

The lamellicorn beetles of southern Sardinia (Coleoptera: Scarabaeoidea)*

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ABSTRACT

A faunistic inventory of lamellicorn beetles has been conducted in southern Sardinia (former province of Cagliari) based on literature and collection records, as well as on new findings from recent field expeditions (2003–2008). The taxonomic analysis of the study area revealed the occurrence of 105 species (2 Lucanidae, 2 Trogidae, 7 Geotrupidae, 1 Hybosoridae and 93 Scarabaeidae). The majority of families are represented by 100% of the known Sardinian fauna; only the Scarabaeidae, the most diverse family, is represented by 80.8% of its Sardinian members. Some considerations are made on the conservation status, trophic categories, chorotypes, habitat distribution and seasonal activity of all the species recorded. The percent values of coprophagous and phytophagous species are respectively 57.1% and 40.9%, almost reversed compared to the same values for the whole Italian lamellicorn fauna (46.8% and 50.5%). This pattern is probably due to the historical impact of land use (mainly based on livestock grazing) on the structure of the scarab communities.

Key words: Lucanidae, Trogidae, Geotrupidae, Hybosoridae, Scarabaeidae, zoogeography, Italy, Sardinia.

RIASSUNTO

I Coleotteri Lamellicorni della Sardegna meridionale (Coleoptera: Scarabaeoidea)

Un inventario faunistico dei Coleotteri Lamellicorni della Sardegna meridionale (ex Provincia di Cagliari) è stato condotto attraverso l'esame di tutti i dati di letteratura e di numeroso materiale inedito, includendo i numerosi esemplari raccolti durante una campagna di esplorazione faunistica condotta negli anni 2003–2008. L'analisi tassonomica dell'area di studio ha rivelato la presenza di 105 specie (2 Lucanidae, 2 Trogidae, 7 Geotrupidae, 1 Hybosoridae e 93 Scarabaeidae). La maggioranza delle famiglie è rappresentata dal 100% delle specie presenti in Sardegna; soltanto la famiglia Scarabaeidae, la più numerosa e diversificata, figura con circa l'80,8% delle specie sarde. L'inventario è accompagnato da considerazioni su abbondanza, stato di conservazione, categorie trofiche, corotipi, distribuzione ecologica e fenologia di tutte le specie trattate. I valori percentuali approssimati di specie coprofaghe e fitofaghe nell'area di studio sono rispettivamente 57,1% e 40,9%, valori quasi inversi a quelli presentati dalle stesse categorie nell'intera fauna dei lamellicorni italiani (46,8% e 50,5%). Ciò potrebbe essere dovuto allo storico impatto dell'uso del suolo (prevalentemente pastorale) sulla struttura delle comunità.

INTRODUCTION

The lamellicorn beetles (including the traditionally named scarab and stag beetles) are currently includ-

ed in the superfamily Scarabaeoidea and represent one of the most diverse taxonomic groups of the order Coleoptera. Their ecological niches are based on the exploitation of many different resources,

mainly leaves, flowers, fruits, roots, fungi, rotten wood and dung. Many species are pollinators while others cause damage to crops. The larvae of several species feed on dead wood of old trees or vegetable debris. Dung beetles are important elements in pasture ecosystems: they annually incorporate tons of animal dung into the soil, increasing fertility and, at the same time, destroying the habitat for the larvae of many pest flies.

A high diversity of lamellicorn beetles (dung and plant eaters together) in a geographic area means the occurrence of various habitat conditions and indicates the existence of an equilibrium between forest and pasture environments. Changes in land use, such as intensive agriculture, use of chemicals, deforestation, pasture abandonment or overgrazing have caused the depletion of lamellicorn beetle populations and the local extinction of many species from European ecosystems (Lumaret 1990; Lobo 2001; Carpaneto et al. 2005, 2007a, 2010).

Current knowledge about scarab beetles in Sardinia refers to both old papers (e.g. Gené 1836, 1839; Bargagli 1872; Magretti 1878; Marcialis 1892; Champion 1911) and more recent taxonomic contributions on single genera or species groups. Our team is involved in a long-term study focused to produce a detailed inventory of the lamellicorn beetles of Sardinia, Corsica and other Tyrrhenian islands (Carpaneto 1979; Pittino 1980b; Dellacasa & Poggi 1981; Carpaneto 1983; Carpaneto & Piattella 1996; Carpaneto et al. 1997; Dellacasa 2004, 2009). Other important contributions came from taxonomic and faunistic studies conducted on some scarab beetle groups, which added new records and new taxa (e.g. Crovetto 1969, 1970a, 1970b, 1970c; Piras & Pisano 1972; Sabatinelli 1976; Pittino 1978a, 1978b, 1980a; Leo & Pisano 1984; Leo 1985; Pittino & Mariani 1986; Pittino 1991; Leo & Fancello 2007; Dellacasa & Dellacasa 2008; Sparacio 2008; Leo 2010).

A recent entomological survey conducted from 2003 to 2008 in south-western Sardinia by the Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana" (Verona, Italy – from here on CNBFVR) (cf. Bardiani 2011) gave us the opportunity to study a lot of specimens from Iglesiente and Sulcis, two areas poorly represented in our database of scarab beetle records. These collections stimulated us to revise all the previous records from southern Sardinia (either from the literature and our database) to draft an inventory of the lamellicorn beetles occurring in the southern provinces of the region.

STUDY AREA, MATERIAL AND METHODS

The study area of the present paper includes all the regional territory of the former province of Cagliari, nowadays split into three provinces: 1) Medio Campidano (VS): northwestern sector of southern Sardinia; 2) Carbonia-Iglesias (CI): southwestern sector of southern Sardinia; 3) Cagliari (CA): eastern and south-eastern sectors of southern Sardinia. The study area also includes the two islands of San Pietro and Sant'Antioco, both located in the south-western part of Sardinia, and belonging to the province of Carbonia-Iglesias. We did not separate the records by administrative provinces because we considered most useful for the reader to group all the localities of southern Sardinia in alphabetical order, each one with the acronym of the province indicated in brackets. This arrangement will facilitate the reader who is searching for single localities but does not know their provincial allocation (the provincial borders were recently redefined); on the other hand, the presence of the province acronyms after each locality will allow administrators to locate all the species occurring in their jurisdiction area. The northern border of the area considered in this paper follows a line passing through the following localities: Sant'Antonio di Santadi, Pabillonis, Sardara, Gesturi, Mandas, Mulargia Lake and Valley of Flumendosa River (all included south of 39° 46' N).

The material examined comes from two data sets:

1. ICKMAP RECORDS (Integrated CKMAP Database) consist of all the records (both literature and unpublished data) included in the CKMAP database, produced by G.M. Carpaneto and E. Piattella for the Italian Ministry of Environment (cf. Carpaneto et al. 2007b; Ruffo & Stoch 2007), integrated by further records, mostly provided by Giovanni Dellacasa, Marco Dellacasa and Riccardo Pittino.
2. CNBFVR RECORDS (unpublished records collected from 2003 to 2008 by the staff of CNBFVR, all gathered during entomological surveys in southern Sardinia, from the Marganai Mountains to the neighbouring forest of Montimannu, the coastal dunes of the Costa Verde to the west and Barbagia to the east (cf. Mason et al. 2006; Cerretti et al. 2009; Bardiani 2011).

The first data set (ICKMAP RECORDS) is based on records from several private and museum collections, where the dates of capture are lacking (only the year

was reported in the database according to the guidelines given by the Ministry of Environment). In the second data set, all the specimens were collected in 2003–2008 by the staff of CNBFVR. It deals with 400 specimens belonging to 31 species, all identified by two of us (G. Carpaneto and E. Piattella).

The nomenclature and taxonomy used for ordering the records in the present paper are those reported in the Catalogue of Palaearctic Coleoptera (Löbl & Smetana 2006), apart from a few exceptions (e.g., recent changes and some misprints occurring in that book).

In the Species List, for each species we provide the following information:

1. Taxonomic identity: scientific name, author and year of description (cf. Carpaneto & Piattella 1995; Löbl & Smetana 2006);
2. Chorology: geographic distribution coded by the chorotypes defined by Vigna Taglianti et al. (1993, 1999);
3. Ecology: ecological distribution in the vegetation belts, coded according to the categories defined for scarab beetles in Italy (Carpaneto 1975; Carpaneto & Piattella 1986);
4. Phenology: monthly occurrence (I–XII) of active adult beetles in Sardinia, according to all available records.

Gazetteer

We provide the geographic coordinates of the sampling sites (reported in fig. 1), according to the World Geodetic System (WGS84). Coordinates of ICKMAP records are expressed in degrees, minutes and seconds for latitude (N) and longitude (E), directly in the text for each species, when available. The CNBFVR sampling sites were arranged (cf. Bardiani 2011) in the following gazetteer according the Universal Transverse Mercator system (UTM) in metres, where the first series of numbers refers to longitude (E) and the second series of numbers to latitude (N). Elevation is given in metres above sea level.

Arbus (VS), Capo Pecora, 15 m, 32S 446760 4367599;

Arbus (VS), Marina di Arbus, 0–5 m;

Arbus (VS), Piscinas, 0–5 m, 32S 452927 4376897;

Buggerru (CI), Cala Domestica, 39 m, 32S 446215 4358636;

Buggerru (CI), Foce Rio Mannu;

Burcei (CA), Burcei, 725 m, 32S 528219 4356591;

Burcei (CA), Punta Serpeddi, 954 m, 32S 525266 4356808;

Domusnovas (CI), Bega d'Aleni, 621 m, 32S 467855 4361336;

Domusnovas (CI), Grotta di San Giovanni, 325 m, 32S 467900 4354891;

Domusnovas (CI), Gutturu Seu, 140 m, 32S 471646 4355238;

Domusnovas (CI), Gutturu Seu, 174 m, 32S 471577 4355716;

Domusnovas (CI), Lago Siuru, 322 m, 32S 467069 4357916;

Domusnovas (CI), Planargia-Scoveri, 32S 466973 4362228;

Domusnovas (CI), Planargia-Scoveri, 625 m, 32S 465523 4362921;

Domusnovas (CI), Punta Piloni de sa Figù, 750 m, 32S 465958 4360742;

Domusnovas (CI), sa Duchessa, road to Perda Niedda, 350 m, 32S 466233 4359025;

Domusnovas (CI), Sedda Pranu Cardu, 549 m, 32S 470926 4358924;

Domusnovas (CI), Valle Oridda, 590 m, 32S 466681 4362696;

Domusnovas (CI), Valle Oridda, 592 m, 32S 466973 4362228;

Domusnovas (CI), Valle Oridda, 595 m, 32S 466970 4362400;

Domusnovas (CI), Valle Oridda, 643 m, 32S 465399 4362770;

Fluminimaggiore (CI), Portixeddu, 6 m, 32S 449437 4365741;

Gesturi (VS), Giara di Gesturi, 568 m, 32S 499568 4399504;

Gonnosfanàdiga (VS), Monte Idda, road to Monte Linas, 474 m, 32S 466946 4368997;

Gonnosfanàdiga (VS), Monte Linas, Genna sa Xirra, 847 m, 32S 464114 4366023;

Gonnosfanàdiga (VS), Monte Linas, Genna su Pudenti, 853 m, 32S 465485 4367656;

Gonnosfanàdiga (VS), Monte Linas, Punta su Filixi, 780 m, 32S 465819 4368289;

Gonnosfanàdiga (VS), Ovile Linas, 710 m, 32S 466346 4365201;

Iglesias (CI), Cantoniera Marganai, 491 m, 32S 462272 4354677;

Iglesias (CI), Case Marganai, 660 m, 32S 463341 4356196;

Iglesias (CI), Case Marganai, 725 m, 32S 463890 4355925;

Iglesias (CI), Conca Margiani, 674 m, 32S 462534 4356859;

Iglesias (CI), Conca Margiani, radura 725 m, 32S 462470 4357011;

Iglesias (CI), dint. colonia Beneck, 636 m, 32S

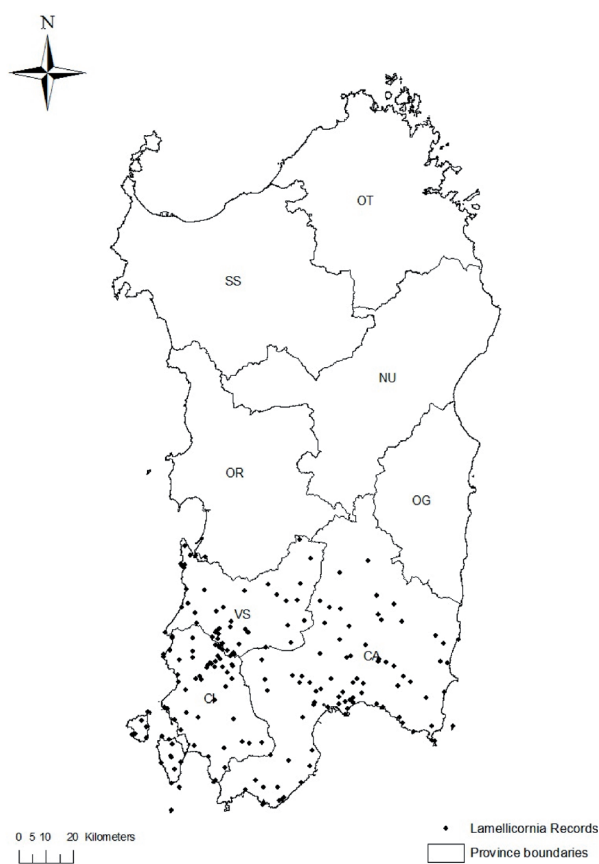


Fig. 1. Sampling coverage of the study area, represented by all the localities of southern Sardinia where lamellicorn beetles have been found (from both literature and unpublished records).

