented distally, with peculiarly indentate outer portion of basicoxites (Fig. 28h), and a single, large, scarcely pigmented but slightly more sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor located more distad than middle, without proximad directed spicule.

**Etymology.** The genus was named for our late friend and colleague Sebastian Endrödy-Younga (1934–1999) who, during the years 1973–1998, collected a very large and only partially studied assemblage of southern African Nitidulidae, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligetes*. Gender masculine.

**Biology.** Larval development is strictly associated with male inflorescences of Asteraceae within the isolated tribe Tarchonantheae, specifically *Tarchonanthus camphoratus* L. (AUDISIO et al. 2008).

**Phylogenetic position.** This genus is strongly isolated in the *Anthystrix* complex of genera, exhibiting several peculiar traits such as a ‘*Pria*-like’ slender and loose male antennal club, markedly sinuate anterior margin of clypeus, elongate segments of male maxillary and labial palpi, long and slender male mandibles, long and narrow prosternal process, nearly indistinct prosternal antennal furrows, strongly convergent antennal furrows on ventral side of head (with inner margin only evident), indistinct postocular furrows on dorsal side of head, and very large and strongly sclerotized internal sac bacula in the male genitalia.

**Taxonomy and geographic distribution.** This taxon includes a single African species (AUDISIO et al. 2008) distributed from Northern Cape (Kuruman area) in NW South Africa to E Namibia (two recently examined specimens, include the following data: Namibia, 46 KM E Otavi, 29.iii.1992, C. V. O’Brien, L. B. O’Brien & G. B. Marshall leg.: CAS, CAR). Very likely also present in southern and western Botswana.

*Sebastiangethes anthystrixoides* Audisio, Kirk-Spriggs & Cline, 2008  
South Africa: Northern Cape; E Namibia

## 29. *Xenostromylogethes* Audisio & Cline, gen. nov.

(Figs. 29 a–h)

**Type species.** *Anthystrix luculenta* Kirejtshuk & Easton, 1988: 42, 45 [= *Xenostromylogethes luculentus* (Kirejtshuk & Easton, 1988) comb. nov.].

**Generic description and diagnosis.** Inclusive species vary moderately in size (1.9–2.5 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence long, golden to silvery-whitish and dense, recumbent, partially obscuring the predominantly dark brown dorsal body surface, sometimes obscuring the narrowly flattened and frequently paler pronotal and elytral sides (Fig. 29a); lateral margin of pronotum and elytra with a series of faintly distinct, short setae, each seta nearly 0.5× as long as those on elytral disc; posterior margin of pronotum with relatively short, distally multifid microsetae, microsetae also present on middle portion anterior to scutellum (as in Fig. 27f).

**Dorsal habitus:** body moderately convex and short, suboval (Fig. 29a); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, moderately to deeply impressed (Fig. 29a); anterior margin of clypeus faintly emarginate medially, simple, i.e. without small distinct medial bulge, usually distinctly bordered (Fig. 29a); circum-ocular furrows (occipital sulci) on dorsal head surface almost obliterated, indistinct; eyes large and usually markedly projecting laterally (Fig. 29a); posterior angles of pronotum distinct, blunt, obtuse (Fig. 29a), never directed posteriorly; scutellum uniformly punctured on most of exposed portion (as in

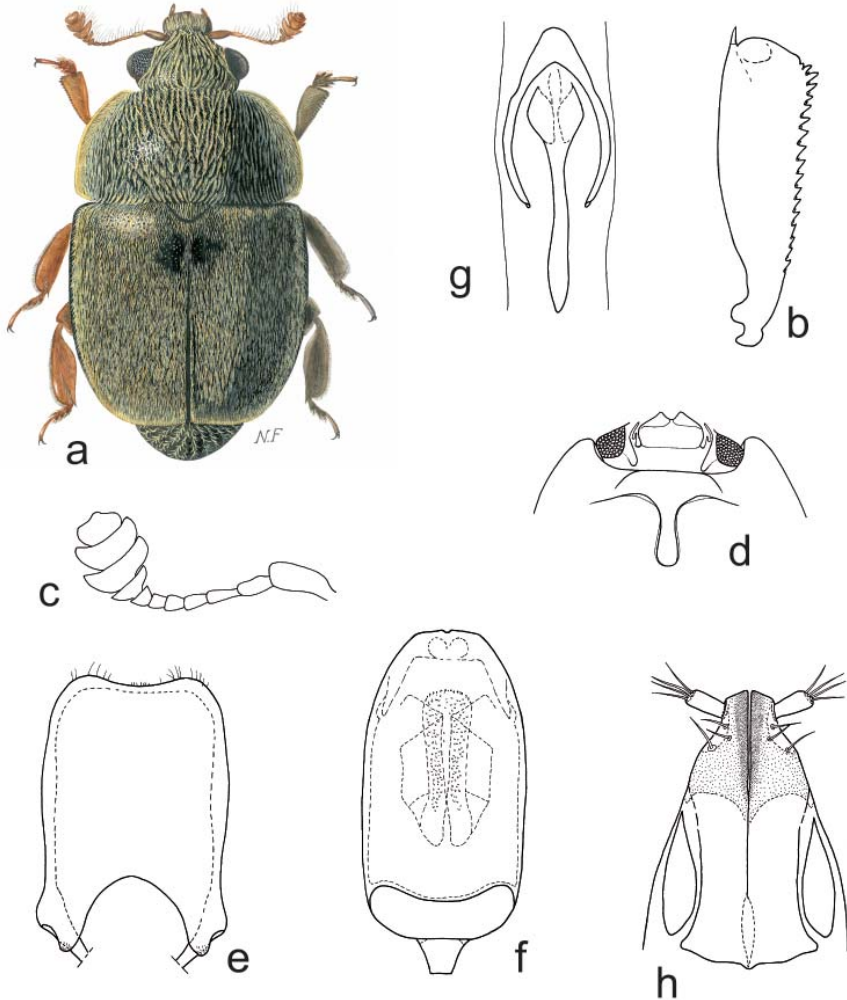
Fig. 27f); elytral punctures simple, never transversely strigose; elytral humeral angle distinct, widely obtuse, never protruding laterally (Fig. 29a); elytral humeral striae not distinct; elytral pre-sutural striae faintly visible, almost indistinct anteriorly, originating posterior to scutellar vertex, terminating at elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural border, more distinct at distal fourth, distinctly narrower than proximal width of 3<sup>rd</sup> antennomere; elytral apices truncately rounded in both sexes (Fig. 29a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 29a).

*Ventral habitus*: antennal furrows markedly delimited, and moderately convergent posteriorly; mentum subpentagonal (Fig. 29d); prosternal antennal furrows on anterior margin of prosternum moderately distinct, widely divergent posteriorly, slightly raised and short in both sexes (Fig. 29d); prosternal process moderately narrow, subapical portion 1.7–1.8× as wide as maximum width of 1<sup>st</sup> antennomere, apex bluntly rounded (Fig. 29d); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating at predistal lateral expansions; posterior margin of mesoventrite simple, not medially incised; scarce sexual dimorphism in shape/size of impressions on metaventrte; first two visible male abdominal ventrites medially bearing a distinct and widely transverse tuft of dense, blackish-brown, shortly erect setae, absent in females; caudal marginal lines of metacoxal cavities simple, subparallel and contiguous to posterior margin of metacoxal cavities, with shallow arched impression of outer ‘axillary’ line; ‘axillary’ space on first abdominal ventrite moderately developed, ‘axillary’ angle slightly obtuse; moderately distinct and shallowly impressed arched impressions on basal portion of last visible abdominal ventrite, partially covered by distal portion of penultimate visible abdominal ventrite.

*Appendages*: male 1<sup>st</sup> antennomere 0.9–1.0× as long as width of protibiae excluding distal teeth (Figs. 29a, c); 3<sup>rd</sup> antennomere ~2.7× as long as wide in both sexes, nearly as long as but distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 29c); 4<sup>th</sup> antennomere slightly longer than 5<sup>th</sup>, the latter short, slightly longer than wide (Fig. 29c); scarce sexual dimorphism in antennal club size, slightly larger and partially including 8<sup>th</sup> antennomere in males (Fig. 29c), smaller and 3-jointed in females; labial palpi moderately short in both sexes, terminal segment 1.6–1.8× as long as wide; maxillary palpi moderately long and thin, last segment 2.1–2.3× as long as wide; mandible mid-sized, moderately short, apex bifid, moderately acuminate, sexual dimorphism absent; tarsi of normal size and shape, 0.7–0.9× as long as corresponding tibiae (Fig. 29a); tarsal claws simple, never toothed at base; protibiae with reduced teeth on outer margins (Figs. 29a, b); lateral margin of meso- and metatibiae bearing a single and regular row of long and thin, yellowish pegs (Fig. 29a), without U-shaped sinuosity at distal third; sexual dimorphism nearly absent in meso- and metatibiae shape, more or less abruptly dilated inwards in basal portion in both sexes, subparallel-sided in medial and distal portions (Fig. 29a); tarsal plates of prolegs wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: simple, processes along inner side of parameres absent (Fig. 29e), without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus simple, without lateral emargination (Fig. 29f); main sclerites of internal sac (flagellum) large, forceps-shaped and well sclerotized, slightly shorter than aedeagus (Fig. 29g).

*Female genitalia (ovipositor)*: large; styli long and distinct, simple, unpigmented, inserted near apex of contiguous gonostyloids, each gonostyloid lightly sclerotized and moderately pigmented distally, with a simple, never indentate outer portion of basicoxites (Fig. 29h), and a single, small, pigmented and more sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor located more distad than middle, without proximad directed spicule.



**Fig. 29.** *Xenostromylogethes* Audisio & Cline, gen. nov.: **a–h** – *X. luculentus* (Kirejtshuk & Easton, 1988). **a** – male habitus (length 2.5 mm); **b** – protibia (length 0.32 mm); **c** – male antenna (length 0.50 mm); **d** – ventral view of head and anterior portion of prosternum (pronotal width 1.22 mm); **e–f** – male genitalia (**e** – length 0.42 mm; **f** – length 0.47 mm); **g** – major sclerites of male endophallus (length 0.42 mm); **h** – distal portion of ovipositor (length 0.49 mm).



**Etymology.** This genus is named for the short oval and moderately convex body shape of inclusive species, covered by dense, long, whitish to yellowish pubescence, which strongly resembles members of the Palearctic Nitidulinae genus *Xenostromylyus* Wollaston, 1854, and from ‘-gethes’, to emphasize its phylogenetic relationship with *Meligethes*. Gender masculine.

**Biology.** Larval development is strictly associated with male inflorescences of Asteraceae within the isolated tribe Tarchonantheae (especially *Tarchonanthus* L.) (AUDISIO unpublished data).

**Phylogenetic position.** *Xenostromylygethes* gen. nov. is moderately isolated within the *Anthystrix* complex of genera, potentially more closely related to *Sebastiangethes* than other members of the complex. *Xenostromylygethes* gen. nov. exhibits some peculiar traits such as reduced antennal sexual dimorphism, and a distinct and large tuft of short, dense, dark, medial setae on the first two visible abdominal ventrites in males.

**Taxonomy and geographic distribution.** The genus includes a single southern African species. A second new southern African species awaits description from the Northwest Province and southern Limpopo. An upcoming paper is devoted to the description of this new species and the taxonomic revision of the genus (AUDISIO et al. in prep.).

*Xenostromylygethes luculentus* (Kirejtshuk & Easton, 1988) **comb. nov.**

South Africa: E Cape, W Cape, KwaZulu-Natal

### 30. *Micropria* Grouvelle, 1899

(Figs. 30 a–z)

*Micropria* Grouvelle, 1899: 131.

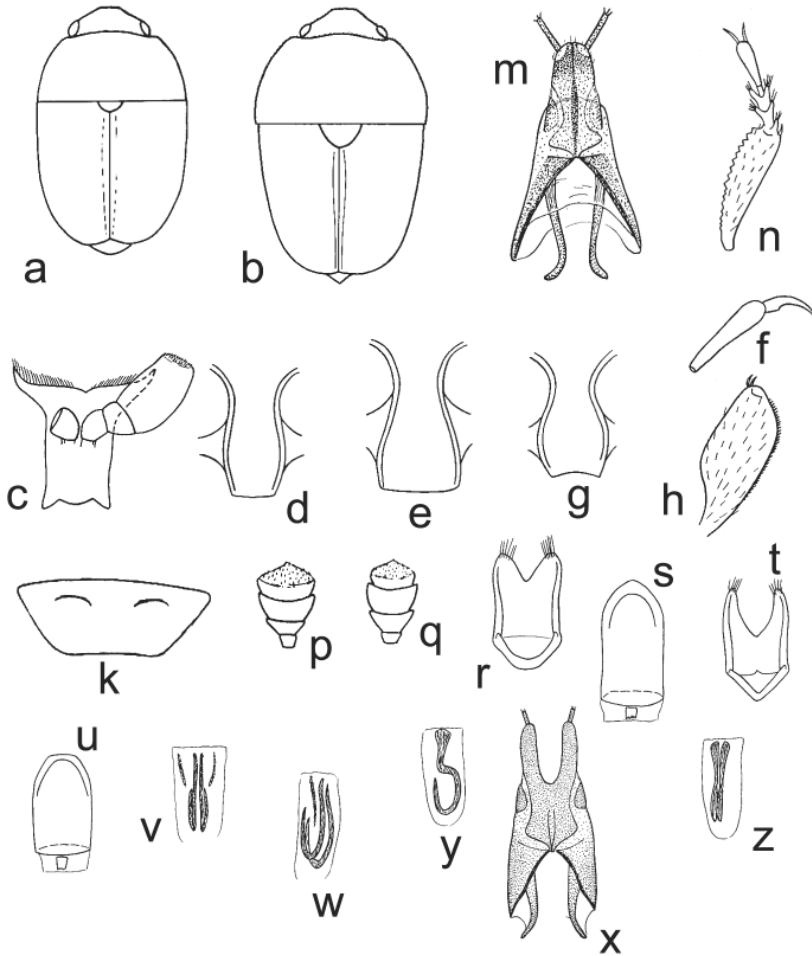
*Metapria* Grouvelle, 1909: 105. Unnecessary replacement name for *Micropria* (cf. KIREJTSHUK 2008; see below).

**Type species.** *Micropria kraatzi* Grouvelle, 1899: 131 (by monotypy).

**Generic redescription and diagnosis.** Inclusive species vary moderately in size (1.1–1.7 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence silvery-whitish, short and fine, recumbent, never obscuring the usually shining and metallic black to ochraceous dorsal body surface; pronotal and elytral sides narrowly flattened, typically same color as disc; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with moderately long, usually distally bifid microsetae, microsetae absent from narrow middle portion anterior to scutellum.

*Dorsal habitus:* body small, more or less strongly convex, variably shaped, usually shortly oval (Figs. 30a, b; Figs. 53, 63, 71 in KIREJTSHUK 1980b), pronotum as wide as or slightly wider than elytra; dorsal punctures on discal portion of pronotum usually larger than eye facet, moderately deeply impressed and densely distributed, but variable; anterior margin of clypeus usually truncate, rarely sinuate, narrowly but distinctly bordered, without small, faintly distinct, medial bulge, lateral angles obtuse (Figs. 54, 64, 72 in KIREJTSHUK 1980b); circum-ocular furrows (occipital sulci) on dorsal side of head completely absent; eyes moderately large and projecting laterally (Figs. 30a, b); pronotum with distinct and nearly right posterior angles, rarely faintly directed posteriorly (Figs. 30a, b; Figs. 53, 63, 71 in KIREJTSHUK 1980b); lateral area adjacent to posterior outer portions of pronotum impunctate, glabrous; scutellum



**Fig. 30.** *Micropria* Grouvelle, 1899: **a, c-d, f, h, k, m-n, p, r-s, v-w** – *M. perparva* (Grouvelle, 1909); **b, q, t-u, y-z** – *M. densepunctata* (Kirejtshuk, 1980); **e, x** – *M. oviformis* (Kirejtshuk, 1980); **g** – *M. diluticolor* (Kirejtshuk, 1980). **a, b** – male habitus; **c** – labium and left palpus; **d, e, g** – prosternal process; **f** – last tarsomere with tarsal claws; **h** – male mesotibia; **k** – exposed portion of last visible abdominal ventrite; **m, x** – ovipositor; **n** – protibia; **p-q** – antennal club; **r-s, t-u** – male genitalia; **v-w, y-z** – major sclerites of male endophallus (dorsal and lateral view). All drawings modified from KIREJTSHUK (1980b); refer to KIREJTSHUK (1980b) for scale.

minutely and sparsely punctured on posterior part of exposed portion; elytra with variable punctation, usually simple, not transversely strigose, some species faintly reticulately rugose with orange-peel like sculpturing; elytral humeral angles more or less distinctly laterally projecting, usually obscured under posterior corners of pronotum; elytral humeral striae usually scarcely distinct or indistinct; elytral pre-sutural striae fine but visible, originating at scutellar vertex, terminating before elytral apex, and delimiting on each elytron a faintly distinct, flat

sutural area, distinctly wider than distal width of third antennomere; elytral apices truncately rounded in both sexes (Fig. 30a); pygidium partially exposed, moderately convex, apically rounded or slightly acuminate in both sexes (Figs. 30a, b).

*Ventral habitus*: antennal furrows markedly delimited, parallel-sided anteriorly, distinctly convergent posteriorly; mentum subpentagonal, strongly transverse, trapezoidal; prosternal antennal furrows of anterior margin of prosternum obliterated, not distinct; prosternal process variably shaped, usually wide, subapical dilated portion 2.6–3.8× as wide as maximum width of 1<sup>st</sup> antennomere, apex truncate or moderately concave (Figs. 30d, e, g), posterior margin not microscopically crenulate; lateral borders of prosternal process delimiting shallowly impressed but wide and distinct furrows, distally terminating over predistal lateral expansions (Figs. 30d, e, g); posterior margin of mesoventrite never medially incised, slightly to markedly arcuately convex posteriorly; male impressions on metaventricle scarcely developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, subparallel and contiguous to posterior margin of metacoxal cavities, shallow arched impression of outer ‘axillary’ line faint; ‘axillary’ space on first abdominal ventrite well developed, ‘axillary’ angle broadly widely obtuse; small, short, and shallowly impressed arched impressions on basal portion of last visible abdominal ventrite (Fig. 30k), moderately far from lateral margins of ventrite, and frequently partially covered by distal portion of penultimate visible abdominal ventrite; apex of last abdominal ventrite frequently emarginate in males, without shining tubercles or arcuate ridges in both sexes.

*Appendages*: male 1<sup>st</sup> antennomere 0.8–0.9× as long as width of protibiae excluding distal teeth; 3<sup>rd</sup> antennomere moderately long in both sexes, 2.3–2.6× as long as wide, ~1.0× as long as but distinctly thinner than 2<sup>nd</sup> antennomere; 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, nearly as long as wide; antennal club compact, middle-sized, simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere) (Figs. 30p, q), more narrow than width of protibiae, sexual dimorphism absent; labial palpi short in both sexes (Fig. 30c), terminal segment ~1.3–1.5× as long as wide; maxillary palpi long and thin in both sexes, terminal segment 2.5–2.8× as long as wide; mandible small-sized, apex moderately acuminate, no sexual dimorphism; tarsal claws simple, not toothed at base (Fig. 30f); tarsi relatively short, 0.6–0.8× as long as corresponding tibiae (Fig. 30n), pretarsus comparatively large; protibiae with a series of small and relatively blunt teeth on distal portion of lateral margin (Fig. 30n); lateral margin of meso- and metatibiae bearing a single and usually even row of short and thin pegs (Figs. 30h), without U-shaped sinuosity at distal third; meso- and metatibiae short and wide, flat (Fig. 30h), subtrapezoidal and axe-shaped; sexual dimorphism scarcely expressed in metatibial shape; tarsal plates of prolegs faintly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 30r–u; Figs. 59–61, 67–69, 75–76 in KIREJTSHUK 1980b), usually with wide V-shaped incision on distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variably shaped, without lateral emargination, narrow and obtuse, distally acuminate or spatulate, without minute excisions or emarginations; main sclerites of internal sac (flagellum) large, arcuate, usually hook-shaped in lateral view (Figs. 30v–z), well-sclerotized, nearly as long as median lobe of aedeagus.

*Female genitalia (ovipositor)*: relatively large; styli long, cylindrical, usually darkly pigmented, inserted at apex of contiguous or markedly divergent gonostyloids (Figs. 30m, x; Figs. 70, 77 in KIREJTSHUK 1980b); each gonostyloid sclerotized and usually darkly pigmented, with a simple, never indentate outer portion of basicoxites, and a single, narrow, pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. 'Central point' of ovipositor typically more proximad than middle, without proximad directed spicule.

**Etymology.** The generic name is derived from Greek 'μικρός' (= small), which is indicative of the usually small body size characterizing all inclusive species, and from *Pria*, to emphasize superficial morphological similarities with this meligethine genus. Gender feminine.

