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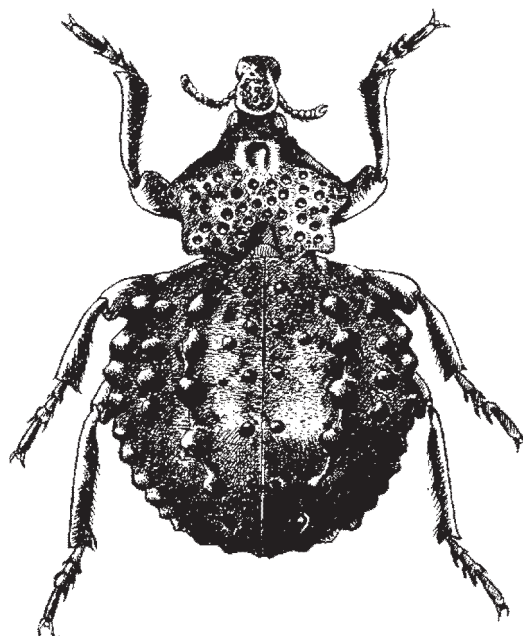


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Taxonomic considerations on the genus *Zabrus* Clairville, 1806 (Coleoptera, Carabidae) in Iberian Peninsula

Таксономические обсуждения по роду *Zabrus* Clairville, 1806 (Coleoptera, Carabidae) с Иберийского полуострова

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Ключевые слова: *Zabrus*, Иберийский полуостров, филогения, таксономические изменения, новый подрод, новые виды.

Abstract. The Iberian species of the genus *Zabrus* Clairville, 1806 are revised. A new subgenus and three new species are described: *Cantabrozabrus* **subgen. n.**; *Zabrus* (*Iberozabrus*) *uhagoni* **sp. n.** (Cuenca, Guadalajara, Teruel); *Zabrus* (*Iberozabrus*) *fuentei* **sp. n.** (Teruel); *Zabrus* (*Iberozabrus*) *prietoi* **sp. n.** (Peña Trevinca). A new reorganization of the genus as well as several changes in the status of different species are proposed: *Z. (Iberozabrus) laurae* Toribio, 1989, **stat. rest.**; *Z. (Iberozabrus) arragonensis* Heyden, 1883, **stat. rest.**; *Z. (Iberozabrus) cameranus* Arribas, 1994 = *Z. (Iberozabrus) laurae* Toribio, 1989, **syn. n.**; *Z. (Iberozabrus) seidlitzii gredosanus* Jeanne, 1970 = *Z. (Iberozabrus) seidlitzii* Schaum, 1864, **syn. n.**; *Z. (Iberozabrus) eserensis* Bolívar, 1918 = *Z. (Iberozabrus) obesus* (Audinet-Serville, 1821), **syn. n.**

Резюме. Дана ревизия видов рода *Zabrus* Clairville, 1806 с Иберийского полуострова. Описаны новый подрод и три новых вида: *Cantabrozabrus* **subgen. n.**; *Zabrus* (*Iberozabrus*) *uhagoni* **sp. n.** (Cuenca, Guadalajara, Teruel); *Zabrus* (*Iberozabrus*) *fuentei* **sp. n.** (Teruel); *Zabrus* (*Iberozabrus*) *prietoi* **sp. n.** (Peña Trevinca). Изменяется статус некоторых таксонов рода: *Z. (Iberozabrus) laurae* Toribio, 1989, **stat. rest.**; *Z. (Iberozabrus) arragonensis* Heyden, 1883, **stat. rest.**; *Z. (Iberozabrus) cameranus* Arribas, 1994 = *Z. (Iberozabrus) laurae* Toribio, 1989, **syn. n.**; *Z. (Iberozabrus) seidlitzii gredosanus* Jeanne, 1970 = *Z. (Iberozabrus) seidlitzii* Schaum, 1864, **syn. n.**; *Z. (Iberozabrus) eserensis* Bolívar, 1918 = *Z. (Iberozabrus) obesus* (Audinet-Serville, 1821), **syn. n.**

Introduction

The genus *Zabrus* Clairville, 1806 has been object of several papers in the last 200 years. The last revision of this genus [Andújar, Serrano, 2001] thoroughly provides a list of these papers in chronological order.

Throughout this period the genus has experienced a series of changes mainly related to its structure and the increasing number of species due to new descriptions.

Despite these different and valuable contributions, still remains the conviction that the knowledge of the genus is not yet complete and presents some aspects open to new advances. As a result, in the last few years some authors were trying to include new distinctive features in their papers in order to help to clarify such knowledge, being behind of this course of action the suspicion that traditional taxonomic characters are not enough to discriminate all the possible different forms within the genus.

The use of morphologic characters not taken in consideration before is another option that may allow a different approach to taxa grouping or discrimination of species that have been hidden due to converging processes of external morphology.

Nowadays, there is no doubt that the morphological study of reproductive organs is an essential element for the species characterization and its taxonomic position.

In the case of *Zabrus*, the external morphology of the male genital has been regularly used, even since ancient times; regarding female genitalia, its knowledge as a whole is still much more limited, although some papers paid attention, at least, to part of the genus [Ortuño et al., 2003].

As a result of Ishikawa's papers [Ishikawa, 1978, 1979] on the genus *Carabus* Linnaeus, 1758, three dimensional structure of aedeagus sac has been pointed out as a highly valuable taxonomic character and it has been successfully used in several groups by different authors, namely Cicindelinae [Matalin, 1998, 1999a, 1999b], *Nebria* Latreille, 1802 [Dudko, Shilenkov 2001; Ledoux, Roux, 2005], Pterostichini [Berlov, Berlov, 1996, 1999; Berlov, 1998, 2000; Berlov, Anichtchenko, 1999, 2005], *Platyderus* Stephens, 1827 [Anichtchenko, 2005], Chrysomelidae [Berti, Mariau, 1999] or Cerambycidae [Rubenyan, 2002; Anichtchenko, Verdugo, 2004], for example.

Materials and methods

793 specimens belonging to 37 species have been studied. This material come from the following

public institutions, Museo Nacional de Ciencias Naturales (Madrid), Universidad Complutense (Madrid) and Teaching Institute (Moscow), and from some private collections: Collection del Junco (Jerez), Collection Ramos-Abuín (Puertollano), Collection Valcárcel (Lugo), Collection Zaballos (Madrid), Collection Zapata (Tres Cantos), Collection Wrase (Berlin), and both authors' collections.

Material pertaining to the typical series kept in the following collections:

CAA – Collection of A. Anichtchenko (Madrid);
 CRT – Collection of I. Ruiz-Tapiador (Madrid);
 CJPZ – Collection of J.P. Zaballos (Madrid);
 CDW – Collection of D.W. Wrase (Berlin);
 CPV – Collection of J.P. Valcárcel (Lugo);
 COJ – Collection of O. del Junco (Jerez);
 CJR – Collection of J. Ramos-Abuín (Puertollano);
 CJZ – Collection of J.L. Zapata (Tres Cantos);
 CUCM – Universidad Complutense Collection (Madrid);
 MNCN – Museo Nacional de Ciencias Naturales (Madrid).

The study on external morphology has been performed following usual techniques. Regarding the study of the internal aedeagus sac, the method used corresponds with technique developed by Berlov [1992].

The nomenclature used to name the various characteristic structures of the internal aedeagus sac, as can be seen in the respective figures, would be as follows: A – apical protuberance; DB – dorsobasal protuberance; V – ventral protuberance; VB – ventrobasal protuberance; SA – supra-apical protuberance; gon – gonopore.

Zabrus (Cantabrozabrus subgen. n.) consanguineus

Chevrolet, 1865

Spain: Asturias: Peña Ubiña, Pinos, 8 ex.; Puerto de Vegarada, 3 ex. Cantabria: Pico Tres Mares, 12 ex. León: Las Colladinas, ref. Jermoso 2100 m., Picos de Europa, Macizo Central, 2 ex.; Puerto de la Ventana, 1587 m., 2 ex.; Puerto de las Señales, 1625 m., 2 ex.

Zabrus (Iberozabrus) angustatus Rambur, 1838

Spain: Granada: Barranco de San Juan, Sierra Nevada, 6 ex.; Carretera al Veleta, 3.000 m., Sierra Nevada, 1 ex.; Pico Veleta, Sierra Nevada, 5 ex.

Zabrus (Iberozabrus) ambiguus Rambur, 1837

Spain: Granada: Puerto de la Ragua, Sierra Nevada, 6 ex.; Sierra Almijara, 1 ex.; Sierra Arana, 25 km. NE Granada, 1700 m., 2 ex.; Sierra de Baza, 1 ex.; Sierra de la Sagra, 1600 m., 1 ex.; Sierra Nevada, 1 ex.; Sierra Parapanda, 1 ex. Jaén: Arjona, 1 ex.; El Yelmo, 1809 m., El Campillo, Sierra Segura, 1 ex.; Jaén, 1 ex.; Loma del Caballo, Norte del Nacimiento del Río Guadalquivir, Sierra de Cazorla, 1 ex.; Sierra de Cazorla, 3 ex.; Sierra Mágina, 1 ex.; Siles, 1 ex.

Zabrus (Iberozabrus) arragonensis Heyden, 1883, **stat.**

rest.

Spain: Teruel: Barrachina, 2 ex.; Camarena de la Sierra, Sierra

de Javalambre, 2 ex.; Mosqueruela, 1 ex.; Nacimiento del Tajo, Frías de Albarracín (Teruel), 1 ex.; Pico del Buitre, Sierra de Javalambre, 26 ex.; Pico Javalambre, 5 ex.; Puerto de Sant Just (Teruel), 1 ex.; Puerto del Portillo, 1780 m., Montes Universales, 3 ex.; Sierra de Javalambre, 1 ex.; Alto del Ventisquero, Camarena de la Sierra, Sierra de Javalambre, 1 ex.; Alrededores de la loma Cruz del Cerro, Arcos de las Salinas, Sierra de Javalambre, 8 ex.; Las Cambrillas, Torrijas, Sierra de Javalambre, 3 ex.; Barranco de la Zarzuela, La Puebla de Valverde, Sierra de Javalambre, 1 ex.; Cerro Caveno, Arcos de Salinas, Sierra de Javalambre, 3 ex.