462391 4355441;

Iglesias (CI), Monte Marganai, 700 m, 32S 462853 4355582;

Iglesias (CI), Monti Marganai, dint. Reigraxius, 703 m, 32S 462635 4356866;

Iglesias (CI), Monti Marganai, Tintillonis, 480 m, 32S 463010 4355249;

Vallermosa (CA), Cantoniera de s'Acquacotta, 83 m, 32S 483910 4361992;

Villacidro (VS), 239 m, 32S 477514 4367748;

Villacidro (VS), Canale Monincu, 450 m, 32S 468040 4383438;

Villacidro (VS), Canali Serci, 381 m, 32S 472208 4359497;

Villacidro (VS), Canali s'Otti, 520 m, 32S 471690 4359611;

Villacidro (VS), Lago di Montimannu, 256 m, 32S 474156 4363150;

Villacidro (VS), Punta Piscina Argiolas, 282 m, 32S 472049 4360081;

Villacidro (VS), Punta Pranu Ilixis, 563 m, 32S 471221 4359310;

Villacidro (VS), Rio Cannisoni, 375 m, 32S 468713 4362692;

Villacidro (VS), Rio Cannisoni, 382 m, 32S 468980 4362541;

Villacidro (VS), Rio Cannisoni, 390 m, 32S 469095 4362383;

Villacidro (VS), Rio Cannisoni, 390 m, Orto Botanico Corpo Forestale;

Villacidro (VS), Rio Cannisoni, 400 m, 32S 468858 4362543;

Villacidro (VS), Rio Cannisoni, 401 m, 32S 468459 4362806;

Villacidro (VS), Rio Cannisoni, 483 m, 32S 468463 4363150;

Villacidro (VS), sorgente s'acqua Frischedda, 372 m, 32S 468391 4362826;

Villacidro (VS), Torrente Leni, 300 m, 32S 469793 4361088.

ABBREVIATIONS

COLLECTORS. DA = D. Avesani; DB = D. Birtele; DW = D. Whitmore; EG = E. Gatti; EM = E. Minari; FM = F. Mason; GC = G. Chessa; GN = G. Nardi; LF = L. Fancello; MB = M. Bardiani; MM = M. Mei; MT = M. Tisato; MTr = M. Trizzino; PA = P. Audisio; PCe = P. Cerretti; PCo = P. Cornacchia; PL = P. Leo.

COLLECTIONS. CCM = C. Meloni c/o Museo Civico di Storia Naturale "G. Doria", Genoa (Italy); CGMD = G. Dellacasa and M. Dellacasa, Genoa (Italy); CDP = D. Patacchiola, Rome (Italy); CPL = P. Leo, Cagliari (Italy); CRP = R. Pittino, Milan (Italy); EAUSS = Istituto di Entomologia Agraria, Università di Sassari, Sassari (Italy); MCSNG = Museo Civico di Storia Naturale "G. Doria", Genoa (Italy); MCSNM = Museo Civico di Storia Naturale di Milano, Milan (Italy); MRSNT = Museo Regionale di Scienze Naturali di Torino, Turin (Italy); MSNTC = Museo di Storia Naturale e del Territorio, University of Pisa, Calci, Pisa (Italy); MZUR = Museo di Zoologia dell'Università di Roma, University of Rome "Sapienza", Rome (Italy).

ACP (Archivio Carpaneto-Piattella) is an archive of data obtained by the identification of several thousands of Italian specimens belonging to private and public collections, all identified by G. M. Carpaneto and E. Piattella since 1970. This archive was the basis for developing the CKMAP database and is continuously updated.

ABBREVIATIONS OF CAPTURE METHODS. al = at light; cn = car net; lt = light trap; mt = Malaise trap; nt = net; pt = pitfall trap; sn = sweep net; wt = window flight trap.

OTHER ABBREVIATIONS. ex = specimen/s.

GEOGRAPHIC TERMS USED FOR THE RECORDS. Bacino = Basin; Cantoniera = Roadman's house; Cascata = Waterfall; dint. = environs of; F. = Fiume = River; Foce = Mouth [of river]; Isola di = Island of; Lago = Lake; M. = Monte = Mount; P.ta = Punta = Peack; Rio = stream/small river; rive = river banks; Sorgente = Spring; Spiaggia = Beach; Stagno = Pond; Torrente = Stream.

FAUNISTIC LIST

LUCANIDAE Latreille, 1804

LUCANINAE Latreille, 1804

1. *Lucanus tetraodon* Thunberg, 1806

ICKMAP RECORDS. Quartu Sant'Elena (CA), 5 m, 1954 (Franciscolo 1997) (doubtful record).

CHOROLOGY. South-European (mainly in central and southern Italy, with populations in northern Italy, Corsica and southern mainland France (Var). In the past the species was also quoted from Albania, Greece and Algeria (Franciscolo 1997), but these records need a confirmation.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. Undefined for lack of data (in peninsular Italy: V–IX).

NOTES. The occurrence of *Lucanus tetraodon* in Sardinia has been questioned by all Sardinian entomologists, who never found this species nor signs of its presence on the island (P. Leo, pers. comm.). All published records are old (prior to 1980, some dating back to the nineteenth century) and based in northern and central Sardinia, e.g. Pattada, Nuoro and the Gennargentu Mountains (Marcialis 1892; Franciscolo 1997; Bartolozzi & Maggini 2007). Nevertheless, caution should be exercised in declaring the erroneous nature of the previous information because (1) this species can hardly be confused with other lamellicorn beetles of Sardinia and (2) the lack of recent findings could be explained by deforestation and overgrazing which have reduced and altered the habitat of stag beetles and other saproxylic insects.

DORCINAE Parry, 1864

2. *Dorcus musimon* Gené, 1836

ICKMAP RECORDS. Cagliari, 10 m, 1935 (CGMD). Fluminimaggiore (CI), 60 m, 1980 (CGMD). Iglesias (CI), 150 m, 1953 (Franciscolo 1997). Maipodis (CA), Monti dei Sette Fratelli, 420 m, 1994 (Bartolozzi & Maggini 2007). Monti dei Sette Fratelli (CA), 800 m, 1955, (CRP). Monteponi (CI), 100 m (Gené 1836). Siliqua (CA), 60 m, 1953 (Franciscolo 1997). Villacidro (VS), 260 m, 1968 (CRP). Villacidro (VS), 1992 (Bartolozzi & Maggini 2007). Villacidro (VS), Foresta di Monti Mannu, 350 m, 2001 (Bartolozzi & Maggini 2007). Villasimius (CA), 40 m, 1976, (CRP).

CHOROLOGY. W-Mediterranean (Sardo-Maghrebini-an), quoted of Sardinia, Algeria and Tunisia; its occurrence in Corsica should be confirmed.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. III–X.

TROGIDAE MacLeay, 1819

3. *Trox cribrum* Gené, 1836

ICKMAP RECORDS. Cagliari, Parco di Monte Urpinu (CA), 70 m, 1972, (CRP). Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10 m, 2006 (CGMD). Fluminimaggiore (CI), 60 m, 1912, (CRP). Isola di San Pietro (CI), Punta Spalmatore, 10 m, 1993 (ACP). Isola di Sant'Antioco (CI), 1 m, 1984 (ACP). Villacidro (VS), Monte Cuccureddus, 700 m, 1973, (CRP); 2006 (CDP). Narcao (CI), 120 m, 1980 (ACP). Pantaleo (CI), 250 m, 1987 (ACP). Villacidro (VS), 260 m, 1978, (CRP); 1974 (CGMD). Villacidro (VS), Cascata sa Spendula, 250 m, 1974, (CRP).

CNBFVR RECORDS. Domusnovas (CI), Valle Oridda, 590 m, 11.XI.2003, DB, on dung, 4 ex (CNBFVR). Iglesias (CI), Conca Margiani, 725 m, 15.XI.2006, DW, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 375 m, 24.III.2006, DB DW, 2 ex (CNBFVR); 24.III.2006, PCo MB, on dry dung, 7 ex (CNBFVR); 11.IX.2006, MB DA DB GN, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 390 m, 11.IX.2006, GN LF, 1 ex (CNBFVR).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. I–V, IX–XII.

4. *Trox nodulosus* Harold, 1872

ICKMAP RECORDS. Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10 m, 2006 (CGMD). Geremeas (CA), 2002 (CDP). Sant'Antonio di Santadi (VS), 39°39'54.9"N-08°35'15.0"E, 80 m, 2004 (CGMD). Villacidro (VS), Monte Cuccureddus, 50 m, 1973 (MCSNM). Villacidro (VS), 250 m, 1974 (MCSNM).

CNBFVR RECORDS. Villacidro (VS), Canali Serci, 381 m, 11.IX.2006, DA MB DB GN, It UV 15 W, 1 ex (CNBFVR). Villacidro (VS), Punta Piscina Argiolas, 282 m, 11.IX.2006, MB, nocturnal survey, 1 ex (CNBFVR).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Oligotopic (montane-mediterranean belt).

PHENOLOGY. IV, VII, IX–X.

GEOTRUPIDAE Latreille, 1802

GEOTRUPINAE Latreille, 1802

Chromogeotrupini Zunino, 1984

5. *Chelotrupes hiostius* (Gené, 1836)

ICKMAP RECORDS. Burcei (CA), Cantoniera Campu Omu (CA), 400 m, 1971, 1973–1975 (CRP). Cala Domestica (CI), 10 m, 1968 (ACP). Fluminimaggiore (CI), Portixeddu, 1984 (CPL) (Dellacasa & Dellacasa 2008). Foce Rio Piscinas (VS), 1 m, 1968 (ACP); 1979 (CRP); 1994–1995, 1999, 2002 (CPL) (CGMD) (Dellacasa & Dellacasa 2008); 2006 (CDP). Giara di Gesturi (VS), 1987 (MCSNG) (Dellacasa & Dellacasa 2008). Iglesias (CI), Rio Canonica, 150 m, 1968 (ACP). Ingurtosu (VS), 200 m, 1968 (Croveti 1970c); 2001 (Dellacasa & Dellacasa 2008). Is Arenas s'Acqua e s'Ollastu (near Torre di Flumentorgiu) (VS), 1993 (CPL) (Dellacasa & Dellacasa 2008). Isola di San Pietro (CI), 10 m, 1970 (Carpaneto et al. 1997). Isola di San Pietro (CI), Cala Lunga, 1 m, 1976 (Carpaneto et al. 1997). Isola di San Pietro (CI), Carloforte, 10 m, 1963 (Carpaneto et al. 1997; Croveti 1970c); 1892, 1902 (Dellacasa & Dellacasa 2008). Isola di San Pietro (CI), Nasca, 10 m, 1994 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 10 m, 1961 (Croveti 1970c); 1987 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1962 (Carpaneto et al. 1997); 1962 (Croveti 1970c). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2005–2007 (CGMD) (Dellacasa & Dellacasa 2008). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2006 (CGMD; MSNTC). Marina di Arbus (VS), 39°33'51.0"N-08°27'48.6"E, 50 m, 2005 (CGMD) (Dellacasa & Dellacasa 2008); Marina di Arbus (VS), 2009 (photo by D. Sechi, 7.XI.2009, www.entomologiitaliani.net). Monti dei Sette Fratelli (CA), 900 m (Croveti 1970c); (MCSNG) (Dellacasa & Dellacasa 2008). Peschiera di Ba Cerbus (CI), 1 m, 1968 (ACP). Portoscuso (CI), 10 m, 1898 (Croveti 1970c). Santa Maria di Flumentepido (CI), 50 m, 1969 (ACP). Santadi (CI), 130 m, 1968 (Croveti 1970c). Sant'Anna Arresi (CI), Cala Sa Barracca 5–48 m, 1998 (CCM) (Dellacasa & Dellacasa 2008).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Oligotopic (submediterranean-mediterranean belts); mainly coastal zones, with scattered populations inland.