**Biology** of *Micropria* is mostly unknown. A few adult specimens of *Micropria diluticolor* (Kirejtshuk, 1980) have been collected in Zaire on fruits of *Treculia africana* var. *engleri-ana* (De Wild. & Th. Dur.) Engl. (Moraceae) (KIREJTSHUK 1980b), but a frugivorous larval life style is unlikely (postulated by KIREJTSHUK 1983). However, some species of *Micropria* may be associated with inflorescences of Moraceae. A few specimens of *Micropria* sp. were recently collected in Rwanda by insecticidal canopy fogging of *Carapa grandiflora* Sprague (Meliaceae; a large tree of montane rain forests), in conjunction with several specimens of *Lucanopria wagneri* gen. nov. and sp. nov. (T. Wagner, pers. comm. 2009; see below).

**Phylogenetic position.** Available morphological data provide evidence of a possible relationship of *Micropria* with the clade ['*Anthystrix* complex of genera' + *Chromogethes*] (AUDISIO et al. 2008), or with the clade [*Meligethinus* + (*Meligethes* + *Brassicogethes*)]. Discovery of larval host-plants and availability of molecular data will help better secure a phylogenetic position for *Micropria*.

The type species of the genus, *M. kraatzi* Grouvelle, 1899 from East Africa, is unknown to the authors. As observed by KIREJTSHUK (1980b) and according to the original description, this species exhibits a few morphological characters that are somewhat atypical with other species of the genus.

**Taxonomy and geographic distribution.** *Micropria* includes six described Afrotropical species (KIREJTSHUK 1980b). These species were formerly attributed to two recognized species-groups, i.e. the '*perparva*', and '*oviformis*' species-groups. *Meligethes carbunculus* Easton, 1960, described from Tanzania, and reported from Sierra Leone (the latter record unfortunately is based solely on female specimens), may likely be transferred to *Micropria* at a later time (AUDISIO 1994, and unpublished data), but is not included within *Micropria* here.

GROUVELLE (1909) introduced the new name *Metapria* as replacement name for *Micropria* Grouvelle, 1899, due to the quasi-homonymy with *Micropria* Gray, 1868 (Mammalia, Cetacea). An analogous situation occurs with the name *Microprius* Fairmaire, 1869 (Coleoptera, Zopheridae). However, according to the ICZN (1999: Article 56.2), this was an unjustified replacement name, and was recently correctly applied by KIREJTSHUK (2008).

|   |                 |
|---|-----------------|
| <i>Micropria collarti</i> (Kirejtshuk, 1980)      | Zaire           |
| <i>Micropria densepunctata</i> (Kirejtshuk, 1980) | Zaire           |
| <i>Micropria diluticolor</i> (Kirejtshuk, 1980)   | Zaire           |
| <i>Micropria kraatzi</i> Grouvelle, 1899          | E Africa        |
| <i>Micropria oviformis</i> (Kirejtshuk, 1980)     | Zaire           |
| <i>Micropria perparva</i> (Grouvelle, 1909)       | Tanzania, Zaire |

### 31. *Meligethinus* Grouvelle, 1906

(Figs. 31 a–m)

*Meligethinus* Grouvelle, 1906: 202.

*Prianella* Reitter, 1919: 16. Senior homonym of *Prianella* Lechanteur, 1955: 238.

**Type species.** *Meligethinus* – *Meligethinus humeralis* Grouvelle, 1906: 202 (by monotypy); *Prianella* – *Pria pallidula* Erichson, 1843 (by monotypy).

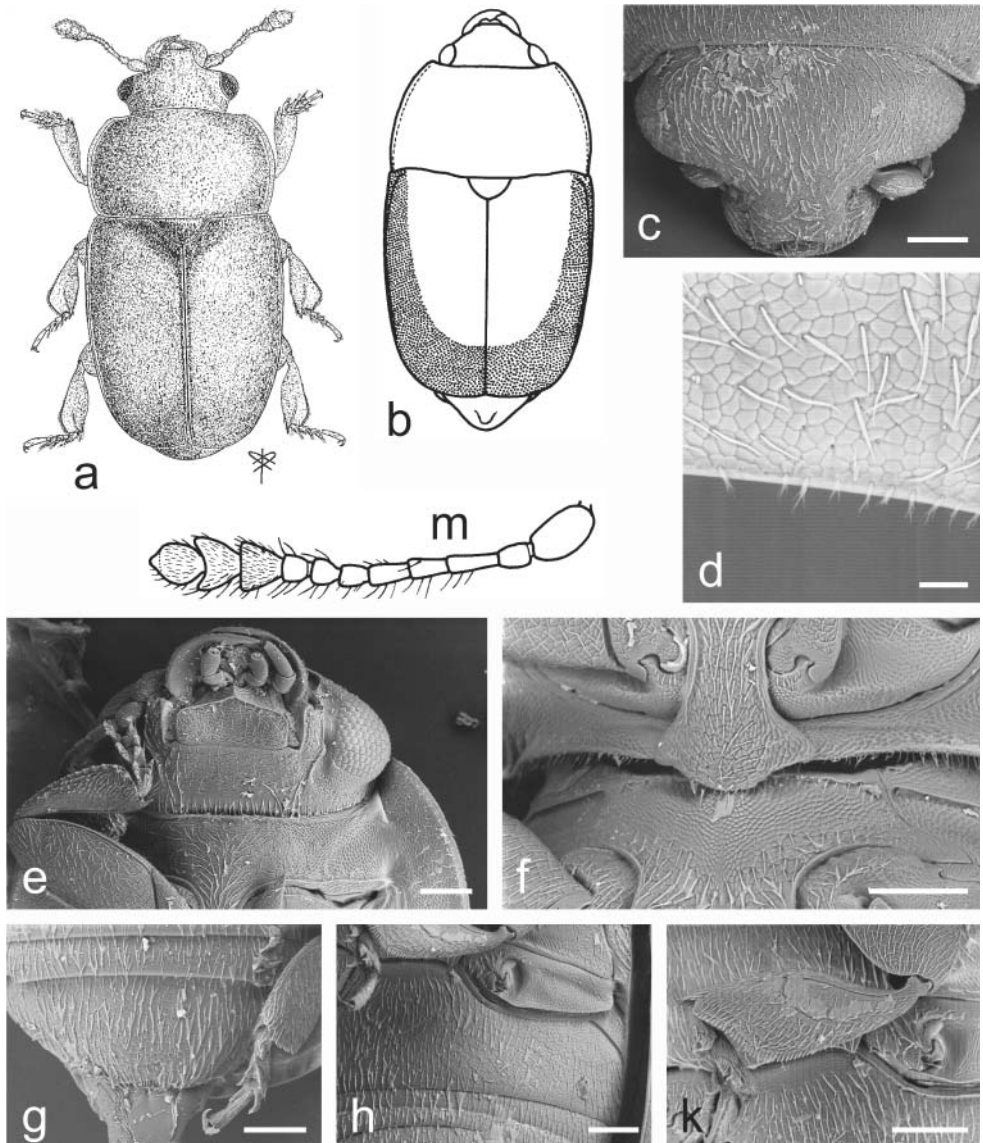
**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.2–3.0 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence short and fine, silvery-whitish to golden, never obscuring the usually dull and densely isodiametrically reticulate, yellowish-ochraceous to partially blackish-brown (Figs. 31a, b) dorsal body surface; pronotal and elytral sides narrowly flattened, typically same color as disc or paler; lateral margin of pronotum and elytra with a series of faintly distinct, small, and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with moderately long, usually distally bifid or trifold microsetae (Fig. 31d), microsetae also uniformly distributed on middle region anterior to scutellum.

*Dorsal habitus:* body small, usually flatly convex, variably shaped (Figs. 31a, b; Figs. 1, 12, 24 in KIREJTSHUK 1980b; Figs. 33–34 in JELÍNEK 1992), pronotum as wide as or slightly more narrow than elytra; dorsal punctures on discal portion of pronotum and elytra usually fine, smaller than eye facet, moderately to shallowly impressed and densely distributed; anterior margin of clypeus usually truncate, rarely sinuate, narrowly but distinctly bordered, without small, faintly distinct, medial bulge, lateral angles obtuse (Fig. 31c; Figs. 2, 13, 25 in KIREJTSHUK 1980b); circum-ocular furrows (occipital sulci) on dorsal side of head absent; eyes moderately large and projecting laterally (Figs. 31a, b); pronotum with distinct and nearly right posterior angles, or slightly acute and more or less distinctly projecting posteriorly (Figs. 31a, b; Figs. 1, 12, 24 in KIREJTSHUK 1980b; Figs. 33–34 in JELÍNEK 1992); lateral area adjacent to posterior outer portions of pronotum normally punctate and setose; scutellum minutely and densely punctured on most of exposed portion; elytra usually finely and densely discretely punctured to almost completely and finely transversely strigose; elytral humeral angle faintly projecting laterally, frequently obscured by posterior corner of pronotum; elytral humeral striae scarcely distinct or indistinct; elytral pre-sutural striae visible, variable, originating at scutellar vertex or more posteriorly, terminating slightly before elytral apex, and delimiting on each elytron a flat sutural area, widest at posterior third, some species (i.e. the western Palearctic *M. pallidulus* and *M. gedrosiacus*) with sutural area faintly distinct and nearly as wide as distal width of 3<sup>rd</sup> antennomere, in other species (i.e. the southern African *M. dolosus*) the sutural area is markedly distinct at least posteriorly and much wider than distal width of third antennomere; elytral apices truncately rounded in both sexes (Fig. 31a), or slightly lobed in females; pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 31a; Figs. 1, 12, 24 in KIREJTSHUK 1980b), rarely with obliquely outstanding predistal conical projections in females (Fig. 31b).

*Ventral habitus:* antennal furrows markedly delimited, parallel-sided anteriorly, strongly convergent posteriorly; mentum subpentagonal, moderately transverse, trapezoidal (Fig. 31e);





**Fig. 31.** *Meligethinus* Grouvelle, 1906: **a, c–k** – *M. pallidulus* (Erichson, 1843); **b** – *M. muehlei* Jelinek, 1992; **m** – *M. humeralis* Grouvelle, 1906. **a** – male habitus (length 1.8 mm); **b** – female habitus (length 2.4 mm); **c** – dorsal view of head; **d** – microsetae on middle of posterior margin of pronotum; **e** – ventral view of head and anterior portion of prothorax; **f** – prosternal process and mesoventrite; **g** – exposed portion of last visible abdominal ventrite; **h** – caudal marginal line of metacoxal cavity; **k** – mesotibia. Drawings **b, m** – refer to JELINEK (1992) for scale. Scale bars: Figs. **c, e, f, g, h, k** = 100  $\mu$ m; Fig. **d** = 20  $\mu$ m.

prosternal antennal furrows on anterior margin of prosternum obliterated, indistinct (Fig. 31e); prosternal process variably shaped, usually wide, subapical dilated portion 2.5–3.5× as wide as maximum width of 1<sup>st</sup> antennomere, apex convex (Fig. 31f; Figs. 5, 16 in KIREJTSHUK 1980b; Fig. 44 in JELÍNEK 1992), posterior margin not microscopically crenulate; lateral borders of prosternal process not delimiting distinct furrows, distally terminating before or over predistal lateral expansions; posterior margin of mesoventrite never medially incised, transversely truncate (Fig. 31f); deep male impressions on metaventrite typically absent; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, subparallel and contiguous to posterior margin of metacoxal cavities, with shallow arched impression of outer ‘axillary’ line (Fig. 31h); ‘axillary’ space on first abdominal ventrite well developed, ‘axillary’ angle widely or broadly widely obtuse (Fig. 31h); variably impressed arched impressions on basal portion of last visible abdominal ventrite: small, short, shallow, and moderately close to lateral margins of ventrite, frequently largely or almost completely obscured by distal portion of penultimate visible abdominal ventrite (Fig. 31g) in the two W Palaearctic species; arched impressions much larger and deeper in some African and Oriental species (Fig. 40 in JELÍNEK 1992), or exceptionally large in the southern African *M. dolosus* (COOPER 1980, AUDISIO unpublished); apex of last abdominal ventrite usually simple in males, rarely distinctly emarginate in females (Fig. 40 in JELÍNEK 1992), without shining tubercles or arcuate ridges in both sexes.

*Appendages*: male 1<sup>st</sup> antennomere small, 0.8–0.9× as long as width of protibiae excluding distal teeth (Fig. 31a); 3<sup>rd</sup> antennomere usually long and slender in both sexes, 2.3–2.8× as long as wide, 1.2–1.5× longer and distinctly thinner than 2<sup>nd</sup> antennomere; 4<sup>th</sup> antennomere usually longer than 5<sup>th</sup> antennomere in both sexes, moderately long, nearly 1.5–1.8× longer than wide; antennal club small or mid-sized, nearly as wide as width of protibiae, compact and rounded or loose and narrow, especially in males (Fig. 31m), simple, comprising last 3 antennomeres in both sexes (8<sup>th</sup> antennomere scarcely widened, 0.4–0.5× as wide as 9<sup>th</sup> antennomere), sexual dimorphism variably expressed; labial palpi moderately short in both sexes (Fig. 31e), terminal segment 1.3–1.6× as long as wide; maxillary palpi long and thin in both sexes, terminal segment 2.6–3.1× as long as wide (Fig. 31e); mandible mid-sized, apex moderately acuminate, no sexual dimorphism usually present; tarsal claws simple, not toothed at base (Fig. 31g); tarsi of normal size, 0.6–0.7× as long as corresponding tibiae (Fig. 31a); protibiae with a series of small and relatively blunt teeth on distal portion of lateral margin (Fig. 31a; Figs. 5, 16 in KIREJTSHUK 1980b); lateral margin of meso- and metatibiae bearing a single and usually even row of short and thin pegs (Figs. 31a, k; Figs. 8, 20 in KIREJTSHUK 1980b; Fig. 45 in JELÍNEK 1992), without U-shaped sinuosity at distal third; meso- and metatibiae variably shaped, flat, usually short and wide, rarely slender, frequently subtrapezoidal and axe-shaped (Fig. 31a; Figs. 8, 20 in KIREJTSHUK 1980b; Fig. 45 in JELÍNEK 1992); sexual dimorphism variably expressed in metatibial shape in most species, rarely with marked projections on inner metatibial margin in males (Fig. 45 in JELÍNEK 1992); tarsal plates of prolegs usually distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: variably shaped, processes along inner side of parameres absent (Figs. 14–17, 20–23 in COOPER 1980; Figs. 9–10, 21–22 in KIREJTSHUK 1980b; Figs. 47–48 in JELÍNEK 1992; Figs. 114a–b in AUDISIO 1993b), usually with narrow and deep incision on distal

margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medio-distal V-shaped excision; median lobe of aedeagus variably shaped, without lateral emargination, narrow and obtuse, distally acuminate or spatulate, without minute excisions or emarginations.

*Female genitalia (ovipositor)*: variably shaped, relatively large; styli long or short, cylindrical, never darkly pigmented, inserted at apex of contiguous or markedly divergent gonostyloids (Figs. 24–25, 27–28 in COOPER 1980; Figs. 11, 23 in KIREJTSHUK 1980b; Figs. 41, 49 in JELÍNEK 1992; Figs. 114g in AUDISIO 1993b); each gonostyloid lightly sclerotized, never darkly pigmented distally, with a simple, never indentate outer portion of variably shaped basicoxites, and a single, narrow, pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually located more proximad than middle, or centrally located, with or without proximad directed spicule.

**Etymology.** The generic name is a diminutive of *Meligethes*, which is indicative of the usually small and slender body sizes characterizing most of inclusive species. Gender masculine.

**Biology.** All true *Meligethinus*, whose larval biology is known, are strictly associated with male inflorescences of palms (Arecaceae) (AUDISIO 1980, 1993b, and unpublished data; JELÍNEK 1992).

**Phylogenetic position.** Available molecular and morphological data provide strong combined evidence of a likely sister-group relationship of *Meligethinus* with the clade [*Meligethes* + *Brassicogethes* gen. nov.] (TRIZZINO et al. 2009, LAMANNA 2009); morphologically, *Micropria* should also be related to this clade (KIREJTSHUK 1980b, JELÍNEK 1992). A marginal phylogenetic relationship may also be hypothesized with the small Oriental clade [(*Cryptarchopria* + *Horakia*) + *Kabakovia*].

**Taxonomy and geographic distribution.** This taxon includes 15 described species. Inclusive species exhibit a high degree of morphological differentiation, and there is a strong need to employ molecular phylogenetic protocols to clarify the taxonomic position of many of the derived species. Most species are distributed in tropical Africa and southeastern Asia, with a couple relictual species known from western Mediterranean and Irano-Arabic areas (COOPER 1980; KIREJTSHUK 1980b; JELÍNEK 1981, 1988, 1992; AUDISIO 1993b; JELÍNEK & AUDISIO 2007). The two Mediterranean-Arabian species (i.e. *M. pallidulus* and *M. gedrosiacus*) and a few Oriental species could possibly be attributed to a separate genus (*Prianella* Reitter, 1919), however the entire group needs a complete phylogenetic and taxonomic revision prior to any further changes.

An additional species described by KIREJTSHUK (1989), i.e. *Meligethinus larioides* Kirejtshuk, 1989, from South Africa: Cape Peninsula, is a member of *Pria* (AUDISIO unpublished data; holotype in BMNH). Likewise, the species described by KIREJTSHUK (1989) as *Meligethinus formosus* Kirejtshuk, 1989, is a member of *Chromogethes* (see above). Finally, a few South African species described as *Meligethinus* by KIREJTSHUK & EASTON (1988), have been transferred here to *Tarchonanθοgethes* gen. nov. (see above).

*Meligethinus absonus* Kirejtshuk, 1987  
*Meligethinus apicalis* (Grouvelle, 1894)  
*Meligethinus bisignatus* Kirejtshuk, 1980  
*Meligethinus dolosus* Grouvelle, 1919  
*Meligethinus gedrosiacus* Jelínek, 1981

India: Uttar Pradesh; Vietnam  
 NE India, S China  
 Zaire, Rwanda  
 E South Africa or S Zimbabwe ?  
 S Iran, Arabian Peninsula

|   |                                    |
|---|------------------------------------|
| <i>Meligethinus grouvellei</i> Kirejtshuk, 1980   | India                              |
| <i>Meligethinus humeralis</i> Grouvelle, 1906     | Zaire, Angola, Rwanda              |
| <i>Meligethinus kabakovi</i> Kirejtshuk, 1980     | Vietnam                            |
| <i>Meligethinus muehlei</i> Jelínek, 1992         | Rwanda                             |
| <i>Meligethinus pallidulus</i> (Erichson, 1843)   | W Mediterranean                    |
| <i>Meligethinus peringueyi</i> (Grouvelle, 1919)  | E South Africa or S Zimbabwe ?     |
| <i>Meligethinus plagiatus</i> (Grouvelle, 1894)   | India: Darjeeling; Vietnam, Taiwan |
| <i>Meligethinus quadricollis</i> Kirejtshuk, 1987 | India: Uttar Pradesh               |
| <i>Meligethinus suffusus</i> Kirejtshuk, 1980     | Zaire                              |
| <i>Meligethinus tschungseni</i> Kirejtshuk, 1987  | China: Fujian, Sichuan, Yunnan     |

### 32. *Meligethes* Stephens, 1830

(Figs. 32 a–g)

*Meligethes* Stephens, 1830: 30.

*Odonthogethes* Reitter, 1871: 154.

**Type species.** *Meligethes* – *Nitidula rufipes* Marsham, 1802: 130, nec *Nitidula rufipes* (Linnaeus, 1767) (subsequent designation by THOMSON 1859) [= *Nitidula atrata* A. G. Olivier, 1790: 18; = *Meligethes atratus* (A. G. Olivier, 1790)]. *Odonthogethes* – *Meligethes hebes* Erichson, 1845: 172 (by monotypy) [= *Nitidula denticulata* Heer, 1841: 402; = *Meligethes denticulatus* (Heer, 1841)].

**Generic redescription and diagnosis.** Inclusive species vary greatly in size (2.2–4.5 mm length), and share the following combination of characters.