Zabrus (Iberozabrus) castroi Martínez, 1873

Spain: Cuenca: El Chantre, 1 ex.; La Vega del Tajo, Tragacete, 2 ex.; Tragacete, 2 ex.; los Palancares, Cuenca 4 ex.

Zabrus (Iberozabrus) coiffaiti Jeanne, 1970

Spain: Ávila: Puerto Peña Negra, Piedrahita, 1909 m., 15 ex.; Sierra de Villa Gauca, 1 ex. Caceres: Puerto de Honduras, 1 ex. Salamanca: Dehesa de Candelario, Candelario, 1200 m., 1 ex.; Sierra de Béjar, 1900–2200 m., 2 ex.; Travieso, Sierra de Béjar, 1 ex.

Zabrus (Iberozabrus) curtus (Audinet-Serville, 1821)

Spain: Ávila: Puerto de la Lancha, Navalperal de Pinares, 20 ex. Burgos: Pineda de la Sierra, Valle del Sol, 1 ex. Huesca: Canfranc, 1 ex.; Monte Perdido, Collata Añisolo 2400 m., 2 ex. Girona: Tossa D'Alp, 2000 m., 4 ex. Guadalajara: Atienza, 3 ex.; Puerto de Maranchón, 1 ex.; Puerto de Maranchón, 1300 m., 2 ex.; Sierra de Pela, 4 ex.; Torreplazo, Miedes de Atienza, 5 ex. La Rioja: Valdezcaray, 1 ex. Lleida: Prats y Sampsor, Cerdanya, 2 ex. Madrid: Cercedilla, 2 ex.; Santa María de la Alameda, 1 ex.; Sierra de Guadarrama, Montes Carpetanos, Puerto de Somosierra, 1600–1700 m., 3 ex. Salamanca: Salamanca, 1 ex. Segovia: Arcones, 4 ex.; Río Peces, La Losa de Riofrío, 1 ex. Soria: Borobia, 2 ex.; Cabeza Alta, Retortillo, 3 ex.; Gallinero, 1 ex.; Molinos de Duero, 1 ex.; Puerto de Oncala, 12 ex.; Puerto de Piqueras, 2 ex.; Sierra Montes Claros, 1700 m., Almarza, 5 ex.; Reznos, 3 ex.; Soria, 2 ex.; Sierra de Urbión, 1 ex.

Zabrus (Iberozabrus) estrellanus Heyden, 1880

Portugal: Serra da Estrela, 2 ex.; Vale do Rassim, Serra da Estrela, 1436 m., 5 ex.; Manteigas, La Estrela, 850 m., (Porto), 1 ex.; Lagoa Comprida 1600m (Portugal).

Zabrus (Iberozabrus) fuentei **sp. n.**

Spain: Teruel: Cantavieja, 7 ex.; Estación de Valdelinares, 2 ex.; Pico Peñarroya, Valdelinares, 6 ex.; Puerto de Cuarto Pelado, 3 ex.; Puerto de Valdelinares, Sierra Gúdar, 1 ex.; Puerto de Villaroya, 2 ex.; Villarejo, Valdelinares, (30T0700640, 4473391, 1948 m.), 8 ex.; Barranco de la Gitana, Valdelinares, (30T0699864, 4473682, 1915 m.), 4 ex.

Zabrus (Iberozabrus) gibbulus Jeanne, 1985

Spain: Cantabria: Mataporquera, 1 ex.; Puerto de Pozazal, 930 m., 2 ex.

Zabrus (Iberozabrus) galicianus Jeanne, 1970

Spain: León: Lago de la Baña, 1 ex. Lugo: Penarrubia, Serra de Ancares, 1500–1750 m., 1 ex.; Porto do Poio, 1337 m., O Cebreiro, 1 ex.; Serra de Ancares, Alto do Poio, Murallón, 1335–1475 m., 1 ex. Ourense: Cabeza de Manzaneda, 4 ex.

Zabrus (Iberoabrus) gravis Dejean, 1828

Spain: Cuenca: Chillarón de Cuenca, 1 ex.; km. 5, N-320, 1 ex.; Tarancón, Sierra al N de Uclés, 1 ex. Madrid: Aranjuez, 1 ex.; El Encin, 2 ex.; Cerro de Almodóvar, 3 ex.; El Pardo, 1 ex.; Somosaguas, 1 ex. Teruel: Puerto de Valdelinares, Sierra de Gúdar, 1 ex. Toledo: La Guardia, 1 ex.; Quero, 1 ex.

Zabrus (Iberoabrus) laurae Toribio, 1989, **stat. rest.**

Spain: Guadalajara: Condemios de Arriba, 2 ex.; Ermita del Alto Rey, Bustares, 12 ex. Hayedo de Tejera Negra (Paratype), 1 ex.; Puerto de la Quesera, 1 ex.; Sierra del Alto Rey, 2 ex. La Rioja: Cameros, 1 ex. Madrid: Sierra de Guadarrama, Montes Carpetanos, Puerto de Somosierra 1600–1700 m., 9 ex. Segovia: La Pinilla, 1 ex.; Sierra de Somosierra, La Pinilla, 3 ex. Soria: Puerto de Santa Inés (Sur), 1 ex.

Zabrus (Iberoabrus) marginicollis Dejean, 1828

Spain: Segovia: Laguna Lucía, Lastras de Cuéllar, 5 ex.

Zabrus (Iberoabrus) obesus (Audinet-Serville, 1821)

France: Pic de Orhy, 1800 m., 8 ex.; Pic de Crabère, 2000 m., 1 ex.; Lac d'Oncet, Hautes Pyrénées, 1 ex.; Pic Anie 2000 m., Pyrénées, 4 ex.; Col d'Aubisque, 1700 m (France), 5 ex.

Spain: Huesca: Ordesa, 1 ex.; Puerto de Castanesa, 2200 m., 1 ex.; Puerto de Sahún, 2000 m., 3 ex. Navarra: Macizo de Larrau, Pirineos, 2 ex.; Piedra San Martín, 2 ex. Lleida: Sall del Pich, Val d'Arán, 2 ex.

Zabrus (Iberoabrus) prietoi **sp. n.**

Spain: Orense: Valdebuéy, Peña Trevinca, 2 ex.; Peña Trevinca, 2 ex.; Refugio de Peña Trevinca, 1 ex. Zamora: Carretera Porto-Valdín, 23.03.1999, 1655 m., 1 ex.

Zabrus (Iberoabrus) rotundatus Rambur, 1838

Spain: Cádiz: Los Llanos, 900 m., Villaluenga del Rosario, 4 ex. Málaga: Llanos de Líbar, Montejaque, 1 ex.; Los Quejigales, 1300 m., Puerto de los Pilones, 1700 m., Sierra de la Nieves, Ronda, 1 ex. Sierra de las Nieves, Ronda, 1 ex.; Sierra de las Nieves, Ronda, 1 ex.

Zabrus (Iberoabrus) seidlitzii Schaum, 1864

Spain: Ávila: Collado de la Mina, Pegueritos, 1 ex.; El Tiemblo, 1 ex.; Las Navas del Marqués, 3 ex.; Puerto de Chía, Sierra de Gredos, 6 ex.; Puerto de la Lancha, Navalperal de Pinares, 2 ex.; Peguerinos, 1 ex.; Pinares Llanos, 1 ex.; Puerto de Menga, Sierra de Gredos, 5 ex.; Puerto de la Cruz de Hierro, Santa María del Cubillo, 2 ex.; Puerto del Pico (Norte), Sierra de Gredos, 1650 m., 1 ex.; Sierra de Gredos, 1 ex.; Sierra de Malagón, Peguerinos, 4 ex. Madrid: 2 km. E Navacerrada, Guadarrama, 3 ex.; Barranco de Navacerrada, 2 ex.; Cabeza de Hierro, 1 ex.; El Escorial, 3 ex.; Puerto de Canencia, 1 ex.; Puerto de Cotos, 1 ex.; Puerto de Navacerrada, 1 ex.; Puerto de Navafría, Lozoya, 3 ex.; Puerto de la Fuenfría, Cercedilla, 1 ex.; Puerto de la Morcuera, Miraflores de la Sierra, 1800 m., 2 ex. Segovia: Valsain, 1 ex.

Zabrus (Iberoabrus) silphoides Dejean, 1828

Spain: A Coruña: Monte Cova da Serpe, 1 ex. Ávila: Becedas, 1150 m., 3 ex.; Fuente del Saúco, 1 ex.; La Cañada, 1 ex.; Las Navas del Marqués, 1 ex.; Puerto de la Cruz de Hierro, Santa María del Cubillo, 3 ex. Cáceres: La Garganta, 1300 m., 2 ex. León: Collado de Valdeteja, 1 ex.; Luyego de Somoza, 1 ex.; Puerto de la Magdalena, 1 ex.; Quintanilla de Somoza, 3 ex.; Valporquera, 2 ex. Palencia: Guardo, 1 ex.; Manganeses de la

Polvorosa, 1 ex. Salamanca: Berrocal de Huebra, 1 ex.; Campo de Ledesma, Villaseco de los Reyes, 4 ex.; Castellanos de Viliquera, 1 ex.; Castroverde, Membibre, 15 ex.; Cuadrilleros, Villaseco de los Reyes, 3 ex.; Guijuelo, 1000 m., 1 ex.; La Alberca, 1000 m., 1 ex.; Peña de Francia, 1723 m., 18 ex.; Peña Venero, Bastida, 1250 m., 2 ex.; Pico Cervero, Linares de Riofrío, 1300 m., 3 ex.; San Miguel de Valero, 1 ex.; Topas, Cañedino, 1 ex.; Valdefuentes de Sangusín, 900 m., 1 ex.; Zorita, Valverdón, 1 ex. Segovia: San Rafael, 2 ex. Zaragoza: Calatayud, 1 ex.