PHENOLOGY. I–VIII, X–XII.

6. *Chelotrupes matutinalis* (Baudi di Selve, 1870)

ICKMAP RECORDS. Arbus (VS), Passo Bidderdi, 490 m, 1993 (CPL), 1995 (CCM; CGMD) (Dellacasa & Dellacasa 2008). Burcei (CA), 1985 (CPL) (Dellacasa & Dellacasa 2008). Cantoniera Campu Omu (CA), 1972–1975 (MCSNM; CRP); 1984

(CPL); 1985 (CCM) (Dellacasa & Dellacasa 2008). Carbonia (CI), Monte Sirai, 1990 (CPL) (Dellacasa & Dellacasa 2008). Foce Rio Piscinas (VS), 1 m, 1979 (CRP); 1991 (CCM) (Dellacasa & Dellacasa 2008); 2006 (CDP). Giara di Gesturi (VS), 550 m, 1978 (CGMD; MCSNG); 1987, 1994 (CPL) (Dellacasa & Dellacasa 2008); 1995 (MCSNM). Giara di Gesturi (VS), Patùli Majori, 570 m, 1987, 1992 (CCM) (Dellacasa & Dellacasa 2008). Iglesias (CI), Campo Pisano 180 m, 1978 (CCM; CGMD); 1979 (CCM; CGMD) (Dellacasa & Dellacasa 2008). Isola di San Pietro (CI), 10 m, 1980 (CGMD). Iglesias (CI), Monti dei Simoni, 250–260 m, 2003 (CCM) (Dellacasa & Dellacasa 2008). Isola di San Pietro (CI), Cala Lunga, 1980 (CCM) (Dellacasa & Dellacasa 2008). Isola di San Pietro (CI), Carloforte, 1912 (MCSNG); 1976 (CCM; CPL) (Dellacasa & Dellacasa 2008). Isola di San Pietro (CI), La Punta, 1976 (CPL) (Dellacasa & Dellacasa 2008). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1962 (CGMD; EAUSS); 60 m, 2006 (CGMD); (Dellacasa & Dellacasa 2008). Isola di Sant'Antioco (CI), Punta Maggiore, 1982 (CPL) (Dellacasa & Dellacasa 2008). Marina di Arbus (VS), 50 m, 2002 (CGMD). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2005–2007 (CGMD). Monti dei Sette Fratelli (CA) (MCSNG); 1985 (EAUSS) (Dellacasa & Dellacasa 2008). Monti dei Sette Fratelli (CA), Monte Cresia, 650–700 m, 1982 (CPL; CCM); 750 m, 1986 (CSZ) (Dellacasa & Dellacasa 2008). Monti dei Sette Fratelli (CA), Monte Eccas, 700–750 m, 1997, 2001 (CCM) (Dellacasa & Dellacasa 2008). Pabillonis (VS), Is Arenas, 50–60 m, 1979 (CCM; CPL) (Dellacasa & Dellacasa 2008). Portoscuso (CI), Paringianu, 1979 (CCM) (Dellacasa & Dellacasa 2008). Torre di Flumentorgiu, 1894 (MCSNM) (Dellacasa & Dellacasa 2008).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Oligotopic (submediterranean-mediterranean belts); mainly coastal zones, with scattered populations inland.

PHENOLOGY. I–VI (VII), IX–XII.

NOTE. This species was for long considered a synonym of *Typhaeus (C.) hiostius* but was recently revalidated by Dellacasa & Dellacasa (2008).

Geotrupini Latreille, 1802

7. *Sericotrupes niger* (Marsham, 1802)

ICKMAP RECORDS. Foce Rio Piscinas (VS), 1 m, 1968 (ACP). Isola di San Pietro (CI), 10 m, (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 10 m, (Piras & Pisano 1972). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2007 (CGMD). Monte Arcuentu (VS), 300 m, 1980 (CGMD). Monti dei Sette Fratelli (CA), Rio Maidopis, 350 m, 1992 (CGMD). Sant'Antonio di Santadi (VS), 10 m, 1980 (CGMD). Sarrabus, Rio di Cannas (CA), 200 m, 1980 (CGMD). Villacidro (VS), Diga di Mon-

timannu, 39°25'02.6"N-08°42'00.0"E, 260 m, 2006 (CGMD). Villasimius (CA), Capo Boi, 80 m, 1985 (CGMD). Villasimius (CA), Rio Muredda, 40 m, 1985 (CGMD).

CHOROLOGY. W-European (with extension to the Maghreb).

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. III–XII.

8. *Geotrupes spiniger* (Marsham, 1802)

ICKMAP RECORDS. Foce Rio Piscinas (VS), 1 m, 1968 (ACP). Giara di Gesturi (VS), 550 m, 1978 (CGMD). Giara di Gesturi (VS), Paùli Maiori, 550 m, 1992 (CGMD). Punta Serpeddi (CA), 900 m, 1968 (ACP). Sant'Antonio di Santadi (VS), 10 m, 1980 (CGMD).

CHOROLOGY. Turano-European.

ECOLOGY. Eurytopic (subalpine-mediterranean belts).

PHENOLOGY. IV–XI.

9. *Thorectes (Jekelius) intermedius* (O.G. Costa, 1839)

ICKMAP RECORDS. Arcu Genna Bogai (CI), 540 m, 1962 (ACP). Assemmini (CA), Rio Flumini Mannu, 10 m, 1989 (CGMD). Assemmini (CA), Rio Cixerri, 50 m, 1974 (CRP). Rio di Chia (CA), 10 m, 1955 (Crovetti 1970b). Barumini (VS), Rio Mannu, 200 m, 1969 (ACP). Burcei (CA), Cantoniera Campu Omu, 400 m, 1973 (CRP). Cagliari, 10 m, 1922 (CGMD); 1966 (CGMD); 30 m, 1930 (Crovetti 1970b). Cagliari, Colle Tuvixeddu, 90 m, 1971 (CGMD). Cantoniera San Giorgio (CA), Rio de Quirra, 20 m, 1977 (CRP). Capoterra (CA), 50 m, 1979 (CRP). Casa Puxeddu (VS), 39°40'26.2"N-08°27'49.5"E, 70 m, 2005 (CGMD). Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10 m, 2006 (CGMD). Chia (CA), 10 m, 1990 (CGMD). Domusnovas (CI), 140 m, 1967 (ACP) (Crovetti 1970b). Foce Rio Piscinas (VS), 1 m, 1979 (CRP); 1968 (ACP); 2004 (MSNTC); 2006 (CDP). Gèremeas (CA), 30 m, 1965 (ACP). Giara di Gesturi (VS), 550 m, 1955 (Crovetti 1970b). Giara di Gesturi (VS), Paùli Maiori, 550 m, 1992 (CGMD). Gonnosfanàdiga (VS), 150 m, 1969 (Crovetti 1970b). Guasila (CA), 200 m, 1946 (CGMD). Ingurtosu (VS), 200 m, 1967, (EAUSS); 1967 (Crovetti 1970b). Isola di San Pietro (CI), 10 m (Piras & Pisano 1972). Isola di San Pietro (CI), Carloforte, 10 m, 1969 (Crovetti 1970b); 1969 (EAUSS); 1975 (Carpaneto et al. 1997). Isola di San Pietro (CI), Punta Spalmatore, 10 m, 1993 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 10 m, (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Cala Sapone, 1 m, 1982 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Cannai, 10 m, 1988 (Carpaneto et al. 1997). Isola il Toro, 1 m, 1986 (Carpaneto et al. 1997). Isola La Vacca, 1 m, 1988 (Carpaneto et al. 1997). Marina di Arbus (VS), 39°33'34.6"N-08°27'51.8"E, 50 m, 2006

(CGMD). Marina di Arbus (VS), 39°33'51.0"N-08°27'48.6"E, 50 m, 2005 (CGMD). Monte Arcuentu (VS), western slope, 300 m, 2004 (MSNTC). Monti dei Sette Fratelli (CA), 900 m, 1955 (Crovetti 1970b); 700 m, 1992 (CGMD). Muravera (CA), Foce F. Flumendosa, 1 m, 1955 (Crovetti 1970b); 1980 (CGMD). Pabillonis (VS), 40 m, 1967–1968 (EAUSS); 1968 (Crovetti 1970b). Peschiera di Ba Cerbus (CI), 1 m, 1968 (ACP); Piano di Santadi (VS), Spiaggia dei Corsari, 1 m, 1968 (EAUSS). Portoscuso (CI), 10 m, 1968 (Crovetti 1970b). Pula (CA), 10 m, 1963 (EAUSS). Punta Sebera (CA-CI), 700 m, 1968 (ACP). Punta Serpeddi (CA), 1000 m, 1967 (Crovetti 1970b); 1967 (ACP). Sant'Andrea Frius (CA), 270 m, 1966 (Crovetti 1970b). Santa Margherita di Pula (CA), 15 m, 1965 (ACP); 1977 (CGMD). Santa Maria di Neapoli (CA), 10 m, 1968 (EAUSS); 1977 (CRP); 1968 (Crovetti 1970b). Santadi (CI), 130 m, 1967 (Crovetti 1970b). Sant'Antonio di Santadi (VS), 39°39'54.9"N-08°35'15.0"E, 80 m, 2004 (CGMD); MSNTC). Sant'Antonio di Santadi (VS), 39°40'52.2"N-08°33'18.1"E, 15 m, 2005 (CGMD). Sant'Antonio di Santadi (VS), 39°40'58.1"N-08°33'18.5"E, 20 m, 2005 (CGMD). Sarda (VS), 160 m, 1969 (Crovetti 1970b). Serramanna (VS), 20 m, 1967 (ACP). Siliqua (CA), 60 m, 1968 (EAUSS); 1968 (Crovetti 1970b). Silius (CA), 550 m, 1966 (Crovetti 1970b). Stagno di Cagliari, 5 m, 1976 (CGMD). Stagno di Colostrai (CA), 1 m, 1972 (CRP); 1974 (CRP). Tempio di Antas (CI), 550 m, 1991 (ACP). Terresoli (CI), 120 m, 1962 (ACP). Teulada (CA), 60 m, 1963 (ACP); 1968 (Crovetti 1970b). Vallermosa (CA), 70 m, 1969 (ACP). Villacidro (VS), Cascata sa Spendula, 250 m, 1977 (CRP).

CNBFVR RECORDS. Arbus (VS), Piscinas, 0 m, 10.IV.2004, GN DB PCe MT DW, 1 ex (CNBFVR). Domusnovas (CI), Lago Siuru, 322 m, 22.III.2006, MB, under a stone, 1 ex (CNBFVR); 15.XI.2006, GN, 1 ex (CNBFVR). Domusnovas (CI), P.ta Piloni de Sa Figù, 750 m, 11.IX.2006, MB DA DB GN, 1 ex (CNBFVR). Domusnovas (CI), Sedda Pranu Cardu, 549 m, 8.IX.2006, DB, in the wood mould of a hollow *Quercus ilex*, 1 ex (CNBFVR). Domusnovas (CI), Sedda Pranu Cardu, 549 m, 9.IX.2006, DA MB DB GN, lt UV 15 W, 4 ex (CNBFVR). Domusnovas (CI), Valle Oridda, 592 m, 23.III.2006, DW, 1 ex (CNBFVR); 25.III.2006, PCo, 1 ex (CNBFVR); 20.V.2006, DW MB DB PCo, 1 ex (CNBFVR); 11.IX.2006, MB DA DB GN, 1 ex (CNBFVR); 11.XI.2006, GN, under stones, 1 ex (CNBFVR); 595 m, 24.III–24.V.2006, MB DB PCo DW, 18 ex (CNBFVR). Gonnosfanàdiga (VS), Monte Linas, Genna sa Xirra, 847 m, 12.IX.2006, GN, 1 ex (CNBFVR). Gonnosfanàdiga (VS), Monte Linas, Genna su Pamenti, 853 m, 12.IX.2006, MB DA DB GN, 1 ex (CNBFVR). Gonnosfanàdiga (VS), Monte Linas, P.ta su Filixi, 780 m, 12.IX.2006, MB DA DB GN, 1 ex (CNBFVR); 12.IX.2006, GN, 3 ex (CNBFVR). Iglesias (CI), Conca Margiani, 725 m, 15.XI.2006, MB GN DW, 1 ex (CNBFVR). Iglesias (CI), Monti Marganai, Tintillonis, 480 m, 7.VI.2004, GN, 1 ex (CNBFVR). Villacidro (VS), Rio Canni-

soni, 375 m, 21.V.2006, MB DB PCo DW, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 390 m, 11.IX.2006, LF PL GN, 6 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 400 m, 11.IX.2006, MB DA DB GN, 3 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19.V.2006, PCo MB DB DW, 3 ex (CNBFVR); 19–24.V.2006, MB DB PCo DW, 16 ex (CNBFVR); 24.V.2006, PCo MB DB DW, 1 ex (CNBFVR). Villacidro (VS), rive Rio Cannisoni, 375 m, 25.III.2006, MB, 1 ex (CNBFVR); 25.III.2006, DW, 1 ex (CNBFVR). Villacidro (VS), rive Rio Cannisoni, 382 m, 24.III.2006, PCo, 8 ex (CNBFVR); 24.III.2006, DB DW, 5 ex (CNBFVR). Villacidro (VS), rive Rio Cannisoni, 390 m, 24.III.2006, MB, 3 ex (CNBFVR).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. I–XII.