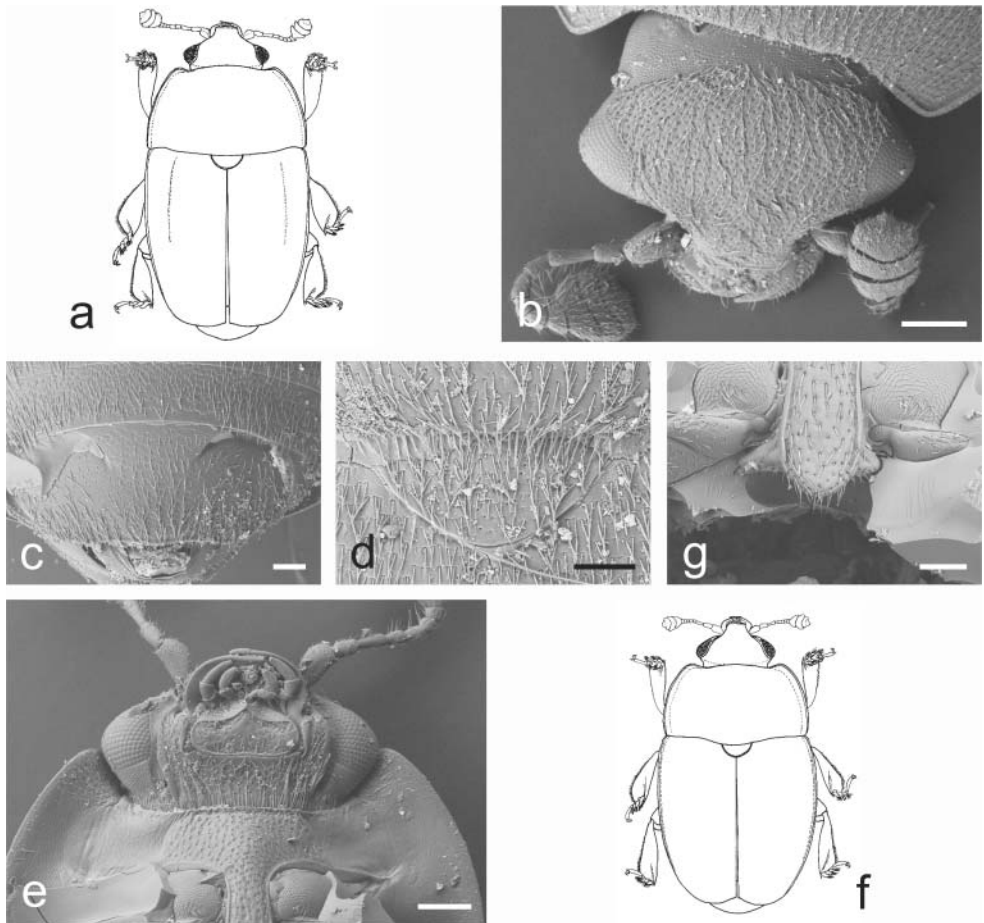
**Body color and pubescence:** pubescence variable, usually short and fine, a few species with long and prostrate setae, golden to silvery-whitish and dense, rarely partially obscuring the usually dark brown (rarely reddish, metallic green, or metallic violet) dorsal body surface; pronotal and elytral sides relatively widely flattened, typically same color as disc, a few species paler, reddish; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid microsetae, microsetae also uniformly distributed on middle region anterior to scutellum (Fig. 32d).

**Dorsal habitus:** body moderately convex, usually wide and oval (Figs. 32a, f); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, dense, usually moderately to deeply impressed; anterior margin of clypeus always truncate, simple, i.e. without small distinct medial bulge, distinctly bordered (Fig. 32b); circum-ocular furrows (occipital sulci) on dorsal side of head absent (Fig. 32b); eyes large and usually moderately projecting laterally (Fig. 32b); pronotum with markedly distinct posterior angles, faintly acute to almost at right angle (Fig. 32f), frequently distinctly directed posteriorly (Fig. 32a); scutellum uniformly punctured on most of exposed portion (Fig. 32c); elytra usually with simple punctation, a few species with transversely strigose sculpturing (Fig. 32d); elytral humeral angle distinct, obtuse, frequently slightly protruding laterally and posteriorly (Figs. 32a, f); elytral humeral stria usually partially distinct, long, and shallowly impressed (Fig. 32a), rarely indistinct; elytral pre-sutural striae visible, usually originating posterior to scutellar vertex, terminating prior to elytral apex, and delimiting on each elytron a more or less distinct, flat sutural area, widest at posterior third, nearly as wide as proximal width of 3<sup>rd</sup> antennomere;



elytral apices truncately rounded in both sexes (Figs. 32a, f); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 32a, f).

*Ventral habitus*: antennal furrows markedly delimited, and moderately convergent posteriorly; mentum subpentagonal (Fig. 32e); prosternal antennal furrows on anterior margin of prosternum almost completely obliterated (Fig. 32e); prosternal process variably shaped, moderately wide, subapical portion 1.6–2.0× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually bluntly rounded (Fig. 32g); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating at predistal lateral expansions (Fig. 32g); posterior margin of mesoventrite simple, never medially incised, longitudinal ridge on



**Fig. 32.** *Meligethes* Stephens, 1830: **a–e**, **g** – *M. atratus* (A. G. Olivier, 1790); **f** – *M. denticulatus* (Heer, 1841). **a**, **f** – male habitus (**a** – length 3.6 mm; **f** – length 3.4 mm); **b** – dorsal view of head; **c** – exposed portion of last visible abdominal ventrite; **d** – scutellum and microsetae on middle of posterior margin of pronotum; **e** – ventral view of head and anterior portion of prosternum; **g** – prosternal process. Scale bars: Fig. **b**, **e** = 200  $\mu$ m; Figs. **c**, **d**, **g** = 100  $\mu$ m.



mesoventrite usually strongly raised, long, and well-marked (Figs. 167–168 in KIRK-SPRIGGS 1996); male impressions on metaventrite and/or tubercles variably developed; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer ‘axillary’ line; ‘axillary’ space on first abdominal ventrite well developed, ‘axillary’ angle widely obtuse; large and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 32c).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 32a, f); 3<sup>rd</sup> antennomere usually 2.7–2.8× as long as wide in both sexes, 1.4–1.5× longer and distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 32b); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, relatively short, moderately longer than wide (Fig. 32b), distinctly longer in some Oriental species; antennal club compact, usually moderately large, simple, comprising last 3 antennomeres in both sexes (Fig. 32b), usually as wide as width of protibiae, sexual dimorphism absent; labial palpi long and slender in both sexes (Fig. 32e), terminal segment 1.9–2.1× as long as wide; maxillary palpi long and slender in both sexes (Fig. 32e), terminal segment 2.7–2.9× as long as wide; mandible mid-sized, length variable, apex bifid, moderately acuminate, sexual dimorphism absent; tarsal claws variable, strongly toothed at base (as in Fig. 17m), bluntly toothed at base, or simple and not toothed; tarsi usually moderately short, 0.5–0.6× as long as corresponding tibiae (Figs. 32a, f); protibiae usually with reduced teeth on outer margins (Figs. 32a, f); lateral margin of meso- and metatibiae bearing a single and regular row of long and thin pegs (Figs. 32a, f), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually long and slender (Figs. 32a, f), rarely wider and shorter, never subtrapezoidal or axe-shaped; scarce sexual dimorphism in meso- and metatibiae shape and armature; tarsal plates of prolegs wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: variable, processes along inner side of parameres usually absent (Figs. 133g–h, m–n in AUDISIO 1993b) or minute, usually with deep and narrow excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, rounded, distally subtruncate to acuminate, frequently with distal minute excision or emargination; main sclerites of internal sac (flagellum) small, arcuate, and moderately sclerotized, typically 3–5× shorter than aedeagus.

*Female genitalia (ovipositor)*: large and usually strongly sclerotized; styli usually short but distinct, simple and pigmented, inserted close to apex of typically contiguous or rarely apically narrowly diverging gonostyloids; each gonostyloid distally unpigmented, with a simple never indentate outer portion of basicoxites (Figs. 153g–h in AUDISIO 1993b), and a single, narrow, slightly pigmented and sclerotized arcuate area along the outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually located more distad than middle, without proximad directed spicule.

**Etymology.** The generic name is derived from Greek ‘γηθέω’ (= enjoying), combined with the suffix ‘μέλι’ (= honey, nectar), to emphasize association of these beetles to flowers and nectaria.

**Biology.** All species are apparently strictly associated for larval development with flowers of Rosaceae, in particular bushes of *Rosa* L., *Rubus* L., and allied genera (AUDISIO 1993b).

**Phylogenetic position.** Available molecular and morphological datasets provide strong and concordant evidence of the robustness of a relatively large clade that includes *Meligethes*, *Brassicogethes* gen. nov., and *Meligethinus* (STRIKA 2004; TRIZZINO et al. 2009; LAMANNA 2009, and unpublished data). With regards to *Meligethes*, this genus exhibits a series of mainly plesiomorphic characters, provided in the above generic diagnosis, which suggests a relatively basal phylogenetic position in the Meligethinae clade, with probably closer affinities to members of the [*Pria* + *Microporum*] complexes of genera (Fig. 43), rather than to other genera formerly prescribed to *Meligethes* s. l.

**Taxonomy and geographic distribution.** *Meligethes* includes 31 described Palearctic and Oriental species, which are distributed from Western Europe and North Africa to Japan and southeastern China and Taiwan. Most of the known species are distributed in Middle Asia, the Eastern Palearctic, and transitional areas in the Oriental Region (e.g. the northern Indian Subcontinent, northern Indochina, and China). Several new species still awaiting description are also known from these areas. All new species will be published in an upcoming revision of the genus (JELÍNEK & AUDISIO in prep.).

Two probably artificial species groups were formerly recognized in the genus, i.e. the ‘*atratus*’ and ‘*denticulatus*’ species-groups. The latter group corresponded to the previously recognized *Meligethes* subgenus *Odonthogethes*, which was characterized by strongly toothed tarsal claws, and usually right angled posterior pronotal angles.

|   |  |
|---|--|
| <i>Meligethes atratus</i> (Olivier, 1790)         | Europe   |
| <i>Meligethes auricomus</i> Rebmman, 1956         | S China  |
| <i>Meligethes auripilis</i> Reitter, 1889         | S China  |
| <i>Meligethes binotatus</i> Grouvelle, 1908       | N India, China                                 |
| <i>Meligethes bourdilloni</i> Easton, 1968        | Nepal, China                                   |
| <i>Meligethes brevipilus</i> Kirejtshuk, 1980     | S China  |
| <i>Meligethes castanescens</i> Grouvelle, 1903    | NE India, S China                              |
| <i>Meligethes chinensis</i> Kirejtshuk, 1979      | S China  |
| <i>Meligethes cinereus</i> Jelinek, 1978          | Bhutan   |
| <i>Meligethes cyaneus</i> Easton, 1957            | E China, Japan                                 |
| <i>Meligethes denticulatus</i> (Heer, 1841)       | Palearctic Region, excluding N Africa          |
| <i>Meligethes ferrugineus</i> Reitter, 1873       | NE India                                       |
| <i>Meligethes flavicollis</i> Reitter, 1873       | E Siberia, Japan, E China                      |
| <i>Meligethes flavimanus</i> Stephens, 1830       | Palearctic Region, excluding N Africa          |
| <i>Meligethes griseus</i> Jelinek, 1978           | Bhutan   |
| <i>Meligethes hammondi</i> Kirejtshuk, 1980       | E China  |
| <i>Meligethes lloydi</i> Easton, 1968             | Nepal, S and E China, Taiwan                   |
| <i>Meligethes lutra</i> Solsky, 1876              | Middle Asia                                    |
| <i>Meligethes melleus</i> Grouvelle, 1908         | Myanmar  |
| <i>Meligethes nepalensis</i> Easton, 1968         | Nepal  |
| <i>Meligethes pectoralis</i> Rebmman, 1956        | SE China, Taiwan                               |
| <i>Meligethes semenovi</i> Kirejtshuk, 1979       | SE Siberia: Ussuri; E China                    |
| <i>Meligethes shirakii</i> Sadan. Hisamatsu, 1956 | S Japan: Amami Islands; China: Sichuan; Taiwan |
| <i>Meligethes shirozui</i> Sadan. Hisamatsu, 1965 | Taiwan   |
| <i>Meligethes torquatus</i> Jelinek, 1997         | Taiwan   |
| <i>Meligethes transmissus</i> Kirejtshuk, 1988    | S China  |

|  |                                  |
|--|----------------------------------|
| <i>Meligethes violaceus</i> Reitter, 1873      | E China, Japan, Russian Far East |
| <i>Meligethes vulpes</i> Solsky, 1876          | Middle Asia                      |
| <i>Meligethes wagneri</i> Rebmann, 1956        | SE China                         |
| <i>Meligethes xanthopus</i> Solsky, 1876       | Uzbekistan                       |
| <i>Meligethes zakharenkoi</i> Kirejtshuk, 2005 | Taiwan, SE China <sup>4)</sup>   |

### 33. *Brassicogethes* Audisio & Cline, gen. nov.

(Figs. 33 a–h)

**Type species.** *Nitidula aenea* Fabricius, 1775: 78 (by present designation) [= *Brassicogethes aeneus* (Fabricius, 1775) comb. nov.].

**Generic description and diagnosis.** Inclusive species vary greatly in size (1.4–3.3 mm length), and share the following combination of characters.

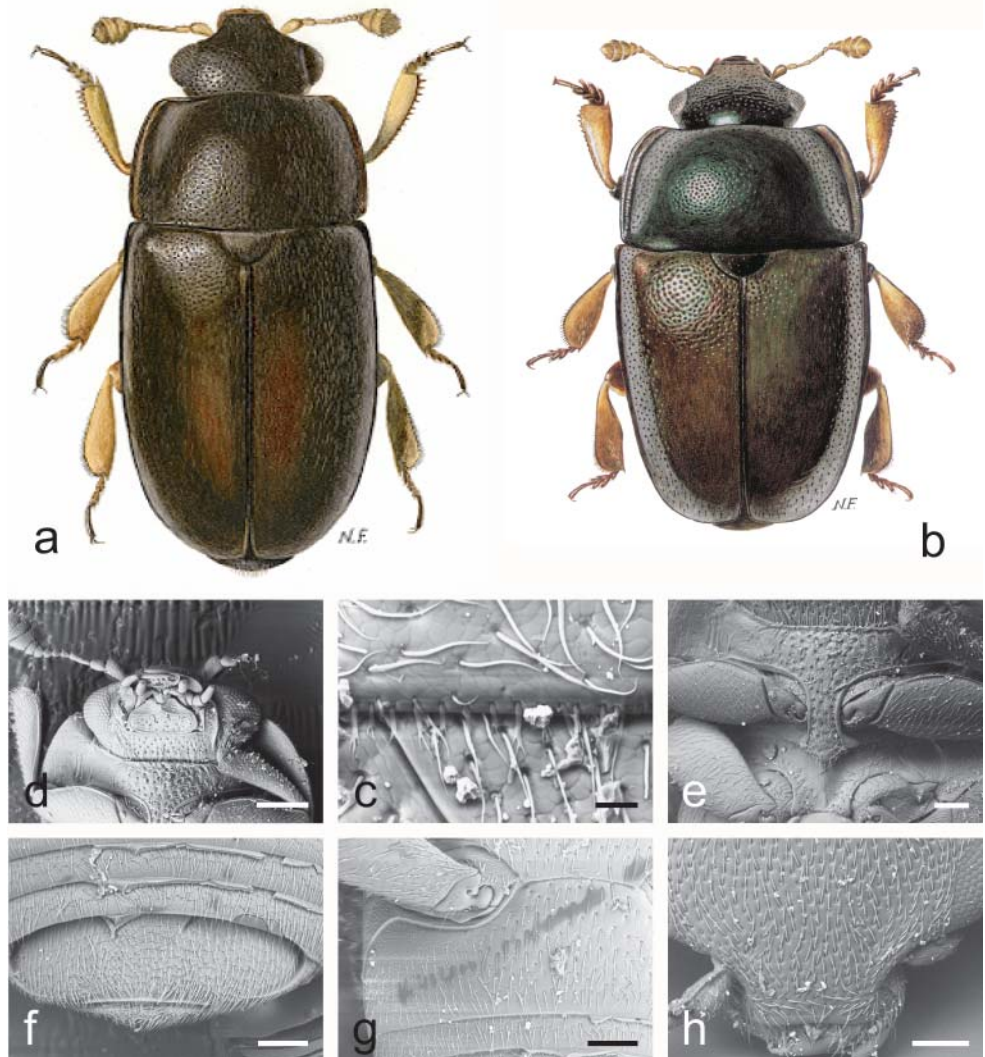
*Body color and pubescence:* pubescence usually short and fine, recumbent and almost indistinct in a few species, golden to silvery-whitish, rarely (i.e. *B. explanatus* (Reitter, 1900), from Middle Asia) with moderately long and more erect setae, never obscuring the variably colored (brown, blackish, metallic green or blue-violet) dorsal body surface (Figs. 33a, b); pronotal and elytral sides relatively widely flattened, typically same color as disc, rarely with pale reddish sides; lateral margin of pronotum and elytra with a series of faintly distinct, small and short setae, each seta 0.3–0.5× as long as those on elytral disc; posterior margin of pronotum with long, usually distally bifid or trifid microsetae, microsetae also uniformly distributed on middle region anterior to scutellum (Fig. 33c).

*Dorsal habitus:* body moderately convex, usually long and oval (Figs. 33a, b); dorsal punctures on discal portion of pronotum as large as or larger than eye facet, usually moderately to deeply impressed and densely distributed, rarely smaller than eye facet, separated by more than 1–2 diameters; anterior margin of clypeus always subtruncate, simple, i.e. without small distinct medial bulge, distinctly bordered (Figs. 33 a, b, h); circum-ocular furrows (occipital sulci) on dorsal side of head absent (Fig. 33h); eyes large and usually moderately projecting laterally (Figs. 33a, b, h); pronotum with markedly distinct posterior angles, slightly obtuse, never posteriorly directed (Figs. 33a, b); scutellum variably punctured at least in posterior half of exposed portion (Fig. 33c); elytra with simple punctation, never transversely strigose; elytral humeral angle distinct, obtuse, in a few species distinctly protruding laterally (Figs. 33a, b); elytral humeral striae usually indistinct; elytral pre-sutural striae visible at least posteriorly, variably shaped, originating at scutellar vertex or slightly posterior, terminating prior to elytral apex, delimiting on each elytron a more or less distinct, flat sutural area, widest at posterior third, nearly as wide as proximal width of 3<sup>rd</sup> antennomere (much wider in *B. humerosus* (Reitter, 1871)), slightly raised in members of *B. viridescens* species-group; elytral apices truncately or obliquely rounded in both sexes (Figs. 33a, b); pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 33a, b).

*Ventral habitus:* antennal furrows markedly delimited, moderately convergent posteriorly; mentum subpentagonal (Fig. 33d); prosternal antennal furrows on anterior margin of prosternum almost completely obliterated (Fig. 33d); prosternal process variably shaped, usually

<sup>4)</sup> Recently examined material from China: Guizhou Province in MHNB collections (JELÍNEK & AUDISIO unpublished data).

narrow, subapical dilated portion 1.7–2.0× as wide as maximum width of 1<sup>st</sup> antennomere, apex usually angulately obtuse (Fig. 33e); lateral borders of prosternal process delimiting shallowly impressed but distinct furrows, distally terminating at predistal lateral expansions (Fig. 33e); posterior margin of mesoventrite simple, never medially incised (Fig. 33e); moderate sexual



**Fig. 33.** *Brassicogethes* Audisio & Cline, gen. nov.: **a** – *B. longulus* (Schilsky, 1894); **b** – *B. salvan* (Audisio, De Biase & Antonini, 2003); **c–h** – *B. aeneus* (Fabricius, 1775). **a, b** – male habitus (**a** – length 2.8 mm; **b** – length 2.6 mm); **c** – scutellum and microsetae on middle of posterior margin of pronotum; **d** – ventral view of head and anterior portion of prosternum; **e** – prosternal process and mesoventrite; **f** – exposed portion of last visible abdominal ventrite; **g** – caudal marginal line of metacoxal cavity; **h** – dorsal view of head. Scale bars: Fig. **c** = 20 µm; Fig. **d** = 200 µm; Figs. **e, f, g, h** = 100 µm.

dimorphism in impressions on metaventrite and/or tubercles; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, with sloping shallowly arched impression of outer 'axillary' line (Fig. 33g); 'axillary' space on first abdominal ventrite moderately well developed, 'axillary' angle usually broadly obtuse (Fig. 33g); large and deeply impressed arched impressions on basal portion of last visible abdominal ventrite, only partially covered by distal portion of penultimate visible abdominal ventrite (Fig. 33f).

*Appendages*: male 1<sup>st</sup> antennomere 0.8–1.0× as long as width of protibiae excluding distal teeth (Figs. 33a, b, d); 3<sup>rd</sup> antennomere usually 2.8–3.0× as long as wide in both sexes, 1.4–1.5× longer and distinctly thinner than 2<sup>nd</sup> antennomere (Figs. 33a, b, d); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, short, scarcely longer than wide (Figs. 33a, b, d); antennal club compact, simple, comprising last 3 antennomeres in both sexes (Fig. 33a, b, d), usually as wide as width of protibiae or smaller, sexual dimorphism absent; labial palpi long and slender in both sexes (Fig. 33d), terminal segment 1.7–1.9× as long as wide; maxillary palpi long and slender in both sexes (Fig. 33d), terminal segment 2.4–2.8× as long as wide; mandible mid-sized, apex bifid, moderately acuminate, sexual dimorphism absent; tarsal claws simple, never toothed at base; tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae (Figs. 33a, b); protibiae usually with a series of small, fine sharp teeth on outer margin (Figs. 33a, b); lateral margin of meso- and metatibiae bearing a single and regular row of long thin pegs (Figs. 33a, b), without U-shaped sinuosity at distal third; meso- and metatibiae of variable width, usually long and slender (Figs. 33a, b), rarely wider and shorter, never subtrapezoidal or axe-shaped; scarce sexual dimorphism in tibial shape (when present, limited to metatibiae: Fig. 33b); tarsal plates of prolegs usually moderately wider in males; posterior margin of mesofemora simple or with single projection in both sexes (Figs. 125*n*, *o* in AUDISIO 1993b); posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: variable, processes along inner side of parameres absent (Figs. 134–135 in AUDISIO 1993b), usually with more or less deep and wide V-shaped excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus variable, without lateral emargination, rounded, distally subtruncate to acuminate, frequently with distal minute excision or emargination; main sclerites of internal sac (flagellum) small, arcuate, usually horse-shoe-shaped, moderately sclerotized, typically 3–4× shorter than aedeagus.

