

AN ILLUSTRATED KEY TO, AND DIAGNOSES OF THE SPECIES OF TENEBRIONIDAE (COLEOPTERA) ASSOCIATED WITH DECAYING CARCASSES IN ARGENTINA

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Abstract.— In this study we identified adults of Tenebrionidae associated mainly with pig carcasses and human cadavers lying in different arid and semiarid areas of Argentina. This article provides an illustrated key to 29 Tenebrionidae species of the potential forensic importance, accompanied by diagnoses, and habitus photographs of these taxa. The recorded species of darkling beetles belong to four subfamilies: Alleculinae (one species of Alleculini), Diaperinae (two species of Crypticini), Tenebrioninae (15 species, ten belonging to the tribe Scotobiini, three to Opatrini, two to Alphotibiini and one species of Tenebrionini), and Pimeliinae (10 species, three belonging to the tribe Epitragini, two to Evaniosomini, two to Praociini, one species from each of the tribes Trilobocarini, Edrotini and Elenophorini). A new species of *Eutelocera* Solier (Pimeliinae: Praociini) collected from decomposing pig carcasses is described: *E. cadaverina* Flores and Zanetti sp. nov. Two species are new records for Argentina: *Conibius* (*Gondwanodilamus*) *franzi* Kaszab and *Alphotobius laevigatus* (Fabricius); three species for Bolivia: *Blapstinus punctulatus* Solier, *Salax lacordairei* Guérin-Méneville, and *Variosus profana* (Kulzer); and one species for Uruguay: *Blapstinus punctulatus* Solier. A discussion is presented on the potential forensic importance of some species collected from human cadavers and pig carcasses.



Key words.— darkling beetles, Alleculinae, Diaperinae, Tenebrioninae, Pimeliinae, forensic, cadavers, arid lands.

INTRODUCTION

The order Coleoptera forms one of the major insect groups involved in the decomposition process of

carcasses, and its forensic importance has been frequently documented (Smith 1986, Battán and Linhares 2011, Prado e Castro *et al.* 2013, Caballero and León-Cortés 2014, Zanetti *et al.* 2015a, b). Certain beetle

species are associated with advanced stages of decomposition (Smith 1986) and their usefulness in estimating the minimum Post-Mortem Interval (PMI) has been highlighted by several authors (Kulshrestha and Satpathy 2001, Schroeder *et al.* 2002, Midgley *et al.* 2010). The main families recorded in decomposition experiments or on human corpses are Dermestidae Latreille, Cleridae Latreille, Histeridae Gyllenhaal, Staphylinidae Latreille, Nitidulidae Latreille, Scarabaeidae Latreille, Silphidae Latreille, and Trogidae MacLeay (Smith 1986, Özdemir and Set 2009, Lefebvre and Gaudry 2009). Besides those coleopteran families usually used for making estimates of the post-mortem interval, species of other families such as the Tenebrionidae Latreille have frequently been reported in forensic studies (Voss *et al.* 2011, Aballay *et al.* 2012, Zanetti *et al.* 2015a, b).

The family Tenebrionidae comprises about 2,300 genera and 20,000 species worldwide (Matthews *et al.* 2010), with 478 genera and 4,624 species estimated to occur in the Neotropical region (Almeida and Mise 2009). Members of the subfamilies Pimeliinae Latreille, Tenebrioninae Latreille and Diaperinae Latreille are ground-dwelling scavengers, usually inhabiting open and arid or semiarid lands (Matthews *et al.* 2010). Some of them feed on plant material including decaying plants, dead wood, lichens, mosses, fungal fruiting bodies and stored products (Almeida and Mise 2009, Matthews *et al.* 2010). Others feed on dead animal material, for example: *Eschatomoxys pholeter* Thomas and Pape, 2007 which was found feeding on dead free-tailed bat (Pape *et al.* 2007); *Gyriosomus elongatus* Waterhouse, 1843 on dead lizards (Pizarro-Araya 2010); *Vanius profana* (Kulzer, 1956) on pig corpses; and *Achanius antofagastensis* Flores and Aballay, 2015 on pig and llama carcasses (Flores and Aballay 2015). *Aphitobius diaperinus* (Panzer, 1796) and *A. laevigatus* (Fabricius, 1781) are frequent inhabitants of bat caves where they scavenge on guano as well as on sick or dead bats (Peck 2005, Matthews *et al.* 2010). In poultry houses, *Aphitobius diaperinus* feeds on feathers, dead, dying or newly born chicks (Matthews *et al.* 2010). Under experimental conditions, larvae of the genera *Tenebrio* Linnaeus, 1758 and *Eleodes* Eschscholtz, 1829 left marks on bones of chicken, pig, horse and sheep (Holden *et al.* 2013). Adults and larvae of Tenebrionidae were collected from pig carcasses for use in decomposition experiments conducted in Argentina's arid and semiarid lands (Aballay 2012, Zanetti *et al.* 2015 a, b). Larvae of unidentified species were collected from human corpses in advanced stages of decomposition (Lefebvre and Gaudry 2009, Introna *et al.* 2011, Mariani *et al.* 2014).

Tenebrionid beetles have been recorded on carcasses by a wide range of forensic entomology studies, from

earlier works (Mégnin 1894, Luederwaldt 1911, Goff *et al.* 1986) to most recent ones (Aballay *et al.* 2012, Santos *et al.* 2014, Zanetti *et al.* 2015a, b). However, these taxa have been considered accidental on cadavers (Özdemir and Sert 2009, Corrêa *et al.* 2014). This is probably caused by specific methodology used in most of the studies, which are concluded a few days after the body reaches the last stage of decomposition (remains), but decomposition continues to progress while tenebrionids would be present on completely dried corpses (Mégnin 1894, Smith 1986, Lefebvre and Gaudry 2009). Larval development in some Tenebrionidae species normally takes about a year (Santos *et al.* 1988), but it can extend to two, with the larval period lasting throughout the winter (Smith 1986). Mégnin (1894) recorded Tenebrionidae on human corpses up to three years or more after death, and Lefebvre and Gaudry (2009) associated 100 % of records of tenebrionids on human corpses with the end of the first generation of colonizing species (Diptera: Calliphoridae). Tenebrionidae are related to the final stage of decomposition in arid and semi-arid environments, and for this reason they were probably not collected in the first forensic studies conducted in Argentina, where the experiments performed by Oliva (2001) and Centeno *et al.* (2002) involved humid environments.

Adult Tenebrionidae have been mentioned in forensic studies on decomposing pig carcasses (Matuszewski *et al.* 2008, Voss *et al.* 2011, Battán and Linhares 2011, Aballay *et al.* 2012, Caballero and León-Cortés 2014, Zanetti *et al.* 2015a, b) and on human corpses (Lefebvre and Gaudry 2009, Mariani *et al.* 2014, Introna *et al.* 2011, Aballay pers. obs.). Tenebrionidae recorded on carcasses were identified at family (Battán and Linhares 2011, Caballero and León-Cortés 2014), genus (Arnaldos *et al.* 2005, Santos *et al.* 2014), and at species levels in recent forensic studies conducted in arid and semiarid lands in Argentina (Aballay *et al.* 2008, 2012, Zanetti *et al.* 2015 a, b). The correct identification of insects at species level and knowledge of their life history as well as the duration of each stage of development lead to accurately establishing the PMI (Turchetto and Vanin 2004). In South America, the usefulness of Tenebrionidae as PMI indicators has not been established because of the absence of taxonomic keys allowing for their identification, as well as because of the scant documentation of the detailed life cycle of species. A key to the main families of South American Coleoptera of forensic importance was published (Almeida and Mise 2009), which includes a list of three identified and four unidentified species of Tenebrionidae, but which does not include a key for identifying these species.

The objectives of this paper are to provide an illustrated key to the Tenebrionidae species associated with decaying carcasses in Argentina and to present

diagnoses, habitus photographs, substratum and distribution for these species.

MATERIAL AND METHODS

Most of the specimens (1421 out of 1509) were collected during forensic studies of decomposing pig carcasses, because this species is the preferred animal model for forensic entomological studies (Goff 1993). Decomposition experiments were conducted in the Argentinean provinces of Mendoza, San Juan, Catamarca and Buenos Aires.

Most of the darkling beetles specimens studied were collected during the entire decomposition process from carcasses of 28 pigs and one llama. In Mendoza, the study was performed on the campus of the Centro Científico and Tecnológico CCT CONICET-Mendoza (32°53' 53.3"S, 68°52'26.2"W, 850 m altitude). Specimens were gathered from 12 pig carcasses during the four seasons of the year. In San Juan, Tenebrionidae were sampled in summer from two decomposing pig carcasses, placed on the campus of Facultad de Ciencias Exactas Físicas y Naturales, Universidad Nacional de San Juan (31°32'34.1"S, 68°34'38.2"W, 673 m altitude). Whereas in Catamarca (Antofagasta de la Sierra, 26°01'32.3"S, 67°20'36.5"W, 3600 m altitude), they were sampled in spring from decomposing carcasses of two pigs and one llama during spring. In Buenos Aires, the experiments were carried out on a field of the Universidad Nacional del Sur, Bahía Blanca (38°41'41"S, 62°15'10"W, 70 m altitude), and specimens were gathered from 12 decomposing pig carcasses during the four seasons of the year. For collecting and preserving specimens, we followed the methods by Centeno *et al.* (2002) and Aballay *et al.* (2008, 2012). Tenebrionids were collected by hand on corpses and from six pitfall traps placed approximately 40 cm from each carcass during the entire process of carcass decomposition. Other six pitfalls were placed 15 m from each carcass as controls, but these control traps caught local epigeal tenebrionids. The tenebrionids attracted by the carcasses were collected with the pitfall traps that had been placed close to the corpses.

Additional Tenebrionidae specimens were obtained using another three types of collection procedures: the first was conducted on human cadavers at various places in Mendoza province, authorized by Mendoza's Medical Forensic Committee of Mendoza; the second was carried out during field trips to various Argentinean provinces, assessing carcasses of cow (*Bos taurus*), fox (*Lycalopex griseus*), horse (*Equus caballus*), whale (*Eubalaena australis*), lesser rhea (*Pterocnemia pennata*), all found outdoors; for the third procedure we used a trap defined here as "baited

bottle trap" made from one 2.5-liter clear plastic soft drink bottle 11 cm in diameter, with its top cut off and turned over, forming a funnel connected to two chambers, an upper collecting chamber and a lower bait chamber. The lower one is baited with rotting chicken flesh and works as an olfactory attractant. The upper chamber of the funnel-shaped bottle ends in a 0.5-liter plastic container with 50% propylene glycol as preservative and captures the insects. This trap was active in the field for 25 days and protected by rocks to avoid vertebrate scavengers. Collecting sites in Argentina belong to the biogeographic provinces of Monte (Mendoza and San Juan), Puna (Catamarca) and Espinal (Buenos Aires) (Cabrera and Willink 1980).

Voucher specimens are housed in the entomological collection of the Instituto Argentino de Investigaciones de las Zonas Áridas (Mendoza, Argentina) and Universidad Nacional del Sur, Bahía Blanca (Argentina). Distributional data were obtained from the following collections: Instituto Argentino de Investigaciones de las Zonas Áridas (IADIZA, Mendoza Argentina), Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (Buenos Aires, Argentina), and National Museum of Natural History, Smithsonian Institution (Washington DC, USA). We followed the classification proposed by Matthews *et al.* (2010) for assigning species and genera to tribes and subfamilies.