10. *Thorectes (Jekelius) sardous* Erichson, 1847

ICKMAP RECORDS. Cala Domestica (CI), 70 m, 1968 (Croveti 1970b). Chia (CA), 10 m, 1990 (CGMD). Foce Rio Piscinas (VS), 1 m, (Croveti 1970b); 1968 (ACP); 1979 (CRP); 2006 (CDP). Gonnese (CI), 50 m (Croveti 1970b). Ingurtosu (VS), 200 m, 1967 (EAUSS); 1967 (Croveti 1970b). Isola di San Pietro (CI), 10 m, 1974 (CRP). Isola di San Pietro (CI), Carloforte, 10 m (Croveti 1970b); (CGMD). Isola di San Pietro (CI), La Caletta, 5 m, 1974 (Carpaneto et al. 1997). Isola di San Pietro (CI), Punta Spalmatore, 10 m, 1988 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1988 (Carpaneto et al. 1997). Marina di Arbus (VS), 39°33'34.6"N-08°27'51.8"E, 50 m, 2006 (CGMD). Marina di Arbus (VS), 39°33'51.0"N-08°27'48.6"E, 50 m, 2005 (CGMD). Monti dei Sette Fratelli (CA), 700 m, 1992 (CGMD). Pabillonis (VS), 40 m (ACP). Portovesme (CI), 1 m (Croveti 1970b). Santa Maria di Flumentepido (CI), 50 m, 1969 (ACP). Santadi (CI), 130 m, 1968 (Croveti 1970b).

CNBFVR RECORDS. Arbus (VS), Piscinas, 5 m, 10.IX.2006, MB DA DB GN, 1 ex (CNBFVR). Buggerru (CI), Cala Domestica, 39 m, 10.IX.2006, MB DA DB GN, 1 ex (CNBFVR). Burcei (CA), Punta Serpeddi, 954 m, 13.XI.2006, GN, under stones, 1 ex (CNBFVR). Domusnovas (CI), Valle Orida, 592 m, 23.IX.2004, EG, 2 ex (CNBFVR); 15.VII.2006, DW DA MM MB DB PCe, 1 ex (CNBFVR); 19.IX–3.X.2006, GC, mt, 1 ex (CNBFVR). Gonnosfanàdiga (CS), M. Linas, Genna su Pamenti, 853 m, 12.IX.2006, GN, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19–24.V.2006, MB, 1 ex (CNBFVR).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. IV–V, VII–XII.

11. *Thorectes (Baraudia) geminatus* (Gené, 1839)

ICKMAP RECORDS. Monti dei Sette Fratelli (CA), 900 m, 1954 (Croveti 1970b); 800 m, 1993 (CGMD).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. IV–XII.

HYBOSORIDAE Erichson, 1847

12. *Hybosorus illigeri* Reiche, 1853

ICKMAP RECORDS. Cagliari, 10 m, 1900 (CGMD). Pabillonis (VS), 40 m, 1989 (ACP).

CHOROLOGY. Turano-Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. Poorly known (VII).

SCARABAEIDAE Latreille, 1802

APHODIINAE Leach, 1815

Aphodiini Leach, 1815

13. *Aphodius (Acanthobodilus) immundus* Creutzer, 1799

ICKMAP RECORDS. Capoterra (CA), 50 m, 1978 (ACP; CRP; CGMD). Gerrei (CA), Cantoniera Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 2006 (CGMD). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS).

CHOROLOGY. Centralasiatic-European (with extension to the Maghreb).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. V–X.

14. *Aphodius (Acrossus) rufipes* (Linnaeus, 1758)

ICKMAP RECORDS. Pantaleo (CI), 150 m (ACP); 200 m (CGMD); Serramanna (VS), Monte Mascia, 30 m (CGMD).

CHOROLOGY. Sibero-European.

ECOLOGY. Stenotopic (montane belt).

PHENOLOGY. No data (spring and summer, in peninsular Italy).

NOTES. The only two records of this species in Sardinia are very old: both are undated and probably date back to more than sixty years ago (E. Festa leg.). However, should the presence of this species be confirmed, it would probably occur in relictual populations having found post-glacial refuges in areas of deciduous broadleaf forest.

15. *Aphodius (Agrilinus) constans* Duftschmid, 1805

ICKMAP RECORDS. Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Gerrei (CA), Cantoniera Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 1993 (CGMD); 2006 (CGMD). Monti dei Sette Fratelli (CA), 900 m, 1983 (ACP; CGMD). Santadi (CI), 120 m, 1984 (ACP). Sant'Andrea Frius (CA), 270 m, 1992 (CGMD).

CNBFVR RECORDS. Villacidro (VS), Rio Cannisoni, 382 m, 25.III.2006, DW, 1 ex (CNBFVR).

CHOROLOGY. European (with extension to Anatolia and the Caucasus).

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. II–VI, X, XII.

16. *Aphodius (Alocoderus) hydrochaeris* (Fabricius, 1798)

ICKMAP RECORDS. Cagliari, Monte Claro, 60 m, 1993 (CGMD). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Isola di San Pietro (CI), La Caletta, 5 m, 1975 (Carpaneto et al. 1997); 1974 (CGMD). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1993 (Carpaneto et al. 1997); Isola di Sant'Antioco (CI), Mercuri, 39°02'32.1"N-08°22'55.6"E, 70 m, 2006 (CGMD). Ortacesus (CA), San Bartolomeo, 40 m, 1966 (CGMD); 175 m, 1966 (CGMD). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 2006 (CGMD); Teulada (CA), road to Santadi, 38°57'51.4"N-08°44'06.2"E, 51 m, 2006 (CGMD).

CHOROLOGY. Turano-Mediterranean.

ECOLOGY. Stenotopic (submediterranean-mediterranean belts).

PHENOLOGY. I–VI, VIII–XII.

17. *Aphodius (Ammoecius) rugifrons* (Aubé, 1850)

ICKMAP RECORDS. Arbus (VS), 300 m, 1968 (MZUR). Capo Malfatano (CA), 60 m, 1986 (CGMD); 1987 (A. Ballerio, in litteris); 1989 (ACP; CGMD). Is Carillus (CA), 39°02'06.1"N-08°42'29.6"E, 117 m, 2008 (CGMD) (Dellacasa 2009). Isola di San Pietro (CI), 1 m, 1962 (Carpaneto et al. 1997); 10 m, 1962 (CGMD). Porto Palma (VS), 39°40'17.5"N-08°27'51.3"E, 46

m, 2008 (CGMD) (Dellacasa 2009). Sant'Antonio di Santadi (VS), 39°40'58.1"N-08°33'18.5"E, 20 m, 2005 (Dellacasa 2009). Sant'Antonio di Santadi (VS), 10 m, 1980 (CGMD); 40 m, 1980 (ACP). Santa Maria di Neapoli (CA), 10 m, 1977 (CRP). Santadi (CI), 120 m, 1984 (ACP); 135 m, 1924 (CGMD). Teulada, road to Santadi (CA), 38°57'51.4"N-08°44'06.2"E, 51 m, 2006 (CGMD) (Dellacasa 2009). Uta (CA), 5 m, 1990 (CGMD; MSNTC). Villacidro (VS), 250 m, 1979 (Pittino 1980b). Villacidro (VS), Cascata sa Spendula, 250 m, 1977 (CRP).

CNBFVR RECORDS. Domusnovas (CI), Gutturu Seu, 140 m, 25.III.2006, PCo, sheep dung, 1 ex (CNBFVR).

CHOROLOGY. W-Mediterranean (Maghreb, Sardinia) (there is also an old record from Etna, Sicily).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. III–VI, IX–XI.

18. *Aphodius (Anomius) castaneus* Illiger, 1803

ICKMAP RECORDS. Isola di Sant'Antioco (CI), Calasetta, 39°03'32.4"N-08°22'51.3"E, 5 m, 1980 (CRP); 1980 (CGMD) (Dellacasa 1983); 53 m, 2008 (Dellacasa 2009). Isola di Sant'Antioco (CI), Cannai, 38°59'31.0"N-08°24'43.2"E, 31 m, 2008 (Dellacasa 2009). Isola di San Pietro (CI), Le Colonne, 1968 (Dellacasa 2009).

CHOROLOGY. W-Mediterranean (Iberian peninsula, Maghreb, Sicily, Sardinia).

ECOLOGY. Stenotopic (submontane-mediterranean belts).

PHENOLOGY. V, IX–X.

NOTES. In Sardinia, it was collected only from the southwestern islands of Sant'Antioco and San Pietro.

19. *Aphodius (Anomius) crovettii* Dellacasa, 1983

ICKMAP RECORDS. Isola di Sant'Antioco (CI), 10 m, 1977 (CGMD). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1967, 1978 (Dellacasa 1983); Calasetta, 1968; Calasetta, 39°03'32.4"N-08°22'51.3"E, 53 m, 2008 (Dellacasa 2009). Isola di Sant'Antioco (CI), Cannai, 38°59'31.0"N-08°24'43.2"E, 31 m, 2008 (Dellacasa 2009). Torre di Piscinni (CA), 38°54'18.3"N-08°47'06.3"E, 44 m, 2008 (Dellacasa 2009).

CHOROLOGY. Endemic to south-western Sardinia (Sant'Antioco Island and Costa del Sud).

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. IX.

20. *Aphodius (Aphodius) fimetarius* (Linnaeus, 1758)

ICKMAP RECORDS. Burcei (CA), 850 m, 1982 (CGMD). Burcei (CA), Cantoniera Campu Omu, 400 m, 1966 (MZUR). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Perdu Carta (CI), 300 m, 1968 (MZUR). Punta Serpeddi (CA), 900 m, 1968 (MZUR). Villacidro (VS) 250 m, 1977 (ACP). Villacidro (VS), Cascata sa Spendula, 250 m, 1977 (CRP). Villasalto (CA), 500 m, 1982 (CGMD).

CHOROLOGY. Asiatic-European (with extension to the Maghreb); introduced to N-America.

ECOLOGY. Eurytopic (subalpine-mediterranean belts).

PHENOLOGY. III–VI, IX–XI.

21. *Aphodius (Aphodius) foetidus* (Herbst, 1783)

ICKMAP RECORDS. Burcei (CA), 850 m, 1985 (CGMD). Cagliari, 10 m, 1969 (ACP); Cagliari, Parco di Monte Urpinu, 70 m, 1979 (CGMD). Capoterra (CA), 50 m, 1978 (ACP); 1978 (CGMD). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Gerrei (CA), Cantoniera Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 2006 (CGMD). Giara di Gesturi (VS), 550 m, 1978 (ACP). Giba (CI), 50 m, 1979 (ACP); (CRP). Isola di Sant'Antioco (CI), 1 m, 1979 (Carpaneto et al. 1997); 10 m, 1979 (CGMD). Isola di Sant'Antioco (CI), Calasetta, 60 m, 2006 (CGMD). Isola di Sant'Antioco (CI), Cannai, 38°59'47.4"N-08°24'26.4"E, 50 m, 2006 (CGMD). Isola Sant'Antioco (CI), Casa Simola, 39°02'34.0"N-08°22'57.2"E, 70 m, 2006 (CGMD). Isola di Sant'Antioco (CI), Mercuri, 39°02'32.1"N-08°22'55.6"E, 70 m, 2006 (CGMD). Monti dei Sette Fratelli (CA), 700 m, 1985 (CGMD); 750 m, 1984 (CGMD). Punta Serpeddi (CA), 900 m, 1968 (ACP); (MZUR). San Nicolò Gerrei (CA), 360 m, 1986 (CGMD). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 1984 (CGMD); 2006 (CGMD). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS). Santa Maria di Neapoli (CA), 10 m, 1977 (ACP; CRP). Sant'Antonio di Santadi (VS), 10 m, 2004 (CGMD). Sarrabus, Dolianova (CA), San Giorgio, 39°25'45.1"N-09°14'29.7"E, 495 m, 2006 (CGMD). Teulada (CA), road to Santadi, 38°57'51.4"N-08°44'06.2"E, 51 m, 2006 (CGMD). Villacidro (VS), 250 m, 1979 (ACP). Villacidro (VS), Cascata sa Spendula, 250 m, 1977 (CRP). Villacidro (VS), Diga di Montimannu, 39°25'02.6"N-08°42'00.0"E, 260 m, 2006 (CGMD).