*Female genitalia (ovipositor)*: variably shaped, usually large; styli short but distinct, simple and pigmented, inserted moderately close to apex of usually contiguous or narrowly diverging (i.e. the isolated southern European *B. humerosus* (Reitter, 1871)) gonostyloid; each gonostyloid lightly sclerotized, markedly more pigmented distally in a few species, with a simple, never indentate outer portion of basicoxites (Fig. 154 in AUDISIO 1993b), and a single, narrow, faintly pigmented and sclerotized arcuate area along outer subdistal portion of gonostyloids. 'Central point' of ovipositor usually located more distad than middle, without proximad directed spicule.

**Etymology.** The generic name is derived from the host-plant family of all inclusive species, i.e. Brassicaceae, and from '-gethes', to emphasize both their association with this botanical family, and phylogenetic relationship with *Meligethes*. Gender masculine.



**Biology.** All species are strictly associated for larval development with flowers of Brassicaceae (here including the closely related Capparaceae, as recently discussed by JUDD et al. (1994, 2002)), especially the subfamilies Arabideae, Brassiceae, and Hesperideae (AUDISIO 1993b; AUDISIO et al. 2005a,b).

**Phylogenetic position.** See above discussion about the closely related genus *Meligethes*. *Brassicogethes* gen. nov. and *Meligethes* are sister taxa, almost certainly linked by a common ancestor that initiated an ecological shift of larval host-plants from Rosaceae to Brassicaceae, or vice versa.

**Taxonomy and geographic distribution.** *Brassicogethes* gen. nov. includes 38 described Holarctic and Oriental species, extending from Europe and North Africa to Japan, China, and in the Nearctic (southward to southern California and NW Mexico, and eastward to the Appalachian Mts, as well as an introduced species in eastern Canada). Most known species (KIREJTSHUK 1992b; AUDISIO 1993b; AUDISIO et al. 1999a,b, 2001a,b, 2002, 2003b, 2005a,b, 2006; JELÍNEK 1997; DE BIASE et al. 2003; JELÍNEK & AUDISIO 2007) are distributed in Europe and northern Mediterranean areas. Inclusive species were formerly attributed to at least five *Meligethes* species-complexes (now considered species-groups), i.e. the ‘*aeneus*’, ‘*coracinus*’, ‘*viridescens*’, ‘*coeruleovirens/simplex*’, and ‘*squamosus*’ species-groups. A complete revision of this genus, including the descriptions of a few new species from the Eastern Mediterranean and Middle Asia (AUDISIO et al. 2005a,b), is currently underway (AUDISIO et al. in prep.).

|  |   |
|--|---|
| <i>Brassicogethes accentus</i> (Kirejtshuk, 1978) <b>comb. nov.</b>                        | Tajikistan                                |
| <i>Brassicogethes aeneus</i> (Fabricius, 1775) <b>comb. nov.</b>                           | Holarctic Region                          |
| <i>Brassicogethes affinis</i> (Jelínek, 1982) <b>comb. nov.</b>                            | S China                                   |
| <i>Brassicogethes anthracinus</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | Southern Europe, Near East                |
| <i>Brassicogethes arankae</i> (Audisio & De Biase, 2005) <b>comb. nov.</b>                 | Southern Europe                           |
| <i>Brassicogethes armeniacus</i> (Audisio, Jelínek & Stevanović, 1999) <b>comb. nov.</b>   | N Turkey, Caucasus                        |
| <i>Brassicogethes audisioi</i> (Jelínek, 1997) <b>comb. nov.</b>                           | China: Tibet                              |
| <i>Brassicogethes bithynicus</i> (Audisio, 1988) <b>comb. nov.</b>                         | NW Turkey                                 |
| <i>Brassicogethes boops</i> (Easton, 1957) <b>comb. nov.</b>                               | Middle Asia                               |
| <i>Brassicogethes carpathicus</i> (Audisio, Jelínek & Stevanović, 1999) <b>comb. nov.</b>  | Romania                                   |
| <i>Brassicogethes cleominis</i> (Easton, 1959) <b>comb. nov.</b>                           | W North America                           |
| <i>Brassicogethes coeruleovirens</i> (Förster, 1849) <b>comb. nov.</b>                     | Central Europe                            |
| <i>Brassicogethes coracinus</i> (Sturm, 1845) <b>comb. nov.</b>                            | Europe, Siberia, Near East, N Middle Asia |
| <i>Brassicogethes cristofaroi</i> (Audisio & De Biase, 2005) <b>comb. nov.</b>             | Southern Turkey                           |
| <i>Brassicogethes czwalinai</i> (Reitter, 1871) <b>comb. nov.</b>                          | Central Europe                            |
| <i>Brassicogethes epeirosi</i> (Audisio, Mancini & De Biase, 2006) <b>comb. nov.</b>       | NW Greece                                 |
| <i>Brassicogethes erysimicola</i> (Audisio & De Biase, 2001) <b>comb. nov.</b>             | Southern Europe, Near East                |
| <i>Brassicogethes explanatus</i> (Reitter, 1900) <b>comb. nov.</b>                         | Middle Asia, Syria                        |
| <i>Brassicogethes fulvipes</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b>    | W Europe, N Africa                        |

|   |   |
|---|---|
| <i>Brassicogethes gracilis</i> (C. N. F. Brisout de Barneville, 1863) <b>comb. nov.</b> | SW Europe   |
| <i>Brassicogethes haroldi</i> (Reitter, 1877) <b>comb. nov.</b>                         | Japan, E Siberia  |
| <i>Brassicogethes humerosus</i> (Reitter, 1871) <b>comb. nov.</b>                       | Central and SE Europe (mountain areas)                          |
| <i>Brassicogethes longulus</i> (Schilsky, 1894) <b>comb. nov.</b>                       | E Turkey, Armenia   |
| <i>Brassicogethes lunariae</i> (Audisio & De Biase, 1999) <b>comb. nov.</b>             | S Italy, Serbia, Montenegro, Greece                             |
| <i>Brassicogethes matronalis</i> (Audisio & Spornraft, 1990) <b>comb. nov.</b>          | S Europe (introduced to N Europe), N Turkey, Caucasus           |
| <i>Brassicogethes mirae</i> (Audisio, Jelínek & Stevanović, 1999) <b>comb. nov.</b>     | Montenegro  |
| <i>Brassicogethes praetermissus</i> (Easton, 1957) <b>comb. nov.</b>                    | Japan, E Siberia, N Korea, NE China                             |
| <i>Brassicogethes primoriensis</i> (Kirejtshuk, 1987) <b>comb. nov.</b>                 | Russian Far East: Primorie                                      |
| <i>Brassicogethes prometheus</i> (Jelínek, 1982) <b>comb. nov.</b>                      | Caucasus, N Turkey, N Iran                                      |
| <i>Brassicogethes reitteri</i> (Schilsky, 1894) <b>comb. nov.</b>                       | S Europe, Turkey, Caucasus, S Siberia, N Middle Asia            |
| <i>Brassicogethes salvan</i> (Audisio, De Biase & Antonini, 2003) <b>comb. nov.</b>     | NW Italy: Maritime Alps   |
| <i>Brassicogethes simplex</i> (Kraatz, 1858) <b>comb. nov.</b>                          | Greece  |
| <i>Brassicogethes simplipes</i> (Easton, 1947) <b>comb. nov.</b>                        | E North America   |
| <i>Brassicogethes spornraftii</i> (Audisio, 1977) <b>comb. nov.</b>                     | Italy and SE France: Maritime Alps; S Serbia                    |
| <i>Brassicogethes squamosus</i> (Jelínek & Marek, 1966) <b>comb. nov.</b>               | Bulgaria  |
| <i>Brassicogethes subaeneus</i> (Sturm, 1845) <b>comb. nov.</b>                         | Europe, N Caucasus  |
| <i>Brassicogethes thalassophilus</i> (Audisio & De Biase, 2005) <b>comb. nov.</b>       | SW Europe   |
| <i>Brassicogethes viridescens</i> (Fabricius, 1787) <b>comb. nov.</b>                   | Europe, Near East, W Siberia, NW China, introduced to N America |

### 34. *Kabakovia* Kirejtshuk, 1979

(Figs. 34 a–s)

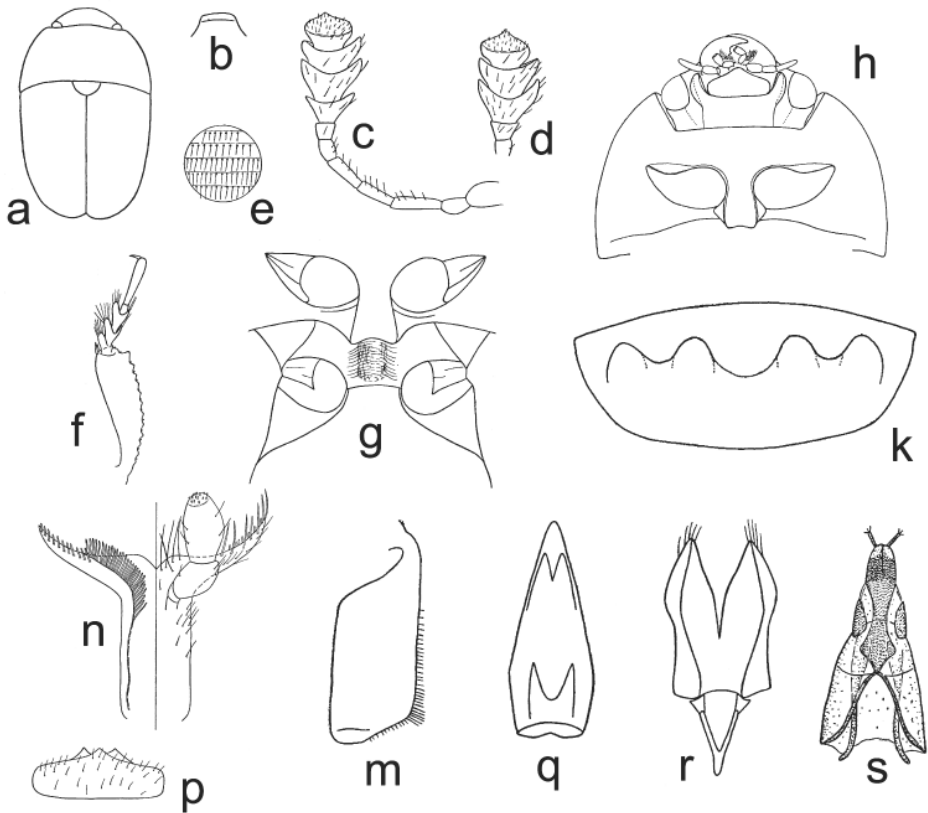
*Kabakovia* Kirejtshuk, 1979: 356.

**Type species.** *Pria latipes* Grouvelle, 1908: 366 (by original designation) [= *Kabakovia latipes* (Grouvelle, 1908)].

**Generic redescription and diagnosis.** The single known species (1.9–2.6 mm length; 1.0–1.5 mm width) exhibits the following combination of characters.

*Body color and pubescence:* pubescence short and fine, recumbent, silvery-whitish, not obscuring the yellowish-brown dorsal body surface; pronotal and elytral sides relatively narrowly flattened, same color as disc; lateral margin of pronotum and elytra nearly without distinct setae; posterior margin of pronotum comprising moderately long, usually distally bifid or trifid microsetae, microsetae also uniformly distributed on middle region anterior to scutellum.

*Dorsal habitus:* body slightly convex, elongate, oval (Fig. 34a); dorsal punctures on discal portion of pronotum as large as or finer than eye facet, usually moderately to shallowly and densely impressed, space between punctures relatively shining with faint traces of transversely strigose sculpturing; anterior margin of clypeus truncate, simple, i.e. without small distinct



**Fig. 34.** *Kabakovia* Kirejtshuk, 1979: a–s – *K. latipes* (Grouvelle, 1908). a – male habitus; b – anterior margin of clypeus; c – male antenna; d – female antennal club; e – elytral punctation; f – male protibia; g – prosternum, mesoventrite, and anterior portion of metaventrite; h – ventral view of head and prosternum; k – exposed portion of last visible abdominal ventrite; m – male mesotibia; n – labium and left palpus; p – labrum; q–r – male genitalia; s – ovipositor. Drawings a–g, m–s modified from KIREJTSHUK (1979a); drawings h–k modified from JELÍNEK (2000a). Refer to KIREJTSHUK (1979a) and to JELÍNEK (2000a) for scale.

medial bulge, distinctly but narrowly bordered (Fig. 34b); circum-ocular furrows (occipital sulci) on dorsal side of head absent; eyes mid-sized and moderately projecting laterally (Figs. 34a, h); pronotum with markedly distinct posterior angles, nearly at right angle, slightly directed posteriorly (Figs. 34a, h); scutellum regularly and finely punctured on most of exposed portion; elytra finely and completely transversely strigose (Fig. 34e); elytral humeral angle distinct, obtuse, slightly protruding laterally, usually covered by pronotal posterior angles (Fig. 34a); elytral humeral striae indistinct; elytral pre-sutural striae almost indistinct, with faint traces medially and posteriorly; elytral apices obtusely rounded in both sexes (Fig. 34a); pygidium partially exposed, moderately convex, apically rounded in both sexes.

*Ventral habitus:* antennal furrows markedly delimited, arcuately convergent posteriorly; mentum subpentagonal (Figs. 34p, h); prosternal antennal furrows on anterior margin of

prosternum obliterated (Fig. 34h); prosternal process moderately wide, subapical dilated portion  $\sim 2.0\times$  as wide as maximum width of 1<sup>st</sup> antennomere, posterior margin concave (Figs. 34g, h); lateral borders of prosternal process not delimiting shallowly impressed and distinct furrows, distally terminating at posterior margin (Fig. 34h); posterior margin of mesoventrite simple, truncate, not medially incised (Fig. 34g); scarce sexual dimorphism in impressions on metaventrite; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer 'axillary' portion; 'axillary' space on first abdominal ventrite well developed, 'axillary' angle widely obtuse; peculiarly shaped and moderately deeply impressed, bisinuate interconnected arched impressions on basal portion of last visible abdominal ventrite (Fig. 34k), frequently partially covered by distal portion of penultimate visible abdominal ventrite.

*Appendages:* male 1<sup>st</sup> antennomere  $0.8\text{--}1.0\times$  as long as width of protibiae excluding distal teeth; 3<sup>rd</sup> antennomere in both sexes  $\sim 3.0\times$  as long as wide,  $1.8\text{--}1.9\times$  longer and distinctly thinner than 2<sup>nd</sup> antennomere (Fig. 34c); 4<sup>th</sup> and 5<sup>th</sup> antennomeres subequal in both sexes, long,  $\sim 2.2\text{--}2.3\times$  longer than wide (Fig. 34c); antennal club compact, moderately large, simple, slightly loose, comprising last 4 antennomeres in males (Fig. 34c), 3 last antennomeres in females (Fig. 34d) distinctly wider than protibiae; labial palpi relatively short in both sexes (Figs. 34h, n), terminal segment nearly  $1.4\times$  as long as wide; maxillary palpi long and slender in both sexes (Fig. 34h), terminal segment  $3.4\text{--}3.8\times$  as long as wide; mandible mid-sized, apex bifid, moderately acuminate, sexual dimorphism absent (Fig. 34h); tarsal claws simple, not toothed at base; tarsi of normal size and shape,  $0.6\text{--}0.7\times$  as long as corresponding tibiae; protibiae with a series of small and moderately sharp teeth on distal portion of lateral margin (Fig. 34f); lateral margin of meso- and metatibiae bearing a single and regular row of long, thin, pale brown pegs (Fig. 34m), without U-shaped sinuosity at distal third; meso- and metatibiae wide and short, subtrapezoidal, axe-shaped (Fig. 34m); scarce sexual dimorphism in meso- and metatibiae; tarsal plates of prolegs distinctly wider in males; posterior margin of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia:* processes along inner side of parameres absent (Figs. 34q–r), deep and moderately wide V-shaped excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus without lateral emargination, distally narrow and acuminate, without distal minute excision or emargination.

*Female genitalia (ovipositor):* relatively small; styli long and distinct, simple, cylindrical and darkly pigmented, inserted at apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and distinctly pigmented distally, with a simple, narrow, never indentate outer portion of basicoxites (Fig. 34s), and a single, narrow, pigmented and relatively more sclerotized arcuate area along outer subdistal portion of gonostyloids. 'Central point' of ovipositor more proximad than middle, without proximad directed spicule.

**Etymology.** *Kabakovia* was named for the Russian entomologist O. N. Kabakov, a member of several Russian entomological expeditions to Vietnam during the 1960's and 1970's. Gender feminine.

**Biology.** The single species is strictly associated with male inflorescences of palms (Arecaceae), in particular *Phoenix humilis* Royle (= *P. hanceana* Naud.) (KIREJTSHUK & KABAKOV 1997, JELÍNEK 2000a).

**Phylogenetic position.** Available morphological data provide evidence of a likely sister-group relationship of *Kabakovia* with the clade [*Cryptarchopria* + *Horakia*] (JELÍNEK 2000a), and more weakly defined relationships (COOPER 1980) with *Meligethinus*. No molecular data are available.

**Taxonomy and geographic distribution.** This taxon includes the one widely distributed species (KIREJTSHUK 1979a, JELÍNEK 2000a), previously erroneously attributed to *Pria* by GROUVELLE (1908a) and later to *Meligethinus* by COOPER (1980).

*Kabakovia latipes* (Grouvelle, 1908)

India, Sri Lanka, Nepal, Vietnam

### 35. *Horakia* Jelínek, 2000

(Figs. 35 a–p)

*Horakia* Jelínek, 2000: 413.

**Type species.** *Horakia kubani* Jelínek, 2000: 414 (by original designation).

**Generic redescription and diagnosis.** The single known species (2.5–2.6 mm length; 1.5 mm width) exhibits the following combination of characters.

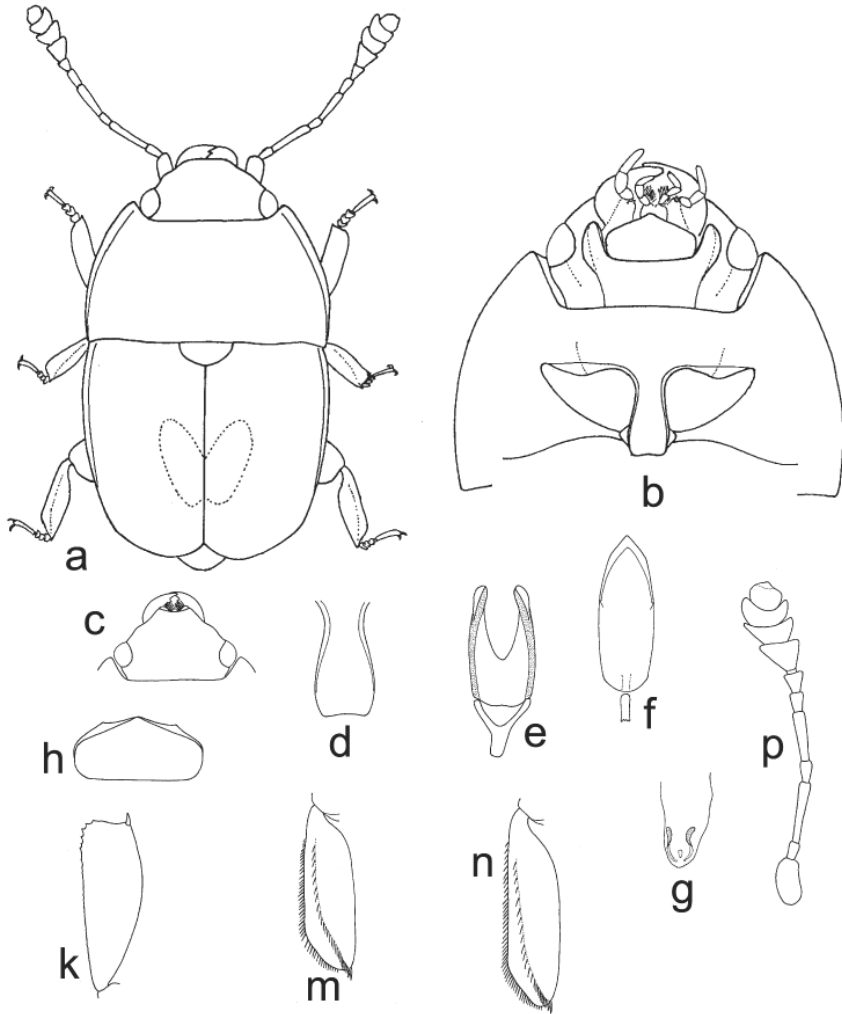
*Body color and pubescence:* pubescence moderately long and fine, recumbent, golden on head and pronotum, darker on elytra, not obscuring the variably colored dorsal body surface (head and pronotal disk dark brown; elytra, pygidium and metaventricle blackish with faint metallic greenish iridescence on pronotal disc and pygidium), flattened sides of frons, and two diverging spots on posterior half of elytra (Fig. 35a) yellowish-brown; pronotal and elytral sides relatively widely flattened. SEM observations of microsetae on lateral margins of elytra and posterior margin of pronotum are unavailable.