Zabrus (Iberoabrus) theveneti Chevrolat, 1874

Spain: Granada: 16 km. S de Santiago de la Espada, Sierra de Segura, 3 ex.; Sierra de Grillemona, 2 ex.; Sierra de la Sagra, 1600 m., 1 ex.

Zabrus (Iberoabrus) uhagoni **sp. n.**

Spain: Cuenca: Alto de la Vega, Río Cuervo, 1 ex.; Nacimiento del Río Cuervo, 1 ex.; Puerto de Cubillo, 1620 m., Montes Universales, 2 ex. Guadalajara: Puerto de Maranchón, 1300 m., 4 ex.; Sierra de Pela, 1 ex.; Sierra de Pela 1, (30T0482778, 4572468, 1460 m.), 1 ex.; Sierra de Pela 2, (30T0485862, 4571989, 1530 m.), 1 ex.; Sierra de Pela 2, Campisabalos, 2 ex.; Torreplazo, Miedes de Atienza, 16 ex. Teruel: Fuentes del Tajo, Frías de Albarracín, 1 ex.; Montes Universales, 1600 m., 1 ex.; Nacimiento del Tajo, Frías de Albarracín, 2 ex.; Puerto de Bañón, 1 ex.; Puerto de Cubillo, 1620 m., 16.06.1994, 1 ex.

Zabrus (Iberoabrus) urbionensis Jeanne, 1970

Spain: Burgos: Laguna Cascadas Neila, 2 ex.; Lagunas de Neila, 1.900 m., 2 ex. Soria: Puerto de Santa Inés, 60 ex.; Pico de Urbión, 9 ex.; Urbión, 2000 m., 2 ex.

Zabrus (Iberoabrus) vasconicus Uhagón, 1904

Spain: Navarra: Altxueta, 1200–1300 m., Sierra de Aralar, 10 ex.; San Miguel de Aralar, 3 ex.

Zabrus (Zabrus) morio Ménétríés, 1832

Iran: Khorasan: Bojnurd, 5 km S Pish Qaleh, 1 ex. Lorestan: Khorram Abad, S of Mahmudvand, 1 ex.

Kirgizstan: Beshkek, 1 ex.; Kirgiz mt. rng., N slope, Alamedin rio, Chon-Kurchak, 2500 m., 2 ex.; Zailiiskii Ala-Tau, South, Kek-Too, Sovetskoe vill., 1 ex.

Tadzhikistan: near Varzob vill., Gissar mt. rng., 1 ex. Turkmenistan: Bezengi, near Ashkhabad, 1 ex.; Kov-Ata, Bacharden, 110 km. NW Ashkhabad, 1 ex. Uzbekistan: Mt. Nuratau, 3 ex.

Zabrus (Zabrus) tenebrioides (Goeze, 1777)

Bulgaria: near Sozopol, 1 ex. Hungary: Nagykovacs, 1 ex. Iran: Lorestan: 50 km N Ardimeshk, 2000 m., Sar Takht, 2 ex. Italy: Vitinia, Roma, 1 ex. Spain: Cuenca: Laguna de El Hito, El Hito, 1 ex. Guadalajara: La Olmeda de Jadraque, 8 ex.; Valdepeñas de la Sierra, 11 ex. Huesca: Huerrios, 2 ex. Madrid: Alcalá, 1 ex.; Casa de Campo-Madrid, 1 ex.; Madrid, 1 ex. Toledo: Cañada de la Tejera, Urda, 1 ex.

Zabrus (Zabrus) ignavus Csiki, 1907

Italy: S. Marg di Pula, Sardegna, 1 ex. Spain: Cáceres: Navalconcejo, 2 ex.; Valle de Plasencia, Plasencia, 3 ex. Ciudad Real: Anchurones, Cabañeros, 2 ex.; Arroyo Valdehornos, Navalpino, 1 ex.; Bermú, Retuerta del Bullaque, 1 ex.; La Alcornoquera,

Cabañeros, 5 ex.; Porzuna, 3 ex.; Sierra Madrona, 1 ex. Granada: Sacromonte, Granada, 2 ex. Madrid: 6 km NW Manzanares el Real, 1 ex.; Tres Cantos, 1 ex. Málaga: Ronda, 3 ex. Salamanca: Algabete, 4 ex.; Doñinos de Ledesma, 1 ex.; Guijo de Ávila, 1 ex.; La Alberca, 2 ex.; Río Agadón, Agallas, 1 ex.; Santibáñez de la Sierra, 1 ex. Toledo: El Navajo, Orgaz, 1 ex.; El Emperador, 3 ex.; Río Guajaraz, La Cantarilla, Mazarambroz, 1 ex.

Zabrus (Epomidozabrus) flavangulus Chevrolat, 1840

Portugal: São Martinho, 2 ex.
Spain: Pontevedra: Alto da Rocha, Silleda, 1 ex.

Zabrus (Epomidozabrus) mateui Novoa, 1980

Spain: Lugo: Penarrubia, Serra dos Ancares, 1800 m., 8 ex.
Zamora: Barjacoba (Holotype), 1 ex.

Zabrus (Euryzabrus) pinguis Dejean, 1831

Portugal: Cova da Junca, 11 ex.; Viana do Castelo, 2 ex.
Spain: A Coruña: Couso, Ribeira, 1 ex.

Zabrus (Platyzabrus) constrictus Gräells, 1858

Spain: Cáceres: Hervás, 1 ex. Salamanca: El Calvitero, 2400 m., Sierra de Béjar, 22 ex.; Laguna del Trampal, Sierra de Béjar, 1 ex.; Sierra de Béjar, 1800–2400 m., 17 ex.; Sierra de Candelario, 2400 m., 3 ex.; Travieso, Candelario 1800 m., 11 ex.

Zabrus (Platyzabrus) pecoudi Colas, 1942

Spain: Ávila: Refugio del Rey, Sierra de Gredos, 6 ex.

Zabrus (Pelor) graecus orientalis Apfelbeck, 1904

Turkey: Pr. Icel, Gülnar, 1 ex.

Zabrus (Pelor) oertzeni Reitter, 1885

Greece: Phalasarina, Heraclion (Crete), 1 ex.

Zabrus (Pelor) politus Gautier des Cottés, 1869

Turkey: Pr. Icel, 20 km E Gülnar, 1 ex.

Results

1. New taxa and taxonomic modifications.

Cantabrozabrus Anichtchenko et Ruiz-Tapiador, **subgen. n.** (Fig. 1, 58)

Type species: *Zabrus (Cantabrozabrus) consanguineus* Chevrolat, 1865.

Description. Suboval and convex shape. Variable coloration from shining black to coppery green. Head and pronotum disc dotted. Convex and transverse pronotum,

wider than long, with the front edge of itself not very low-cut. The back base is slightly low-cut and rear angles are not very prominent. Basal margin of the elytra straight and getting narrow at the end, giving rise to the appearance of a small humeral tooth. Dotted episternum and sides of the prosternum. Aedeagus sac with a very simple form (fig. 1) in which the lack of basal protuberances, the presence of a highly sclerotized ring in a middle position, and the ventral position of the gonopore can be observed.

Taxonomic considerations. A new subgenus maintains some primitive characteristics, such as head and pronotum disc markings, as well as the simple form of the internal aedeagus sac. The presence of a humeral tooth and the straight base of the elytra relate this subgenus to subgenus *Epomidozabrus* Ganglbauer, 1915 and separate it from *Iberozabrus* Ganglbauer, 1915, subgenus in which it has been traditionally categorized (fig. 44–51, 55–58). This relationship is reinforced if it's taken into account the similar general design of the sac, with the lack of basal protuberances and the presence, in both cases, of a more or less sclerotized ring (fig. 1, 40–41).

In the last few years, *Z. consanguineus* has been placed in the subgenus *Iberozabrus*; however, as described above, there is a set of characters that differentiate them: head and pronotum disc markings, presence of humeral tooth and presence of sclerotized ring in the aedeagus sac.

As a conclusion, in our opinion, this species forms its own subgenus and the hypothesis already anticipated by Andújar and Serrano [2001] is more than justified.

Etymology. The origin of this new subgenus name *Cantabrozabrus* refers to the Montes Cantabricos where live.

Zabrus (Iberozabrus) uhagoni Ruiz-Tapiador et

Anichtchenko, **sp. n.**

(Fig. 7–8, 51)

Material. Holotype: ♂, Guadalajara: Sierra de Pela 2 (30T0485862, 4571989, 1530 m.), 31.05.2005, Ruiz-Tapiador leg. (CRT). Paratypes: Cuenca: 1♂, Alto de la Vega, Río Cuervo, 24.09.1985, Barrueco leg. (CRT); 1♂, Nacimiento del Río Cuervo, 25.09.1985, Ruiz-Tapiador leg. (CRT); 2♂, Puerto de Cubillo, 1620 m., Montes Universales, 31.05.2006, Anichtchenko leg. (CAA); 1♂, 1♀, Guadalajara: Puerto de Maranchón, 1300 m., 28.04.2006, Anichtchenko leg. (CAA); 2♂, Ruiz-Tapiador leg. (CRT); 1♀, Sierra de Pela 1 (30T0482778, 4572468, 1.460 m.), 31.05.2005, Ruiz-Tapiador leg. (CRT); 1♀, Sierra de Pela 2, 11.05.2006, Ruiz-Tapiador leg. (CRT); 1♂, Sierra de Pela 2, Campisabalos, 3.10.2005, Ruiz-Tapiador leg. (CRT); 3♂, 2♀, Torreplazo, Miedes de Atienza, 10.10.2005, Ruiz-Tapiador leg. (MNZN, CJPZ, CRT); 1♂, idem, 29.05.2007, Ruiz-Tapiador leg. (CRT); 1♂, 6♀, idem, 19.07.2007, Ruiz-Tapiador leg. (CRT); 1♂, 1♀, idem, 11.09.2007, Ruiz-Tapiador leg. (CRT); 1♀, idem, 8.10.2007, Ruiz-Tapiador leg. (CRT); 1♂, Teruel: Fuentes del Tajo, Frías de Albarracín, M.A. Fernández leg. (CUCM); 1♂, Montes Universales, 1600 m., 1.05.1985, Valdinizza leg. (CDW); 1♂, Nacimiento del Tajo, Frías de Albarracín, 30.04.1994, A. Zapata leg. (CJZ); 1♂, idem, J.L. Zapata leg. (CAA); 1♂, Puerto de Bañón, 20.04.1996, J.L. Zapata leg. (CAA); 1♂, Puerto de Cubillo, 1620 m., 16.06.1994, Teunissen leg. (CDW).