CHOROLOGY. European (with extension to Anatolia, Caucasus and the Maghreb).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. IV–VI, VIII–XI.

22. *Aphodius (Bivalus) satellitius* (Herbst, 1789)

ICKMAP RECORDS. Cagliari, 10 m (CGMD); 1978 (ACP). Gerrei

(CA), Cantoniera Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 2006 (CGMD). Giara di Gesturi (VS), 550 m, 1978 (ACP; CGMD). Guasila (CA), 200 m, 1946 (CGMD).

CHOROLOGY. Turano-European (with extension to the Maghreb).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. III–VI.

23. *Aphodius (Bodiloides) ictericus* Laicharting, 1781 ssp. *ghardimaouensis* Balthasar, 1929

ICKMAP RECORDS. Assemini (CA), 10 m, 1989 (ACP; CGMD); Burcei (CA), 850 m, 1985 (CGMD). Cantoniera Nuraxi de Mesu (CA), 220 m, 1980 (CGMD). Capoterra (CA), 50 m, 1978 (CGMD); 1979 (CRP); 1980 (ACP; CGMD); 1988 (ACP). Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10 m, 2006 (CGMD). Costa Rei (CA), 10 m, 1982 (CGMD). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Giba (CI), 50 m, 1979 (ACP; CRP). Goni (CA), 380 m, 1980 (ACP; CGMD). Isola di San Pietro (CI), La Caletta, 5 m, 1974 (ACP; CGMD); 1975 (Carpaneto et al. 1997); 1997 (CGMD). Isola di Sant'Antioco (CI), 10 m, 1987 (CGMD); 1987 (Carpaneto et al. 1997); 1997 (CGMD); Isola di Sant'Antioco (CI), Calasetta, 5 m, 1980 (CGMD); 60 m, 2006 (CGMD); 1980, 1993 (ACP) (Carpaneto et al. 1997). Isola Sant'Antioco (CI), Casa Simola, 39°02'34.0"N-08°22'57.2"E, 70 m, 2006 (CGMD). Macchiareddu (CA), 10 m, 1977 (ACP). Monti dei Sette Fratelli (CA), 700 m, 1985 (CGMD); 750 m, 1984 (CGMD). Muravera (CA), 100 m, 1984 (CGMD). Muravera (CA), Foce F. Flumendosa, 1 m, 1980 (ACP); 1980 (CGMD). Muravera (CA), San Giovanni, 1 m, 1977 (CRP). Musei (CI), 100 m, 1973 (CRP). Musei (CI), Sa Terredda, 39°17'28.5"N-08°42'30.2"E, 100 m, 2006 (CGMD). Nuraxi de Mesu (CA), 300 m, 1980 (ACP). Pabillonis (VS), 40 m, 1986 (CGMD). Quartu Sant'Elena (CA), 5 m, 1974 (ACP). San Priamo (CA), Rio sa Picocca, 10 m, 1973 (CRP); 39°21'52.1"N-09°34'40.6"E, 25 m, 1973 (ACP); 1984 (CGMD); 2006 (CGMD). Sant'Antonio di Santadi (VS), 40 m, 1980 (ACP); 10 m, 1980 (CGMD); 2004 (CGMD); 39°39'54.9"N-08°35'15.0"E, 80 m, 2004 (MSNTC). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS). Santa Maria di Neapoli (CA), 10 m, 1977 (ACP; CRP); 1986 (CGMD). Sarrabus, Dolianova (CA), San Giorgio, 39°25'45.1"N-09°14'29.7"E, 495 m, 2006 (CGMD). Teulada (CA), road to Santadi, 38°57'51.4"N-08°44'06.2"E, 50 m, 2006 (CGMD).

CHOROLOGY. A Mediterranean subspecies (with extension to Iran) of a Centralasiatic-Mediterranean species.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. V–XII.

NOTES. Previously considered as the sister species of

A. ictericus (Laicharting, 1781), it is now regarded as a southern subspecies of the latter (Dellacasa & Dellacasa 2006).

24. *Aphodius (Bodilus) beduinus* Reitter, 1892

ICKMAP RECORDS. Cagliari, 10 m, 1935 (CRP); 1966 (CGMD); 1976 (ACP). Capoterra (CA), 50 m, 1979 (CRP); 1980 (ACP); 1980 (CGMD). Goni (CA), 380 m, 1980 (ACP; CRP; CGMD). Isola di San Pietro (CI), 1 m, 1962 (ACP); 10 m, 1962 (CGMD). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1974 (CRP); 1974 (CGMD); 1980 (CGMD); 1980 (Carpaneto et al. 1997).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. V–IX.

25. *Aphodius (Bodilus) lugens* Creutzer, 1799

ICKMAP RECORDS. Isola di San Pietro (CI), 1 m, 1962 (ACP); 1994 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1974 (Carpaneto et al. 1997).

CHOROLOGY. Turano-Mediterranean.

ECOLOGY. Eurytopic (montane-mediterranean belts).

PHENOLOGY. VI–VII.

26. *Aphodius (Calamosternus) algericus* Mariani & Pittino, 1983

ICKMAP RECORDS. Assemini (CA), 10 m, 1989 (ACP); 1989 (CGMD). Assemini (CA), Rio Flumini Mannu, 10 m, 1989 (MSNTC). Capo Malfatano (CA), 60 m, 1989 (ACP; CGMD). Chia (CA), 10 m, 1989 (CGMD). Is Arenas (VS), beach, 10 m, 1986 (CGMD). Isola di San Pietro (CI), 1 m (Carpaneto et al. 1997); 10 m (CGMD). Maracalagonis (CA), 80 m, 1980 (ACP); 1980 (CGMD). Poetto (CA), 1 m, 1973 (Mariani & Pittino 1983). Rio di Chia (CA), 10 m, 1989 (ACP). Serramanna (VS), 20 m, 1976 (Mariani & Pittino 1983). Stagno dei Molentargius (CA), 5 m, 1973 (Mariani & Pittino 1983).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. III–V, IX–XII.

NOTES. This species was described as a subspecies of *Aphodius (Calamosternus) hyxos* Petrovitz, 1962, and was later synonymized by Branco (2005). In the Catalogue of Palaearctic Coleoptera (Dellacasa & Dellacasa 2006), the two taxa are treated as two

valid species.

27. *Aphodius (Calamosternus) granarius* (Linnaeus, 1767)

ICKMAP RECORDS. Cagliari, Terramaini (CA), 10 m, 1982 (CGMD). Cantoniera di Sardara (VS), 140 m, 1982 (CGMD). Capo Spartivento (CA), 60 m, 1982 (CGMD). Foce Rio Mannu (CI), 10 m, 1989 (CGMD). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Giara di Gesturi (VS), 550 m, 1974 (CGMD); 1978 (ACP). Giorgino (CA), 1 m, 1990 (ACP). Guasila (CA), 200 m, 1946 (CGMD). Isola di San Pietro (CI), 1 m, 1983, (Carpaneto et al. 1997); 10 m, 1977 (CGMD); 1982, 1983 (CGMD). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Cannai, 38°59'47.4"N-08°24'26.4"E, 50 m, 2006 (CGMD). Isola Sant'Antioco (CI), Casa Simola, 39°02'34.0"N-08°22'57.2"E, 70 m, 2006 (CGMD). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Monti dei Sette Fratelli (CA), 750 m, 1984 (CGMD). Pirri (CA), 10 m, 1979 (ACP). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Serdiana (CA), 150 m, 1979 (ACP). Sestu (CA), 40 m, 1979 (ACP). Stagno dei Molentargius (CA), 10 m, 1982 (CGMD). Stagno di Marceddi (VS), southern shore, 20 m, 2005 (CGMD). Stagno di San Giovanni (VS), 39°41'43.5"N-08°30'51.5"E, 10 m, 2006 (MSNTC).

CNBFVR RECORDS. Domusnovas (CI), Gutturu Seu, 174 m, 25.III.2006, PCo, sheep dung, 1 ex (CNBFVR).

CHOROLOGY. Turano-Europeo-Mediterranean.

ECOLOGY. Eurytopic (subalpine-mediterranean belts).

PHENOLOGY. II–VI, IX–XII.

28. *Aphodius (Calamosternus) mayeri* Pilleri, 1953

ICKMAP RECORDS. Assemini (CA), 10 m, 1989 (ACP; CGMD). Cagliari, 10 m, 1976 (Pittino 1980b). Cagliari, Monte Claro, 60 m, 1980 (CGMD). Cagliari, Parco di Monte Urpinu (CA), 70 m, 1970 (CGMD); 1976 (CGMD; CRP). Cagliari, Terramaini (CA), 10 m, 1982 (CGMD). Capo Malfatano (CA), 60 m, 1981 (ACP); 1984, 1989 (CGMD). Capo Sperone (CI), 1 m, 1980 (Carpaneto et al. 1997). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Gerrei (CA), Cantoniera Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 2006 (CGMD). Giara di Gesturi (VS), 550 m, 1955 (Mariani & Pittino 1983). Isola di San Pietro (CI), 1 m, 1982 (Carpaneto et al. 1997); 10 m, 1975 (CGMD); 1982 (CGMD). Isola di San Pietro (CI), La Caletta, 5 m, 1976 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Cannai, 38°59'47.4"N-08°24'26.4"E, 50 m, 2006 (CGMD). Monserrato (CA), 5 m, 1976 (Pittino 1980b). Monte Linas (CI), SW slope,

39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC). Ortacesus (CA), San Bartolomeo, 175 m, 1966 (CGMD). Porto Palma (VS), 39°40'26.5"N-08°27'49.5"E, 65 m, 2006 (MSNTC). Sarda (VS), 100 m, 1982 (ACP); 160 m, 1982 (CGMD). Sarrach (CA), 40 m, 1979 (Pittino 1980b). Stagno dei Molentargius (CA), 5 m, 1982 (ACP); 10 m, 1982 (CGMD). Stagno di Marceddi (VS), southern shore, 20 m, 2005 (CGMD).

CHOROLOGY. N-African (with extension to Spain and southern Italy).

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. I–V, X–XII.

29. *Aphodius (Chilothorax) conspurcatus* (Linnaeus, 1758)

ICKMAP RECORDS. Giara di Gesturi (VS), Paùli Maiori, 570 m, 1992 (Meloni 1993, as *A. conspurcatus* [sic]). Giara di Gesturi (VS), Paùli Maiori, 550 m, 1993 (CGMD).

CHOROLOGY. European.

ECOLOGY. Stenotopic (montane-submontane belts).

PHENOLOGY. II–IV.

NOTES. In Sardinia, this species is known only of Giara di Gesturi (VS) and the Marghine Mountains (NU) (Dellacasa 2009).

30. *Aphodius (Chilothorax) lineolatus* Illiger, 1803

ICKMAP RECORDS. Burcei (CA), 850 m, 1982 (CGMD). Cagliari, Terramaini (CA), 10 m, 1982 (CGMD). Capoterra (CA), 50 m, 1978 (ACP; CGMD); 1981 (CGMD). Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10 m, 2006 (CGMD). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Gerrei (CA), Cantoniera Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 2006 (CGMD). Giara di Gesturi (VS), 550 m, 1978 (ACP; CGMD). Giba (CI), 50 m, 1979 (CRP). Guspini (VS), 39°37'26.7"N-08°37'04.4"E, 50 m, 2006 (MSNTC). Iglesias (CI), 150 m, 1968 (ACP). Isola di San Pietro (CI), 1 m, 1982 (Carpaneto et al. 1997); 10 m (CGMD). Isola di San Pietro (CI), Capo La Punta, 10 m, 1982 (CGMD). Isola di San Pietro (CI), La Caletta, 5 m, 1975 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 1 m, 1993 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1993 (ACP); 60 m, 2006 (CGMD). Isola di Sant'Antioco (CI), Cannai, 38°59'47.4"N-08°24'26.4"E, 40 m, 2006 (CGMD); 50 m, 2006 (CGMD). Isola Sant'Antioco (CI), Casa Simola, 39°02'34.0"N-08°22'57.2"E, 70 m, 2006 (CGMD). Isola di Sant'Antioco (CI), Mercuri, 39°02'32.1"N-08°22'55.6"E, 70 m, 2006 (CGMD). Maracalagonis (CA), 80 m, 1980 (CGMD). Monti dei Sette Fratelli (CA), 900 m, 1982 (CGMD); 750 m, 1984 (CGMD). Monte Linas (CI), SW slope, 900 m, 2004 (CGMD); 39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC).