Tenebrionidae were examined using a NiKon SMZ 745 microscope. Measurements (given in millimeters) were taken with an ocular micrometer. Overall body length was measured from the apex of the labrum to the apex of the elytra. The terminology used in the key and diagnoses follows recent papers dealing with Tenebrionidae (Aalbu 2006, Matthews *et al.* 2010, Silvestro and Flores 2012, Silvestro *et al.* 2012, Flores and Aballay 2015). Digital photographs of the specimens were taken with a Canon S50 camera adapted to a NiKon SMZ 745 stereomicroscope. Final images of the specimens were produced using the image-stacking free-ware CombineZM (Hadley 2014).

Type specimens of the newly described species are deposited in the following collections:

- FMNH – Field Museum of Natural History, Chicago, USA;
- IADIZA – Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina;
- IFML – Instituto y Fundación Miguel Lillo, San Miguel de Tucumán, Argentina;
- MACN – Museo Argentino de Ciencias Naturales Bernardino Rivadavia, Buenos Aires, Argentina;
- MLPA – Museo de La Plata, La Plata, Argentina;
- MNHN – Muséum National d'Histoire Naturelle, Paris, France;
- NHMB – Natural History Museum, Basel, Switzerland.

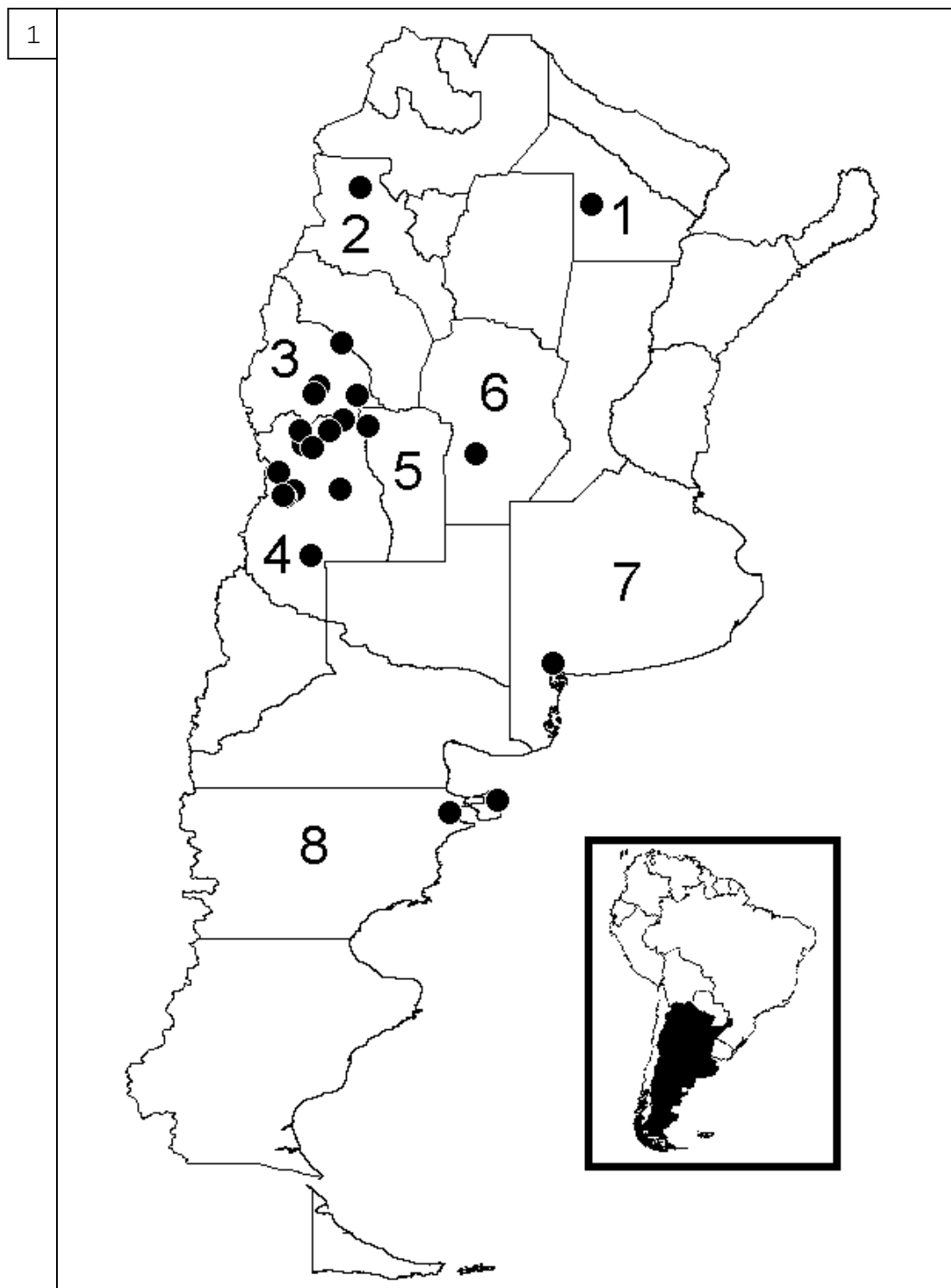


Figure 1. Sites where tenebrionid species of forensic importance were sampled in provinces of Argentina (see Table 1 for a list of species sampled at each site) Provinces: 1 – Chaco, 2 – Catamarca, 3 – San Juan, 4 – Mendoza 5 – San Luis, 6 – Córdoba, 7 – Buenos Aires, 8 – Chubut.

RESULTS

The list of Tenebrionidae of potential forensic importance in Argentina comprises 29 species included in four subfamilies (Alleculinae, Diaperinae, Tenebrioninae and Pimeliinae Latreille) and twelve tribes (Alleculini Laporte, Crypticini Brullé, Alphetobiini Reitter, Opatrini Brullé, Scotobiini Solier, Tenebrionini Latreille, Trilobocarini Lacordaire, Edrotini Lacordaire, Evaniosomini Lacordaire, Epitragini Blanchard, Elenophorini Solier, and Praociini Eschscholtz) distributed in eight provinces (Fig. 1). In order to make a more accurate use of the key, a diagnosis and habitus photographs are provided for each species.

Key to species of Tenebrionidae associated with carcasses in Argentina

1. Tarsal claws pectinate (Fig. 2) *Lobopoda breyeri* Brèthes
- Tarsal claws simple 2
2. Eyes completely divided into separate lower and upper parts by epistomal canthus (Figs. 3–5) ... 3
- Eyes entire or emarginate anteriorly by epistomal canthus (Figs. 6, 7), not completely divided 5
3. Pronotum widest at base or behind midpoint, posterior angles acute, projected backwards; antennomere 11 as long as 10; dorsal surface of body clothed with two kinds of setae, one stout, dark brown, the other finer, golden, dense (Fig. 3) *Trichoton roigi* Ferrer and Moragues
- Pronotum widest at or before midpoint, posterior angles straight to obtuse, not projected backwards; antennomere 11 longer than 10; dorsal surface of body clothed in sparse, fine, golden setae (Figs. 4, 5) 4
4. Pronotum with anterior margin concave; elytron with nine rows of punctures and intervals with dense punctures, epipleuron reaching the apex (Fig. 4) *Blapstinus punctulatus* Solier
- Pronotum with anterior margin straight; anterior half of elytron with surface densely punctate but punctures not aligned in rows, epipleuron abruptly abbreviated before apex (Fig. 5) *Conibius franzi* Kaszab
5. Eyes emarginate anteriorly by epistomal canthus, not completely divided (Figs. 6, 7) 6
- Eyes entire: rounded, elliptical, or semicircular, narrow, never emarginate 7
6. Eyes emarginate anteriorly by epistomal canthus leaving 3 to 4 ommatidia in their narrowest part (Fig. 6); body shiny; pronotum with lateral margins subparallel toward posterior angles, punctures on disc separated by two puncture diameters (Fig. 8) *Alphetobius diaperinus* (Panzer)
- Eyes emarginate anteriorly by epistomal canthus almost completely divided, leaving only one ommatidium in their narrowest part (Fig. 7); body dull; pronotum with lateral margins concave, narrowed toward posterior angles, punctures on disc separated by one puncture diameter (Fig. 9) *Alphetobius laevigatus* (Fabricius)
7. Pronotum widest before midpoint (Figs. 10, 11); anterior margin of clypeus armed with a row of teeth directed downwards, with one large tooth at middle (Fig. 12) 8
- Pronotum widest at or behind midpoint, or at base; anterior margin of clypeus lacking row of teeth ... 9
8. Clypeus short, not covering the labrum, anterior margin nearly at same level as antennal insertions; eyes protruding outward, upper margin lacking carina; length of epicanthus 2.5 x the length of eye (Figs. 10, 12) *Vaniosus profana* (Kulzer)
- Clypeus covering the labrum, with anterior margin produced anteriorly to antennal insertions; eyes not protruding, upper margin with a carina well marked, starting posteriorly to the epicanthus and ending in the posterior margin of eye; length of epicanthus equal to length of eye (as in Fig. 11; Fig. 13) *Achanius antofagastensis* Flores and Aballay
9. Abdomen without exposed intersegmental membranes apical to visible sternites three and four 10
- Abdomen with exposed intersegmental membranes apical to visible sternites three and four 17
10. Anterior margin of clypeus trilobate, divided by two undulating incisions; head widest at epicanthus, before eyes (Figs. 14, 15) *Salax lacordairei* Guérin-Méneville
- Anterior margin of clypeus concave, straight or convex; head widest at or behind eyes 11
11. Eyes protruding outward; mandibles with a dorsal cusp on basal half, shorter on the left than on the right (as in Fig. 12); labrum partially sclerotized, dorsal mandibular cusps slightly overlap the labrum (Fig. 16) *Hylithus tentyroides* Guérin-Méneville
- Eyes not protruding; mandibles lacking dorsal cusp on basal half; labrum exposed, entirely sclerotized 12
12. Humeri not elevated, elytra fused along the midline and abdomen 13
- Humeri elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen 15
13. Large size, usually more than 3.0 cm in length; elytral epipleuron with an undulate ridge bearing transverse, small carinae, modified as strigil; antennomere 3 longer than 4 + 5 combined; subgenal process contiguous with mentum, maxillary