Description. Length 17–18 mm. Convex shape. Black with slight metallic shine. Head large, wide and flat. Short antennae, almost reaching the base of pronotum. Transverse and convex pronotum. Low-cut front edge with rounded and not very prominent angles. Low-cut rear edge with sharp and prominent rear angles. Elytra with wide lateral channel, enlarged in the humeral angle. Isodiametric microreticulation. Intermediate abdominal

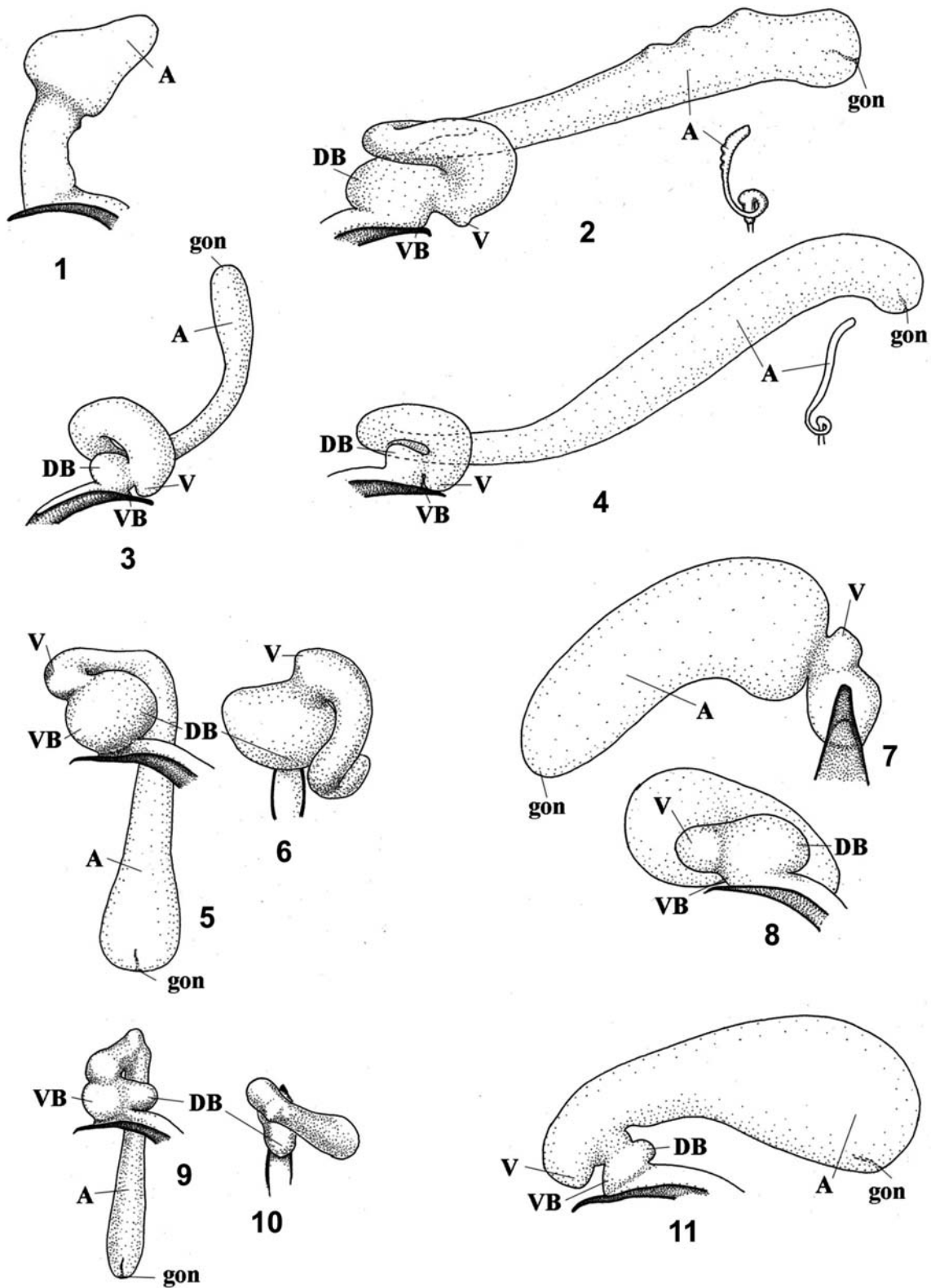


Fig. 1-11. Structure of the internal aedeagus sac.

Рис. 1-11. Строение внутреннего мешка эдеагуса.

1 - *Z. (Cantabrozabrus subgen. n.) consanguineus* Chevrolat, 1865; 2 - *Z. (Iberozabrus) obesus* (Audinet-Serville, 1821); 3 - *Z. (I.) marginicollis* Dejean, 1828; 4 - *Z. (I.) castroi* Martínez, 1873; 5-6 - *Z. (I.) fuentei* sp. n.; 7-8 - *Z. (I.) uhagoni* sp. n.; 9-10 - *Z. (I.) ambiguus* Rambur, 1837; 11 - *Z. (I.) vasconicus* Uhagón, 1904.

segments bisetose.

Aedeagus sac according to attached figures (fig. 7–8). General orientation of the sac is parallel to its own axis. Basal protuberances are well developed, with a sub-spherical aspect, being the dorsobasal one approximately twice as big as the dorsoventral one. The ventral protuberance is big and clearly defined. After this last structure, the sac shows a sharp enlargement up to the apex, with the gonopore located at its end.

Taxonomic considerations. *Z. uhagoni* sp. n., *Z. fuentei* sp. n. and *Z. castroi* make a group characterized by the homogeneous of its external morphological characters. Due to this fact and the important intra-species variability of the characters used traditionally to differentiate species in this group, it's almost impossible to separate them starting from their outward appearance.

Since there is an absence of an unmistakable differential character, specimens with a similar corporal pattern have been regularly attributed to *Z. castroi*.

In the last few years, however, some papers in the field of genetics [Serrano, Galián, 1998; Sánchez-Gea et al., 2000; Sánchez-Gea et al., 2004] had brought up significant data that gave rise to suspect that it was possible the existence of a complex of closely related species. That point has being now proved because of the well differentiated structure of the aedeagus sac.

The description of the aedeagus sac provides a set of new discriminatory elements that allows to separate these three species with no doubt. *Z. uhagoni* sp. n. (fig. 7–8) is easily separated by more massive appearance of the apical area of the sac, amongst other characters. The other two species, *Z. castroi* (fig. 4) and *Z. fuentei* sp. n. (fig. 5–6), show a narrow and elongated apical area, but both are clearly different in the basal area. *Z. castroi* shows an underdeveloped ventrobasal protuberance, while *Z. fuentei* sp. n. shows this protuberance greatly developed. Between these two last species, there is an inverse situation with regards to the size of the ventral protuberance.

Z. notabilis Martínez, 1873 is a special case, since only two specimens are known, one from the type location “Castroceniza (Burgos)” and another found in “La Cuenca (Soria)” and, despite the efforts, it was not possible to collect material to study it. According to the description and discussion offered by Andújar and Serrano [2001], this species seems to be well defined and differs from those mentioned above, with a more northern distribution area. This species have been mostly collected in open stony areas up of 1300m.

Etymology. This species is dedicated to great entomologist Serafín Uhagón, author of the first monograph in spanish about the genus *Zabrus* in the Iberian Peninsula.

Zabrus (Iberoabrus) fuentei Anichtchenko et Ruiz-Tapiador, sp. n.
(Fig. 5–6)

Material. Holotype: ♂, Teruel: Cantavieja, 5.05.2001, J.L. Zapata leg. (CAA). Paratypes: 3♂, 1♀, Teruel: Cantavieja, 5.05.2001, J.L. Zapata leg. (CAA); 2♂, Estación de Valdelinares, 15.05.1993, J.L. Zapata leg. (CAA, CJZ); 4♂, 4♀, Pico Peñarroya, Valdelinares, 27.06.2005, (MNCN, CJPZ, CRT); 1♂, Puerto de Cuarto Pelado, 6.05.2000, J.L. Zapata leg. (CAA);

1♀, 26.06.2005, Ruiz-Tapiador leg. (CRT); 1♂, Puerto de Valdelinares, Sierra Gúdar, 28.04.1990, (CAA); 1♂, 3♀, 28.04.1990, X. Vázquez leg. (CPV, CRT); 2♀, Puerto de Villaroya, 26.06.2005, Ruiz-Tapiador leg. (CRT); 2♂, 5♀, Valdelinares 2 (30T0700640, 4473391, 1948 m.), 27.06.2005 (CRT); 4♀, Valdelinares 3 (30T0699864, 4473682, 1915 m.), 27.06.2005, Ruiz-Tapiador leg. (CO, CRT).

Description. Length 16.6–18.2 mm. Convex shape. Black with slight metallic shine. Head large, wide and flat. Short antennae, almost reaching the base of pronotum. Transverse and convex pronotum. Low-cut front edge with rounded and not very prominent angles. Low-cut rear edge with sharp and prominent rear angles. Elytra with wide lateral channel, enlarged in the humeral angle. Isodiametric microreticulation. Intermediate abdominal segments bisetose.