Muravera (CA), 20 m, 1936 (MZUR). Muravera (CA), Foce Fiume Flumendosa, 1 m, 1980 (ACP; CGMD). Musei (CI), Sa Terredda, 39°17'28.5"N-08°42'30.2"E, 100 m, 2006 (CGMD). Ortacesus (CA), San Bartolomeo, 175 m, 1960 (CGMD). Porto Palma (VS), 39°40'26.5"N-08°27'49.5"E, 65 m, 2006 (MSNTC). Porto Pino (CI), 5 m, 1976 (CGMD). Quartu Sant'Elena (CA), 5 m, 1982 (CGMD). San Nicolò Gerrei (CA), 60 m, 1986 (CGMD). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 1984 (CGMD); 2006 (CGMD). Santa Maria di Neapoli (CA), 10 m, 1977 (CRP); 1986 (CGMD). Sarrabus, Dolianova (CA), San Giorgio, 39°25'45.1"N-09°14'29.7"E, 495 m, 2006 (CGMD). Sestu (CA), 40 m, 1979 (ACP). Siliqua (CA), Castello di Acquafredda, 39°14'56.9"N-08°49'04.0"E, 120 m, 2006 (CGMD). Stagno di Cagliari, 1 m, 1974 (ACP); 5 m, 1976 (CGMD). Stagno di Marceddi (VS), southern shore, 20 m, 2005 (CGMD). Stagno di San Giovanni (VS), southern shore, 39°41'43.5"N-08°30'51.5"E, 10 m, 2006 (MSNTC). Teulada (CA), road to Santadi, 38°57'51.4"N-08°44'06.2"E, 50 m, 2006 (CGMD). Villacidro (VS), Diga di Montimannu, 39°25'02.6"N-08°42'00.0"E, 260 m, 2006 (CGMD). Villasalto (CA), 500 m, 1982 (CGMD).

CHOROLOGY. Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. II–VI, VIII–XII.

31. *Aphodius (Colobopterus) erraticus* (Linnaeus, 1758)

ICKMAP RECORDS. Cagliari, Monte Claro, 60 m, 1981 (CGMD). Capoterra (CA), 50 m, 1978, 1981 (CGMD). Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Gerrei (CA), Cantoniera Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 2006 (CGMD). Giara di Gesturi (VS), 550 m, 1978 (ACP). Isola di San Pietro (CI), 1 m, 1972 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 1 m, 1972 (Carpaneto et al. 1997); 10 m, 1972 (CGMD). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Perdas de is Ominis, 230 m, 1971 (Piras & Pisano 1972). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Monte Linas (CI), SW slope, 900 m, 2004 (CGMD); 39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC). Ortacesus (CA), San Bartolomeo, 175 m, 1966 (CGMD). Porto Botte (CI), 1 m, 1971 (Piras & Pisano 1972). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Quartu Sant'Elena (CA), 5 m, 1978 (CGMD). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 1984 (CGMD). Sarrabus, Dolianova (CA), San Giorgio, 39°25'45.1"N-09°14'29.7"E, 495 m, 2006 (CGMD). Stagno di Cagliari, 1 m, 1976 (ACP); 5 m, 1976 (CGMD). Teulada (CA), road to Santadi, 38°57'51.4"N-08°44'06.2"E, 51 m, 2006 (CGMD). Terresoli (CI), 120 m, 1962 (ACP).

CHOROLOGY. Asiatic-European (extended to the Maghreb).

ECOLOGY. Eurytopic (subalpine-mediterranean).

PHENOLOGY. III–VIII, X–XI.

32. *Aphodius (Erytus) aequalis* A. Schmidt, 1907

ICKMAP RECORDS. Castiadas (CA), 165 m, 2006 (CGMD) (Dellacasa 2009). Quartu Sant'Elena (CA), Riu su Pau, 10 m, 1955 (CRP).

CHOROLOGY. Centralasiatic-Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. Poorly known (IV–VII).

NOTES. In Sardinia, this species was known only from two localities in the provinces of Nuoro and Cagliari.

33. *Aphodius (Esymus) merdarius* (Fabricius, 1775)

ICKMAP RECORDS. Giara di Gesturi (VS), 550 m, 1978 (CGMD); 1987 (ACP; CGMD). Giara di Gesturi (VS), Pauli Maiori, 550 m, 1987 (CGMD).

CHOROLOGY. Turano-European.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. V–VI, IX–X.

34. *Aphodius (Esymus) pusillus* (Herbst, 1789)

ICKMAP RECORDS. Giara di Gesturi (VS), 550 m, 1977 (ACP; CGMD).

CHOROLOGY. Sibero-European.

ECOLOGY. Oligotopic (montane-mediterranean).

PHENOLOGY. Poorly known (V) but probably occurring from spring to autumn.

35. *Aphodius (Eudolus) quadriguttatus* (Herbst, 1783)

ICKMAP RECORDS. Foce Rio Piscinas (VS), 1 m, 1968 (ACP). Giara di Gesturi (VS), 550 m, 1978 (ACP; CGMD). Guasila (CA), 200 m, 1946 (ACP). Isola di San Pietro (CI), 1 m, 1982 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Cannai, 38°59'47.4"N-08°24'26.4"E, 50 m, 2006 (CGMD). Maracalagonis (CA), 80 m, 1980 (ACP); 1980 (CGMD). Marina di Arbus (VS), 1 m, 1968 (ACP).

CHOROLOGY. Turano-European (with extension to the Maghreb).

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. II–V, IX–XII.

36. *Aphodius (Labarrus) lividus* (Olivier, 1789)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1978 (ACP). Domus de Maria (CA), P.ta Su Pisu, 30 m, 38°53'37.8"N-8°51'10.7"E [photo by G. Ruzzante, 3.IX.2010, www.entomologiitaliani.net]. Isola di Sant'Antioco (CI), Calasetta, 5 m, 1980 (Carpaneto et al. 1997); 1980 (CGMD). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS).

CHOROLOGY. Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. Poorly known (IX).

37. *Aphodius (Liothorax) niger* Illiger, 1798

ICKMAP RECORDS. Punta sa Cresia (CA), 700 m, 1982 (CGMD). Sardara (VS), 100 m, 1976 (Pittino 1980b).

CHOROLOGY. Centralasiatic-European.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. IV–VI, XII.

38. *Aphodius (Loraphodius) suarius* Faldermann, 1835

ICKMAP RECORDS. Assemini (CA), 10 m, 1977 (Pittino 1980b); 1989 (CGMD). Capoterra (CA), 50 m, 1979 (Pittino 1980b). Samassi (VS), 60 m, 1976 (Pittino 1980b). Porto Palma (VS), 39°40'17.5"N-008°27'51.3"E, 46 m, 2008 (Dellacasa 2009).

CHOROLOGY. Mediterranean (with extension to Syria).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. Poorly known (IX–X).

39. *Aphodius (Melinopterus) consputus* Creutzer, 1799

ICKMAP RECORDS. Burcei (CA), 850 m, 1982 (CGMD). Giara di Gesturi (VS), Pauli Maiori, 550 m, 1993 (CGMD). San Nicolò Gerrei (CA), 360 m, 1993 (CGMD).

CHOROLOGY. Europeo-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. III–V, IX–XII.

40. *Aphodius (Melinopterus) tingens* Reitter, 1892

ICKMAP RECORDS. Burcei (CA), 850 m, 1982 (CGMD). Cagliari, Terramaini (CA), 10 m, 1973 (Pittino 1980b); 10 m, 1978 (CGMD). Stagno dei Molentargius (CA), 5 m, 1974 (Pittino 1980b).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. II, XII.

41. *Aphodius (Nimbus) franzinii* Pittino, 1978

CNBFVR RECORDS. Iglesias (CI), Monti Marganai, 700 m, 29.IX–21.X.2003, DB PCe EM MT DW, mt, 1 ♀ (CNBFVR).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Oligotopic (montane-submontane belts, 700–1000 m).

PHENOLOGY. IX–XII.

NOTES. In the past, this species had never been found south of the Gennargentu (Pittino 1978a, 1980b). This is the first record from the southern part of Sardinia.

42. *Aphodius (Otophorus) haemorrhoidalis* (Linnaeus, 1758)

ICKMAP RECORDS. Gerrei (CA), Bruncu Salamu, 39°28'15.3"N-09°17'02.4"E, 400 m, 2006 (CGMD). Gerrei (CA), Cantonierra Pranu Sanguni, 39°29'08.3"N-09°14'09.5"E, 610 m, 2006 (CGMD).

CHOROLOGY. Holarctic (Sibero-European and Nearctic).

ECOLOGY. Eurytopic (subalpine-mediterranean).

PHENOLOGY. IV–X.

43. *Aphodius (Sigorus) porcus* (Fabricius, 1792)

ICKMAP RECORDS. Ballao (CA), 90 m, 1990 (ACP).

CHOROLOGY. European (with extension to the Caucasus).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. IX–X.

44. *Aphodius (Subrinus) sturmi* Harold, 1870

ICKMAP RECORDS. Isola di San Pietro (CI), 1 m, 1994 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 1 m, 1987 (Carpaneto et al. 1997); 10 m, 1987 (CGMD). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1974 (CRP); 1980 (Carpaneto et al. 1997); 1980 (CGMD). Marina di Nebida (CI), 10 m, 1980 (CGMD). Monti dei Sette Fratelli (CA), 750 m, 1984 (CGMD). Nebida (CI), 1 m, 1980 (ACP). Sant'Antonio di Santadi (VS), 10 m, 1980 (CGMD); 40 m, 1980 (ACP). Santadi (CI), 10 m (ACP); 130 m (CGMD).

CHOROLOGY. Centralasiatic-European-Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. IV–XI.

45. *Aphodius (Trichonotulus) scrofa* (Fabricius, 1787)

ICKMAP RECORDS. Giara di Gesturi (VS), 550 m, 1978 (ACP); 1978 (CGMD). Isola di San Pietro (CI), 1 m, 1982 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 1 m, 1982 (Carpaneto et al. 1997); 10 m, 1982 (CGMD). Monte Linas (CI), SW slope, 39°29'29"N-08°31'01"E, 900 m, 2004 (CGMD; MSNTC). Pula (CA), 10 m, 1974 (ACP).

CHOROLOGY. Centralasiatic-European (with extension to the Maghreb).

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. III–VI.

Psammodiini Mulsant, 1842

46. *Brindalus porricollis* (Illiger, 1803)

ICKMAP RECORDS. Buggerru (CI), 50 m, 1976 (CGMD). Carbonia (CI), Bo Cerbus, 10 m, 1977 (CGMD). Giorgino (CA), 1 m, 1973 (ACP; CGMD); 1975 (CGMD); 1979 (ACP). Isola di San Pietro (CI), 1 m, 1993 (Carpaneto et al. 1997); 10 m, 1977 (CGMD). Isola di San Pietro (CI), La Caletta, 5 m, 1993 (Carpaneto et al. 1997). Isola di San Pietro (CI), Punta Spalmatore, 10 m, 1993 (ACP). Isola di Sant'Antioco (CI), 1 m, 1978 (Carpaneto et al. 1997); 10 m, 1978 (ACP). Fontanamare di Gonnese (CI), 5 m, 1979 (ACP). Muravera (CA), Foce F. Flumendosa, 1 m, 1980 (ACP); 1980 (CGMD). Muravera (CA), Porto Corallo, 1 m, 1977 (ACP). Peschiera di Ba Cerbus (CI), 1 m, 1977 (ACP). Poetto (CA), beach, 1 m, 1980 (ACP); 1 m, 1980 (CGMD). Portovesme (CI), 1 m, 1978 (ACP). Stagno di Colostri (CA), 1 m, 1977 (ACP).

CHOROLOGY. Mediterranean (with extension to the Atlantic coasts up to S-England).

ECOLOGY. Stenotopic (mediterranean belt); in marine sand beaches.

PHENOLOGY. I–V, VII, IX–XII.