- articulation of cardo partially covered by subgena and submentum (Figs. 17, 18). *Megelenophorus americanus* (Lacordaire)
- Size smaller, less than 1.5 cm in length; elytral epipleuron lacking ridge or small carinae; antennomere 3 shorter than 4 + 5 combined; subgenal process remote from mentum, maxillary articulation of cardo visible (Fig. 19) **14**
14. Medium size, usually more than 1.0 cm in length; pronotum widest at base; antennae moniliform, antennomere 11 shorter and narrower than antennomere 10; maxillary palps with last segment axe-shaped, widest at apex (Fig. 20) *Praocis ecostata* Kulzer
- Size smaller, less than 0.5 cm in length; pronotum widest behind midpoint; antennae clavate, antennomere 11 as long as 10; maxillary palps with last segment subcylindrical, widest at midpoint (Fig. 21) *Eutelocera cadaverina* Flores and Zanetti sp. nov.
15. Pronotum widest at base, anterior angles rounded sloping towards venter, posterior angles acute; elytra with punctures aligned in ten rows (Fig. 22) *Hemasodes minutus* (Steinheil)
- Pronotum widest at or behind midpoint, anterior angles acute, directed forwards, posterior angles obtuse (Figs. 23, 24); punctures on elytra dense but not aligned in rows (Figs. 25, 26) **16**
16. Pronotum with lateral margins concave; antennomere 11 as long as 10; frons with two tufts of setae inward to eyes (Figs. 23, 25) *Omopheres scabripennis* (Steinheil)
- Pronotum with lateral margins subparallel; antennomere 11 longer than 10; frons lacking tufts of setae (Figs. 24, 26) *Omopheres difficilis* (Steinheil)
17. Antennomeres 8–10 longer than wide; eyes elliptical; last tarsomeres lacking longitudinal groove on anterior margin; macropterous metathoracic wings present, elytra not fused along the midline and abdomen **18**
- Antennomeres 8–10 wider than long; eyes narrow, semicircular; last tarsomeres with longitudinal groove on anterior margin; elytra fused along the midline and abdomen **20**
18. Size large, usually more than 2.5 cm in length; last visible abdominal sternite with groove along outer margin; apical ring on antennomeres 7–11 with simple sensilla (Fig. 27) *Zophobas opacus* (Sahlberg)
- Size smaller, less than 0.5 cm in length; last visible abdominal sternite lacking groove along outer margin; apical ring on antennomeres 7–11 with compound, stellate sensoria, visible as white circles **19**
19. Pronotum widest at base, lateral margins arcuate, parallel in posterior half; prosternal process subrectangular, forming a straight angle; elytron dark brown, lacking spots (Fig. 28) *Gondwanocrypticus platensis* Fairmaire
- Pronotum widest at midpoint, lateral margins concave; prosternal process absent; elytron light brown with two spots and apex black (Fig. 29) *Poecilocrypticus formicophilus* Gebien
20. Body brown to light brown; head, antennomeres 1–7 and legs clothed in dense woolly, yellow setae; head elongated behind the eyes, widest at epicanthus, before eyes; lateral margins of pronotum with a constriction at base (Figs. 30, 31) **21**
- Body black or black to reddish; head, antennomeres 1–7 and legs clothed in sparse short, finer setae; head not elongated behind the eyes, widest at eyes; lateral margins of pronotum lacking constriction at base (Figs. 32–38) **22**
21. Head without horn or protuberances; pronotum with two elevated, sharp, central protuberances; elytra with four complete carinae (Fig. 30) *Leptynoderes strangulata* Fairmaire
- Head with a horn in the clypeus and two protuberances between the eyes; pronotum with two large, elongate, central protuberances and four small protuberances, two forward and two at the sides of the centrals; elytra with nine complete carinae (Fig. 31) *Leptynoderes nordenskioldi* Kulzer
22. Anterior margin of profemur with a tooth or a sharp spine **23**
- Anterior margin of profemur wavy, lacking tooth or spine **24**
23. Anterior margin of profemur with a sharp spine; pronotum without grooves or foveae, with dense punctures regularly distributed, lateral margin not curved upwards; elytron with nine longitudinal rows of conical tubercles, each interval with a row of sparse tubercles (Fig. 32) *Emmallodera perlifera* Burmeister
- Anterior margin of profemur with a rounded tooth; pronotum with a central longitudinal groove, a fovea on each side, and a posterior transverse groove, disc almost smooth, lateral quarters with large and dense punctures, lateral margin curved upwards; elytron with nine longitudinal rows of conical tubercles, each interval with a row of sparse punctures (Fig. 33) *Scotobius muricatus* Guérin-Méneville
24. Small size: length: 10–11 mm; pronotum with small, sparse punctures, width 1.8 times the length; elytra almost subquadrate, 1.20 times longer than wide, lateral margins nearly parallel (Fig. 34) *Scotobius ovalis* Guérin-Méneville
- Medium to large size: length: 19–30 mm; pronotum with large, dense punctures; width not exceeding 1.5 times the length; elytra elongate, 1.36 times

- longer than wide, lateral margins oval (Figs. 35–38) 25
25. Elytra with rows of punctures and intervals forming broad carinae slightly raised, turning backwards into rows of tubercles and converging postero-laterally (Fig. 35, 36) 26
- . Elytra without rows of punctures, with rows of tubercles all along (Figs. 37–39) 27
26. Pronotum widest behind midpoint, with punctures uniformly distributed, anterior angles acute and produced, posterior angles straight; elytron with punctures of same size or smaller than pronotum punctures (Fig. 35)
..... *Scotobius punctatus* Eschscholtz
- . Pronotum widest at midpoint, with punctures not uniformly distributed, denser on margins, anterior angles straight to obtuse, not produced, posterior angles obtuse; elytron with punctures larger than pronotum punctures (Fig. 36)
..... *Scotobius andrassyi* Kaszab
27. Pronotum widest at midpoint, with 2 to 4 irregular, smooth and slightly raised areas; anterior margin as wide as posterior margin; elytra with rows of large round tubercles, with only 10–16 tubercles per row (Fig. 37)
..... *Scotobius pilularius* Germar
- . Pronotum widest behind midpoint, without smooth raised areas; anterior margin different width than posterior margin; elytra with rows of medium size tubercles, more than 25 tubercles per row (Figs. 38, 39) 28
28. Large size: length 26–30 mm; pronotum with anterior margin wider than posterior margin, anterior angles produced; elytra with rows of conical tubercles aligned (Fig. 38)
..... *Scotobius casicus* Lacordaire
- . Medium size: length 15–17 mm; pronotum with anterior margin narrower than posterior margin, anterior angles not produced; elytra with rows of rounded tubercles not aligned (Fig. 39)
..... *Scotobius granosus* Solier

DIAGNOSES OF SPECIES

Lobopoda breyeri Brèthes, 1910
(Alleculinae, Alleculini)
(Fig. 2)

Diagnosis. Medium size (length: 11.8–17.6 mm, width: 3.8–5.9 mm). Body dark brown, elongate, dorsal surface clothed in dense, short, fine, brown setae. Pronotum with punctures separated by more than two puncture diameters, frons punctures same size of clypeal punctures, separated by less than one puncture diameter. Clypeal suture as a vertical, bisinuate

groove, clypeus lower than frons. Maxillary palps axe-shaped, distal margin four times width than base. Eyes emarginate anteriorly by epistomal canthus not completely divided. Antennae filiformis, antennomere 11 as long as 10. Pronotum widest at base or at midpoint, with lateral margins subparallel in posterior half; disc flat, lateral quarters sloping towards venter, posterior angles straight, posterior margin bisinuate, wider than anterior margin. Elytron with nine longitudinal rows of sunken punctures and intervals slightly raised with small disperse punctures; humeri elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four. Tarsal claws pectinate (Fig. 2).

Distribution. Argentina: provinces Buenos Aires, Catamarca, Chubut, Córdoba, La Rioja, Mendoza, Neuquén, Rio Negro, San Juan, San Luis, Tucumán (collection data IADIZA).

Trichoton roigi Ferrer and Moragues, 2001
(Tenebrioninae, Opatrini)
(Fig. 3)

Diagnosis. Medium size (length: 7.2–8.1 mm, width: 3.5–4.1 mm). Body dark brown, oval, dorsal surface clothed with two kinds of setae, one stout, dark brown, the other finer, golden, dense. Head and pronotum with punctures separated by less than one puncture diameter, frons punctures same size of clypeal punctures. Eyes completely divided into separate lower and upper parts by epistomal canthus. Antennae moniliform, antennomere 11 as long as 10. Pronotum widest at base or behind midpoint, disc very raised, lateral quarters flat, posterior angles acute, projected backwards, posterior margin bisinuate, wider than anterior margin. Elytron with nine longitudinal rows of big punctures and intervals carina-shape slightly raised, with small punctures; humeri elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires (Zanetti *et al.* 2015 a, b), Córdoba, Formosa, La Rioja, Mendoza, Salta, San Juan, Santa Fe (collection data IADIZA).

Blapstinus punctulatus Solier, 1851
(Tenebrioninae, Opatrini)
(Fig. 4)

Diagnosis. Small size (length: 4.9–6.2 mm, width: 2.1–2.5 mm). Body black to dark brown, oval, dorsal surface clothed in sparse, short, fine, golden setae.

Head and pronotum with punctures separated by one puncture diameter, frons punctures same size of clypeal punctures. Eyes completely divided into separate lower and upper parts by epistomal canthus. Antennae moniliform, antennomere 11 longer than 10. Pronotum widest at or before midpoint, disc and lateral quarters raised, posterior angles straight, not projected backwards, posterior margin almost straight, wider than anterior margin. Elytron with nine longitudinal rows of sunken punctures and intervals with disperse punctures; humeri weakly elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires (Zanetti *et al.* 2015 a, b), Catamarca, Chaco, Chubut, Córdoba, Entre Ríos, Jujuy, La Pampa, La Rioja, Mendoza, Neuquén, Salta, San Juan, San Luis, Santa Fe Santiago del Estero, Río Negro, Tucumán, (collection data IADIZA, MACN); Bolivia: Cochabamba department (collection data IADIZA) **new record for Bolivia**; Chile: provinces Bio-Bio, Cachapoal, Chiapa, Cordillera, Elqui, Linares, Maipo, Malleco Ñuble, Quillota, Santiago, Talca, (Vidal and Guerrero 2007). Uruguay: departments Canelones (Atlántida), Colonia, Montevideo (Carrasco) (collection data MACN) **new record for Uruguay**.

Conibius (Gondwanodilamus) franzi Kaszab, 1969
(Tenebrioninae, Opatrini)
(Fig. 5)

Diagnosis. Small size (length: 3.9–4.6 mm, width: 1.2–1.8 mm). Body black to dark brown, elongate, dorsal surface clothed in sparse, very short, fine setae on punctures. Head, pronotum and elytron with punctures separated by one puncture diameter, frons punctures same size of clypeal punctures. Eyes completely divided into separate lower and upper parts by epistomal canthus. Antennae moniliform, antennomere 11 longer than 10. Pronotum widest before midpoint, disc and lateral quarters raised, posterior angles obtuse, not projected backwards, posterior margin concave, narrower than anterior margin. Elytron densely punctate, on anterior half punctures not aligned in rows; epipleuron abruptly abbreviated before apex, humeri not elevated, metathoracic wings present, reduced. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces La Pampa, Mendoza, Neuquén, Salta, San Juan (collection data IADIZA), **new record for Argentina**. Chile: provinces Chañaral, El Loa (Vidal and Guerrero 2007).

Alphitobius diaperinus (Panzer, 1796)
(Tenebrioninae, Alphitobiini)
(Figs 4, 6)

Diagnosis. Small size (length: 5.9–7.4 mm, width: 2.5–3.3 mm). Body shiny, dark brown, oval, dorsal surface clothed in sparse, very short, fine setae on punctures. Frons punctures same size of clypeal punctures. Eyes emarginate anteriorly by epistomal canthus not completely divided, leaving 3 to 4 ommatidia in their narrowest part (Fig. 6), head widest at epicanthus, before eyes. Antennae capitate, antennomeres 6 to 10 wider than long, asymmetrically expanded apically (Fig. 6), antennomere 11 longer than 10. Pronotum widest at or before midpoint, with lateral margins subparallel toward posterior angles, disc and lateral quarters raised, posterior angles straight, not projected backwards, posterior margin bisinuate, wider than anterior margin; punctures separated by less than two puncture diameters on lateral quarters and by two puncture diameters on disc. Elytron with eight longitudinal rows of sunken punctures and intervals with shallow punctures; humeri weakly elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires, Entre Ríos, La Rioja, Mendoza, Río Negro, San Juan (collection data IADIZA).