Aedeagus sac according to attached figures (fig. 5–6). General orientation of the sac is parallel to its own axis. It presents a very large and well-developed asymmetric single basal area, as a result of the joining of the basal protuberances. The ventral protuberance is relatively small, although clearly evident. From this point, the sac is proportionally narrower and goes on gradually widening up to the apex, acquiring a mallet-shaped appearance. The gonopore is located at the apex itself.

This species have been collected in clear areas at altitudes of more than 1500 m.

Etymology. The species is dedicated to José María de la Fuente, author of the first monograph about the Carabidae family published in spanish.

Zabrus (Iberoabrus) prietoi Ruiz-Tapiador et Anichtchenko, sp. n.
(Fig. 24)

Material. Holotype: 1♂, Valdehuey, Peña Trevinca, 27.08.1988, Barrueco leg. (CRT). Paratypes: Ourense: 1♂, Peña Trevinca, 12.04.1990, Ramos-Abuín leg. (CRT); 1♂, 3.07.1991, Ramos-Abuín leg. (CJR); Zamora: 1♂, Carretera Porto-Valdín, 23.03.1999, 1655 m., F. Prieto and Valcárcel leg. (CRT); 1♂, Refugio de Peña Trevinca, 27.08.1988, Barrueco leg. (CAA); 1♂, Valdehuey, Peña Trevinca, 27.08.1988, Barrueco leg. (MNCN).

Description. Length 17 mm. Convex shape. Black color. Large and wide head, finely dotted. Long antennae. The last antenomere exceeding the base of the pronotum. The mouth palps are reddish.

Pronotum transverse and not very convex. Very slightly low-cut front edge with very rounded and slightly protruding rear angles. Lateral channel flat along the rear half. Front edge, lateral margins and base of the pronotum highly dotted. Elytra with wide lateral channel, enlarged in the humeral angle. Isodiametric microreticulation. Flat elytra intervals. Grooves with fine dots.

Aedeagus sac according to figure (fig. 24). General orientation of the sac is perpendicular to its own axis. The sac configuration is complex. The dorsobasal protuberance is elongated and attenuated; the ventrobasal protuberance is even less marked and its length is half of the previous one. The ventral protuberance is well defined and protrudes moderately. Two protuberances can be distinguished at the apical area, one in dorsal position and the second in ventral position, where the gonopore is located. A supra-apical hypertrophied protuberance with sub-spherical aspect, in which two symmetric projections can be distinguished close to its base, appears at the distal extreme of the sac.

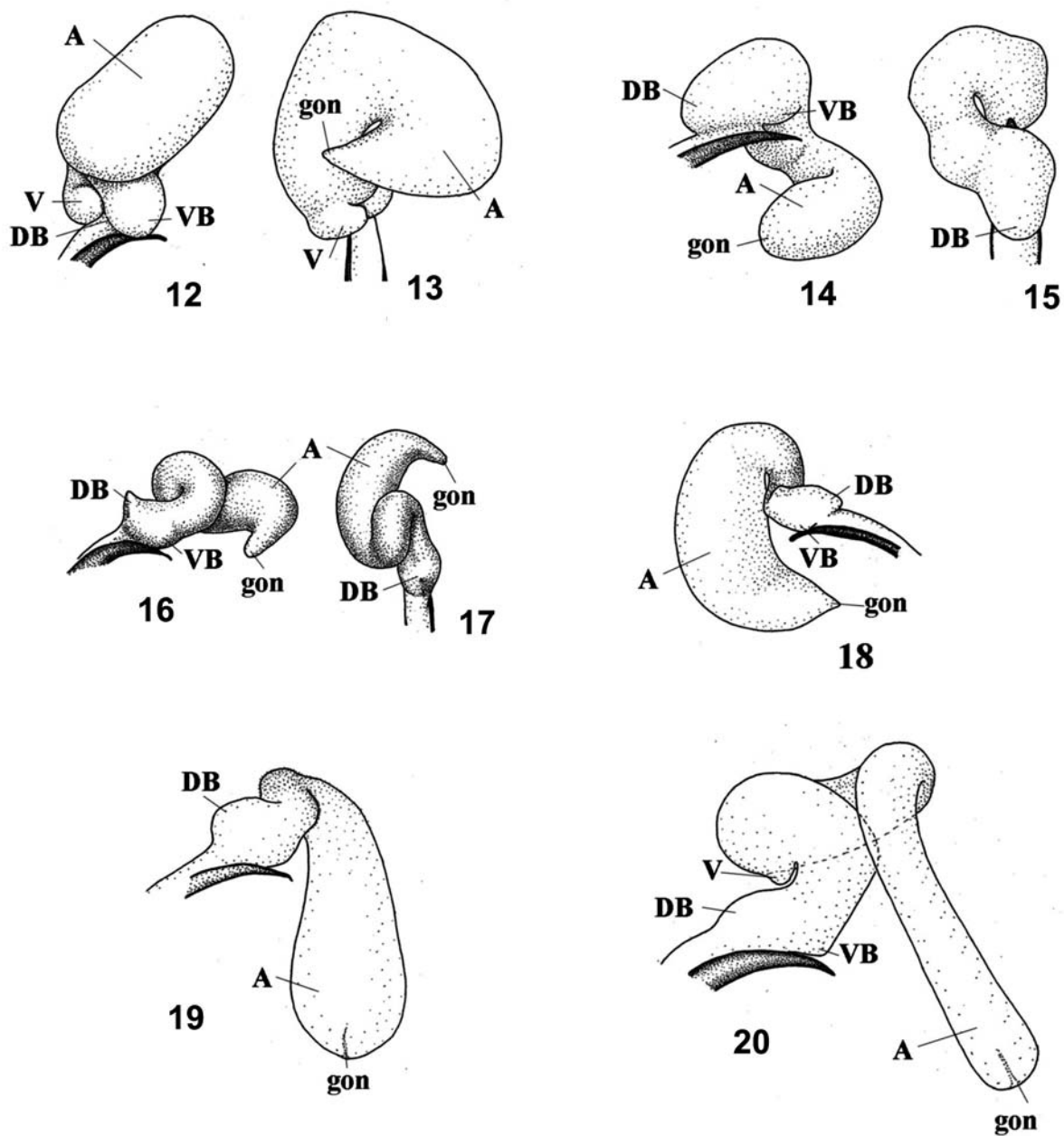


Fig. 12–20. Structure of the internal aedeagus sac.

Рис. 12–20. Строение внутреннего мешка эдеагуса.

12–13 – *Z. (Iberoabrus) arragonensis* Heyden, 1883; 14–15 – *Z. (I.) silphoides* Dejean, 1828; 16–17 – *Z. (I.) theveneti* Chevrolat, 1874; 18 – *Z. (I.) urbionensis* Jeanne, 1970; 19 – *Z. (I.) gibbulus* Jeanne, 1985; 20 – *Z. (I.) curtus* (Audinet-Serville, 1821).

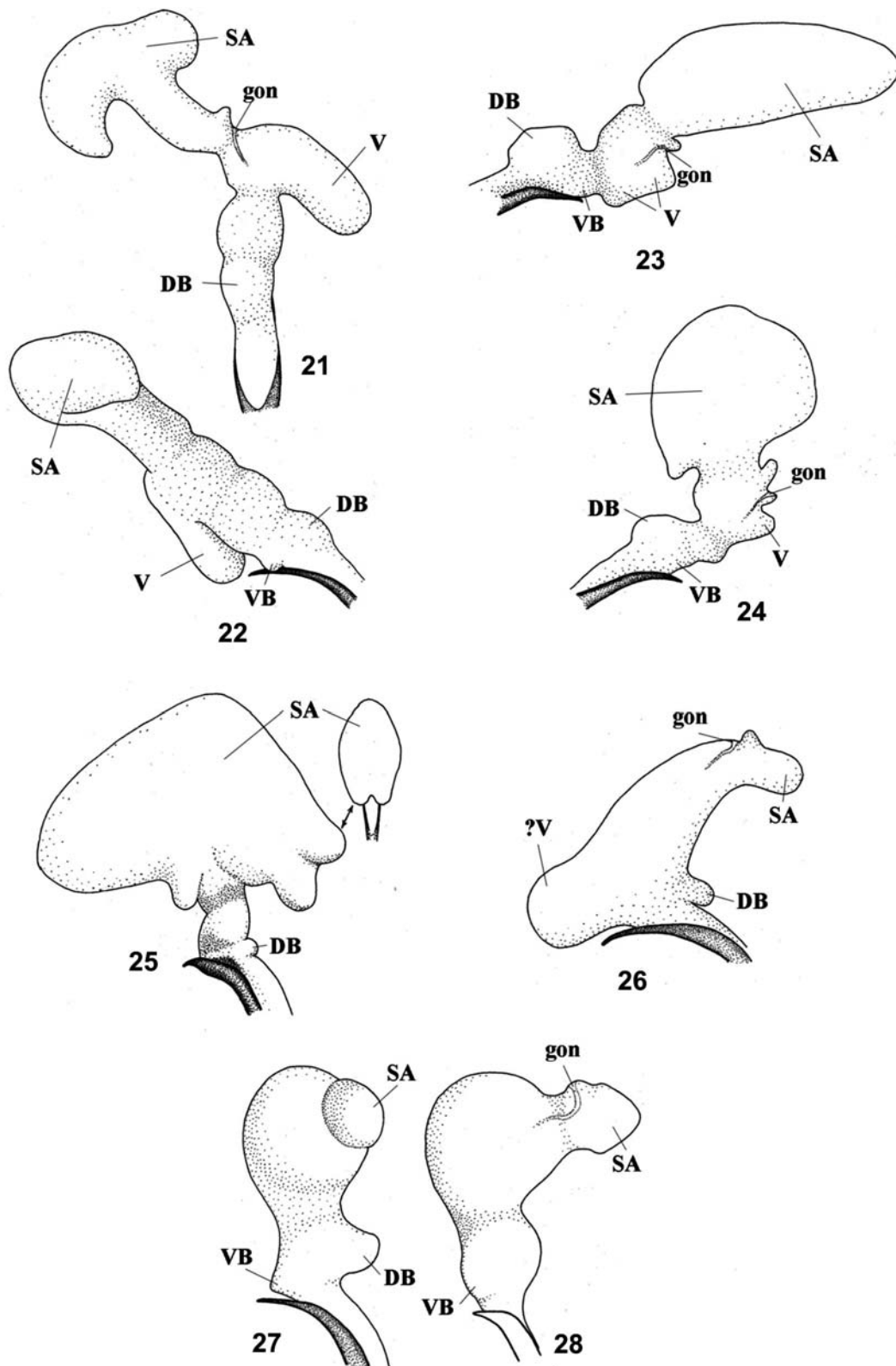


Fig. 21–28. Structure of the internal aedeagus sac.