*Dorsal habitus:* body slightly convex, wide and oval (Fig. 35a); dorsal punctures on discal portion of pronotum smaller than eye facet, shallowly impressed and sparsely distributed; anterior margin of clypeus emarginate, simple, i.e. without small distinct medial bulge, fused with frons; frons with lateral margins moderately bulging over antennal insertions (Fig. 35a); circum-ocular furrows (occipital sulci) on dorsal side of head (occipital sulci) absent; eyes small-sized and moderately projecting laterally (Fig. 35a), pronotum with markedly distinct posterior angles, subrectangular to slightly acute, slightly directed posteriorly (Fig. 35a); scutellum densely punctate on most of exposed portion; elytral punctation almost completely finely transversely strigose; elytral humeral angle obtuse, not protruding laterally; elytral humeral striae indistinct; elytra apically truncately rounded in males (Fig. 35a), female unknown; pygidium partially exposed, moderately convex, apically rounded in males (Fig. 35a).

*Ventral habitus:* antennal furrows delimited by moderately bulged genae, arcuately convergent posteriorly (Fig. 35b); mentum subpentagonal; prosternal antennal furrows on anterior margin of prosternum absent (Fig. 35b); prosternal process flat, moderately narrow,



shallowly arcuately emarginate apically (Fig. 35d), subapical dilated portion  $\sim 1.5\times$  as wide as maximum width of 1<sup>st</sup> antennomere; lateral borders of prosternal process not delimiting impressed furrows, distally terminating at predistal lateral expansions (Fig. 35d); posterior margin of mesoventrite simple, not medially incised; sexual dimorphism likely absent in impressions on metaventricle, absent in males; first two visible abdominal ventrites simple in males, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and



**Fig. 35.** *Horakia* Jelínek, 2000: **a–p** – *H. kubani* Jelínek, 2000. **a** – male habitus; **b** – ventral view of head and prosternum; **c** – dorsal view of head; **d** – prosternal process; **e–f** – male genitalia; **g** – major sclerites of endophallus; **h** – labrum; **k** – male protibia; **m** – male mesotibia; **n** – male metatibia; **p** – male antenna. Drawings **a–p** modified from JELÍNEK (2000a). Refer to JELÍNEK (2000a) for scale.

contiguous to posterior margin of metacoxal cavities; arched impressions on basal portion of last visible abdominal ventrite absent.

*Appendages*: male 1<sup>st</sup> antennomere  $\sim 1.0\times$  as long as width of protibiae (Fig. 35a); 3<sup>rd</sup> antennomere long and thin in males,  $\sim 5\times$  longer than wide,  $3.5\times$  longer and much thinner than 2<sup>nd</sup> antennomere (Fig. 35p); 4<sup>th</sup> antennomere relatively short,  $2\times$  longer than wide, 5<sup>th</sup> antennomere long and thin in males,  $\sim 4\times$  longer than wide; antennal club compact, long, moderately loose, comprising last 4 antennomeres in males (unknown, but presumably 3-segmented in females), wider than protibiae; labial palpi long and slender in both sexes (Fig. 35b), terminal segment  $\sim 2.7\times$  as long as wide; maxillary palpi long and slender in both sexes (Fig. 35b), terminal segment  $\sim 3.4\times$  as long as wide; mandibles mid-sized, apex arcuate and acuminate with subapical tooth; tarsal claws simple, not toothed at base; tarsi of normal size and shape,  $0.6\text{--}0.7\times$  as long as corresponding tibiae (Fig. 35a); protibiae with a series of small, fine, sharp teeth on apical portion of lateral margin (Fig. 35k), almost rectilinear outer margins and flatly arcuate inner margins; lateral margin of meso- and metatibiae bearing a single and regular row of long thin pegs (Figs. 35m, n), without U-shaped sinuosity at distal third; meso- and metatibiae moderately long and slender, not markedly subtrapezoidal or axe-shaped; tarsal plates of prolegs moderately wide in males; posterior margins of metafemora simple in males, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 35e–f), with deep and wide V-shaped excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus long, without lateral emargination, sharply acuminate distally, without distal minute excision or emargination; main sclerites of internal sac small, narrow, lyriform, moderately sclerotized,  $\sim 4\text{--}5\times$  shorter than aedeagus (Fig. 35g).

*Female genitalia (ovipositor)*: unknown.

**Etymology.** *Horakia* was named for a Czech entomologist, Jan Horák (Prague), who collected the type specimens in Thailand (JELÍNEK 2000a). Gender feminine.

**Biology.** The biology of the single inclusive species is unknown (JELÍNEK 2000a). Both specimens in the type series were collected in indigenous mountain forests of northern Thailand on inflorescences of large trees of a local species of *Castanopsis* (D. Don) Spach (Fagaceae), which is attractive to beetles in general. *Horakia* larvae may be associated with male inflorescences of a mountain forest palm (Arecaceae), as analogously observed in the two related genera *Kabakovia* and *Cryptarchopria* known from the region. The specific host is probably the Mountain fishtail palm, *Caryota gigas* W. J. Hahn ex Hodel, which is a large, endangered species that inhabits middle altitude (1200–1800 m a.s.l.) indigenous forests of northern Thailand and northeastern India, Myanmar (Burma), southern China, and Laos (RIFFLE 2008). However this assumption is speculative and requires further fieldwork to substantiate.

**Phylogenetic position.** Available morphological data provide good evidence of a sister-group relationship of *Horakia* and *Cryptarchopria*, with *Kabakovia* being likely sister to this clade (JELÍNEK 2000a). A weaker relationship to members of *Meligethinus* could also be postulated. No molecular data is currently available.

**Taxonomy and geographic distribution.** This genus includes a single species from northwestern Thailand (JELÍNEK 2000a).

### 36. *Cryptarchopria* Jelínek, 1975

(Figs. 36 a–r)

*Cryptarchopria* Jelínek, 1975: 1.

**Type species.** *Cryptarcha infima* Grouvelle, 1895: 259 (by original designation) [= *Cryptarchopria infima* (Grouvelle, 1895)].

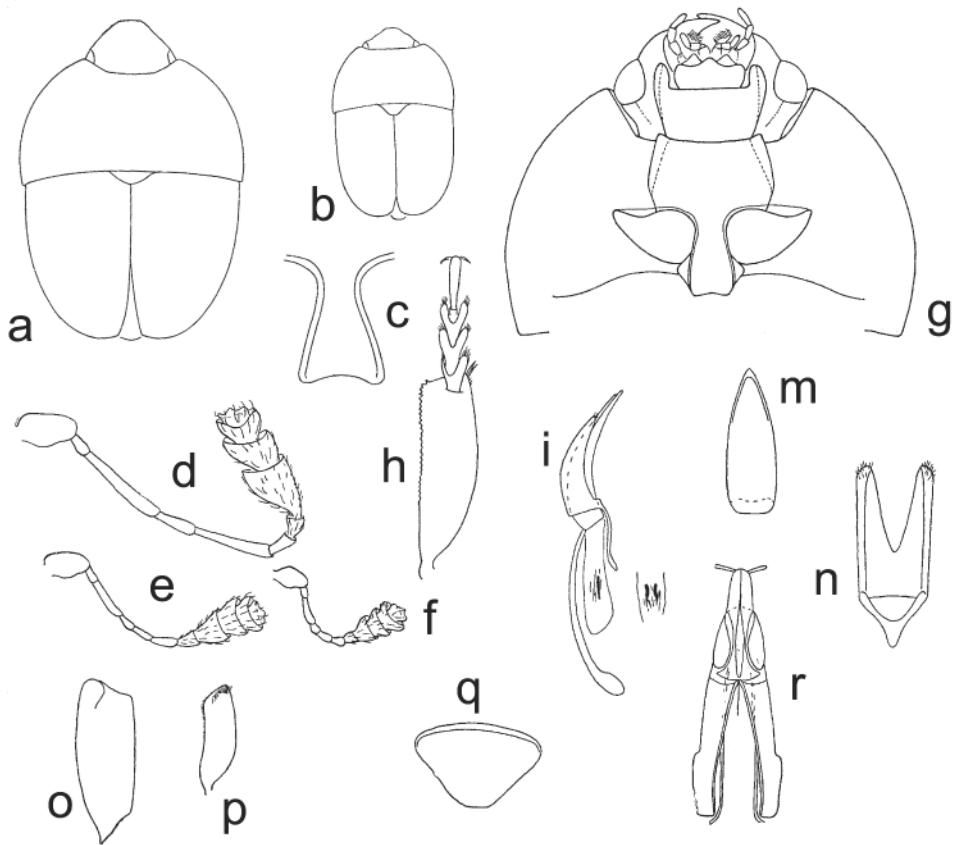
**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.9–4.0 mm length), and share the following combination of characters.

**Body color and pubescence:** pubescence moderately long and fine, recumbent, golden, not obscuring the mostly yellowish-brown dorsal body surface, frequently with darker areas on elytra. Pubescence on lateral margins of elytra short, faintly distinct; setae on posterior margin of pronotum long and mostly bifid distad, however not observed with SEM.

**Dorsal habitus:** body slightly convex, more or less wide and oval (Figs. 36a, b); dorsal punctures on discal portion of pronotum smaller than eye facet, shallowly impressed and moderately dense; anterior margin of clypeus subtruncate anteriorly, simple, i.e. without small distinct medial bulge, lateral angles completely rounded and widely obtuse, fused with frons; frons with lateral margins moderately dilated over antennal insertions (Fig. 36a); circum-ocular furrows (occipital sulci) on dorsal side of head absent; eyes small-sized and moderately projecting laterally (Figs. 36a, g); pronotum with markedly distinct posterior angles, subrectangular to slightly acute, and slightly directed posteriorly (Figs. 36a, g); scutellum densely punctate on most of exposed portion; elytral punctation almost completely finely transversely strigose; elytral humeral angle obtuse, not protruding laterally; elytral humeral striae indistinct; elytral pre-sutural striae faintly visible, peculiarly fine, originating posteriorly to scutellar vertex, terminating before elytral apex, and delimiting on each elytron a faintly distinct, flat, unraised sutural area, widest at posterior third, nearly as wide as width of third antennomere; elytra apically truncately rounded in males (Fig. 36a), moderately and separately lobed in females; pygidium partially exposed, moderately convex, apically rounded in both sexes (Figs. 36a, q).

**Ventral habitus:** antennal furrows long and strongly raised, delimited by moderately bulged genae, nearly rectilinearly convergent posteriorly (Fig. 36g); mentum subpentagonal; prosternal antennal furrows on anterior margin of prosternum strongly raised, long, complete, reaching anterior margin of procoxal cavities (Fig. 36g); prosternal process flat, moderately wide, shallowly arcuately emarginate apically (Fig. 36g), subapical dilated portion 1.3–1.5× as wide as maximum width of 1<sup>st</sup> antennomere; lateral borders of prosternal process faintly delimiting impressed furrows, distally terminating close to posterior margin (Fig. 36g); posterior margin of mesoventrite simple, not medially incised; scarce sexual dimorphism, impressions on metaventrite absent in both sexes; first two visible abdominal ventrites simple in males, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer ‘axillary’ portion; ‘axillary’ space on first abdominal ventrite well developed, ‘axillary’ angle widely obtuse; arched impressions on basal portion of last visible abdominal ventrite absent.

**Appendages:** male 1<sup>st</sup> antennomere ~1.0× as long as width of protibiae, peculiarly wide in both sexes (Figs. 36d–f); 3<sup>rd</sup> antennomere long and thin in males, allometrically developed,



**Fig. 36.** *Cryptarchopria* Jelínek, 1975: **a-f, h-r** – *C. kabakowi* Kirejtshuk, 1979; **g** – *C. infima* (Grouvelle, 1895). **a, b** – male habitus variation; **c** – prosternal process; **d–e** – male antennal club variation; **f** – female antennal club; **g** – ventral view of head and prosternum; **h** – male protibia; **i–n** – lateral and dorsal view of male genitalia; **o** – male mesofemur; **p** – male mesotibia; **q** – male pygidium; **r** – ovipositor. Drawings **a–f, h–r** modified from KIREJTSHUK (1979b); drawing **g** modified from JELÍNEK (2000a). Refer to KIREJTSHUK (1979b) and to JELÍNEK (2000a) for scale.

~4–5× longer than wide in large males, 3× longer and much thinner than 2<sup>nd</sup> antennomere (Figs. 36d–e); 4<sup>th</sup> antennomere relatively short, 2× longer than wide, 5<sup>th</sup> antennomere frequently allometric in males, usually long and thin, ~3–4× longer than wide; antennal club long, moderately loose, comprising last 4 or 5 antennomeres in males, 3-segmented in females, slightly wider than protibiae; labial palpi long and slender in both sexes (Fig. 36g), terminal segment ~2.3× as long as wide; maxillary palpi long and slender in both sexes (Fig. 36g), terminal segment ~3.0× as long as wide; mandibles mid-sized, arcuate, apex acuminate with small subapical tooth; tarsal claws simple, not toothed at base; tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae; protibiae with a series of minute, fine sharp teeth on apical portion of almost rectilinear outer margins, inner margins flatly arcuate; lateral margin of meso- and metatibiae bearing a single and regular row of long thin pegs, without U-shaped

sinuosity at distal third; meso- and metatibiae flat, moderately slender, markedly subtrapezoidal or axe-shaped; tarsal plates of prolegs scarcely wider in males; posterior margins of metafemora simple in males, without tubercles or projections.

**Male genitalia:** processes along inner side of parameres absent (Figs. 36m–n), with deep and wide V-shaped excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus long, without lateral emargination, sharply acuminate distally, without distal minute excision or emargination; main sclerites of male internal sac small, narrow, W-shaped, moderately sclerotized, 4–5× shorter than aedeagus (Figs. 36i–m).

**Female genitalia (ovipositor):** relatively small; styli long and distinct, simple, cylindrical, not darkly pigmented, inserted at apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and never pigmented distally, with a simple, non-indentate outer portion of basicoxites (Fig. 36r), and a single, wide, moderately pigmented and relatively more sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor centrally located, without proximad directed spicule.

**Etymology.** The generic name was derived from the combination of *Cryptarcha* Shuckard, 1840, a widespread genus of Cryptarchinae, and *Pria*, a widespread genus of Meligethinae, which is indicative of the phylogenetic position of this taxon, i.e. closely related to *Pria* and allied genera, and with the body shape superficially resembling species of *Cryptarcha*. Gender feminine.

**Biology.** Members of *Cryptarchopria* are strictly associated with male inflorescences of forest palm species (Arecaceae), as analogously observed in the related *Kabakovia*. *Cryptarchopria infima* is associated with male inflorescences of the betel palm *Areca catechu* L. in Indonesia (JELÍNEK 2000a); *C. kabakowi* is associated with male inflorescences of *Arenga pinnata* (Wurmb.) Merr. in Vietnam (KIREJTSHUK & KABAKOV 1997); *C. ponomarenkoi* was recently discovered in northwestern Thailand (Mae Hong Son province, Pang Mapha, 1.v.2009, P. Audisio, R. Fochetti & P. Cerretti leg.) in association with male inflorescences of *Caryota mitis* Lour. (AUDISIO unpublished data).

**Phylogenetic position.** Available morphological data provide evidence of a likely sister-group relationship of *Cryptarchopria* to *Horakia*, with *Kabakovia* being sister to this clade (JELÍNEK 2000a). More weakly supported relationships could also be postulated with *Meligethinus* and *Pria*. Preliminary molecular analyses with PEPCK and ITS2 nuclear genes suggest that *Cryptarchopria* is more closely related to *Meligethes* s. str. and to *Pria* (LAMANNA 2009), however no molecular data are available for *Horakia* and *Kabakovia*.

**Taxonomy and geographic distribution.** As previously discussed, this taxon includes three species from southeastern Asia (KIREJTSHUK 1979b, JELÍNEK 2000a). However, undescribed species will likely be discovered on several of the endemic palm species (HENDERSON 1986, RIFFLE 2008) occurring in southeastern Asia, from northeastern India to the Philippines and Indonesia.

*Cryptarchopria infima* (Grouvelle, 1895)

*Cryptarchopria kabakowi* Kirejtshuk, 1979

*Cryptarchopria ponomarenkoi* Kirejtshuk, 1989

Indonesia: Java, Moluccas Islands

Vietnam

Vietnam, N Thailand



### 37. *Pria* Stephens, 1830

(Figs. 37 a–k)

*Pria* Stephens, 1830: 49.

*Cormyphora* Laporte [de Castelnau], 1840: 12.

*Strychnobia* Gistel, 1857: 573.

*Allopria* Kirejtshuk, 1980: 278 (described as a subgenus of *Pria* Stephens, 1830).

**Type species.** *Pria* – *Silpha truncatella* Marsham, 1802: 50 (by monotypy; KERZHNER & KIREJTSHUK 1991; ICZN 1995, Opinion 1809) [= *Laria dulcamarae* Scopoli, 1763: 22; = *Pria dulcamarae* (Scopoli, 1763)]. *Cormyphora* – *Cormyphora mandibularis* Laporte de Castelnau, 1840: 12 (by monotypy) [= *Laria dulcamarae* Scopoli, 1763: 22; = *Pria dulcamarae* (Scopoli, 1763)]. *Strychnobia* – *Nitidula dulcamarae* Illiger, 1798: 387 (by monotypy) [= *Laria dulcamarae* Scopoli, 1763: 22; = *Pria dulcamarae* (Scopoli, 1763)]. *Allopria* – *Pria horni* Grouvelle, 1909: 139 (by original designation).

**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.2–3.3 mm length), and share the following combination of characters.

*Body color and pubescence:* pubescence variably expressed, usually moderately long and fine, recumbent, golden, whitish, grey to olivaceous, rarely obscuring the mostly yellowish or yellowish-brown dorsal body surface, a few species exhibiting more erect, longer, dense, and whitish pubescence; dorsal body surface frequently darker, exhibiting darker areas on elytra, or (rarely) entirely blackish-brown; pubescence on lateral margins of pronotum and elytra short, faintly distinct; microsetae on posterior margin of pronotum long and mostly bifid or trifid distad, also uniformly distributed on middle region anterior to scutellum (Fig. 37e).

*Dorsal habitus:* body slightly convex, variably shaped, usually long and oval to moderately parallel-sided (Fig. 37a); dorsal punctures on discal portion of pronotum usually smaller than eye facet, shallowly impressed and sparse; anterior margin of clypeus variably shaped anteriorly (arcuately emarginate, sinuate, to subtruncate), simple, i.e. without small distinct medial bulge, lateral angles usually blunt, not fused to frons; frons with lateral margins never dilated over antennal insertions (Figs. 37a, b); circum-ocular furrows (occipital sulci) on dorsal side of head absent; eyes mid-sized and moderately projecting laterally (Figs. 37a, b), pronotum with markedly distinct posterior angles, subrectangular to slightly acute (Fig. 37a), frequently slightly directed posteriorly; scutellum densely punctate on most of exposed portion; elytral punctuation never transversely strigose; elytral humeral angle obtuse, not protruding laterally; elytral humeral striae indistinct; elytral pre-sutural striae visible, fine, variably shaped, usually originating slightly posterior to scutellar vertex, terminating before elytral apex, and delimiting on each elytron a faintly distinct, flat sutural area, widest medially, usually wider than width of third antennomere; elytra usually truncately rounded apically in both sexes (Fig. 37a); pygidium partially exposed, moderately convex, apically rounded in both sexes (Fig. 37a), or more or less distinctly pointed, especially in males of several African species.

*Ventral habitus:* antennal furrows moderately raised, delimited by moderately bulged genae, arcuately convergent posteriorly, frequently with arcuately posterior portions partially surrounding the posterior ventral portion of eyes (Fig. 37c); mentum subpentagonal; prosternal antennal furrows on anterior margin of prosternum absent (Fig. 37d); prosternal process flat, moderately wide predistally, triangularly bluntly acuminate apically (Fig. 37d), subapical

dilated portion 1.3–2.0× as wide as maximum width of 1<sup>st</sup> antennomere; lateral borders of prosternal process not delimiting impressed furrows, distally terminating near posterior margin (Fig. 37d); posterior margin of mesoventrite simple, not medially incised; moderate sexual dimorphism of impressions on metaventrite, frequently absent even in males; first two visible abdominal ventrites simple in both sexes, without tufts of setae; caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer ‘axillary’ portion (Fig. 37f); ‘axillary’ space on first abdominal ventrite markedly reduced, ‘axillary’ angle bluntly acute (Fig. 113s in AUDISIO 1993b; Fig. 37f); arched impressions on basal portion of last visible abdominal ventrite absent (Fig. 37g).