Remarks. It is currently cosmopolitan, introduced in South America and recently recorded in Argentina (Cecco *et al.* 2005), it has been associated with many stored products (Spilman 1991) and in poultry farms (Cecco *et al.* 2005, Matthews *et al.* 2010).

Alphitobius laevigatus (Fabricius, 1781)
(Tenebrioninae, Alphitobiini)
(Figs 5, 7)

Diagnosis. Small size (length: 5.6–6.3 mm, width: 2.3–2.5 mm). Body dull, dark brown, oval, dorsal surface clothed in sparse, very short, fine setae on punctures. Frons punctures same size of clypeal punctures. Eyes emarginate anteriorly by epistomal canthus almost completely divided, leaving only one ommatidium in their narrowest part (Fig. 7), head widest at epicanthus, before eyes. Antennae capitate, antennomeres 6 to 10 wider than long, asymmetrically expanded apically (Fig. 7), antennomere 11 longer than 10. Pronotum widest at midpoint, with lateral margins concave, narrowed toward posterior angles, disc and lateral quarters raised, posterior angles obtuse, not projected backwards, posterior margin bisinuate, wider than anterior margin; punctures uniformly

distributed, separated by one puncture diameter. Elytron with eight longitudinal rows of sunken punctures and intervals with shallow punctures; humeri weakly elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: Mendoza province (collection data IADIZA).

Remarks. It is currently cosmopolitan and introduced in South America, it has been associated with many stored products (Spilman 1991), **new record for Argentina.**

Vaniosus profana (Kulzer, 1956)
(Pimeliinae, Evanosomini)
(Figs 10, 12)

Diagnosis. Small size (length: 3.6–4.8 mm, width: 1.3–1.8 mm). Body dark brown, elongate, dorsal surface clothed in sparse, very short, fine setae on punctures. Head and pronotum with punctures separated by less than one puncture diameter, frons punctures same size of clypeal punctures. Mandibles with a dorsal cusp on basal half, longer on the right than on the left mandible (Fig. 12); anterior margin of clypeus armed with a row of teeth directed downwards, with one large tooth at middle (Fig. 12). Eyes protruding outward. Antennae moniliform, antennomere 11 as long as 10. Pronotum widest before midpoint, disc raised, lateral quarters flat, posterior angles obtuse, not projected backwards, posterior margin concave, narrower than anterior margin. Elytron with ten longitudinal rows of punctures, only the anterior quarter of intervals with disperse punctures; humeri weakly elevated, metathoracic wings present, reduced, as long as elytra, not folded. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Catamarca, Córdoba, La Rioja, Mendoza, Salta, San Juan, Santiago del Estero, Tucumán (Flores and Aballay 2015), and Formosa; Bolivia: Santa Cruz department (collection data USNM), **new record for Bolivia.**

Achanius antofagastensis Flores and Aballay, 2015
(Pimeliinae, Evanosomini)
(Fig. 11)

Diagnosis. Small size (length: 3.5–4.9 mm, width: 1.1–1.5 mm). Body elongate, head and prothorax dark brown, elytra light brown, with a dark brown spot on central third extending backwards along the suture; antennae, legs and mouth parts light brown as elytra, dorsal surface glabrous. Head and pronotum with

punctures separated by two puncture diameters, frons punctures same size of clypeal punctures. Right mandible with a dorsal cusp on the basal half, left mandible with a dorsal sharp raised edge; anterior margin of clypeus armed with a row of teeth directed downwards, with one large tooth at middle. Eyes round, upper margin with a carina well marked (Fig. 13). Antennae moniliform, antennomeres 6 to 10 triangular, expanded outwards, antennomere 11 longer than 10. Pronotum widest before midpoint, disc and lateral quarters raised, with anterior angles rounded, sloping towards venter, posterior angles obtuse, not projected backwards, posterior margin concave, narrower than anterior margin. Elytron with ten longitudinal rows of punctures; humeri elevated, metathoracic wings present, reduced, narrow, reaching the $\frac{3}{4}$ of length of elytra. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: Catamarca province over altitude of 3000 m (Flores and Aballay 2015).

Salax lacordairei Guérin-Méneville, 1834
(Pimeliinae, Trilobocarini)
(Figs 14, 15)

Diagnosis. Medium size (length: 7.9–9.9 mm, width: 3.1–4.6 mm). Body black to dark brown, elongate, dorsal surface clothed in dense, short, fine setae. Head, pronotum and elytron with punctures separated by one puncture diameter; frons punctures larger than clypeal punctures. Anterior margin of clypeus trilobate, divided by two undulating incisions. Eyes round, upper margin of eyes with a carina well marked; head widest at epicanthus, before eyes (Fig. 14). Antennae moniliform, antennomere 11 shorter than 10; antennomere 10 twice the width of antennomere 11 (Fig. 14). Pronotum widest at or before midpoint, disc and lateral quarters raised, posterior angles straight, not projected backwards, posterior margin bisinuate, wider than anterior margin. Elytron with punctures not aligned in rows, with five to seven superficial, longitudinal grooves and intervals carina-shape slightly raised; humeri elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Catamarca, Córdoba, La Pampa, La Rioja, Mendoza, Neuquén, Río Negro Salta, San Juan, San Luis, Santiago del Estero, Tucumán (collection data IADIZA); Bolivia: Cochabamba department (collection data IADIZA) **new record for Bolivia**; Chile: provinces Antofagasta, El Loa (collection data IADIZA; Vidal and Guerrero, 2007).

Hylithus tentyroides Guérin-Méneville, 1834
(Pimeliinae, Edrotini)
(Fig. 16)

Diagnosis. Small size (length: 5.4–7.9 mm, width: 2.1–3.1 mm). Body black to dark brown, elongate, dorsal surface clothed in sparse, very short setae on punctures. Head and pronotum with punctures separated by less than two puncture diameters, frons punctures same size of clypeal punctures. Mandibles with a dorsal cusp on basal half, shorter on the left than on the right (as in Fig. 12); labrum partially sclerotized, dorsal mandibular cusps slightly overlap the labrum. Eyes round, protruding outward. Antennae moniliform, antennomere 11 longer than 10. Pronotum widest at midpoint, disc and lateral quarters not raised, posterior angles obtuse, not projected backwards, posterior margin as wide as anterior margin. Elytron with nine longitudinal rows of punctures smaller than head and pronotum punctures, intervals with punctures same size aligned in rows, making visible the surface with eighteen rows of punctures; humeri elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires, Catamarca, Chubut, Córdoba, La Rioja, Mendoza, Río Negro, Salta, San Juan, Tucumán (collection data IADIZA and MACN; Zanetti *et al.* 2015 a, b).

Megelenophorus americanus (Lacordaire, 1830)
(Pimeliinae, Elenophorini)
(Figs 17, 18)

Diagnosis. Large size (length: 29.9–40.7 mm, width: 11.4–15.9 mm). Body black, elongate, dorsal surface clothed in sparse, very short setae arising on small protuberances in frons, pronotum and elytra. Clypeus with sparse punctures on anterior half, frontoclypeal and genoclypeal sutures well marked and deep; subgenal process contiguous with mentum, maxillary articulation of cardo partially covered by subgena and submentum (Fig. 18). Eyes semicircular, narrow. Antennae filiformis, antennomere 3 longer than 4 + 5 combined; antennomere 10 and 11 shorter than remaining. Pronotum separated from elytra, lateral margins concave, well marked, carina shape, widest at midpoint, disc very raised, lateral quarters raised, posterior angles obtuse, not projected backwards, posterior margin straight, narrower than anterior margin. Elytron plain, with lateral margins carina-shape, humeri not elevated, elytra fused along the midline and abdomen; pseudopleuron with two carinae; elytral epipleuron broadened in posterior half, with an undulate ridge

bearing transverse, small carinae, modified as strigil. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Catamarca, Formosa, La Rioja, Mendoza, Neuquén, Río Negro, Salta, San Juan, Santiago del Estero, Tucumán (collection data IADIZA and MACN).

Praocis ecostata Kulzer, 1958
(Pimeliinae, Praociini)
(Figs 19, 20)

Diagnosis. Medium size (length: 9.6–12.1 mm, width: 6.1–8.1 mm). Body black to dark brown, oval, dorsal surface of pronotum and elytron clothed in sparse, very short setae on punctures; with noticeable punctures on pronotum and elytra not uniformly distributed, separated by more than two puncture diameters, bigger on elytra than on pronotum. Clypeal suture as horizontal groove not covered by frons, clypeus lower than frons. Eyes elliptical. Antennae moniliform, antennomere 11 shorter and narrower than antennomere 10. Pronotum widest at base, lateral margins arcuate, well marked; disc very raised, lateral quarters raised, posterior angles acute, projected backwards; posterior margin bisinuate, wider than anterior margin. Elytron with two longitudinal carinae slightly raised, equidistant between suture and lateral margin; humeri not elevated, elytra fused along the midline and abdomen. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Catamarca, Jujuy and Salta, over altitude of 3000 m (collection data IADIZA).

Eutelocera cadaverina Flores and Zanetti sp. nov.
(Pimeliinae, Praociini)
(Fig. 21)

Diagnosis. *Eutelocera cadaverina* sp. nov. differs from *E. viatica* Solier 1840 by having pronotum with posterior angles obtuse, rounded, not produced backwards, posterior margin convex, elytron with small, isolated protuberances and dorsal surface clothed with two kinds of setae, one stout, the other finer, while in *E. viatica* the pronotum has posterior angles straight produced backwards, posterior margin biconcave, elytron with three rows of big protuberances on posterior half, lateral margin formed by big protuberances, and dorsal surface clothed in sparse, finer setae.

Description. Small size (length: 3.8–4.9 mm, width: 1.8–2.5 mm). Body black to dark brown, oval, dorsal surface clothed with two kinds of setae, one stout, the

other dense, finer. Clypeal suture as horizontal groove not covered by frons, clypeus lower than frons. Eyes elliptical. Antennae clavate, antennomere 11 as long as 10. Pronotum with small protuberances, widest behind midpoint, lateral margins concave, well marked; disc raised, lateral quarters flat, posterior angles obtuse, not produced backwards; posterior margin convex, wider than anterior margin. Elytron with deep, sparse punctures and small, isolated protuberances on distal third and on pseudopleuron; humeri not elevated, elytra fused along the midline and abdomen. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Etymology. Its name is derived from the Latin word *cadaverina*, prope of carcase, meaning that feed on dead bodies.

Type material. Holotype, male: [Argentina, Buenos Aires, Dto. Bahía Blanca, Bahía Blanca, Altos del Palihue, on pig carcase, 38°41'41"S, 62°15'10"W, 70 m, 17.II.2011, coll: N. Zanetti] [*Eutelocera / cadaverina* sp. n. / HOLOTYPUS male / Det. G. Flores and / N. Zanetti 2016] (IADIZA). Allotype, female: with the same data as holotype except date: 9.IX.2010 (IADIZA). Paratypes with the same data as holotype except date: one female 28.VIII.2010 (IADIZA); two males and one female 10.XI.2010 (IADIZA); one male 10.XII.2010 (MLPA); three males 1.III.2011 (2 MACN, 1 MLPA); four males 1.IV.2011 (2 FMNH, 2 NHMB); one male 12.IV.2011 (MNHN); one male 17.II.2011 (IADIZA); one male 18.X.2011 (IFML); one paratype not sexed 8.X.2010 (IFML).