47. *Brindalus rotundipennis* (Reitter, 1892)

ICKMAP RECORDS. Fontanamare di Gonnese (CI), 5 m, 1983 (ACP); 1983 (CGMD). Giorgino (CA), 1 m, 1979 (Pittino 1980a). Isola di Sant'Antioco (CI), 1 m, 1979 (Carpaneto et al. 1997). Poetto (CA), beach, 1 m, 1974 (Lucchini 1981); 1 m, 1980 (CGMD).

CHOROLOGY. W-Mediterranean (southern Iberian peninsula, Maghreb, Lybia, Sardinia).

ECOLOGY. Stenotopic (mediterranean belt), in marine sand beaches.

PHENOLOGY. Based on few records (IV, X–XI).

48. *Psammодиус basalis* Mulsant & Rey, 1870

ICKMAP RECORDS. Muravera (CA), Porto Corallo, 1 m (Pittino 1978b). Stagno di Colostrai (CA), 1 m, 1978 (Pittino 1978b).

CHOROLOGY. Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt), in marine sand beaches.

PHENOLOGY. Poorly known (X).

49. *Psammодиус plicicollis* Erichson, 1848

ICKMAP RECORDS. Isola di San Pietro (CI), 1 m, 1976 (Pittino 1980b; Carpaneto et al. 1997); 1977 (Carpaneto et al. 1997). Peshiera di Ba Cerbus (CI), 1 m, 1977 (Pittino 1980a). Muravera (CA), Porto Corallo, 1 m (Pittino 1978b). Stagno di Colostrai (CA), 1 m (Pittino 1978b). Teulada (CA), 50 m, 1990 (ACP).

CHOROLOGY. W-Mediterranean (absent in N-Africa).

ECOLOGY. Oligotopic (submontane-mediterranean belts), in marine and riparian sand beaches.

PHENOLOGY. Based on few records (II, IV, VI, X).

50. *Platytomus laevistriatus* (Perris, 1870)

ICKMAP RECORDS. Cagliari, 10 m (Pittino & Mariani 1986). Cagliari (CA), San Bartolomeo, 1996 (A. Ballerio & C. Meloni, in litteris). Giorgino (CA), 1 m (Pittino 1980b).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. Poorly known (V, X).

51. *Platytomus tibialis* (Fabricius, 1798)

ICKMAP RECORDS. Giorgino (CA), 1 m, 1979 (Pittino 1980b). Sardara (VS), 160 m, 1976 (Pittino 1980b).

CHOROLOGY. Mediterranean (with extension to Macaronesia).

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. Poorly known (VI, XII).

52. *Pleurophorus caesus* (Creutzer, 1796)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1978 (ACP). Isola di San Pietro (CI), La Caletta, 5 m, 1977 (Carpaneto et al.

1997). Isola di Sant'Antioco (CI), 10 m, 1987 (CGMD). Isola di Sant'Antioco (CI), Monte sa Scrocca Manna, 50 m, 1988 (Carpaneto et al. 1997). Ortacesus (CA), San Bartolomeo, 175 m, 1966 (CGMD). Poetto (CA), beach, 1 m, 1974 (ACP). Saline di Santa Gilla (CA), 5 m, 1975 (ACP). Stagno dei Molentargius (CA), 5 m, 1979 (ACP). Villasimius (CA), 40 m, 1974 (ACP).

CNBFVR RECORDS. Domusnovas (CI), sa Duchessa, 350 m, road to Perda Niedda, holm oak stand, 8.VI.2004, GN, 1 ex (CNBFVR). Domusnovas (CI), Grotta di San Giovanni, 325 m, 12.VI.2004, GN, 1 ex (CNBFVR). Iglesias (CI), Case Marganai, 660 m, 7.VI.2004, DB PCe GN MT DW, cn, 4 ex (CNBFVR). Iglesias (CI), Case Marganai, 660 m, 8.VI.2004, DB PCe GN MT DW, cn, 13 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 375 m, 21.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR); 19–24.V.2006, MB DB PCo DW, lt, 8 ex (CNBFVR).

CHOROLOGY. Centralasiatic-Europeo-Mediterranean (introduced to N-America and other zoogeographic regions).

ECOLOGY. Oligotopic (montane-mediterranean belts), in mud soils.

PHENOLOGY. III–X.

53. *Pleurophorus mediterranicus* Pittino & Mariani, 1986

ICKMAP RECORDS. Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997).

CHOROLOGY. W-Mediterranean (with extension to the Atlantic coasts of Europe).

ECOLOGY. Oligotopic (submontane-mediterranean belts), in mud soils.

PHENOLOGY. Poorly known (VI, X).

54. *Rhyssemus plicatus* (Germar, 1817)

ICKMAP RECORDS. Capitana (CA), 1 m, 1974 (Pittino 1980b). Chia (CA), 10 m, 1979 (Pittino 1980a). Giorgino (CA), 1 m, 1979 (Pittino 1980b). Isola di San Pietro (CI), 1 m, 1975 (Carpaneto et al. 1997); 1977 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 10 m, 1978 (Pittino 1980b); 1987 (ACP). Isola di Sant'Antioco (CI), 1 m, 1987 (Carpaneto et al. 1997). Stagno di Quartu (CA), 1 m, 1974 (Pittino 1980b).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. I–V, X–XII.

NOTES. The specimens from Sardinia and Corsica

seem to belong to a distinct species (Pittino, unpublished data), the correct name of which is in course of detection.

55. *Rhyssemus sardous* Pierotti, 1980

ICKMAP RECORDS. Foce Torrente Quirra (CA), 1995 [photo by L. Colacurcio, collected by L. Fancello, 30.V.1995, www.entomologiitaliani.it].

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. V–X.

56. *Rhyssemus sulcatus* (Olivier, 1789)

ICKMAP RECORDS. Giorgino (CA), 1 m, 1899 (Pittino 1980b). Torre di Flumentorgiu (VS), 60 m (Pittino 1980b). Villaspeciosa (CA), 10 m, 1901 (Pittino 1980b).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt), on sandy beaches.

PHENOLOGY. Based on few records (V, VIII, X).

SCARABAEINAE Latreille, 1802

Coprini Leach, 1815

57. *Copris hispanus* (Linnaeus, 1764) ssp. *hispanus* (Linnaeus, 1764)

ICKMAP RECORDS. Ballao (CA), 90 m, 1990 (ACP). Cagliari, 1878 (Magretti 1878). Cagliari, 10 m, 1966 (CGMD). Cagliari, Parco di Monte Urpinu, 70 m, 1970 (CGMD). Capoterra (CA), 50 m, 1979 (CRP); 1989 (ACP). Foce Rio Piscinas (VS), 1 m, 1968 (MZUR); 2006 (CDP). Giara di Gesturi (VS), 550 m, 1955 (Dellacasa 1968); 1978 (CGMD). Goni (CA), 380 m, 1980 (CGMD). Guspini (VS), 39°37'26.7"N-08°37'04.4"E, 50 m, 2006 (CGMD). Isola di San Pietro (CI), 1 m, 1976 (Carpaneto et al. 1997). Isola di San Pietro (CI), Carloforte, 10 m, 1949 (EAUSS); 1969 (EAUSS). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 10 m, 1957 (EAUSS). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1993 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Cannai, 50 m, 1978 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Mercuri, 39°02'34.0"N-08°22'57.2"E, 70 m, 2006 (CGMD). Isola il Toro, 1 m, 1988 (Carpaneto et al. 1997). Marina di Arbus (VS), 50 m, 1967 (MZUR). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2006–2007

(CGMD). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Monte San Miali (CI), 500 m, 1971 (Piras & Pisano 1972). Poetto (CA), 1 m, 1954 (Dellacasa 1968). Porto Botte (CI), 1 m, 1971 (Piras & Pisano 1972). Porto Palma (VS), 39°40'26.5"N-08°27'49.5"E, 65 m, 2006 (CGMD). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Portoscuso (CI) (CI), 10 m, 1870 (Bargagli 1872). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS). Sant'Antonio di Santadi (VS), 39°40'52.2"N-08°33'18.1"E, 15 m, 2005 (CGMD). Stagno dei Molentargius (CA), 5 m, 1870 (Bargagli 1872). Torre delle Stelle (CA), 1 m, 1979 (MZUR). Torre di Flumentorgiu (VS), 60 m, 1894 (Dellacasa 1968).

CHOROLOGY. Centralasiatic-Mediterranean species (with extension to Pakistan).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. I–XII.

NOTES. Sardinian populations belong to the nominal subspecies (W-Mediterranean chorotype). According to Falahee & Angus (2010), the two subspecies (*hispanus* and *cavolinii* Petagna, 1792) represent two valid species.

Gymnopleurini Lacordaire, 1856

58. *Gymnopleurus mopsus* (Pallas, 1781)

ICKMAP RECORDS. Barumini (VS), 200 m (E. Barbero, in litteris). Cagliari, 30 m, 1974 (ACP). Giara di Gesturi (VS), 550 m, 1955 (ACP). Siliqua (CA), 60 m, 1954 (ACP).

CHOROLOGY. Centralasiatic-Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. V–VIII, XII.

59. *Gymnopleurus sturmi* MacLeay, 1821

ICKMAP RECORDS. Cagliari, 10 m, 1974 (E. Barbero, in litteris). Giara di Gesturi (VS), 550 m, 1965 (ACP). Guasila (CA), 200 m, 1942 (MCSNG); 1946 (MCSNG). Isola di San Pietro (CI), 1 m, 1961 (E. Barbero, in litteris); 1970 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 1 m, 1989 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Perdus de is Ominis, 230 m, 1971 (Piras & Pisano 1972). Monte San Miali (CI), 500 m, 1971 (Piras & Pisano 1972). Pula (CA), 10 m, 1965 (EAUSS). Stagno di Santa Caterina (CI), Saline, 1 m, 1972 (MCSNG). Sanluri (VS), 120 m, 1955 (ACP). Siliqua (CA), 60 m, 1954 (ACP); 1976 (E. Barbero, in litteris). Villamar (VS), 100 m, 1990 (MRSNT). Villaspeciosa (CA), 10 m, 1976 (E. Barbero, in litteris).

CHOROLOGY. Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. IV–VI, VIII, XII.

Oniticellini Kolbe, 1905

60. *Euoniticellus fulvus* (Goeze, 1777)

ICKMAP RECORDS. Cagliari, 10 m, 1922 (ACP; CGMD). Giara di Gesturi (VS), 550 m, 2002 (ACP). Giba (CI), 50 m, 1979 (CRP). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 1 m, 1970 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971 (Piras & Pisano 1972). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Porto Botte (CI), 1 m, 1971 (Piras & Pisano 1972). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Rio di Chia (CA), 10 m, 1954 (ACP). San Priamo (CA), Rio sa Picocca, 10 m, 1973 (CRP). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 1973 (ACP). Siliqua (CA), 60 m, 1972 (ACP).

CHOROLOGY. Turano-Europeo-Mediterranean.

ECOLOGY. Eurytopic (subalpine-mediterranean belts).

PHENOLOGY. V–IX.

61. *Euoniticellus pallens* (Olivier, 1789)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1979 (CRP); 1988 (ACP). Giba (CI), 50 m, 1979 (ACP; CRP). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1980 (Carpaneto et al. 1997); 1980 (CGMD). Quartu Sant'Elena (CA), 5 m, 1976 (MZUR). Rio di Chia (CA), 10 m, 1954 (ACP). San Priamo (CA), Rio sa Picocca, 10 m, 1979 (CRP). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 10 m, 1973 (ACP); 25 m, 2006 (CGMD). Sant'Anna Arresi (CI), 38°59'17.2"N-08°41'02.7"E, 70 m, 2006 (CGMD). Sant'Antonio di Santadi (VS), 40 m, 1980 (ACP). Sant'Antonio di Santadi (VS), 39°40'52.2"N-08°33'18.1"E, 15 m, 2005 (CGMD). Sant'Antonio di Santadi (VS), 39°40'58.1"N-08°33'18.5"E, 20 m, 2005 (CGMD). Stagno di Quartu (CA), 1 m, 1974 (CRP). Villacidro (VS), Cascata sa Spendula, 250 m, 1979 (ACP); (CRP). Villasimius (CA), 40 m, 1977 (ACP; CRP).

CHOROLOGY. Afro-Indo-Mediterranean (in Europe only from Andalusia, Corso-Sardinia and Sicily).

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. V–XI.

62. *Euoniticellus pallipes* (Fabricius, 1781)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1980 (CGMD). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1994 (Carpaneto et al. 1997). Quartu Sant'Elena (CA), 5 m, 1978 (CGMD). Sant'Antonio di Santadi (VS), 10 m, 1980 (CGMD).