Рис. 21–28. Строение внутреннего мешка эдегуса.

21–22 – *Z. (Iberozabrus) laurae* Toribio, 1989, *stat. rest.*; 23 – *Z. (I.) galicianus* Jeanne, 1970; 24 – *Z. (I.) prietoi* sp. n.; 25 – *Z. (I.) coiffaiti* Jeanne, 1970; 26 – *Z. (I.) estrellanus* Heyden, 1880; 27–28 – *Z. (I.) seidlitzii* Schaum, 1864.

Taxonomic considerations. The outward appearance of this species is very similar to *Z. galicianus*, *Z. estrellanus*, *Z. laurae* **stat. rest.** and *Z. seidlitzii*. This set of taxa has been object of controversy throughout the last century because of its specific or sub-specific status [Uhagón, 1904; Jeanne, Zaballos, 1986; Andújar, Serrano, 2001]. According geographical criteria, the nearest species to *Z. prietoi* **sp. n.** turns out to be *Z. galicianus* (fig. 23).

General orientation of the internal sac is perpendicular to aedeagus' axis, having *Z. prietoi* **sp. n.** the supra-apical protuberance with sub-spherical shape. In contrast to this, *Z. galicianus* shows parallel orientation, being its supra-apical protuberance elongated.

The aedeagus sac structure of the rest of these closely related species shows evident morphological differences, as can be easily observed in the respective figures (fig. 21–22, 25, 27–28).

The species seems to be confined to the higher areas of the Peña Trevinca Massif.

Etymology. This species is dedicated to Fernando Prieto, our friend and galician entomologist.

Zabrus (Iberozabrus) laurae Toribio, 1989, **stat. rest.**

(Fig. 21–22, 48)

= *Zabrus (Iberozabrus) cameranus* Arribas, 1994, **syn. n.**

Taxonomic considerations. This taxon has very solid characters associated to the morphology of the internal sac of the aedeagus, which allow to separate it from *Z. seidlitzii* (fig. 21–22, 27–28) with no kind of doubt, after having been considered just as a simple subspecies up to now. Apart from other differences, the development of the supra-apical protuberance is very different in both cases and *Z. laurae* shows a clearly defined ventral protuberance that is not present in *Z. seidlitzii*.

As a result of the revision of iberian *Zabrus*, a second result related with *Z. laurae* has to be pointed out, which deals with *Z. cameranus* **syn. n.** real status.

There is a total similarity in what refers to the internal sac structure, while the morphological characters used in the original description are not stable and present great subjectivity.

The study of specimens from the typical series of *Z. cameranus*, described by Arribas [1994], along with new material from its area of distribution, has allowed us to come to the conclusion that *Z. laurae* and *Z. cameranus* **syn. n.** are in fact the same species.

As a result of the taxonomic changes proposed above, the distribution area of *Z. laurae* increases, giving rise to a rare distribution pattern as the species is present both in North-Iberian and Central System, although it is not the only known case within the iberian Carabidae. In this sense, it deserves attention the synonymy established by Ledoux and Roux [1992] between *Nebria vuillefroyi* Chaudoir, 1866 (located in the Central System) and *Nebria urbionensis* Arribas, 1992 (located in the North-Iberian System) or the possible synonymy between *Trechus schaufussi pandellei* Putzeys, 1870 and *Trechus schaufussi vivesi* Jeanne, 1976.

Zabrus (Iberozabrus) seidlitzii Schaum, 1864

(Fig. 27–28, 49)

= *Zabrus (Iberozabrus) seidlitzii gredosanus* Jeanne, 1970, **syn. n.**

Taxonomic considerations. In that pertaining to validity of *Z. seidlitzii gredosanus* **syn. n.** it has been proved that the structure of the internal sac is the same in all specimens of *Z. seidlitzii* from the Central System (fig. 27–28).

In our opinion, the characters used by Jeanne [1970] to separate specimens from the Sierra de Gredos at a sub-specific level enter into the intra-specific variation.

The admission of specimens from Gredos as a valid sub-species is probably due to certain scarcity of material available for study and, therefore, the lack of knowledge of the variability of the characters within the different populations.

Zabrus (Iberozabrus) arragonensis Heyden, 1883, **stat.**

rest.

(Fig. 12–13)

= *Zabrus (Iberozabrus) intercalaris* Ganglbauer, 1915

= *Zabrus (Iberozabrus) aragonicus* Jeanne et Zaballos, 1986.

Taxonomic considerations. The external appearance of *Z. arragonensis* is very similar to *Z. curtus* and *Z. gibbulus*. It is easy to separate it from *Z. gibbulus* starting from the morphological differences of the base of the pronotum. In *Z. gibbulus* the base is, at most, moderately arched, while the other two species have that base low-cut and the rear angles are elongated backwards, giving it a trapezoidal appearance.

This is not the case trying to separate *Z. arragonensis* from *Z. curtus*, both frequently grouped within the same species by different authors [Fuente, 1927; Zaballos, Jeanne, 1994; Andújar, Serrano, 2001; Serrano, 2003].

The study of the aedeagus sac solves any doubt since its structure is very different, as can be seen in the corresponding figures. It specially attracts attention the different development of the apical area, being narrow and elongated in *Z. curtus* (fig. 20) and wide and short in *Z. arragonensis* (fig. 12–13).

The internal sac of the aedeagus of *Z. gibbulus* (fig. 19) has its own special features. The apical area has a mallet-shaped appearance and, at its beginning, it shows a dense small spines covered zone, which gradually disappear towards the apex.

The reason to retrieve *Z. arragonensis* its status as a species is based both on the morphological concordance to original description and the coincidence between the distribution area of the studied specimens and part of the distribution already outlined by this author. As a consequence of the scarcely clear original description, the doubts generated for a long time and the new characters suggested for its differentiation, a redescription of the species is needed.

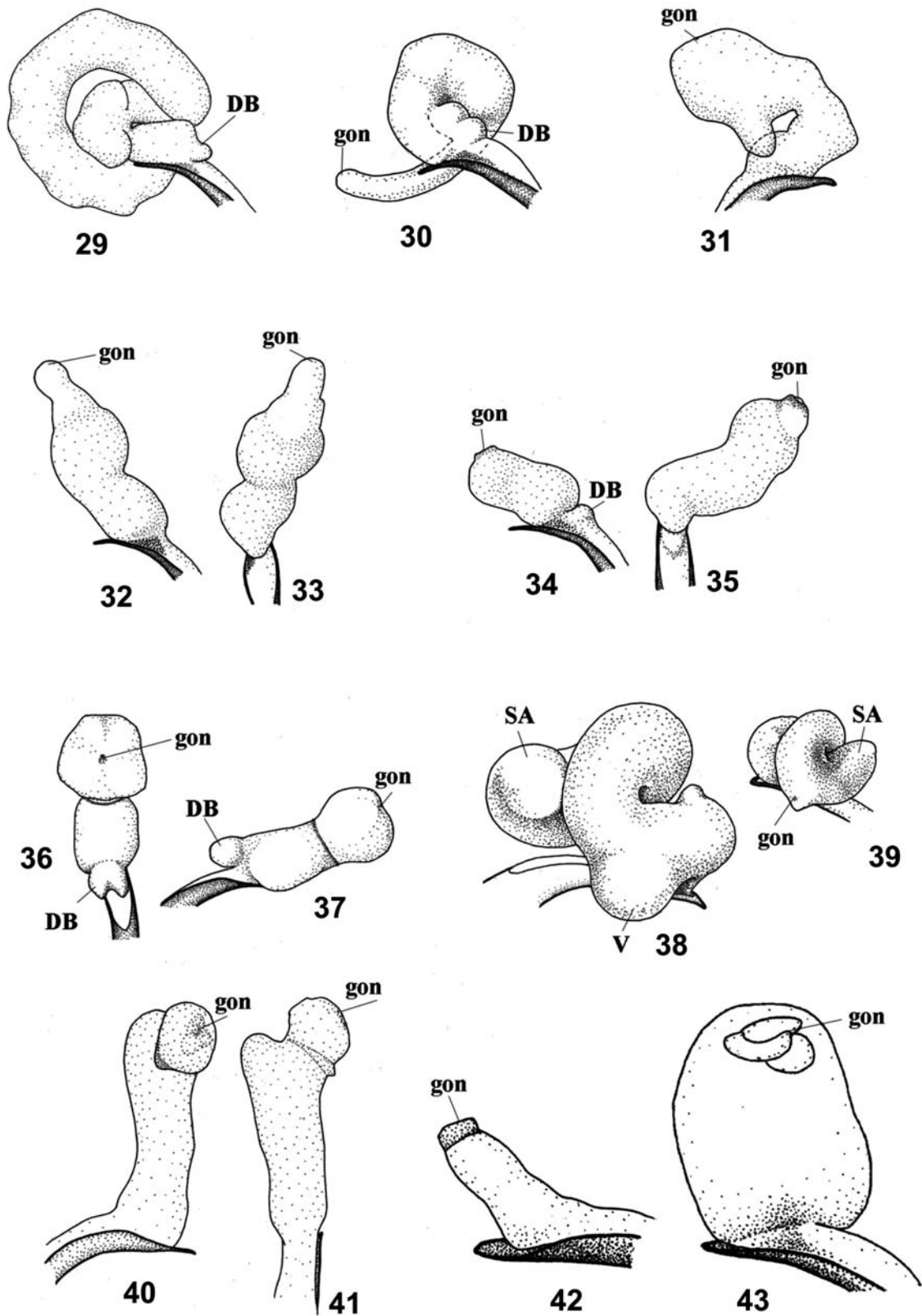


Fig. 29–43. Structure of the internal aedeagus sac.