Distribution. Argentina: Known only from the typical locality, Altos del Palihue, Bahía Blanca, Buenos Aires province.

Remarks. Prior to this study *Eutelocera* Solier, 1840 was monotypic. Now the genus is comprised of two species: *E. viatica* and *E. cadaverina* sp. nov.

Hemasodes minutus (Steinheil, 1874)
(Pimeliinae, Epitragini)
(Fig. 22)

Diagnosis. Small size (length: 5.1–8.2 mm, width: 2.0–3.4 mm). Body brown, elongate, dorsal surface of pronotum and elytron clothed in sparse, golden, very short setae; with punctures on pronotum and elytra separated by less than two puncture diameters. Eyes round. Antennae filiformis, antennomere 11 as long as 10. Pronotum widest at base, anterior angles rounded sloping towards venter, lateral margins arcuate, well marked; disc raised, lateral quarters not raised, posterior angles acute, projected backwards; posterior margin bisinuate, wider than anterior margin. Elytron with punctures aligned in 10 rows, intervals with sparse punctures; humeri elevated, macropterous

metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires, La Rioja, Mendoza, San Juan, San Luis, Santiago del Estero (collection data IADIZA and MACN).

Omopheres scabripennis (Steinheil, 1874)
(Pimeliinae, Epitragini)
(Figs 23, 25)

Diagnosis. Medium size (length: 10.8–15.5 mm, width: 3.9–7.1 mm). Body brown to dark brown, elongate, dorsal surface of pronotum and elytra clothed in sparse, golden, very short setae; punctures on pronotum and elytra separated by less than two puncture diameters. Frons with two tufts of setae inward to eyes. Eyes round. Antennae filiformis, antennomeres 8 to 10 asymmetrically expanded outwards, antennomere 11 as long as 10. Pronotum widest at or behind midpoint, anterior angles acute, directed forwards, lateral margins concave, well marked; disc and lateral quarters raised, posterior angles obtuse, not projected backwards; posterior margin bisinuate, wider than anterior margin. Elytron with noticeable, dense punctures not aligned in rows; humeri elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Catamarca, Chaco, Córdoba, La Rioja, Mendoza, Neuquén, Río Negro, San Juan, San Luis, Santiago del Estero (collection data IADIZA and MACN); Bolivia (Freude 1967).

Omopheres difficilis (Steinheil, 1874)
(Pimeliinae, Epitragini)
(Figs 24, 26)

Diagnosis. Medium size (length: 10.1–15.1 mm, width: 4.1–6.6 mm). Body brown to dark brown, elongate, dorsal surface of pronotum and elytron clothed in sparse, golden, very short setae; punctures on pronotum and elytra separated by two puncture diameters. Eyes round. Antennae filiformis, antennomeres 8 to 10 asymmetrically expanded outwards, antennomere 11 longer than 10. Pronotum widest at or behind midpoint, anterior angles acute, directed forwards, lateral margins subparallel, well marked; disc and lateral quarters raised, posterior angles obtuse, not projected backwards; posterior margin convex, wider than anterior margin. Elytron with dense punctures not aligned in rows; humeri elevated, macropterous metathoracic

wings present, elytra not fused along the midline and abdomen. Abdomen without exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Catamarca, Chaco, La Rioja, Mendoza, Neuquén, Rio Negro, Salta, San Juan, San Luis, Santiago del Estero (collection data IADIZA and MACN); Bolivia and Paraguay (Freude 1967).

Zophobas opacus (Sahlberg, 1823)
(Tenebrioninae, Tenebrionini)
(Fig. 27)

Diagnosis. Large size (length: 22.9–29.3 mm, width: 7.5–9.4 mm). Body black, elongate, surface of pronotum and elytron glabrous. Eyes elliptical. Antennae moniliform, antennomere 11 with apex asymmetrically curved outwards, longer than 10. Pronotum almost smooth with sparse punctures, widest at or before midpoint, anterior angles rounded, lateral margins concave, well marked; disc and lateral quarters raised, posterior angles obtuse, not projected backwards; posterior margin slightly bisinuate, wider than anterior margin. Elytron with punctures aligned in nine rows, intervals smooth; humeri elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four; last visible abdominal sternite with groove along outer margin.

Distribution. America, from United States to Argentina (Ferrer 2011). In Argentina: provinces Chaco, Córdoba, Formosa, Mendoza, Salta, San Juan, Santa Fe, Santiago del Estero (collection data IADIZA).

Gondwanocrypticus platensis Fairmaire, 1883
(Diaperinae, Crypticini)
(Fig. 28)

Diagnosis. Small size (length: 3.6–4.9 mm, width: 1.8–2.5 mm). Body dark brown to black, oval, dorsal surface clothed in sparse, very short, fine setae. Clypeal suture not marked, anterior margin of clypeus contiguous with genae, forming an arcuate anterior margin of head. Eyes elliptical. Antennae filiformis, antennomere 11 with apex asymmetrically curved outwards, longer than 10; apical ring on antennomeres 7–11 with compound, stellate sensoria, visible as white circles. Pronotum with punctures separated by one puncture diameter, widest at base, disc and lateral quarters raised, lateral margins arcuate, parallel in posterior half, posterior angles straight, not projected backwards, posterior margin straight, twice the length of anterior margin. Elytron with nine imperceptible

longitudinal rows of punctures and intervals with sparse punctures; humeri weakly elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires (Zanetti *et al.* 2015 a, b), Catamarca, Córdoba, Formosa, La Pampa, La Rioja, Mendoza, Salta, San Juan, San Luis, Santiago del Estero, Tucumán (collection data IADIZA and MACN) and Misiones; Uruguay: Montevideo department (Fairmaire 1883). Introduced in the United States (Steiner and Swearingen 2014).

Poecilocrypticus formicophilus Gebien, 1928
(Diaperinae, Crypticini)
(Fig.

Diagnosis. Small size (length: 2.8–3.2 mm, width: 1.1–1.3 mm). Body oval, light brown to reddish, elytron light brown with two spots and apex black, dorsal surface glabrous. Anterior margin of clypeus straight. Eyes elliptical. Antennae moniliform, antennomere 11 with apex asymmetrically curved outwards, longer than antennomere 10; apical ring on antennomeres 7–11 with compound, stellate sensoria, visible as white circles. Pronotum with punctures separated by one puncture diameter, widest at midpoint, disc and lateral quarters raised, lateral margins concave, posterior angles straight, not projected backwards, posterior margin straight, wider than anterior margin. Elytron with nine longitudinal rows of punctures and intervals with sparse, smaller punctures; humeri weakly elevated, macropterous metathoracic wings present, elytra not fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires, Córdoba, Mendoza (collection data IADIZA and MACN; Gebien 1928) and Brazil (Rio Grande do Sul; Gebien 1928). Introduced in the United States (Steiner 1982).

Leptynoderes strangulata Fairmaire, 1903
(Tenebrioninae, Scotobiini)
(Fig. 30)

Diagnosis. Medium size (length: 9.4–14.4 mm, width: 3.9–6.5 mm). Body brown to light brown, usually covered with grains of sand. Head elongated behind the eyes, without horn or protuberances on clypeus. Head, antennomeres 1–7 and legs covered with dense woolly, yellow setae, setae not covering completely the cuticle. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum with

two acute central protuberances; lateral margin expanded upwards with a constriction at base; posterior angles straight, produced backwards; posterior margin straight, wider than anterior margin. Elytron with seven carinae: first adjoining elytral suture, 2 and 4 as rows of acute tubercles only visible in posterior third; carina 3 entire, raised, acute and smooth; carina 5 raised with tubercles; 6 and 7 like rows of acute tubercles inconspicuous for the grains of sand; humeri weakly elevated, elytra fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: Catamarca, Tucumán (Kulzer 1955); Córdoba, La Rioja, Northern Mendoza, San Juan (collection data IADIZA).

Leptynoderes nordenskioldi Kulzer, 1955
(Tenebrioninae, Scotobiini)
(Fig. 31)

Diagnosis. Medium size (length: 11.0–13.0 mm, width: 4.9–5.8 mm). Body brown to light brown, dull, sometimes covered with grains of sand. Head elongated behind the eyes with a horn on the clypeus and two acute and elongate protuberances between the eyes. Head, antennomeres 1–7 and legs covered with dense woolly, yellow setae, covering completely the cuticle. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum with two large, elongate central protuberances and four small protuberances, two forward and two at the sides of the centrals; lateral margin expanded upwards with a constriction at base; posterior angles acute, produced backwards; posterior margin straight, wider than anterior margin. Elytron with nine carinae: first adjoining elytral suture, 2 as row of small tubercles slightly raised, more pronounced in posterior third; 3 and 4 more raised than the remaining, acute and smooth, backwards become in elongate tubercles; the remaining carinae as rows of acute tubercles sometimes elongated backwards; humeri weakly elevated, elytra fused along the midline and abdomen. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: South Buenos Aires (Zanetti *et al.* 2015 a, b), Chubut, Southern Mendoza, Neuquén, Rio Negro (collection data IADIZA).

Emmallodera perlifera Burmeister, 1875
(Tenebrioninae, Scotobiini)
(Fig. 32)

Diagnosis. Large size (length: 20.9–28.8 mm, width: 9.1–13.4 mm). Body black, dull, oval. Head with punctures separated less than two puncture diameters;

frons punctures two times larger than clypeal punctures. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest at midpoint, with dense punctures of same size of clypeal punctures regularly distributed; lateral margin not curved upwards; anterior angles acute; posterior margin straight, wider than anterior margin. Elytron with nine longitudinal rows of conical tubercles, the first three rows inconspicuous anteriorly, each interval with a row of sparse tubercles, more noticeable on the sides; humeri not elevated, elytra fused along the midline and abdomen. Legs with punctures; anterior margin of profemur with a sharp spine. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina provinces Catamarca, La Rioja, Mendoza, Neuquén, Salta, San Juan, Santiago del Estero (Kulzer 1955), Córdoba (collection data IADIZA).

Scotobius muricatus Guérin-Ménéville, 1834
(Tenebrioninae, Scotobiini)
(Fig. 33)

Diagnosis. Large size (length: 18.2–29.9 mm, width: 8.2–12.2 mm). Body black, dull, elongated. Head with punctures separated less than two puncture diameters; frons punctures three to four times larger than clypeal punctures. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest at midpoint, with a central longitudinal groove, a fovea on each side, and a posterior transverse groove; disc almost smooth, lateral quarters of pronotum with large and dense punctures of same size of clypeal punctures; lateral margin curved upwards; anterior angles rounded and downwards; posterior margin straight, as wide as anterior margin. Elytron with nine longitudinal rows of conical tubercles well defined even backwards and sideways; humeri not elevated, elytra fused along the midline and abdomen. Legs with inconspicuous punctures; anterior margin of profemur with a rounded tooth. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina provinces Córdoba, La Pampa, San Luis (collection data IADIZA) Buenos Aires (Zanetti *et al.* 2015a, b); Uruguay; Paraguay (Kulzer 1955).

Scotobius ovalis Guérin-Ménéville, 1834
(Tenebrioninae, Scotobiini)
(Fig. 34)

Diagnosis. Medium size (length: 10.3–11.5 mm, width: 4.6–6.0 mm). Body black, dull, oval and glabrous.