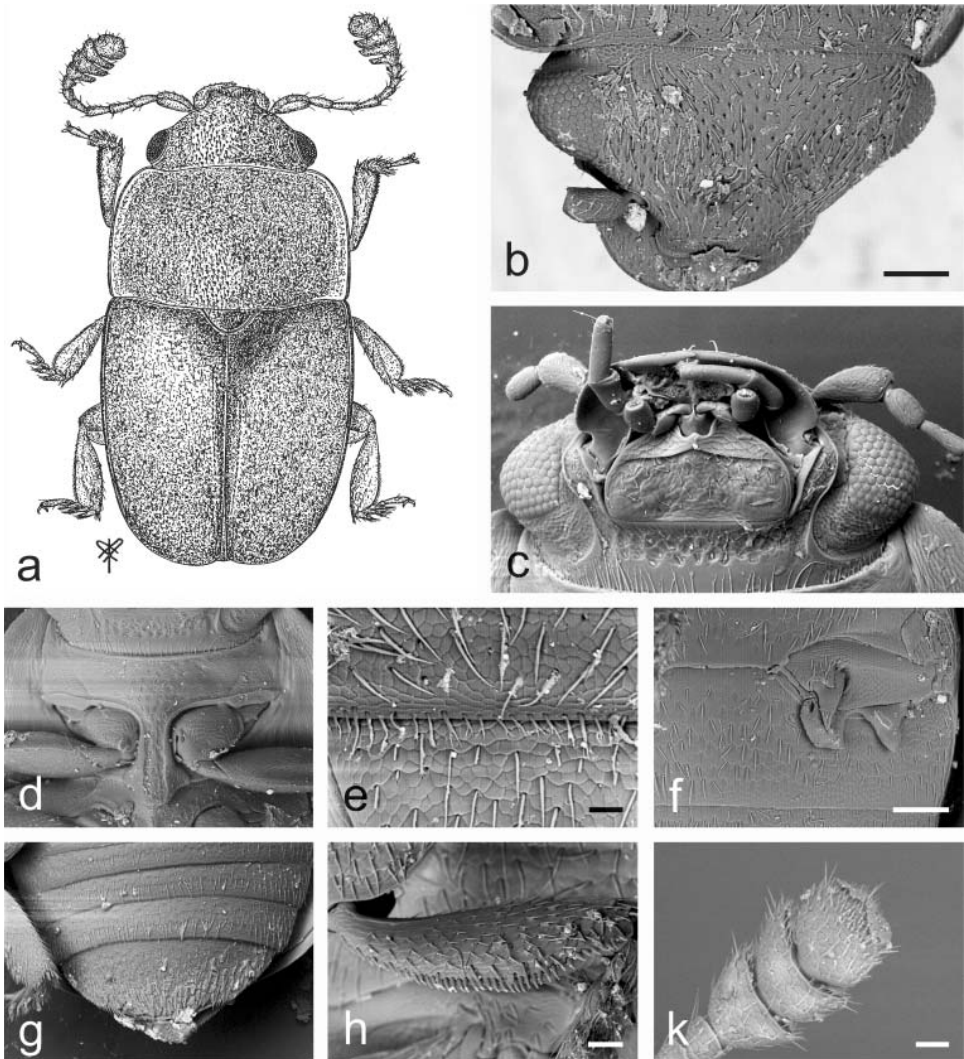
*Appendages*: male 1<sup>st</sup> antennomere ~1.0–1.3× as long as width of protibiae, moderately wide in both sexes (Figs. 37a, c); 3<sup>rd</sup> antennomere long and thin, frequently allometric, 2.5–4.0× longer than wide in males, 1.1–3.0× longer and much thinner than 2<sup>nd</sup> antennomere (Figs. 37a, c; Fig. 131 in KIREJTSHUK 1980b; COOPER 1982); 4<sup>th</sup> and 5<sup>th</sup> antennomeres usually subequal, frequently allometric, usually long and thin, 2–4× longer than wide; antennal club long, compact to markedly loose, usually comprising last 4 or 5 antennomeres (less frequently, last 3 or 6 antennomeres) in males, 3-segmented in females, as wide as to strongly wider than protibiae (KIREJTSHUK 1980b, COOPER 1982); labial palpi variably shaped but relatively short in both sexes (Fig. 37c), terminal segment usually 1.5–2.0× as long as wide; maxillary palpi long and slender in both sexes (Fig. 37c), terminal segment 3.0–3.6× as long as wide (maxillary palpi much longer, terminal segment up to 5× as long as wide in some Afrotropical species); mandibles mid-sized, arcuate, apex acuminate; tarsal claws simple, or moderately toothed at base; tarsi of normal size and shape, 0.6–0.7× as long as corresponding tibiae; protibiae usually with a series of small, fine sharp teeth on arcuate outer margins (inner margins usually almost rectilinear), some species with relatively larger, fine and moderately sharp teeth distally, or with crenulation gradually increasing in size distad; lateral margin of meso- and metatibiae bearing a single and regular row of long thin pegs, without U-shaped sinuosity at distal third; meso- and metatibiae moderately flat, slender, never subtrapezoidal or axe-shaped; tarsal plates of prolegs usually scarcely wider in males; posterior margins of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 114c–f in AUDISIO 1993b; see also COOPER 1982), with deep and wide usually V-shaped excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus long, without lateral emargination, variably shaped at anterior portion, usually with distal excision or emargination; main sclerites of internal sac relatively large, frequently roughly W-shaped in dorsal view and hook-shaped in lateral view, moderately sclerotized, ~2–3× shorter than aedeagus.

*Female genitalia (ovipositor)*: variably shaped, usually small; long and distinct, simple, cylindrical, not darkly pigmented styli, inserted close to apex of usually contiguous (rarely distally divergent) gonostyloids; each gonostyloid lightly sclerotized and pigmented distally, with simple, never indentate outer portion of basicoxites (Fig. 114h in AUDISIO 1993b; COOPER 1982), and a single, wide, moderately pigmented and relatively more sclerotized arcuate area along outer subdistal portion of gonostyloids. ‘Central point’ of ovipositor usually centrally located, without proximad directed spicule.

**Etymology.** Unknown.

**Biology.** The biology of several representatives of *Pria* is poorly known, but highly variable among the several recognized species-groups. The Palearctic *Pria dulcamarae* (Scopoli, 1763) and allied species from tropical and southern Africa are known to be strictly associated at larval stages with flowers of Solanaceae (COOPER 1982; AUDISIO 1993b, and unpublished



**Fig. 37.** *Pria* Stephens, 1830: **a–k** – *P. dulcamarae* (Scopoli, 1763). **a** – male habitus (length 2.0 mm); **b** – dorsal view of head; **c** – ventral view of head; **d** – ventral view of prosternum; **e** – anterior portion of scutellum and microsetae on middle posterior margin of pronotum; **f** – caudal marginal line of metacoxal cavity; **g** – exposed portion of last ventral visible abdominal ventrite; **h** – middle tibia; **k** – female antennal club. Scale bars: Figs. **b**, **f** = 100  $\mu$ m; Fig. **e** = 20  $\mu$ m; Figs. **h**, **k** = 30  $\mu$ m.

data). Among the several southern African species, a few are likely associated with large inflorescences of Mesembryanthemaceae (AUDISIO unpublished data). *Pria concolor* Grouvelle, 1899 and allied African species are probably associated with large inflorescences of Proteaceae, whereas a couple of isolated southern African species are likely associated with floral envelopes of Restionaceae (COOPER 1982; KIREJTSHUK 1996b; AUDISIO unpublished data). Adults of several other Southern African *Pria* species are regularly collected on flowering trees and bushes, in particular on Loganiaceae, Anacardiaceae, Asteraceae, and other families (COOPER 1982; KIREJTSHUK 1996b, 2001; AUDISIO unpublished data), however these plants are usually attractive for beetles in general when flowering, and no evidence of larval-host plant relationships have been demonstrated with certainty.

**Phylogenetic position.** Available morphological and molecular data provide possible evidence of relatively close relationships of *Pria* with the clade [*Meligethinus* + (*Meligethes* + *Brasicogethes* gen. nov.)] and allied genera, as well as with the *Microporum* generic assemblage and with the clade [*Kabakovia* + (*Cryptarchopria* + *Horakia*)]. However, the considerable degree of morphological and bionomical variation observed within the genus indicates that *Pria*, as considered here, could be paraphyletic, thereby suggesting possible separation of the current conglomerate taxon into two or three related genera. The decision to split the current genus must be based on thorough taxonomic and systematic revision of the whole genus, and is outside the focus of the present preliminary contribution.

**Taxonomy and geographic distribution.** This taxon includes some 80 described species, mostly distributed in tropical Africa with relatively few species known to occur from Europe and Irano-Arabic areas to southern-eastern Asia and Australasia (KIREJTSHUK 1979d, 1980b, 1996, 2001; COOPER 1982; JELÍNEK 1979, 1988, 1997; AUDISIO 1993b; JELÍNEK & AUDISIO 2007). The taxonomic, nomenclatorial and faunistic scenario within this difficult genus must be considered provisional, pending a complete re-examination of the problematic contributions by COOPER (1982) and KIREJTSHUK (1980b, 1996, 2001), and a full revision of all constituent members and related outgroup taxa in a quantitative phylogenetic framework.

|  |   |
|--|---|
| <i>Pria abbreviata</i> Cooper, 1982        | Kenya   |
| <i>Pria adumbrata</i> Cooper, 1982         | India   |
| <i>Pria adusta</i> Cooper, 1982            | Nigeria, Cameroon, Ivory Coast                              |
| <i>Pria angustula</i> Cooper, 1982         | South Africa, Namibia, Angola                               |
| <i>Pria antennata</i> Grouvelle, 1899      | South Africa  |
| <i>Pria aureopuberula</i> Kirejtshuk, 1980 | India   |
| <i>Pria basilewskyi</i> Kirejtshuk, 1980   | Tropical and subtropical East, Central, and Southern Africa |
| <i>Pria biplagiata</i> Kirejtshuk, 1980    | Zaire, Rwanda, Kenya  |
| <i>Pria brevicornis</i> Cooper, 1982       | Zaire   |
| <i>Pria brunnea</i> Cooper, 1982           | Ethiopia  |
| <i>Pria castanea</i> Cooper, 1982          | South Africa  |
| <i>Pria ceylonica</i> Grouvelle, 1902      | India   |
| <i>Pria cinerascens</i> Erichson, 1843     | South Africa  |
| <i>Pria clavicornis</i> (Fairmaire, 1868)  | Madagascar  |
| <i>Pria compacta</i> Cooper, 1982          | Yemen   |
| <i>Pria concolor</i> Grouvelle, 1899       | South Africa, Zimbabwe                                      |
| <i>Pria convexa</i> Grouvelle, 1912        | Zaire   |
| <i>Pria copiosa</i> Kirejtshuk, 1980       | Central, Eastern, and Southern Africa, Saudi Arabia         |
| = <i>Pria gracilipes</i> Cooper, 1982      |   |

|  |   |
|--|---|
| <i>Pria crassa</i> Grouvelle, 1906       | Madagascar  |
| <i>Pria curta</i> Cooper, 1982           | South Africa                                      |
| <i>Pria decorata</i> Grouvelle, 1899     | Madagascar  |
| <i>Pria deplanata</i> Reitter, 1872      | New Caledonia                                     |
| <i>Pria depressa</i> Cooper, 1982        | Madagascar  |
| <i>Pria dulcamarae</i> (Scopoli, 1763)   | W Palaearctic areas                               |
| <i>Pria fallax</i> Grouvelle, 1908       | Ethiopia  |
| <i>Pria ferruginea</i> Cooper, 1982      | Eastern and Southern Africa                       |
| <i>Pria fervida</i> Cooper, 1982         | Zaire   |
| <i>Pria flava</i> Cooper, 1982           | Zaire   |
| <i>Pria flavicornis</i> Cooper, 1982     | Zaire   |
| <i>Pria furva</i> Cooper, 1982           | South Africa                                      |
| <i>Pria fusca</i> Cooper, 1982           | São Tomé  |
| <i>Pria gilva</i> Cooper, 1982           | Angola  |
| <i>Pria grouvellei</i> Kirejtshuk, 1980  | Zaire   |
| <i>Pria hildebrandti</i> Grouvelle, 1913 | Madagascar  |
| <i>Pria hirta</i> Cooper, 1982           | Yemen, NE Africa                                  |
| <i>Pria horni</i> Grouvelle, 1909        | Tanzania, Ethiopia, Kenya, Rwanda                 |
| <i>Pria impulchra</i> Kirejtshuk, 2001   | Kenya   |
| <i>Pria indica</i> Grouvelle, 1894       | India   |
| <i>Pria integra</i> Cooper, 1982         | Nigeria   |
| <i>Pria kenyaensis</i> Kirejtshuk, 2001  | Kenya   |
| <i>Pria kolbei</i> Grouvelle, 1909       | Tanzania, Kenya, Uganda, Saudi Arabia             |
| <i>Pria lata</i> Cooper, 1982            | Zaire   |
| <i>Pria lutea</i> Cooper, 1982           | Kenya   |
| <i>Pria magna</i> Reitter, 1872          | South Africa, Namibia, Swaziland                  |
| <i>Pria majuscula</i> Kirejtshuk, 1980   | Zaire, Rwanda                                     |
| <i>Pria micans</i> Cooper, 1982          | Ethiopia  |
| <i>Pria mixta</i> Grouvelle, 1909        | Tanzania, Kenya                                   |
| <i>Pria nebulosa</i> Cooper, 1982        | Zaire   |
| <i>Pria nigricans</i> Grouvelle, 1899    | South Africa: KwaZulu-Natal, E Cape               |
| <i>Pria nigrifrons</i> Cooper, 1982      | Madagascar  |
| <i>Pria nigrifula</i> Reitter, 1872      | Madagascar  |
| <i>Pria nitens</i> Cooper, 1982          | Zaire   |
| <i>Pria notata</i> Cooper, 1982          | South Africa, Zimbabwe                            |
| <i>Pria oblita</i> Grouvelle, 1908       | Ethiopia  |
| <i>Pria ochroleuca</i> Grouvelle, 1908   | Ethiopia, Tanzania, Zaire, Zimbabwe, Kenya        |
| <i>Pria palpata</i> Kirejtshuk, 1989     | Mozambique, Zimbabwe, South Africa: KwaZulu-Natal |
| <i>Pria parviclava</i> Kirejtshuk, 2001  | South Africa                                      |
| <i>Pria pauli</i> Grouvelle, 1909        | Tanzania, Zaire, Ethiopia                         |
| <i>Pria peckorum</i> Kirejtshuk, 1989    | South Africa: KwaZulu-Natal                       |
| <i>Pria pectinicornis</i> Cooper, 1982   | South Africa                                      |
| <i>Pria pulchra</i> Kirejtshuk, 1980     | Zaire, Uganda                                     |
| <i>Pria pumilla</i> Cooper, 1982         | Australia   |
| <i>Pria pygidialis</i> Grouvelle, 1906   | Madagascar  |
| <i>Pria raffrayi</i> Grouvelle, 1908     | Ethiopia, Saudi Arabia                            |
| <i>Pria reitteri</i> Grouvelle, 1896     | Madagascar  |
| <i>Pria reticulata</i> Cooper, 1982      | Ethiopia  |
| <i>Pria robigonosa</i> Cooper, 1982      | South Africa                                      |
| <i>Pria rubida</i> Cooper, 1982          | Ethiopia  |
| <i>Pria subnigella</i> Cooper, 1982      | Ethiopia, Kenya                                   |
| <i>Pria testacea</i> Grouvelle, 1909     | Zimbabwe, Angola                                  |



|   |                              |
|---|------------------------------|
| <i>Pria tokarensis</i> Nakane, 1959         | Japan: Tokara Islands        |
| <i>Pria transitoria</i> Kirejtshuk, 1979    | S Russia, Caucasus           |
| <i>Pria transvaalensis</i> Kirejtshuk, 2001 | South Africa: Mpumalanga     |
| <i>Pria umbrosa</i> Cooper, 1982            | Zaire                        |
| <i>Pria vicina</i> Grouvelle, 1909          | Tanzania, E Africa, Zimbabwe |
| <i>Pria weisei</i> Grouvelle, 1909          | Tanzania, Kenya              |
| <i>Pria zenobia</i> Jelinek, 1997           | Israel, S Turkey, Greece     |

### 38. *Lucanopria* Audisio & Cline new genus

(Figs. 38 a–k)

**Type species.** *Lucanopria wagneri* Audisio & Cline, sp. nov. (by present designation).

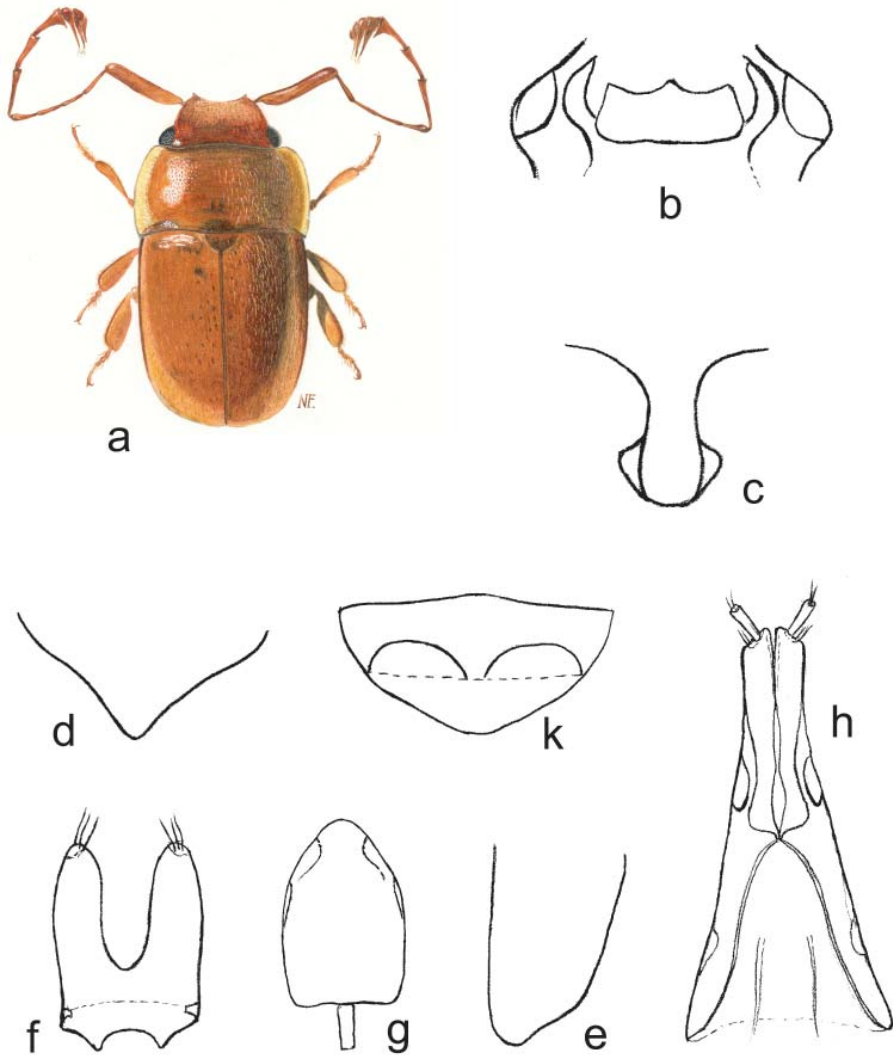
**Generic description and diagnosis.** The single known species (1.6–2.0 mm length; 0.7–1.0 mm width) exhibits the following combination of characters.

*Body color and pubescence:* pubescence fine and short, recumbent, golden, not obscuring the mostly unicolorous yellowish-brown dorsal body surface; pubescence on lateral margins of elytra short, faintly distinct; microsetae on posterior margin of pronotum long and mostly bifid or trifid distad.