Рис. 29–43. Строение внутреннего мешка эдеагуса.

29 – *Z. (Iberozabrus) gravis* Dejean, 1828; 30 – *Z. (I.) angustatus* Rambur, 1838; 31 – *Z. (I.) rotundatus* Rambur, 1838; 32–33 – *Z. (Platyzabrus) pecoudi* Colas, 1942; 34–35 – *Z. (P.) constrictus* Graells, 1858; 36–37 – *Z. (Euryzabrus) pinguis* Dejean, 1831; 38–39 – *Z. (s.str.) ignavus* Csiki, 1907; 40–41 – *Z. (Epomidozabrus) mateui* Novoa, 1980; 42 – *Z. (s.str.) tenebrioides* (Goeze, 1777); 43 – *Z. (s.str.) morio* Ménétriés, 1832.

Redescription. Length 12.5–13.5 mm. Black colored body with slight metallic shine. Tarsi and mouth palpa reddish. Flat head. Long antennae, with the last antennomere exceeding the base of the pronotum. Pronotum black, transverse and convex. Slightly low-cut front edge with rounded angles. Very low-cut rear base of the pronotum, with slightly sharp rear angles. Front edge, lateral margins and base of the pronotum dotted. Very diffuse pronotal carinae and slightly sinuous pronotum margins before the rear angles.

Finely dotted striation of the elytra, almost flat inter-striation, isodiametric microreticulation and barely visible pre-apical sinuosity.

Aedeagus sac according to figures (fig. 12–13). General orientation of the sac is perpendicular to its axis. Basal protuberances are scarcely developed, joined and forming a sub-spherical structure. Protruding and well-defined ventral protuberance. Hypertrophied apical protuberance twisted over itself with the gonopore located at its end.

Zabrus (Iberozabrus) obesus (Audinot-Serville, 1821)
(Fig. 2)

- = *Zabrus (Iberozabrus) eserensis* Bolívar, 1918, **syn. n.**
- = *Zabrus (Iberozabrus) neerensis* Heyden, 1889
- = *Zabrus (Iberozabrus) orientalis* Aubry, 1956
- = *Zabrus (Iberozabrus) aubryi* Jeanne, 1970
- = *Zabrus (Iberozabrus) souletin* Jeanne, 1970

Taxonomic considerations. The status of *Z. eserensis* in relation to *Z. obesus* has been object of different interpretations all along. Both species are valid according the last revision of the group [Andújar, Serrano, 2001], although the need of new data to confirm this position is suggested.

The study carried out over different populations of *Z. obesus* from its entire distribution area allows to conclude that it is a single species with a high degree of inter-population variability regarding the external morphology. Within this context, *Z. eserensis* is merely another example of such variability. This affirmation is supported on the study of the internal sac of the aedeagus of specimens from different pyrenean locations, which in all cases presents the same appearance (fig. 2). It was even possible to study material labelled as *Z. eserensis* from the typical location.

2. Considerations on *Zabrus* from the Iberian Peninsula

The most recent studies addressed to set the phylogenetic relationships among the different taxa of *Zabrus* are based on cladistic analysis of morphological characters [Andújar, Serrano, 2001], or based on combination of genetic and morphological data [Sánchez-Gea et al., 2000; Sánchez-Gea et al., 2004]. The most recent proposal regarding the organization of the genus *Zabrus* at a palaeartic level is reported in Catalogue of Palearctic

Coleoptera [2003], being Serrano and Andújar [2003] the authors although, for unknown reasons, some previous proposals such as grouping of some taxa within new subgenera [Andújar, Serrano, 2000] are not mentioned.

The comparative study of the internal aedeagus sac offers a new prospect of the relationship among the different taxa. The starting hypothesis assumes that the *Zabrus*' ancestral taxa in their origin must have had an aedeagus with a simple internal sac like *Z. (s. str.) tenebrioides* (Goeze, 1777) (fig. 42) or *Z. (s. str.) morio* Ménétríés, 1832 (fig. 43).

Taking in consideration all data previously provided by other authors in combination with our own investigations, it would be possible to explain the phylogenetic relationship among the Iberian *Zabrus* as follows:

Based on morphological characters such as their winged nature and elongated metapisternas, the existence of a distinctive group that corresponds with *Zabrus* (s. str.) is considered.

The case of *Z. ignavus* (fig. 38–39) deserves a particular treatment, as the possibility of being part of a different subgenus due to the special morphology of the right paramere (presence of apical hook) was suggested by Andújar and Serrano [2001]. The study of the internal sac allows to support this hypothesis, since its configuration shows a clearly different and more complex model than *Z. tenebrioides* and *Z. morio*.

Special relevance has the fact that the gonopore in *Z. ignavus* is not located in the apical position and the lack of a sclerotized ring, clearly visible in the other two species.

The subgenus *Epomidozabrus* Ganglbauer, 1915 shows a model of aedeagus sac with absence of visible protuberances at its base, having a vertical and elongated development the rest of the sac (fig. 40–41), with a sclerotized ring close to the apex.

Its validity as a subgenus is also supported by a series of external morphological characters. Species in this subgenus have elytron with a straight basal margin, ascending at its extreme. The basal edge as a whole maintains a constant width right up to the humeral angle, where it is obliquely truncated, and ends up in a lobe that in some cases acquires a tooth-shaped aspect (fig. 55, 56).

It is worth to point out that similar morphological characters appear in some species of the Eastern Mediterranean region, such as *Z. (Pelor) oertzeni*, *Z. (P.) politus* and *Z. (P.) graecus orientalis* (fig. 52–54).

Preliminary studies about the configuration of the aedeagus internal sac of these species allow us to consider the possibility of a close relationship with *Epomidozabrus*. These data, along with other not published yet, support the need to review the present subgenera division of *Zabrus*, what it will be the object of an upcoming paper.

The validity of the subgenus *Euryzabrus*, described by Ganglbauer [1915], has been supported by different authors in recent papers [Andújar, Serrano, 2001; Ortuño et al., 2003]. The configuration of the aedeagus sac (fig. 36–37) adds more reasons to reinforce this statement. Its simple aspect along with the presence of the sclerotized ring becomes this sub-genus related to *Zabrus* (s. str.), *Epomidozabrus* and *Cantabrozabrus* **subgen. n.** and, more weakly, with *Platyabrus*.

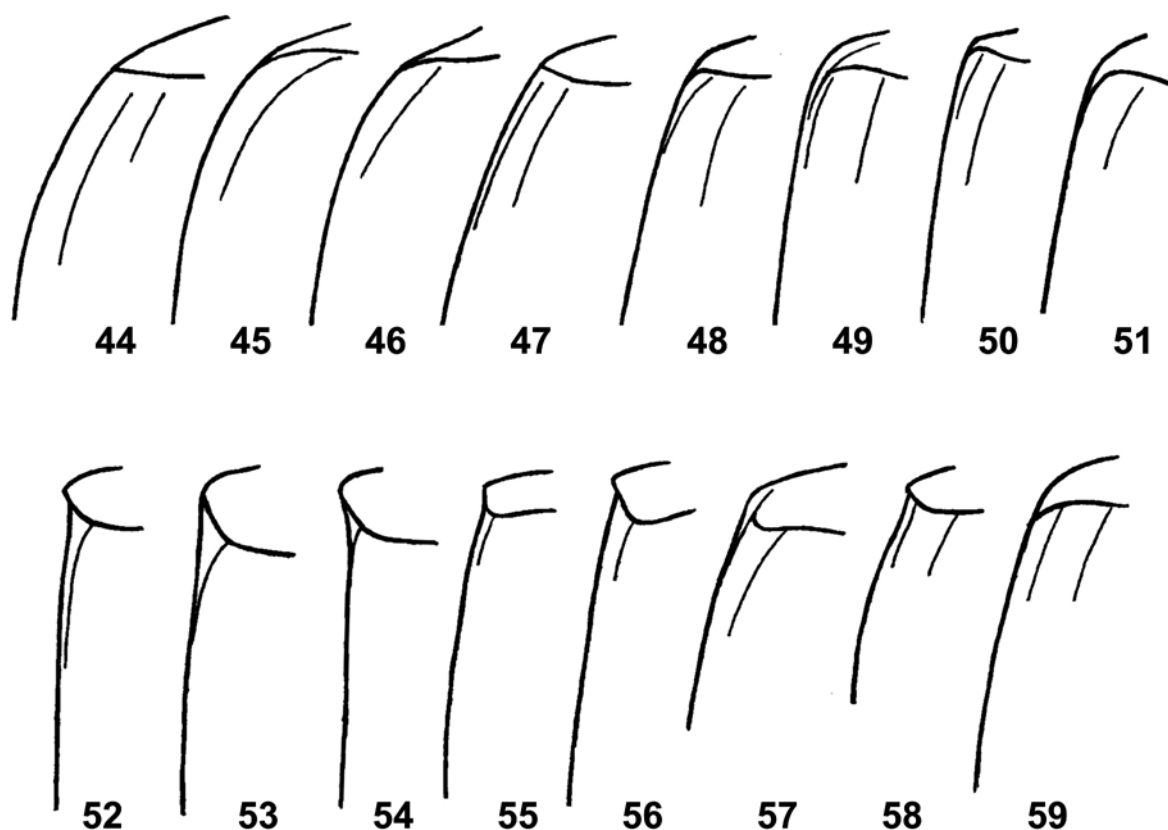


Fig. 44–59. Base of elytra.