Head punctures separated by more than three puncture diameters; frons punctures of same size than clypeal punctures, distributed uniformly. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest just behind midpoint, with a central longitudinal groove and punctures smaller than frons punctures, separated by one to three puncture diameters; lateral margin marked, not elevated; anterior angles acute, rounded, slightly produced; posterior angles obtuse, rounded; posterior margin straight, wider than anterior margin. Elytron with nine carinae slightly raised and intervals with longitudinal rows of large punctures slightly marked; on the carinae and intervals with small disperse punctures uniformly distributed; humeri elevated, elytra fused along the midline and abdomen. Legs with punctures same size than pronotum punctures; anterior margin of profemur wavy, lacking tooth. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: Buenos Aires province; Uruguay: Montevideo department (Kulzer 1955).

Scotobius punctatus Eschscholtz, 1831
(Tenebrioninae, Scotobiini)
(Fig. 35)

Diagnosis. Medium size (length: 13.3–17.0 mm, width: 6.5–8.0 mm). Body black to reddish, dull, glabrous. Head and pronotum with punctures of same size, separated by less than two puncture diameters uniformly distributed. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest behind midpoint; lateral margin flattened, slightly curved upwards; anterior angles acute, produced; posterior angles straight; posterior margin straight, wider than anterior margin. Elytron with nine longitudinal rows of punctures of same size or smaller than pronotum punctures; intervals carina-shape slightly raised with small disperse punctures, turning backwards into rows of tubercles and converging postero-laterally; humeri not elevated, elytra fused along the midline and abdomen. Legs with punctures same size than pronotum punctures, anterior margin of profemur wavy, lacking tooth. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: South and West Mendoza and West Neuquén provinces; Chile: Malleco province (Silvestro *et al.* 2012).

Scotobius andrassyi Kaszab, 1969
(Tenebrioninae, Scotobiini)
(Fig. 36)

Diagnosis. Medium size (length: 21.3–13.8 mm, width: 8.9–5.7 mm). Body black to reddish, dull,

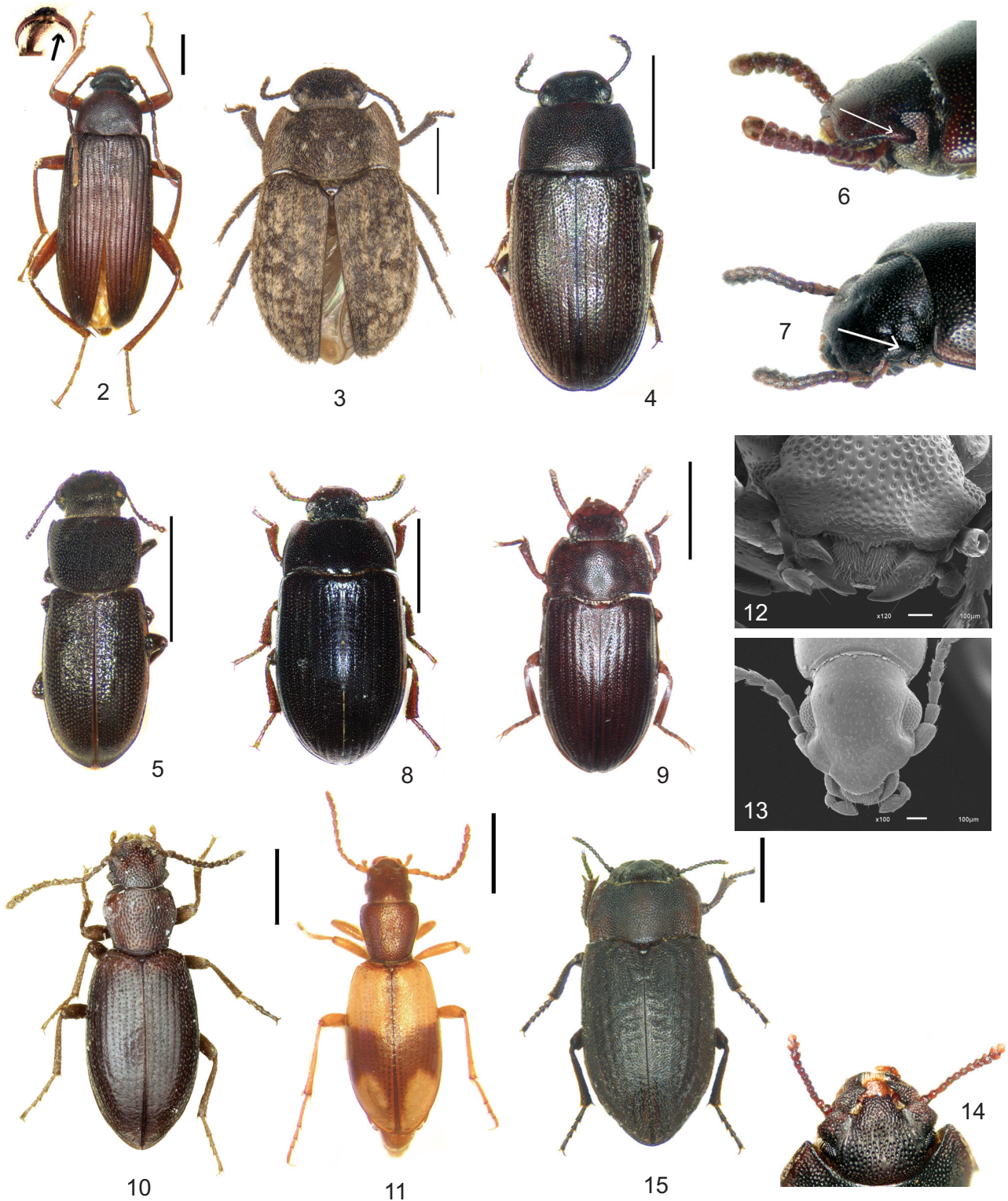
glabrous. Head and pronotum with punctures of same size. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest at midpoint, with punctures separated by more than two puncture diameters on the disc and separated by less than one puncture diameter at lateral quarters; lateral margin flattened, slightly curved upwards; anterior angles straight to obtuse, not produced; posterior angles obtuse; posterior margin straight, narrower than anterior margin. Elytron with nine longitudinal rows of punctures larger than pronotum punctures; intervals carina-shape slightly raised without or with small disperse punctures, turning backwards into rows of tubercles and converging postero-laterally; humeri not elevated, elytra fused along the midline and abdomen. Legs with punctures same size than pronotum punctures, anterior margin of profemur wavy, lacking tooth. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: Northwest Mendoza and Center-Southwest San Juan provinces; Chile: Los Andes, Santiago, Cordillera, and Cachapoal provinces (Silvestro *et al.* 2012).

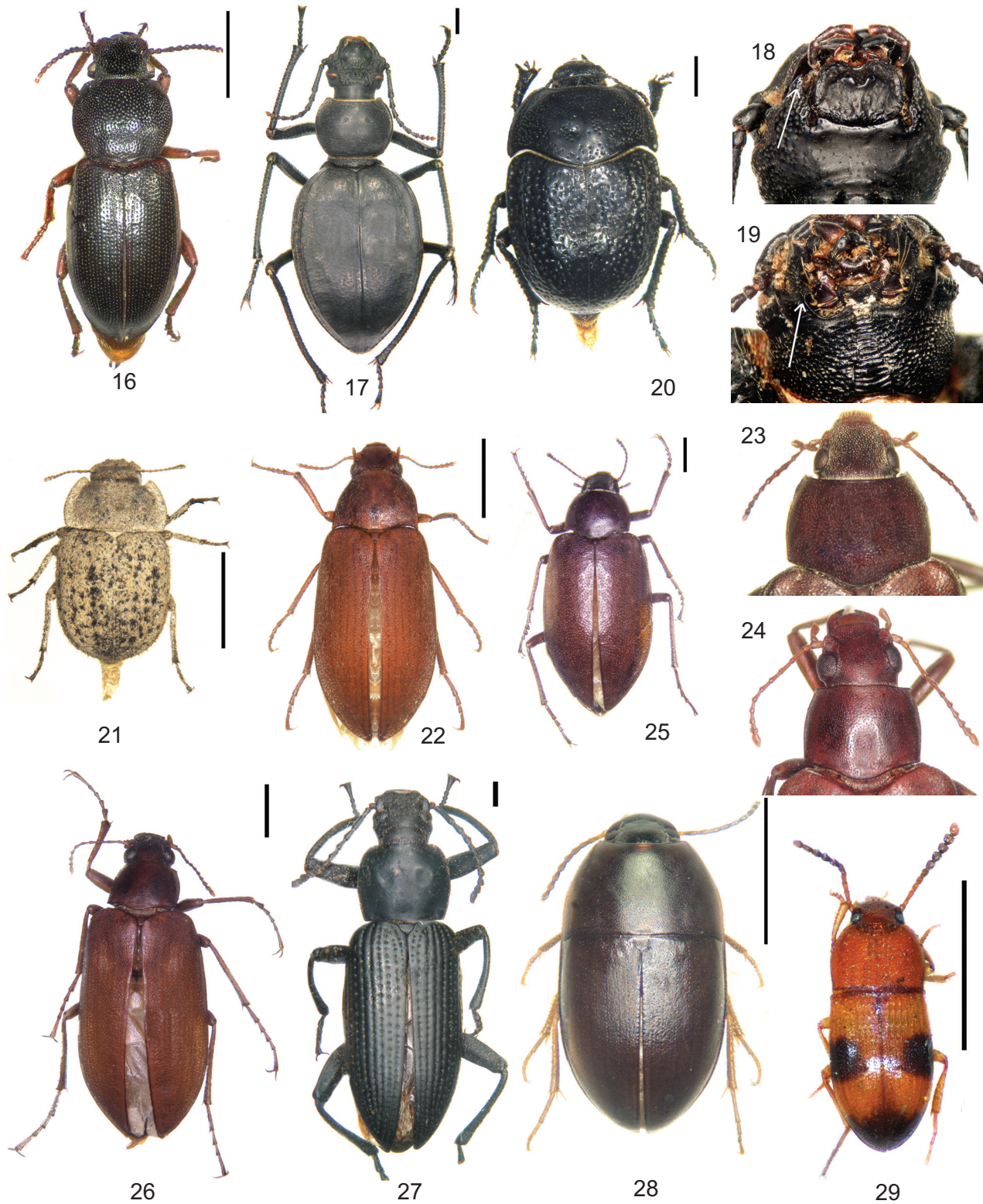
Scotobius pilularius Germar, 1823
(Tenebrioninae, Scotobiini)
(Fig. 37)

Diagnosis. Medium size (length: 15.7–19.9 mm, width: 7.6–9.9 mm). Body black, dull, glabrous. Head punctate, on frons not uniform, on clypeus uniformly distributed, separated by less than two puncture diameters, both of same size. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest at midpoint, with punctures same size than head punctures, separated by less than one puncture diameter, with two to four irregular, smooth and slightly raised areas; lateral margin flat, slightly curved upwards; anterior angles rounded, not produced; posterior margin straight, as wide as anterior margin. Elytron with nine longitudinal rows of round large tubercles, with only 10–16 tubercles per row; humeri weakly elevated, elytra fused along the midline and abdomen. Legs punctures lesser than pronotum punctures; anterior margin of profemur wavy, lacking tooth. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