*Dorsal habitus:* body flatly convex, moderately elongate and parallel-sided (Fig. 38a); dorsal punctures on discal portion of pronotum slightly smaller than eye facet, shallowly impressed and moderately dense; anterior margin of clypeus subtruncate anteriorly, simple, i.e. without small distinct medial bulge, lateral angles bluntly rounded, not visible in dorsal view in males, mouthparts and clypeus oriented nearly perpendicularly to frons; frons with lateral margins moderately to strongly raised and minutely incised over antennal insertions forming a markedly arcuately emarginate saddle anteriorly when observed from above (Fig. 38a); clypeus and frons *Pria*-like, simple, normally oriented in females; circum-ocular furrows (occipital sulci) on dorsal side of head absent; eyes middle-sized and moderately projected laterally (Fig. 38a), pronotum faintly wider than elytra in males, slightly narrower than elytra in females, with markedly distinct posterior angles, subrectangular (Fig. 38a), slightly directed posteriorly; pronotal sides flattened slightly wider than 2<sup>nd</sup> antennomere (Fig. 38a); scutellum densely punctate on most of exposed portion; elytral punctation simple, not transversely strigose; elytral humeral angle obtuse, not protruding laterally; elytral humeral striae indistinct; elytral pre-sutural striae visible, fine, originating slightly posterior to scutellar vertex, terminating prior to elytral apex, and delimiting on each elytron a faintly distinct, flat, sutural border, widest medially, narrower than proximal width of 3<sup>rd</sup> male antennomere; elytra apically truncately rounded in males (Fig. 38a), moderately separately lobed in females (Fig. 38e); pygidium small, almost completely covered by elytra, minute triangular distal lobe directed posteriorly in males (Fig. 38d), moderately convex, nearly apically rounded in females.

*Ventral habitus:* antennal furrows strongly raised in males, delimited by markedly bulged genae, strongly arcuately convergent posteriorly (Fig. 38b), much less raised, shorter, and less markedly delimited in females; strongly transverse subpentagonal mentum; prosternal antennal furrows on anterior margin of prosternum absent; prosternal process flat, moderately widened pre-distally, with obtusely rounded apex (Fig. 38c), subapical dilated portion 1.0–1.4× as wide as maximum width of 1<sup>st</sup> male antennomere; lateral borders of prosternal process not delimiting impressed furrows, distally terminating close to posterior margin (Fig.

38c); posterior margin of mesoventrite simple, not medially incised; nearly absent sexual dimorphism in impressions on metaventrte; first two visible abdominal ventrites simple in both sexes, without tufts of setae, caudal marginal lines of metacoxal cavities simple, parallel and contiguous to posterior margin of metacoxal cavities, without deep arched impression of outer 'axillary' portion; 'axillary' space on first abdominal ventrite moderately well developed,



**Fig. 38.** *Lucanopria* Audisio & Cline, gen. nov.: **a–k** – *L. wagneri* Audisio & Cline, sp. nov. **a** – male habitus (length 1.9 mm); **b** – ventral view of head (width – 0.62 mm); **c** – prosternal process (width – 0.18 mm); **d** – male pygidium; **e** – female elytral apex; **f–g** – male genitalia (**f** – length 0.15 mm; **g** – length 0.18 mm); **h** – ovipositor (length 0.38 mm); **k** – exposed (below dashed line) and obscured (above dashed line) portions of last visible abdominal ventrite (abdominal width 0.85 mm).

'axillary' angle widely arcuately rounded; arched impressions on basal portion of last visible abdominal ventrite large and wide, but short, shallowly impressed, and usually obscured by penultimate abdominal ventrite (Fig. 38k).

*Appendages*: male antennae showing peculiarly expressed allometric development and variation in the single known species; male 1<sup>st</sup> antennomere usually exceptionally developed, ~7–8× as long as width of protibiae, and ~5× longer than wide (Fig. 38a), 2<sup>nd</sup> male antennomere (Figs. 38a) long and thin, 6× longer than wide, 1.2–1.3× longer than 3<sup>rd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> male antennomeres subequal, long and thin, ~0.8× as long as 2<sup>nd</sup> antennomere, 5<sup>th</sup> antennomere slightly shorter and blunt-shaped, oriented to form a right angle with 6<sup>th</sup> antennomere when antennae distended, 6× longer than wide, slightly longer than 7<sup>th</sup> antennomere; male antennal club comprising last 4 antennomeres, terminal 3 antennomeres peculiarly prolonged in a thin and long lobe directed towards inner side (Fig. 38a); antennae simple, mid-sized, short, and not enlarged in females, with normally compact and slender club comprising last 3 antennomeres, not lobed or modified; male antennal shape varies from the example given in Fig. 38a to a remarkable reduction in length, with loose 4-jointed antennal club, not exhibiting the peculiarly developed and thin lobes in Fig. 38a, and with much shorter antennal flagellum; labial palpi moderately short in both sexes, terminal segment 1.3–1.8× as long as wide; maxillary palpi variably shaped in both sexes, terminal segment 2–3× longer than wide; mandibles small-sized, arcuate, apex acuminate; tarsal claws simple, not toothed at base; tarsi moderately long and thin, 0.7–0.8× as long as corresponding tibiae; protibiae with a series of small, fine crenulations on distal portion of lateral margin (Fig. 38a); lateral margin of meso- and metatibiae bearing a single and regular row of long thin pegs in both sexes, without U-shaped sinuosity at distal third; meso- and metatibiae moderately flat, but slender, not distinctly subtrapezoidal or axe-shaped; tarsal plates of prolegs scarcely wider in males; posterior margins of metafemora simple in both sexes, without tubercles or projections.

*Male genitalia*: processes along inner side of parameres absent (Figs. 38f–g), with deep and wide V-shaped excision along distal margin, without deep median longitudinal desclerotization from proximal portion of tegmen extending to medial distal V-shaped excision; median lobe of aedeagus relatively short, without lateral emargination, moderately acuminate distad, without distal excision.

*Female genitalia (ovipositor)*: mid-sized; styli long and distinct, simple, cylindrical, not darkly pigmented, inserted close to apex of contiguous gonostyloids; each gonostyloid lightly sclerotized and scarcely pigmented distally, with a simple, never indented outer portion of basicoxites (Fig. 38h), and a single, wide, moderately pigmented and relatively more sclerotized arcuate area along outer subdistal portion of gonostyloids. 'Central point' of ovipositor centrally located, without proximad directed spicule.

**Etymology.** The generic name was derived from the combination of the Latin generic name *Lucanus* Scopoli, 1763 (= a stag-beetle genus), and *Pria*, a widespread genus of Meligethinae, which is indicative of the usually pectinate male antennal club resembling that of stag-beetles, and overall morphological similarity with *Pria*. Gender feminine.

**Biology.** The biology of the single known representative is uncertain. The type material was collected in Rwanda by insecticidal canopy fogging of *Carapa grandiflora* Sprague

(Meliaceae), a large tree in a montane (cloudy) rain forest remnant (Cyamudongo Forest) (T. Wagner, pers. comm. 2009). Therefore, larvae of *Lucanopria* gen. nov. may be associated with inflorescences of *Carapa*, but this assumption needs further field data. At the type locality the type species was collected in conjunction with a few specimens of *Micropria*.

**Phylogenetic position.** Available morphological data provide possible evidence of phylogenetic relationships of this genus with members of *Microporum* and allied taxa. See below discussion about the phylogenetic position of the *Microporum* generic assemblage. No molecular data are available for this genus.

**Taxonomy and geographic distribution.** This taxon includes only *Lucanopria wagneri* Audisio & Cline, sp. nov. from Rwanda described below.

### *Lucanopria wagneri* Audisio & Cline, sp. nov.

(Figs. 38 a–k)

**Type material.** HOLOTYPE: ♂, RWANDA: community of Nyakabuye, Cyamudongo cloud montane rain forest, x.1993, 1700 m, T. Wagner leg., by insecticidal canopy fogging of *Carapa grandiflora* Sprague (Meliaceae) (ZFMK). PARATYPES: 6 ♂♂ 5 ♀♀, same data as holotype (ZFMK, CAR, NMPC).

**Description and diagnosis.** See above generic description of *Lucanopria* gen. nov.

Body length 1.6–2.0 mm; width 0.7–1.0 mm; body moderately flat and elongate, orange-yellowish, with infusate scutellum, and a slightly darker elytral circum-scutellar area in some specimens; lateral sides of pronotum markedly paler (Fig. 38a). Morphological male variability as described above.

*Male genitalia* as described above (Figs. 38f–g).

*Female genitalia* as described above (Fig. 38h).

**Etymology.** This new species is named for a German entomologist, our friend Thomas Wagner (Koblentz), a renowned specialist on Chrysomelidae and collector of the entire type series.

**Biology.** See generic section above.

**Geographic distribution.** This new species is known only from the above listed type material collected in Rwanda.

### 39. *Cornutopria* S. Endrödy-Younga, 1978

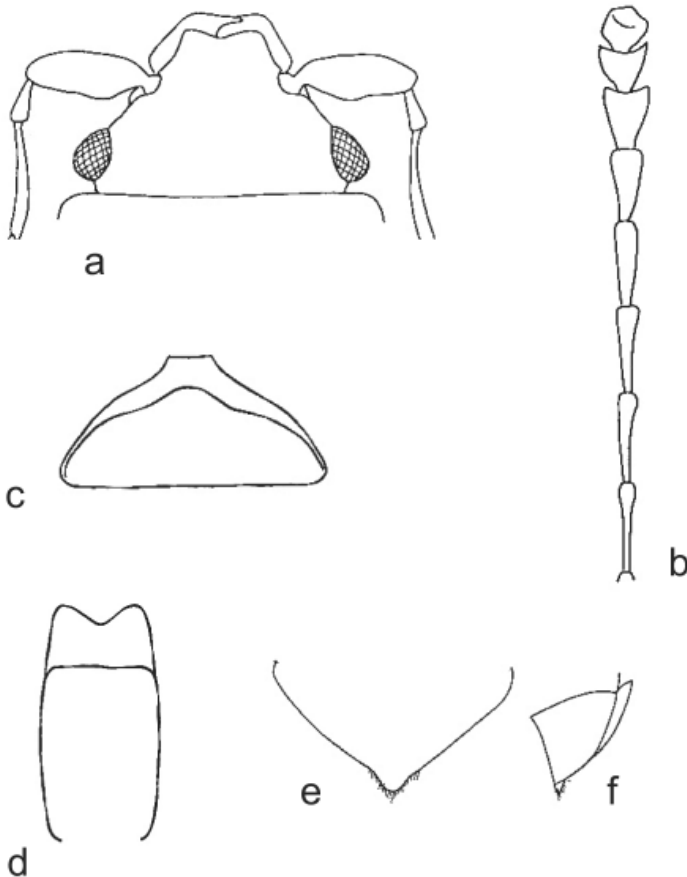
(Figs. 39 a–f)

*Cornutopria* S. Endrödy-Younga, 1978: 303, 305.

**Type species.** *Cornutopria basilewskyi* S. Endrödy-Younga, 1978: 306 (by original designation).

**Generic diagnosis.** The single known species (1.8–3.1 mm length; 1.0–1.5 mm width) exhibits the combination of characters listed by ENDRÖDY-YOUNGA (1978) (Figs. 39 a–f; all drawings from ENDRÖDY-YOUNGA 1978).

**Etymology.** The generic name was derived from the combination of the Latin name ‘*cornutus*’ (= bearing horns), and *Pria*, a widespread genus of Nitidulidae Meligethinae, which is indicative of the long antennae of the single species attributed to this taxon, and the phylogenetic relationships with *Pria*. Gender feminine.



**Fig. 39.** *Cornutopria* S. Endrödy-Younga, 1978: **a-f** – *C. basilewskyi* S. Endrödy-Younga, 1978. **a** – dorsal view of male head and first three antennomeres; **b** – male antennal club and antennomeres 4–11; **c** – mentum; **d** – dorsal view of aedeagus; **e-f** – dorsal and lateral view of male pygidium. All drawings modified from ENDRÖDY-YOUNGA (1978). Refer to ENDRÖDY-YOUNGA (1978) for scale.

**Biology.** The biology of the single known representative of *Cornutopria*, *C. basilewskyi* from Zaire, is unknown (ENDRÖDY-YOUNGA 1978). A probable association with male inflorescences of palms (Arecaceae) may be inferred, as it is analogously exhibited in the related genera *Microporodes* and *Palmopria*, however this assumption is speculative and requires further fieldwork to substantiate.

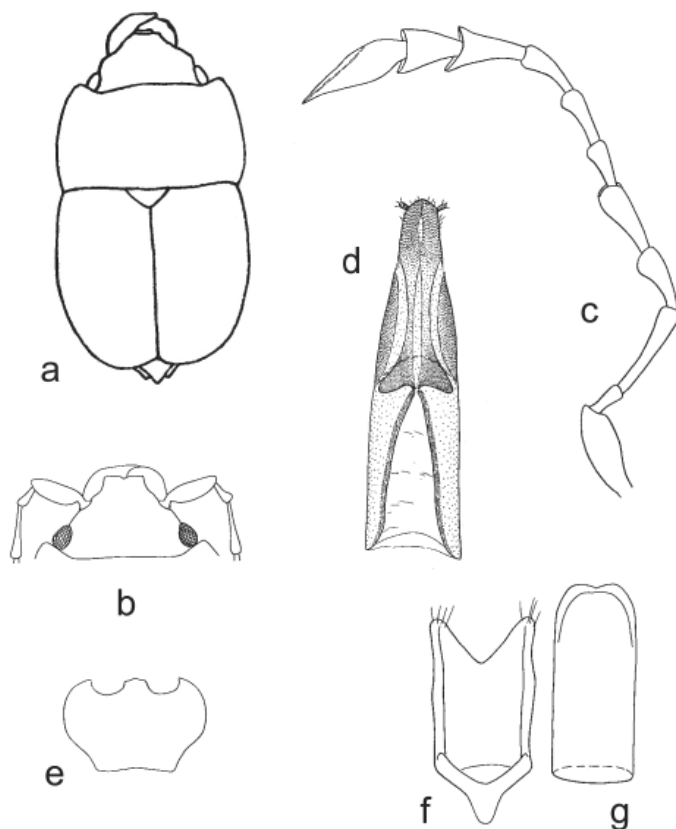
**Phylogenetic position.** Available morphological data provides possible evidence of a relatively close relationship with members of the [(*Palmopria* + *Microporodes*) + *Lechantouria*] clade. No molecular data are currently available.

**Taxonomy and geographic distribution.** This taxon includes a single species from central Africa.



**40. *Lechanteuria* S. Endrödy-Younga, 1978**

(Figs. 40 a–g)

*Prianella* Lechanteur, 1955: 238. Junior homonym of *Prianella* Reitter, 1919: 16.*Lechanteuria* S. Endrödy-Younga, 1978: 303, 307. Substitute name for *Prianella* Lechanteur, 1955 (non Reitter, 1919).**Type species.** *Prianella binotata* Lechanteur, 1955: 239 (by original designation) [= *Lechanteuria binotata* (Lechanteur, 1955)].**Generic redescription and diagnosis.** The single known species (4.2–4.3 mm length; 2.4–2.5 mm width) exhibits the combination of characters listed by LECHANTEUR (1955) and ENDRÖDY-YOUNGA (1978) (Figs. 40 a–g; drawings from LECHANTEUR 1955, ENDRÖDY-YOUNGA 1978, and KIREJTSHUK 1980b).

**Fig. 40.** *Lechanteuria* S. Endrödy-Younga, 1978: a–g – *L. binotata* (Lechanteur, 1955). a – male habitus; b – dorsal view of male head and first three antennomeres; c – male antenna; d – ovipositor; e – mentum; f–g – male genitalia. Drawing a modified from LECHANTEUR (1955); drawings b, e modified from ENDRÖDY-YOUNGA (1978); drawings c–d, f–g modified from KIREJTSHUK (1980b). Refer to LECHANTEUR (1955), ENDRÖDY-YOUNGA (1978), and KIREJTSHUK (1980b) for scale.

**Etymology.** The generic name was derived from F. Lechanteur, a renowned Belgian specialist on Afrotropical Nitidulidae, who was active mostly in the second half of the past century, and who first described this genus under *Prianella*, a preoccupied name by REITTER (1919) (see ENDRÖDY-YOUNGA 1978). Gender feminine.

**Biology.** The biology of the single representative of *Lechanteuria*, *L. binotata* from Zaire, is not completely known (LECHANTEUR 1955, ENDRÖDY-YOUNGA 1978, KIREJTSHUK 1980b). The type series was collected in Zaire on fruits of *Treculia africana* var. *engleriana* (De Wild. & Th. Dur.) Engl. (Moraceae), but a frugivorous larval life style seems unlikely. However, we cannot exclude that *Lechanteuria* is associated with inflorescences of Moraceae.

**Phylogenetic position.** Available morphological data provide evidence of a likely sister-group relationship to *Microporodes* and *Palmopria* (ENDRÖDY-YOUNGA 1978). Weaker relationships may also be postulated with members of *Microporum* and *Cornutopria*. A revision of the whole Afrotropical complex of genera including *Microporodes*, *Palmopria*, *Lechanteuria*, *Cornutopria*, and *Microporum* s. l. is currently in preparation (AUDISIO et al. in prep.). See also the discussion below on the phylogenetic position of *Microporodes*. No molecular data are currently available.

**Taxonomy and geographic distribution.** The genus includes a single species from central Africa (LECHANTEUR 1955, ENDRÖDY-YOUNGA 1978).

*Lechanteuria binotata* (Lechanteur, 1955)

Zaire

#### 41. *Microporodes* S. Endrödy-Younga, 1978

(Figs. 41 b–e)

*Microporodes* S. Endrödy-Younga, 1978: 303, 311.

**Type species.** *Mystrops dispar* Murray, 1864: 413–414 (by original designation) [= *Microporodes dispar* (Murray, 1864)].

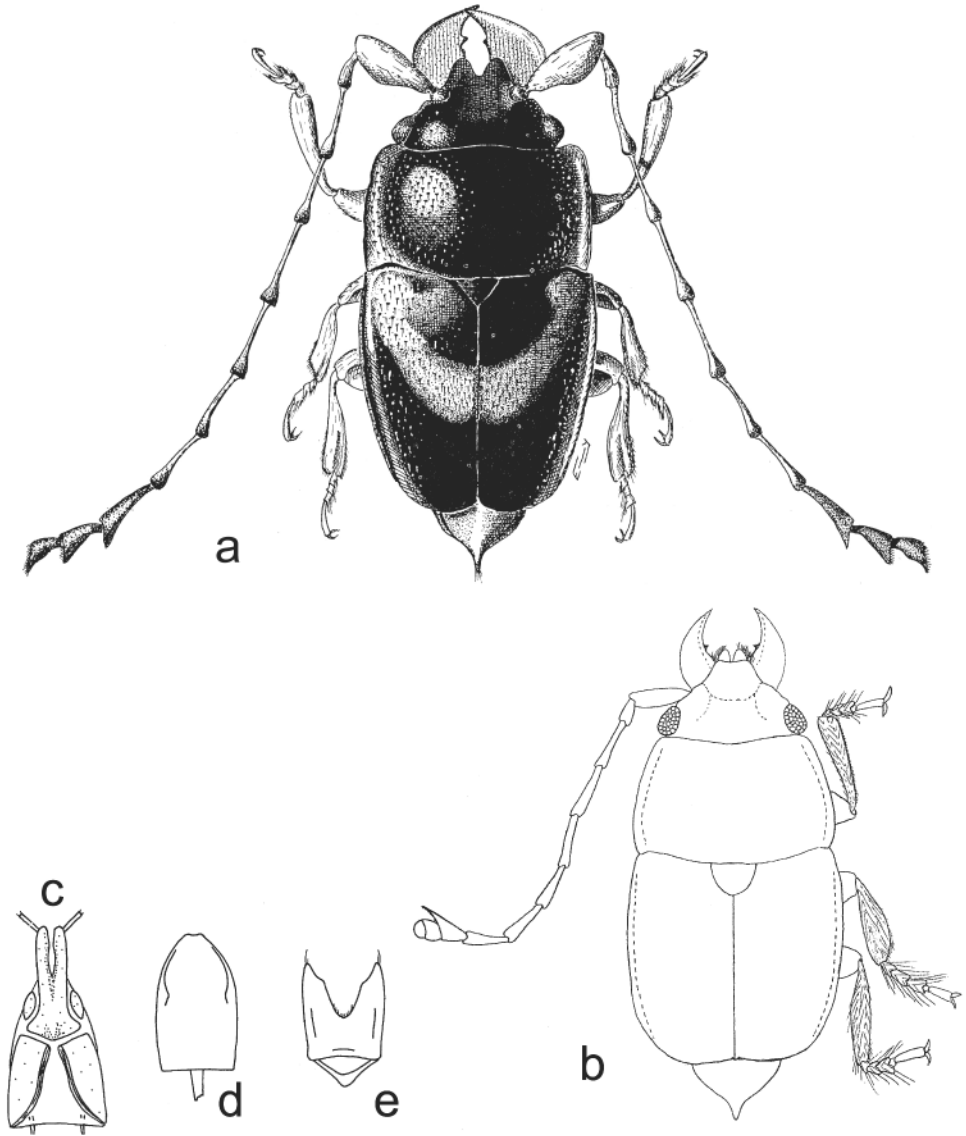
**Generic diagnosis.** The single known species (2.4–3.1 mm length, 1.1–1.4 mm width) exhibits the combination of characters listed by ENDRÖDY-YOUNGA (1978) (Figs. 41 b–e; drawings c–e from COOPER 1974, as *Microporum dispar*).