Рис. 44–59. Основание надкрылий.

44 – *Z. (Iberozabrus) theveneti* Chevrolat, 1874; 45 – *Z. (I.) ambiguus* Rambur, 1837; 46 – *Z. (I.) gravis* Dejean, 1828; 47 – *Z. (I.) angustatus* Rambur, 1838; 48 – *Z. (I.) laurae* Toribio, 1989, **stat. rest.**; 49 – *Z. (I.) seidlitzii* Schaum, 1864; 50 – *Z. (I.) curtus* (Audinet-Serville, 1821); 51 – *Z. (I.) uhagoni* **sp. n.**; 52 – *Z. (Pelor) oertzeni* Reitter, 1885; 53 – *Z. (P.) politus* Gautier des Cottés, 1869; 54 – *Z. (P.) graecus orientalis* Apfelbeck, 1904; 55 – *Z. (Epomidozabrus) flavangulus* Chevrolat, 1840; 56 – *Z. (E.) mateui* Novoa, 1980; 57 – *Z. (I.) urbionensis* Jeanne, 1970; 58 – *Z. (Cantabrozabrus subgen. n.) consanguineus* Chevrolat, 1865; 59 – *Z. (Platyzabrus) constrictus* Graells, 1858.

The variability detected in some of the characters is worth mentioning, as these have been traditionally considered to be exclusive of *Z. pinguis*. This is the case of the absence of pores in the proximities of the chin tooth, which despite being the most habitual case, is not in fact a fixed character, given that specimens with well-defined setulated pores sporadically appear mixed with normal specimens, as occurs in a studied population from Viana do Castelo (Portugal).

Just like in the previous case, the subgenus *Platyzabrus* seems to be quite sound. It differs from other *Zabrus* because of its nebrion-like general appearance and the pronotum particularities, having also differences related to female genitalia [Ortuño et al., 2003] and chromosomal number [Serrano, Galián, 1998].

Both species from this subgenus, *Z. pecoudi* (fig. 32–33) and *Z. constrictus* (fig. 34–35), show internal sacs with a similar simple structure, with vestigial traces of the sclerotized ring and with small chitinized dots over its whole extent.

The subgenus *Iberozabrus* sensu Jeanne [1968] has been recently cast on doubt by Andújar and Serrano [2001], inferring from their considerations that the validity of this subgenus is just supported by biogeographical criteria.

The comparative study of the aedeagus sacs in species from this subgenus shows several different and well-defined evolutive patterns, what give rise to think that *Iberozabrus* is actually an artificial subgenus where several groups of species with different evolutive levels are coexisting.

To take a decision regarding the validity of *Iberozabrus* is rather complex and, therefore, it has been chosen to, provisionally, maintain this common denomination for a set of taxa, due to functional reasons essentially based on geographical isolation criteria.

In a first approach, the subgenus *Iberozabrus* can be divided into five groups of species, which would represent in the same way the main subgenus evolutionary lineages.

The first group would be the “*seidlitzii*” group, made up by *Z. laurae* **stat. rest.** (fig. 21–22), *Z. galicianus* (fig. 23), *Z. prietoi* **sp. n.** (fig. 24), *Z. coiffaiti* (fig. 25), *Z. estrellanus* (fig. 26) and *Z. seidlitzii* (fig. 27–28). It is characterized by a highly accentuated hypertrophy of the supra-apical protuberance, which consequently displaces the gonopore into a ventral position. Within this group species *Z. seidlitzii* and *Z. estrellanus* show a sac model less evolved.

The second group would be the “*curtus*” group, made up by *Z. obesus* (fig. 2), *Z. marginicollis* (fig. 3), *Z. castroi* (fig. 4), *Z. fuentei* **sp. n.** (fig. 5–6), *Z. uhagoni* **sp. n.** (fig. 7–8), *Z. ambiguus* (fig. 9–10), *Z. vasconicus* (fig. 11), *Z. gibbulus* (fig. 19) and *Z. curtus* (fig. 20). These are characterized by a very elongated apical protuberance and a gonopore situated in an apical position. The ventrobasal and dorsobasal protuberances are evident in all cases.

The third group would be the “*silphoides*” group, made up by *Z. aragonensis* **stat. rest.** (fig. 12–13), *Z. silphoides* (fig. 14–15), *Z. theveneti* (fig. 16–17) and *Z. urbionensis* (fig. 18), characterized by a smaller relative length of the apical protuberance and a more robust aspect. The gonopore is also located in apical position. As it can be seen in the figures, this group is closely related to the “*curtus*” group and, probably, the oldest one, along with the next two groups. Within this group *Z. urbionensis* presents the singularity of being the only species of *Iberozabrus* that has simple epipleurae, given that the other character regularly taken into consideration, separation of the umbilicated series, is not actually fixed in two of the groups. With the lack of new data, it has been considered to include this species within the group, although its position could be modified in the future.

The fourth group would be the “*gravis*” group, made up by *Z. gravis* (fig. 29) and *Z. angustatus* (fig. 30). The aedeagus sac is characterized by the absence of ventral protuberance and the presence of a highly-marked and bilobulated dorsobasal protuberance. The apical protuberance is highly developed and shows several folds with different degree of development, being the gonopore located at its extreme.

The fifth group would be the “*rotundatus*” group, and is just made up by *Z. rotundatus* (fig. 31). Taking in consideration the morphology of the internal sac, it doesn't fit easily to any group proposed before. Although its outward appearance shows great similarity to the “*ambiguus*” group [Andújar, Serrano, 2001], the configuration of the internal sac in the species from this group is so different that even every single species would belong to a different group, according this new proposed sketch. Because of this statement, it was decided to keep this species in a group aside.

3. Phylogeny and evolution of iberian *Zabrus*

Despite the notable efforts made during the last few years by Sánchez-Gea et al. [2000, 2004], the evolutive and phylogenetic model of the iberian *Zabrus* doesn't have enough consistency yet to be free from new proposals that could represent substantial changes in the present overview. The strictly cladistic approach imposed in the last few years is not free of well-founded criticism.

The first problem of this overview appears with the hierarchical structuring of the value of every selected character. In this sense, one may ask if all the characters used possess the same evolutive significance. A second disturbing matter deals with the identification and interpretation of possible evolutive convergence phenomena within this genus. A third question to discuss is the choice of the characters to be used for the analysis and the objectivity

of its selection or removal from the data matrixes. Another additional element appears as a consequence of using genetic techniques that reveal a lack of congruence with models only based on external morphological characters. In summary, reasons more than enough to review the model, as it has been duly assumed by Sánchez Gea et al. [2004].

As a result of the study of the internal aedeagus sac, performed to most of the species of iberian *Zabrus*, some changes related to the possible evolutive model and the phylogenetic relations within this genus turn out to be reasonable. These data allow to explain some of the disarrangements observed between the model based on external morphology and strictly genetic data.

In the last few years, some authors have started to manage the idea of using the internal sac as an especially valuable indicator to follow the evolutive changes [Ledoux, Roux, 2005].

As outlined before, the propounded hypothesis of evolution would start from the assumption that the aedeagus sac would have a simple morphological configuration in its origin, with the gonopore situated at its extreme. This would match the model that actually present species such as *Z. tenebrioides*, *Z. morio*, and some sub-genus of lusitanian origin such as *Epomidozabrus*, *Platyzabrus* and *Cantabrozabrus*.

From this point two different evolutionary paths seem to develop. In the first one, the aedeagus sac would tend to get longer, with the gonopore in its extreme, being this tendency observed in the groups “*curtus*”, “*silphoides*”, “*gravis*” and “*rotundatus*”, all from subgenus *Iberozabrus*. In the second one, the sac evolves into a very complex morphology, with great development of different protuberances and with the gonopore moved out of the apical end, because of the important development of the supra-apical protuberance. This model can be observed in the group “*seidlitzii*” and in *Z. (s. str.) ignavus*.

From the historical bio-geographic point of view, the origin of the genus *Zabrus* probably is situated in the Eastern Mediterranean, where an important number of species with primitive characters can be found, both in that regarding the external morphology, as well as the configuration of the internal sac.

From this point, it's rather problematic to justify how the Peninsula was inhabited and its possible stages, taking into account, moreover, the complexity of the geological history of the Mediterranean region.

In the light of the available data, the most logical hypothesis fits to that proposed by different authors [Antunes, 1979; Ginsburg, Antunes, 1979; Azzaroli, 1981; Aguilar et al., 1984], who proclaim the existence of a direct connection between Asia Minor and Iberia without passing through Africa or Europe, connection that would have taken place on different occasions during the early Miocene period, about 10–20 million years ago and that would have been used as a colonization route in both directions.

This hypothesis has already been used for other groups of Coleoptera, as in the case of *Thorectes* Mulsant, 1842 (Geotrupidae), as pointed out by Palmer and Cambefort [1997]. In the case of *Zabrus*, the migration would be in an east-west direction, quite probably in several waves, giving a first one rise to species with more primitive characters in the portuguese area, such as *Euryzabrus*, *Platyzabrus*, *Epomidozabrus* and *Cantabrozabrus*, with very restricted distribution areas.

The origin of species within subgenus *Iberozabrus* would be found in later migrations. The external morphology of the ancestors of *Iberozabrus* would be quite probably similar to *Z. gravis*, *Z. ambiguus* or *Z. silphoides*, with rounded rear angles of the pronotum, favouring mobility and dispersion. It would be about one or more species with no severe altitude requirements and with a tendency to occupy extensive areas of distribution.

From this point, the geo-climatic changes that took place in the Peninsula gave rise to the appearance of singular ecological niches that would require specific adaptations, what could have being the cause for a very active evolutionary radiation. This fact would justify changes like body flattening, reinforcement of the pronotal angles or the evolution of the sac's morphology itself.

In our opinion, it would be too premature to try to explain the phylogeny and the evolution of genus *Zabrus* with the data actually known. In order to go forward in the knowledge of these items the study of the genus in its whole is considered as essential.

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