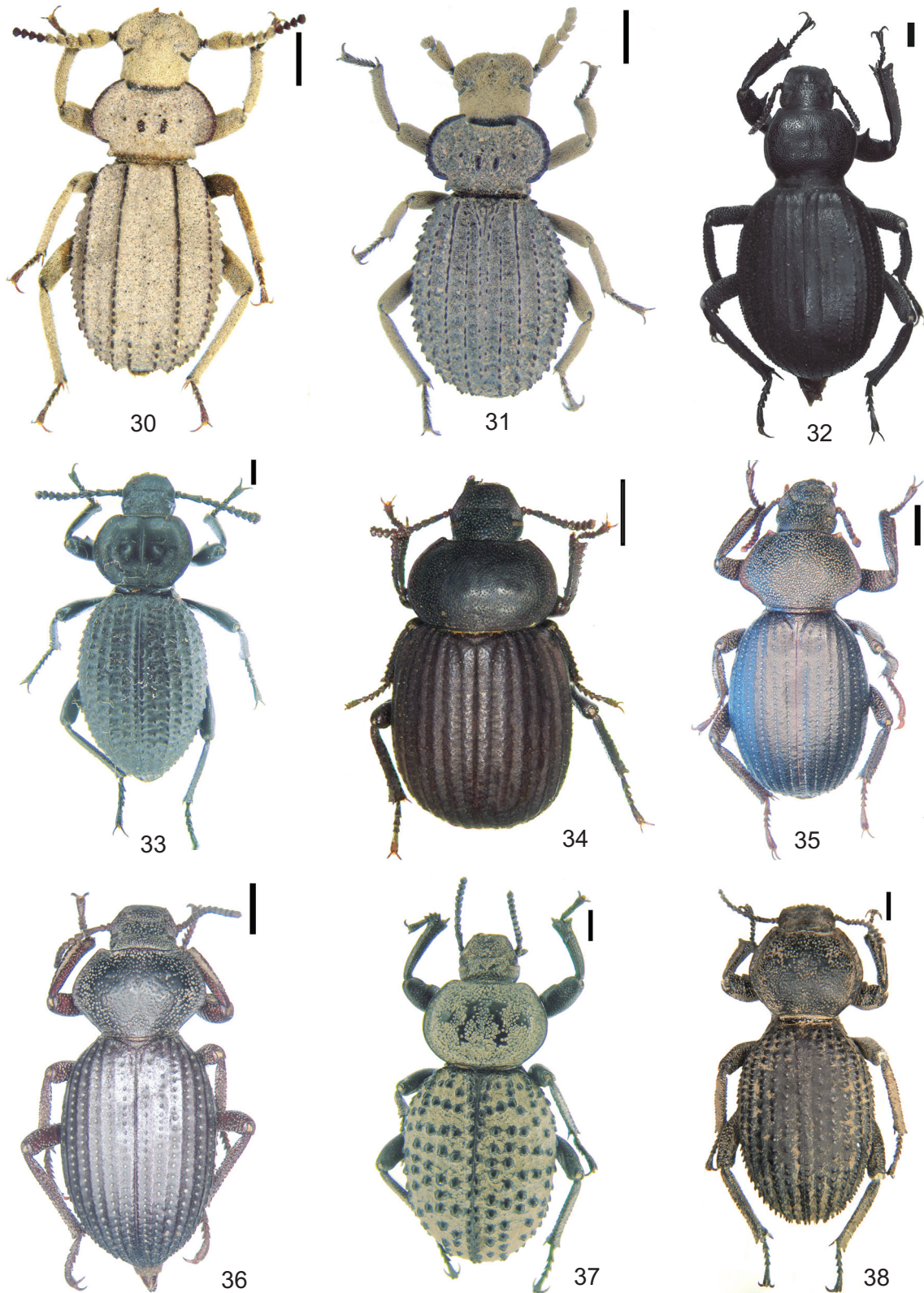
Distribution. Argentina: provinces Buenos Aires, Chubut, Córdoba, Corrientes, Entre Ríos, Formosa, La Pampa, La Rioja, Mendoza, Neuquén, Río Negro, San Luis, Tucumán; Uruguay: departments Canelones, Lavalleja, Montevideo; Brazil: Rio Grande do Sul; Chile: Cautín province (Kulzer, 1955, Zanetti *et al.* 2015a, b cited as *S. miliaris* Billberg 1815, Silvestro and Flores 2016, this volume).



Figures 2–15. (2–5) Habitus: 2 – *Lobopoda breyeri*, upper left showing tarsal claws pectinate; 3 – *Trichoton roigi*; 4 – *Blapstinus punctulatus*; 5 – *Conibius franzi*; (6–7) Eyes emarginate anteriorly by epistomal canthus: 6 – *Alphetobius diaperinus*, 7 – *Alphetobius laevigatus*, (8–11) Habitus: 8 – *Alphetobius diaperinus*, 9 – *Alphetobius laevigatus*, 10 – *Vaniosus profana*, 11 – *Achanius antofagastensis* (Figs 10 and 11 images from Flores and Aballay 2015: Figs. 2 and 14, reproduced with permission); (12–14) Head, frontal view showing mouthparts: 12 – *Vaniosus profana*; 13 – *Achanius (Ambigatus) bicolor* Kulzer (images from Flores and Aballay 2015: Figs. 6 and 19, reproduced with permission); 14 – *Salax lacordairei*, (15) Habitus: 15 – *Salax lacordairei*. Scale bars 2 mm.



Figures 16–29. 16 - *Hylithus tentyroides*, 17 - *Megelenophorus americanus*; (18, 19) Head, ventral view showing mouthparts: 18 - *Megelenophorus americanus*, 19 - *Praocis ecostata*. White arrow indicates subgenal process; (20–22) Habitus: 20 - *Praocis ecostata*, 21 - *Eutelocera cadaverina* sp. nov. (paratypus), 22 - *Hemasodes minutus*, (23–24) Pronotum: 23 - *Omopheres scabripennis*, 24 - *Omopheres difficilis*, (25–39) Habitus: 25 - *Omopheres scabripennis*, 26 - *Omopheres difficilis*, 27 - *Zophobas opacus*, 28 - *Gondwanoerypticus platensis*, 29 - *Poecilocrypticus formicophilus*. Scale bars 2 mm.



Figures 30–38. (30) *Leptynoderes strangulata*, (31) *Leptynoderes nordenskioldi*, (32) *Emmallodera perlifera*, (33) *Scotobius muricatus*, (34) *Scotobius ovalis*, (35) *Scotobius punctatus* (image from Silvestro *et al.* 2012: Fig. 1, reproduced with permission), (36) *Scotobius andrassyi* (image from Silvestro *et al.* 2012: Fig. 3, reproduced with permission), (37) *Scotobius pilularius*, (38) *Scotobius casicus*. Scale bars 2 mm.

Remarks. This species was known in publications as *Scotobius miliaris* since 173 years ago due to incorrect synonymy (Silvestro and Flores 2016, this volume). The taxonomic history can be found in Silvestro and Flores (2016, this volume).

Scotobius casicus Lacordaire, 1830
(Tenebrioninae, Scotobiini)
(Fig. 38)

Diagnosis. Large size (length: 21.9–30.0 mm, width: 9.2–12.0 mm). Body black, dull, elongated. Head with punctures separated by less than two puncture diameters, frons punctures same size of clypeal punctures. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest behind midpoint, with punctures same size than frons punctures, separated by less than three puncture diameters, denser towards the margins and in the central longitudinal groove slightly marked; lateral margin flattened, slightly curved upwards; anterior angles produced; posterior margin convex, narrower than anterior margin. Elytron with nine rows of conical tubercles well defined even backwards and sideways; humeri not elevated, elytra fused along the midline and abdomen. Legs with punctures same size than pronotum punctures; anterior margin of profemur wavy, lacking tooth. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Buenos Aires (Zanetti *et al.* 2015 a), Mendoza, Neuquén, San Luis (Kulzer 1955), Santiago del Estero (collection data IADIZA).

Scotobius granosus Solier, 1838
(Tenebrioninae, Scotobiini)
(Fig. 39)

Diagnosis. Medium size (length: 15.2–19.9 mm, width: 6.6–8.9 mm). Body black, dull, glabrous. Head with punctures separated by less than two puncture diameters; frons punctures larger than clypeal punctures, uniformly distributed. Eyes narrow, semicircular. Antennae moniliform, antennomere 11 slightly longer than 10. Pronotum widest behind midpoint, punctures same size than frons, separated by less than two puncture diameters, denser towards the margins and in the central longitudinal groove; lateral margin slightly marked, flat; anterior angles rounded, not produced; posterior margin straight, wider than anterior margin. Elytron with nine longitudinal rows of round tubercles, with more than 30 tubercles per row, not aligned; humeri not elevated, elytra fused along the

midline and abdomen. Legs with punctures same size than pronotum punctures; anterior margin of profemur wavy, lacking tooth. Abdomen with exposed intersegmental membranes apical to visible sternites three and four.

Distribution. Argentina: provinces Córdoba, San Luis, Santiago del Estero, Tucumán (collection data IADIZA).

DISCUSSION

The identification key and diagnoses of particular species presented in this paper are the first attempt to gather information concerning the species of Tenebrionidae associated with carcasses. The 29 species studied here (Table 1) represent four of the nine currently recognized subfamilies of Tenebrionidae (Matthews *et al.* 2010): Alleculinae (one species of Alleculini), Diaperinae (two species of Crypticini), Tenebrioninae (15 species, ten belonging to the tribe Scotobiini, three to Opatrini, two to Alphetobiini and one species of Tenebrionini), Pimeliinae (10 species, three belonging to the tribe Epitragini, two to Evanosomini, two to Praociini, one species from each of the tribes Trilobocarini, Edrotini and Elenophorini). The tribe Scotobiini is the most numerous in this study, comprising species of the three genera that occur in Argentina, all of which have been recorded feeding on corpses and rotting chicken flesh, which suggests that the members of this tribe have a preference for feeding on cadaver tissue. It should be



Figure 39. *Scotobius granosus*. Scale bar 2 mm.

noted that all species of the tribes Scotobiini, Elenophorini and Praociini are flightless, while the remaining species of the other tribes are able to fly actively, and therefore exhibiting different capabilities to find a carcass.

Twelve species of Tenebrionidae constitute new records for the cadaver fauna in Argentina: *Ompheres difficilis*, *O. scabripennis*, *Hemasodes minutus*, *Zophobas opacus*, *Alphitobius laevigatus*, *Conibius franzi*, *Eutelocera cadaverina* sp. nov., *Scotobius granosus*, *S. ovalis*, *S. punctatus*, *S. andrassyi* and *Emmallodera perlifera*. With exception of the last three species (collected only in chicken-baited trap) all of them were collected mostly from carcasses (Table 1). The remaining species associated with carcasses listed in this key were previously recorded for the country in Buenos Aires (Zanetti *et al.* 2015 a, b), Mendoza (Aballay 2012, Flores and Aballay 2015), Catamarca (Flores and Aballay 2015), and San Juan provinces (Aballay *et al.* 2008, 2012). Herein we present here two new records for Argentina: *Conibius (Gondwanodilamus) franzi* and *Alphitobius laevigatus*; three new for Bolivia: *Salax lacordairei*, *Blapstinus punctulatus*, *Variosus profana*; and one new for Uruguay: *Blapstinus punctulatus*.