**Etymology.** The generic name was derived from *Microporum*, a genus of Meligethinae from tropical Africa and Madagascar, being indicative of the partially similar external body shape of the two taxa. Gender masculine.

**Biology.** The single known representative of *Microporodes*, *M. dispar* from Madagascar, is associated with male inflorescences of palms (Arecaceae), in particular the widespread oil palm, *Elaeis guineensis* Jacq. (AUDISIO unpublished data), which is analogously observed in the related genus *Palmopria* from tropical Africa (ENDRÖDY-YOUNGA 1978).

**Phylogenetic position.** Available morphological data provide evidence of a likely sister-group relationship of *Microporodes* to *Palmopria*, with *Lechanteuria* as the likely sister group to this clade (ENDRÖDY-YOUNGA 1978). Weaker relationships may also be postulated with members of *Microporum* and *Cornutopria*.

KIREJTSHUK (1980b) suggested grouping together *Microporodes*, *Palmopria*, *Lechanteuria*, *Cornutopria*, *Microporellus* and *Microporum* within a single taxon of generic rank. We



**Fig. 41.** *Microporodes* S. Endrödy-Younga, 1978 and *Palmopria* S. Endrödy-Younga, 1978: **a** – *P. elaeidis* S. Endrödy-Younga, 1978; **b–e** – *M. dispar* (Murray, 1864). **a, b** – male habitus (**a** – length 2.5 mm; **b** – length 2.6 mm); **c** – ovipositor; **d–e** – male genitalia. Drawing **a** modified from ENDRÖDY-YOUNGA (1978); drawings **c–e** modified from COOPER (1974). Drawings **c–e** refer to COOPER (1974) for scale.

disagree with this simplified approach, but KIREJTSHUK (2008) recently modified his ideas on the matter, retaining only *Microporellus* as synonym of *Microporum* and suggesting a generic rank for all other above listed taxa. Actually, at least two main clades are recognizable within this complex of genera, the first clade including *Microporodes*, *Palmopria* and maybe also *Lechanteuria* (at least the first two taxa associated with male inflorescences of Arecaceae), and a second clade including *Microporum* s.l. (including at least a couple of species likely associated with male inflorescences of Pandanaceae), *Cornutopria* and *Lucanopria* gen. nov. (characterized by uncertain larval-host plants relationships) occupying an unclear phylogenetic position. No molecular data available for these genera.

**Taxonomy and geographic distribution.** The genus includes a single species from Madagascar (ENDRÖDY-YOUNGA 1978).

*Microporodes dispar* (Murray, 1864)

Madagascar

#### 42. *Palmopria* S. Endrödy-Younga, 1978

(Fig. 41 a)

*Palmopria* S. Endrödy-Younga, 1978: 303, 312.

**Type species.** *Microporum congolense* Grouvelle, 1915: 107–108 (by original designation) [= *Palmopria congolensis* (Grouvelle, 1915)].

**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.7–4.2 mm length), and share the combination of characters listed by ENDRÖDY-YOUNGA (1978) (Fig. 41 a, from ENDRÖDY-YOUNGA 1978).

**Etymology.** The generic name was derived from the combination of the Latin name ‘*palma*’ (= hand palm, and consequently also the frequently hand shaped leaves of most palm species), and *Pria*, a widespread genus of Meligethinae, which is indicative of the life history of inclusive species, i.e. associated at both larval and imaginal stages with male inflorescences of palms and the overall similarity of the genus to *Pria*. Gender feminine.

**Biology.** Members of *Palmopria* are strictly associated with male inflorescences of palms (Arecaceae), in particular the widespread oil palm, *Elaeis guineensis* Jacq. (ENDRÖDY-YOUNGA 1978), which is analogously observed in the related *Microporodes* from Madagascar.

**Phylogenetic position.** Available morphological data provide evidence of a likely sister-group relationship of *Palmopria* to *Microporodes*, with *Lechanteuria* being the likely sister group of this clade (ENDRÖDY-YOUNGA 1978). Weaker relationships could also be postulated with members of *Microporum* s. l. No molecular data available.

**Taxonomy and geographic distribution.** This taxon includes three described species from tropical Africa (ENDRÖDY-YOUNGA 1978).

*Palmopria congolensis* (Grouvelle, 1915)

tropical Africa

*Palmopria elaeidis* S. Endrödy-Younga, 1978

tropical Africa

*Palmopria tomentosa* S. Endrödy-Younga, 1978

tropical Africa

### 43. *Microporum* C. O. Waterhouse, 1876

(Figs. 42 a–m)

*Microporum* C. O. Waterhouse, 1876: 109.

*Probaenus* C. O. Waterhouse, 1876: 110.

? *Microporellus* S. Endrödy-Younga, 1978: 303, 304.

**Type species.** *Microporum* – *Microporum nitens* C. O. Waterhouse, 1876: 109 (by monotypy); *Probaenus* – *Probaenus longicornis* C. O. Waterhouse, 1876: 110 (by monotypy) [= *Microporum nitens* C. O. Waterhouse, 1876]; *Microporellus* – *Pria scotti* Grouvelle, 1913: 3 (by original designation).

**Generic redescription and diagnosis.** Inclusive species vary greatly in size (1.3–2.8 mm length), and share the combination of characters listed by COOPER (1974, *partim*), ENDRÖDY-YOUNGA (1978), and KIREJTSHUK (1980b, *partim*) (Figs. 42a–m; drawings from COOPER 1974, ENDRÖDY-YOUNGA 1978).

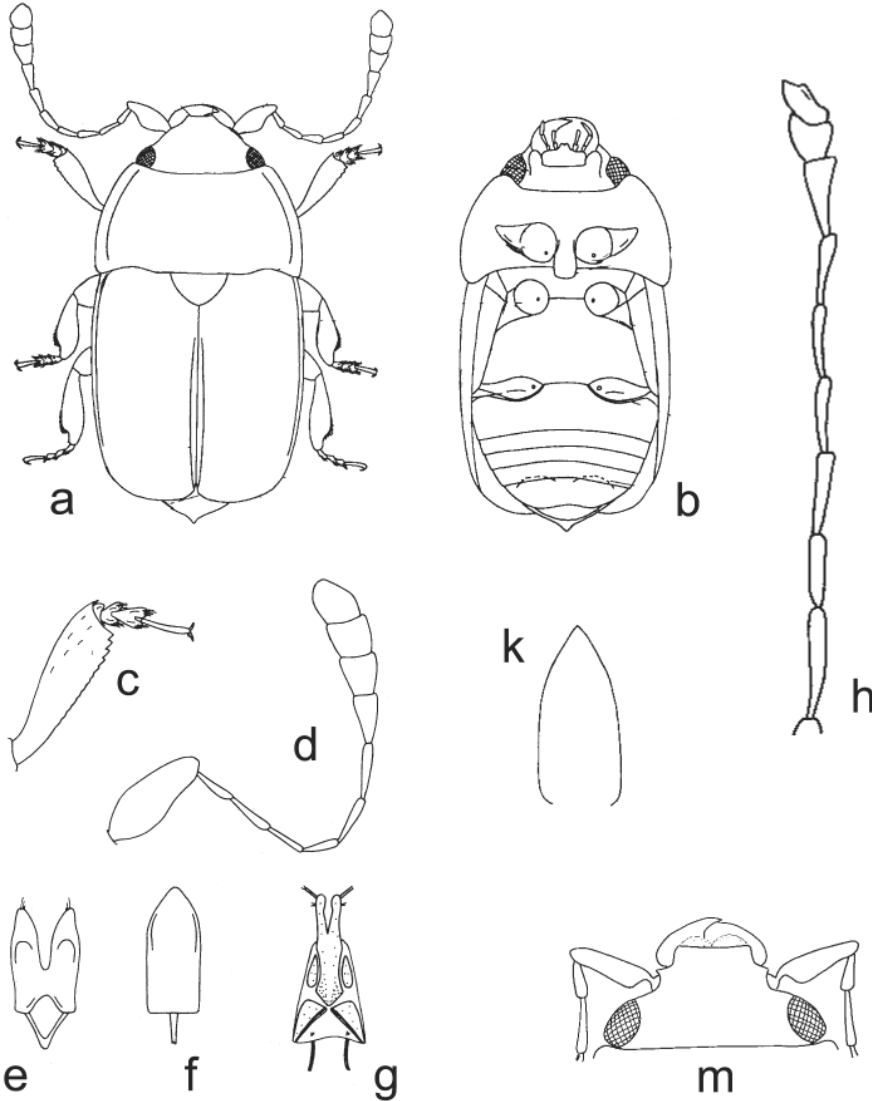
**Etymology.** The generic name was probably derived from Greek ‘μικρός’ (= small) and ‘πόρος’ (meaning puncture), which is indicative of the small sized dorsal body punctures characterizing most inclusive species.

The original gender assignment (WATERHOUSE 1876) was uncertain, despite the obviously neuter (–*um*) generic ending. GROUVELLE (1913c) listed the genus as being implicitly masculine, but later the same author treated this taxon as neuter (GROUVELLE 1915) when describing *Microporum congolense* Grouvelle, 1915 (now within *Palmopria*). COOPER (1974) used both neuter and masculine specific epithets for his inclusive species, whereas KIREJTSHUK (1980b) described a few African species using neuter specific epithets and later describing (KIREJTSHUK 1995) an additional new species from Seychelles Islands with a masculine specific epithet, i.e. *Microporum insularis* Kirejtshuk, 1995. All other known animal genera ending with ‘–*porum*’ included in Nomenclator Zoologicus are considered neuter (NEAVE 2009). However, article 30.1.2 of the Code (ICZN 1999) states that ‘a genus-group name that is or ends in a Greek word transliterated into Latin without other changes takes the gender given for that word in standard Greek dictionaries’. In the present case, the Latin desinence ‘–*porum*’ is a transliteration from a combination of the Greek ‘πόρος’, which is masculine, but with a deliberately changed ending (several animal taxa of genus-groups share, in fact, the more correct ‘–*porus*’ desinence, and all these taxa retain an obvious masculine gender). Consequently, also applying the ICZN (1999) article 30.1.4.5 (‘A genus-group name that is or ends in a Latin word of which the ending has been changed takes the gender appropriate to the new ending’), we suggest considering *Microporum* as being definitively neuter.

**Biology.** The biology of the described species of *Microporum* is poorly known. The available data refer only to imaginal associations of a single species from the Aldabra Islands (i.e. *M. popei* S. Endrödy-Younga, 1978) with male inflorescences of *Pandanus* sp. (Monocots; family Pandanaceae: ENDRÖDY-YOUNGA 1978). Larval associations of *Microporum* inhabiting Madagascar and surrounding islands that possess *Pandanus* may be likely. However, KIREJTSHUK (1980b) reported a small number of specimens of *Microporum corbisieri* Kirejtshuk, 1980 collected, in conjunction with *Micropria diluticolor* Kirejtshuk, 1980, on fruits of *Treculia*



(Moraceae) in Zaire. Therefore, an association with inflorescences and/or fruits of Moraceae in Central African *Microporum* cannot be excluded. However, as discussed above, the classification of Afrotropical complex of genera and species related to *Microporum* is in need of complete revision.



**Fig. 42.** *Microporum* C. O. Waterhouse, 1876: **a–g** – *M. mordace* Cooper, 1974; **h–m** – *M. scotti* (Grouvelle, 1913). **a** – male habitus; **b** – ventral view of body; **c** – male protibia; **d, h** – male antennae; **e–f, k** – male genitalia; **g** – ovipositor; **m** – dorsal view of male head and first three antennomeres. Drawings **a–g** modified from COOPER (1974); drawings **h–m** modified from ENDRÖDY-YOUNGA (1978). Refer to COOPER (1974) and ENDRÖDY-YOUNGA (1978) for scale.

**Phylogenetic position.** *Microporum* is likely related to *Lechanteuria*, *Microporodes*, *Palmopria*, and allied taxa. *Microporellus* S. Endrödy-Younga, 1978 from the Seychelles Islands is considered by KIREJTSHUK (1980b, 2008) as a synonym of *Microporum*. We tentatively accept this synonymy, however we suspect *Microporellus* could represent a distinct lineage and a valid taxon. The entire set of known species from Tropical Africa, southern-western Indian Ocean Islands, and Madagascar now attributed to *Microporum*, *Microporellus*, *Lechanteuria*, *Cornutopria*, and *Lucanopria* gen. nov. possess deviating species (WATERHOUSE 1876; GROUVELLE 1913c; COOPER 1974; ENDRÖDY-YOUNGA 1978; KIREJTSHUK 1980b, 1995) that are in need of accurate generic level revision. See above discussion on the phylogenetic position of *Microporodes*. No molecular data are currently available.

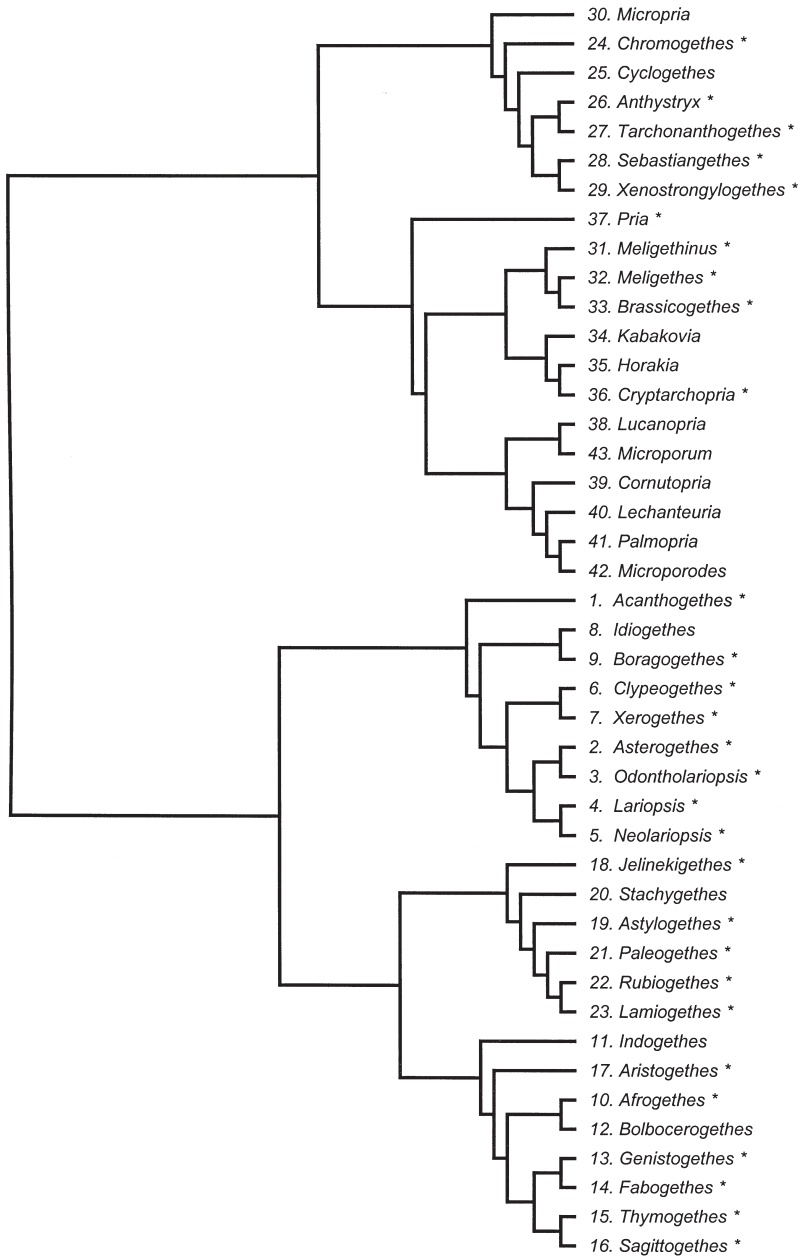
**Taxonomy and geographic distribution.** This taxon tentatively includes (with the reservations discussed above about the taxonomic position of *Microporum*, *Microporellus*, and related taxa) 12 species from Tropical Africa, southwestern Indian Ocean Islands, and Madagascar (WATERHOUSE 1876, GROUVELLE 1913c, COOPER 1974, ENDRÖDY-YOUNGA 1978, KIREJTSHUK 1980b). However, undescribed species await description from these areas.

|  |                |
|--|----------------|
| <i>Microporum corbisieri</i> Kirejtshuk, 1980    | Zaire          |
| <i>Microporum insulare</i> Kirejtshuk, 1995      | Seychelles     |
| <i>Microporum interruptum</i> Kirejtshuk, 1980   | Zaire          |
| <i>Microporum mordace</i> Cooper, 1974           | Madagascar     |
| <i>Microporum nitente</i> C. O. Waterhouse, 1876 | Rodriguez      |
| <i>Microporum nitidior</i> (Grouvelle, 1913)     | Seychelles     |
| <i>Microporum opacum</i> Cooper, 1974            | Madagascar     |
| <i>Microporum popei</i> S. Endrödy-Younga, 1978  | Aldabra Island |
| <i>Microporum pusillum</i> Cooper, 1974          | Madagascar     |
| <i>Microporum reitteri</i> (Grouvelle, 1896)     | Madagascar     |
| <i>Microporum rufulum</i> Cooper, 1974           | Madagascar     |
| <i>Microporum scotti</i> (Grouvelle, 1913)       | Seychelles     |

## Conclusions

Meligethinae includes the largest number of anthophagous species within Nitidulidae, and the whole subfamily includes strictly anthophagous taxa, whereas anthophagization in other subfamilies occurs independently in more or less isolated generic groups (AUDISIO 1993b, KIREJTSHUK 1992a, 1997). The only exception is the Neotropical tribe Mystropini within Nitidulinae (possibly to be considered a separated subfamily upon phylogenetic scrutiny; AUDISIO 1993b), wherein all species also are known to be anthophagous, in particular on male palm inflorescences (JELÍNEK 1992; KIREJTSHUK 1994a,b, 1996a, 1997; KIREJTSHUK & JELÍNEK 2000). Meligethinae anthophagy is a relatively ancient evolutionary innovation; and Meligethinae origins and early radiations can probably be traced to the Rubicon of the Mesozoic/Cenozoic, concurrent with an ever increasing angiosperm radiation (CRANE & LIDGARD 1990; DOYLE & DONOGHUE 1993; AUDISIO 1997a; KIREJTSHUK 1992a, 1994a,b, 1996a, 1997). The timing of this specialization subsequently allowed for a relatively rapid coevolution (or sequential evolution) of Meligethinae with Angiospermae.

Preliminary molecular data from different species-groups of *Afrogethes* gen. nov. suggest an independent evolution from Africa to southern Europe, southern Asia, and western North



**Fig. 43.** Cladogram of hypothetical phylogenetic relationships between the 43 recognized genera of Meligethinae, as inferred from an exploratory and preliminary cladistic analysis based on 72 morphological characters. Asterisks indicate genera for which molecular data is available for some species.

America during the last 30–17 Mya (AUDISIO et al. 2009b). The same is probably true for *Lamiogethes* gen. nov., with the ancient origin of this clade being supported by the widespread presence in Madagascar of several representatives of this taxon in conjunction with a few species of *Afrogethes* gen. nov. *Afrogethes* gen. nov. and *Lamiogethes* gen. nov. are the only two genera of the *Meligethes* s. l. complex of genera known to occur on Madagascar, where their presence, provided a Jurassic separation of Madagascar from southeastern Africa, could be probably explained by the ‘Lemurian Stepping-stones’ hypothesis (SCHATZ 1996). This hypothesis is linked to a marked regression at the Rupellian/Chattian boundary during the Oligocene ca. 30 Mya (HAQ et al. 1988). At that time significant portions of the Chagos/Laccadive Plateau and the contiguous Mascarene Plateau (including the Seychelles Bank, which encompasses over 50,000 km<sup>2</sup> now at an average depth of 75 m) could have been emergent and served as stepping-stones for dispersal of Laurasian (mesic) elements between Laurasia/Western Malesia and Africa/Madagascar via India/Sri Lanka (SCHATZ 1996). This scenario fits well with available data about the origin, phylogenetic position, dispersion and present-day distributions in the western Indian Ocean Islands of several representatives of the *Microporum* generic complex.

We then hypothesize that some of the largest clades of Meligethinae genera originated moderately early in tropical Africa approximately 40 Mya or more.

Preliminary results from a cladistic analysis based on available morphological data, coupled with those of molecular analyses, seem to support two main clades within Meligethinae (Fig. 43). The first clade includes genera 1 to 23 (*Acanthogethes* to *Lamiogethes* gen. nov.), and the second clade includes genera 24 to 43 (*Chromogethes* to *Microporum*, including *Meligethes* s. str., *Brassicogethes* gen. nov., and *Meligethinus*). However, this preliminary evidence must be analyzed and reviewed with caution. A combined cladistic analysis including adult and larval morphological characters, and available molecular data from COI, ITS2, PEPCK, and Elongation Factor 1-alpha [EF-1 $\alpha$ ] genes, will be published in an upcoming series of papers (AUDISIO et al. in prep.). Only after publication of robust phylogenetic evidence will a more deep-rooted classification of Meligethinae be explored.

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