Hylithus tentyroides has been listed in a catalog as being phytophagous, eating corn seed and cotton seedlings (Flores and Debandi 2004), and in recent decomposition experiments it was recorded on pig carcasses (Aballay *et al.* 2008, 2012, Zanetti *et al.* 2015 a, b). During the present study, this species was collected from horse, whale, pig, chicken carcasses, and human cadavers, showing a wide distribution across Argentina (from Salta to Chubut) and being recorded from sea level to 2200 m (Table 1). *Alphitobius diaperinus* has been collected from pig carcasses (Matuszewski *et al.* 2008); this species can feed on dead chickens and bats (Matthews *et al.* 2010) and has been considered a predator on larvae and pupae of *Musca domestica* Linnaeus, 1758 (Despins *et al.* 1988); in the present research, it was collected from pig carcasses and human corpses. *Alphitobius diaperinus* was recorded on human cadavers at the end of the advanced decay stage with presence of larvae III and pupae of Calliphoridae (Diptera), it can possibly feed on larvae and pupae of Calliphoridae or on cadaver tissues. *Salax lacordairei* was also listed as phytophagous, eating cotton seed and seedlings (Flores and Debandi 2004) and has previously been collected from pig carcasses (Aballay *et al.* 2008, 2012); during this study, it was collected from pig, cow and human carcasses. This species and *Hylithus tentyroides* likely feed on dry cadaver tissue. *Salax lacordairei*, *Hylithus tentyroides* and *Alphitobius diaperinus* constitute new records on human corpses, but their potential as forensic indicators needs to be investigated. *Megelenophorus*

americanus, *Blapstinus punctulatus* and *Scotobius pilularius* are also omnivorous beetles, the first has been reported to eat dry fruits of *Bulnesia retama* (Flores and Debandi 2004) and to feed on cow and horse carcasses (Aballay *et al.* 2008); the second has been recorded feeding on seedlings of cotton, sunflower, capsicum, potato, grapevine, corn and seeds of cotton and corn (Flores and Debandi 2004), and in the present study it was collected eating on lesser rhea, cow and pig carcasses (Table 1); and the third was reared on fruit (banana, apple), vegetables and meat in order to obtain eggs and larvae (Silvestro and Michat 2016, this volume), and was also collected eating on pig carcasses (Zanetti *et al.* 2015 a, b as *Scotobius miliaris*).

Blapstinus punctulatus and *Scotobius pilularius* were collected over a wide area, whereas *Eutelocera cadaverina* sp. nov appears to have a restricted distribution. Moreover, *Praocis ecostata* and *Achanis antofagastensis* exclusively inhabit high altitude environments. Differences among species in geographic distribution and behavior may be attributed to the conditions characterizing the environment, such as climate, vegetation and substrate (Cepeda-Pizarro 1989, Cartagena and Galante 2001). These conditions determine adaptations of tenebrionids to arid and semiarid ecosystems since many species of the family show a predisposition in to occupy dry habitats (Matthews *et al.* 2010). These beetles play an important role in these environments by facilitating nutrient recycling (Santos *et al.* 1988, Cepeda-Pizarro 1989). This variation in the distribution of species of Tenebrionidae can help as a forensic indicator in case of corpse transport.

Further studies are needed to state the specific time period in the cadaver succession that a species is in, which would make the species cited in the present article more predictable, and which could be used to estimate PMI indicators based on succession patterns. In addition, immature stages of Tenebrionidae can be useful in forensic entomology because they are reared in the corpses and collected in advanced stages of decomposition (Lefebvre and Gaudry 2009, Introna *et al.* 2011, Aballay 2012, Mariani *et al.* 2014, Zanetti *et al.* 2015a, b) but the duration of larval development is variable and depends on the species. Because information about larvae of Tenebrionidae species is limited (Doyen 1994), research studies should be conducted on their life cycle, and essential to this end is a correct identification of adult Tenebrionidae. In fact, of the 29 species collected in this study, only the larvae of three of them are known: *Alphitobius laevigatus* (Klausnitzer 1996), *Alphitobius diaperinus* (Hayashi 1966) and *Scotobius pilularius* (Silvestro and Michat 2016, this volume). We expect that this key will contribute to future studies addressing the potential role of carrion-frequenting Tenebrionidae as PMI indicators.

Table 1. List of Tenebrionidae species collected on vertebrate carcasses and from baited traps in Argentina and their geographic distribution by provinces.
Sampling method: m = hand on the carcass, pt = pitfall trap, bt = baited bottle trap

Species	N°	Substratum/ carcasses	Sampling method	Province	Geographic coordinates	Altitude (m)	Collector/reference
<i>Achanius antofagastensis</i>	13	Pig	m, pt	Catamarca	26°01'32"S, 67°20'36"W	3578	Flores and Aballay (2015)
<i>Alphitobius diaperinus</i>	3	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	843	Aballay, F. (2012)
<i>Alphitobius laevigatus</i>	2	Pig	m	Mendoza	32°53'49"S, 68°52'24"W	843	Aballay, F. (2012)
<i>Alphitobius diaperinus</i>	28	Human	m	Mendoza	32°58'36"S, 68°37'24"W	653	Aballay, F. (forensic cases)
<i>Blapstinus punctulatus</i>	1	Cow	m	Mendoza	34°02'46"S, 67°54'37"W	565	Flores, G.
<i>Blapstinus punctulatus</i>	3	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	845	Aballay, F. (2012)
<i>Blapstinus punctulatus</i>	43	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Blapstinus punctulatus</i>	1	Lesser rhea	m	Chubut	42°20'21"S, 63°42'05"W	25	Flores, G. Carrara, R. Cheli, G.
<i>Blapstinus punctulatus</i>	1	Pig	m, pt	San Juan	31°32'34"S, 68°34'38"W	676	Aballay et al. (2008)
<i>Coribius franzi</i>	5	Pig	pt	Mendoza	32°53'49"S, 68°52'24"W	845	Aballay, F. (2012)
<i>Emmalleria periferia</i>	1	Chicken	bt	Mendoza	33°36'09"S, 69°18'45"W	1400	Jofré, F., Aballay, F.
<i>Eutelocera cadaverina</i> sp. nov.	46	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Gondwanocrypticus platensis</i>	2	Pig	pt	Mendoza	32°53'49"S, 68°52'24"W	847	Aballay, F. (2012)
<i>Gondwanocrypticus platensis</i>	103	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Hemasodes minutus</i>	19	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	853	Aballay, F. (2012)
<i>Hylithus tentyroides</i>	161	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Hylithus tentyroides</i>	54	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	842	Aballay, F. (2012)
<i>Hylithus tentyroides</i>	1	Human	m	Mendoza	32°31'23"S, 68°56'4"W	1247	Aballay, F. (forensic cases)
<i>Hylithus tentyroides</i>	7	Chicken	bt	Mendoza	34°15'00"S, 69°21'45"W	2200	J. Jofré, F., Aballay, F.
<i>Hylithus tentyroides</i>	1	Chicken	bt	Mendoza	33°36'58"S, 69°30'21"W	2600	Jofré, F., Aballay, F.
<i>Hylithus tentyroides</i>	2	Horse	m	Mendoza	35°49'01"S, 68°39'57"W	1877	Roig, S., Flores, G.
<i>Hylithus tentyroides</i>	1	Whale	m	Chubut	42°39'48"S, 64°59'22"W	2	Rojas Lanús, D.
<i>Hylithus tentyroides</i>	3	Pig	m, pt	San Juan	31°32'34"S, 68°34'38"W	675	Aballay et al. (2008, 2012)
<i>Leptynoderes nordenskiöldi</i>	17	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Leptynoderes strangulata</i>	2	Pig	m, pt	Catamarca	26°01'33"S, 67°20'42"W	839	Aballay, F. (2012)
<i>Lobopoda breyeri</i>	1	Pig	m	Mendoza	32°53'49"S, 68°52'24"W	846	Aballay, F. (2012)
<i>Megelenophorus americanus</i>	5	Cow	m	San Juan	32°13'00"S, 67°47'38"W	520	Aballay et al. (2008)
<i>Megelenophorus americanus</i>	2	Cow	m	San Juan	31°32'54"S, 67°25'27"W	560	Aballay et al. (2008)
<i>Megelenophorus americanus</i>	1	Cow	m	San Juan	31°18'36"S, 68°26'31"W	631	Aballay et al. (2008)
<i>Megelenophorus americanus</i>	1	Horse	m	San Juan	31°18'36"S, 68°26'31"W	1392	Aballay et al. (2008)

Table 1. Continued.

Species	N°	Substratum/ carcasses	Sampling method	Province	Geographic coordinates	Altitude (m)	Collector/reference
<i>Omophres difficilis</i>	6	Pig	m	Mendoza	32°53'49"S, 68°52'24"W	851	Aballay, F. (2012)
<i>Omophres scabripennis</i>	11	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	852	Aballay, F. (2012)
<i>Omophres scabripennis</i>	3	Chicken	bt	Mendoza	34°06'29"S, 69°06'42"W	1400	Jofré, F., Aballay, F.
<i>Poecilocrypticus formicophilus</i>	3	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	844	Aballay, F. (2012)
<i>Praocis ecosata</i>	1	Llama	m	Catamarca	26°01'32"S, 67°20'36"W	3578	Aballay, F. (2012)
<i>Salax lacordairei</i>	205	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	841	Aballay, F. (2012)
<i>Salax lacordairei</i>	1	Human	m	Mendoza	32°30'17"S, 68°09'08"W	572	Aballay, F. (forensic cases)
<i>Salax lacordairei</i>	2	Cow	m	San Juan	31°32'54"S, 67°25'27"W	560	Aballay, F.
<i>Salax lacordairei</i>	15	Pig	m, pt	San Juan	31°32'34"S, 68°34'38"W	673	Aballay et al. (2008, 2012)
<i>Salax lacordairei</i>	6	Cow	m	San Luis	32°22'08"S, 67°09'37"W	551	Aballay, F.
<i>Scotobius casicus</i>	25	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Scotobius granosus</i>	1	Cow	m	Cordoba	33°06'35"S, 64°17'54"W	432	Gómez, R.
<i>Scotobius pilularius</i>	176	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Scotobius muricatus</i>	42	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Scotobius ovalis</i>	166	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Scotobius punctatus</i>	2	Chicken	bt	Mendoza	34°14'20"S, 69°24'23"W	2509	Aballay, F.
<i>Scotobius punctatus</i>	8	Chicken	bt	Mendoza	34°15'00"S, 69°21'45"W	2200	Jofré, F., Aballay, F.
<i>Scotobius punctatus</i>	2	Chicken	bt	Mendoza	34°15'28"S, 69°17'32"W	1800	Jofré, F., Aballay, F.
<i>Scotobius andrassyi</i>	6	Chicken	bt	Mendoza	32°30'13"S, 69°03'11"W	2600	Jofré, F., Aballay, F.
<i>Scotobius andrassyi</i>	3	Chicken	bt	Mendoza	32°29'08"S, 69°06'55"W	3000	Jofré, F., Aballay, F.
<i>Trichoton roigi</i>	8	Pig	m, pt	San Juan	31°32'34"S, 68°34'38"W	674	Aballay et al. (2008, 2012)
<i>Trichoton roigi</i>	189	Pig	pt	Mendoza	32°53'49"S, 68°52'24"W	840	Aballay, F. (2012)
<i>Trichoton roigi</i>	6	Pig	m, pt	Buenos Aires	38°41'41"S, 62°15'10"W	70	Zanetti et al. (2015a)
<i>Variosus profana</i>	91	Pig	m, pt	Mendoza	32°53'49"S, 68°52'24"W	849	Flores and Aballay (2015)
<i>Zophobas opacus</i>	1	Fox	m	Chaco	26°30'05"S, 61°11'39"W	124	Gómez, R.

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