CHOROLOGY. Centralasiatic-European (with extension to India).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. IV–X.

Onitini Laporte, 1840

63. *Bubas bison* (Linnaeus, 1767)

ICKMAP RECORDS. Cagliari, 10 m, 1966 (ACP); 1966 (CGMD). Casa Puxeddu (VS), 39°40'26.2"N-08°27'49.5"E, 70 m, 2005 (CGMD). Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10 m, 2006 (CGMD). Foce Rio Piscinas (VS), 1 m, 1968 (MZUR). Giara di Gesturi (VS), 550 m, 1994 (ACP). Guasila (CA), 200 m, 1946 (CGMD). Guspini (VS), 39°37'26.7"N-08°37'04.4"E, 50 m, 2006 (CGMD). Iglesias (CI), 150 m, 1968 (MZUR). Isola di San Pietro (CI), 1 m, 1982 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971 (Piras & Pisano 1972); 1993 (Carpaneto et al. 1997); 60 m, 2006 (CGMD). Isola di Sant'Antioco (CI), Cannai, 50 m, 1988 (Carpaneto et al. 1997). Sant'Antioco (CI), Cannai, 38°59'47.4"N-08°24'26.4"E, 40 m, 2006 (CGMD). Isola di Sant'Antioco (CI), Mercuri, 39°02'34.0"N-08°22'57.2"E, 70 m, 2006 (CGMD). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Monte Linas (CI), SW slope, 39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC). Monte Marganai (CI), 900 m, 1881 (Costa 1882). Musei (CI), Sa Terredda, 39°17'28.5"N-08°42'30.2"E, 100 m, 2006 (CGMD). Porto Botte (CI), 1 m, 1971 (Piras & Pisano 1972). Porto Palma (VS), 39°40'26.5"N-08°27'49.5"E, 65 m, 2006 (MSNTC; CGMD). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972); 1976 (CGMD). Pula (CA), 10 m, 1965 (EAUSS). Pula (CA), Nora, 38°59'42.1"N-09°00'14.5"E, 35 m, 2006 (CGMD). Punta Serpeddi (CA), 1000 m, 1962 (MZUR). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 2006 (CGMD). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS). Santa Maria di Neapoli (CA), 10 m, 1977 (ACP; CRP). Sant'Anna Arresi (CI), 38°59'17.2"N-08°41'02.7"E, 70 m, 2006 (CGMD). Sant'Antonio di Santadi (VS), 39°40'52.2"N-08°33'18.1"E, 15 m, 2005 (CGMD). Stagno di Cagliari, 1 m, 1976 (ACP); 5 m, 1976 (CGMD). Stagno di Marceddi (VS), southern shore, 20 m, 2005 (CGMD). Stagno di San Giovanni (VS), southern shore, 39°41'43.5"N-08°30'51.5"E, 10 m, 2006 (CGMD). Villacidro (VS), Diga di Montimannu, 39°25'02.6"N-

08°42'00.0"E, 260 m, 2006 (CGMD). Villamassargia (CI), 110 m, 1976 (Rastelli 2000).

CNBFVR RECORDS. Arbus (VS), Piscinas, 0 m, 26.III.2006, MB, 1 ex (CNBFVR).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. I–VII, X–XII.

64. *Cheironitis furcifer* (Rossi, 1792)

ICKMAP RECORDS. Cagliari, 10 m, 1962 (MZUR). Domus de Maria (CA), 50 m, 1954 (ACP; CRP). Giara di Gesturi (VS), 550 m, 2002 (ACP). Pantaleo (CI), 150 m, 1962 (ACP). Rio di Chia (CA), 10 m, 1954 (ACP). Torre di Flumentorgiu (VS), 60 m, 1897 (ACP).

CHOROLOGY. Turano-Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. V–VIII.

65. *Cheironitis ungaricus* (Herbst, 1789) ssp. *irroratus* (Rossi, 1790)

ICKMAP RECORDS. Cagliari, 10 m, 1920 (ACP; CGMD); Cantoniera Nuraxi de Mesu (CA), 220 m, 1980 (CGMD). Carbonia (CI), 100 m, 1954 (ACP); 1959 (CRP). Domus de Maria (CA), 50 m, 1954 (ACP; CRP). Foce Rio Piscinas (VS), 2006 (CDP). Giara di Gesturi (VS), 550 m, 2002 (ACP). Goni (CA), 380 m, 1980 (CGMD). Isola di San Pietro (CI), 1 m, 1994 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1994 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1974 (Carpaneto et al. 1997). Monte Arcuentu (VS), western slope, 300 m, 1980 (CGMD). Muravera (CA), Foce F. Flumendosa, 1 m, 1980 (CGMD). Rio di Chia (CA), 10 m, 1954 (ACP). Sant'Antonio di Santadi (VS), 10 m, 1980 (CGMD). Sant'Antonio di Santadi (VS), 39°40'58.1"N-08°33'18.5"E, 20 m, 2005 (CGMD).

CNBFVR RECORDS. Arbus (VS), Marina di Arbus, 0 m, 14.VII.2006, MB DA DB PCe DW, 1 ex (CNBFVR).

CHOROLOGY. W-Mediterranean subspecies of a Turano-Mediterranean species.

ECOLOGY. Stenotopic (submediterranean-mediterranean belts).

PHENOLOGY. II, VI–X.

NOTES. The status of this species is based on the taxonomic revision of Martín Piera (1987), followed by Löbl & Smetana (2006).

Onthophagini Burmeister, 1846

66. *Caccobius schreberi* (Linnaeus, 1767)

ICKMAP RECORDS. Cagliari, 10 m, 1962 (ACP). Giara di Gesturi (VS), 550 m, 2002 (ACP). Iglesias (CI), 150 m, 1962 (MZUR). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 1 m, 1970 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971 (Piras & Pisano 1972). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Monte Linas (CI) (SW slope), 39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Rio di Chia (CA), 10 m, 1954 (ACP). Siliqua (CA), 60 m, 1954 (ACP). Terresoli (CI), 120 m, 1962 (MZUR).

CHOROLOGY. Turano-Europeo-Mediterranean.

ECOLOGY. Eurytopic (subalpine-mediterranean belts).

PHENOLOGY. IV–IX.

67. *Onthophagus* (*Onthophagus*) *taurus* (Schreber, 1759)

ICKMAP RECORDS. Acquaresi (CI), 300 m, 1966 (EAUSS). Cagliari, 10 m, 1969 (ACP). Cagliari, Parco di Monte Urpinu, 70 m, 1969 (CGMD). Cantoniera Nuraxi de Mesu (CA), 220 m, 1980 (CGMD). Iglesias (CI), 150 m, 1962 (MZUR). Isola di San Pietro (CI), 1 m, 1962 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 1 m, 1989 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1980 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Perdas de is Ominis, 230 m, 1971 (Piras & Pisano 1972). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Porto Botte (CI), 1 m, 1971 (Piras & Pisano 1972). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Sant'Antonio di Santadi (VS), 10 m, 1980 (CGMD).

CHOROLOGY. Centralasiatic-Europeo-Mediterranean.

ECOLOGY. Eurytopic (subalpine-mediterranean belts).

PHENOLOGY. III–VIII, X.

68. *Onthophagus* (*Palaeonthophagus*) *opacicollis* Reitter, 1892

ICKMAP RECORDS. Acquaresi (CI), 300 m, 1966 (EAUSS). Burcei (CA), 850 m, 1982 (CGMD). Cagliari, 10 m, 1966 (CGMD); 1970 (Palestrini 1981). Capoterra (CA), 50 m, 1978 (CGMD); 1980 (MZUR). Castiadas (CA), 150 m, 1962 (ACP). Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10

m, 2006 (CGMD). Iglesias (CI), 150 m, 1962 (MZUR). Isola di Sant'Antioco (CI), 1 m, 1982 (ACP). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1992 (Carpaneto et al. 1997); 1993 (ACP); 60 m, 2006 (CGMD). Isola di Sant'Antioco (CI), Cannai, 50 m, 1940 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Mercuri, 39°02'34.0"N-08°22'57.2"E, 70 m, 2006 (CGMD). Macchiareddu (CA), 10 m, 1976 (CRP); 1977 (ACP). Monte Linas (CI), SW slope, 39°29'29"N-08°31'01"E, 900 m, 2004 (CGMD); (MSNTC). Punta Serpeddi (CA), 1000 m, 1968 (MZUR). Rio di Chia (CA), 10 m, 1969 (Pierotti 1959). Santa Maria di Neapoli (CA), 10 m, 1977 (ACP; CRP). Sant'Antonio di Santadi (VS), 39°40'58.1"N-08°33'18.5"E, 20 m, 2005 (CGMD). Stagno di San Giovanni (VS), southern shore, 39°41'43.5"N-08°30'51.5"E, 10 m, 2006 (CGMD). Terresoli (CI), 120 m, 1962 (MZUR). Villacidro (VS), Cascata sa Spendula, 250 m, 1979 (ACP); (CRP). Villacidro (VS), Diga di Montimannu, 39°25'02.6"N-08°42'00.0"E, 260 m, 2006 (CGMD).

CNBFVR RECORDS. Domusnovas (CI), Gutturu Seu, 140 m, 23.III.2006, PCo DB DW, sheep carrion, 1 ex (CNBFVR). Domusnovas (CI), Valle Orida, 643 m, 10.VI.2004, GN, 2 ex (CNBFVR).

CHOROLOGY. Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. III–XII.

69. *Onthophagus (Palaeonthophagus) ruficapillus* Brullé, 1832

ICKMAP RECORDS. Acquaresi (CI), 300 m, 1966 (EAUSS). Capoterra (CA), 50 m, 1978 (CGMD). Iglesias (CI), 150 m, 1962 (MZUR). Monte Linas (CI), SW slope, 39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC). Rio di Chia (CA), 10 m, 1954 (ACP). Siliqua (CA), 60 m, 1954 (Binaghi et al. 1969). Terresoli (CI), 120 m, 1962 (MZUR).

CHOROLOGY. S-European (with extension to Anatolia and Iran).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. IV–VIII, X.

70. *Onthophagus (Palaeonthophagus) vacca* (Linnaeus, 1767)

ICKMAP RECORDS. Acquaresi (CI), 300 m, 1966 (EAUSS). Cagliari, 10 m, 1966 (ACP; CGMD). Capoterra (CA), 50 m, 1970 (ACP). Casa Puxeddu (VS), 39°40'26.2"N-08°27'49.5"E, 70 m, 2005 (CGMD). Castiadas (CA), Arcu s'Accile, 39°11'13.3"N-09°33'34.9"E, 10 m, 2006 (CGMD). Fluminimaggiore (CI), Tempio di Antas, 2008 (Rössner et al. 2010). Guspini (VS),

39°37'26.7"N-08°37'04.4"E, 50 m, 2006 (CGMD). Isola di San Pietro (CI), 1 m, 1975 (Carpaneto et al. 1997); 1994 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1960 (EAUSS); 1974 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 1987 (Rössner et al. 2010). Monte Linas (CI), SW slope, 39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC). Pantaleo (CI), 150 m, 1966 (ACP). Porto Palma (VS), 39°40'26.5"N-08°27'49.5"E, 65 m, 2006 (CGMD). Porto Teulada (CA), 1992 (Rössner et al. 2010). Pula (CA), 1987 (Rössner et al. 2010). Punta Serpeddi (CA), 1000 m, 1962 (ACP). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 2006 (CGMD). Santa Margherita di Pula (CA), 1987 (Rössner et al. 2010). Sant'Antonio di Santadi (VS), 39°39'54.9"N-08°35'15.0"E, 80 m, 2004 (CGMD); 2004 (MSNTC); 39°40'52.2"N-08°33'18.1"E, 15 m, 2005 (CGMD); 39°40'58.1"N-08°33'18.5"E, 20 m, 2005 (CGMD). Stagno di Cagliari, 1 m, 1976 (ACP); 5 m, 1976 (CGMD). Stagno di San Giovanni (VS), southern shore, 39°41'43.5"N-08°30'51.5"E, 10 m, 2006 (CGMD); 2006 (MSNTC). Terresoli (CI), 120 m, 1962 (ACP). Teulada (CA), 1982 (Rössner et al. 2010). Villisimius (CA), 40 m, 1991 (ACP).

CNBFVR RECORDS. Arbus (VS), Piscinas, 0 m, 26.III.2006, DW, 1 ex (CNBFVR).

CHOROLOGY. Turano-Europeo-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. II–III, X.

Scarabaeini Latreille, 1802

71. *Scarabaeus (Ateuchetus) laticollis* Linnaeus, 1767

ICKMAP RECORDS. Cagliari, 10 m, 1966 (MZUR); 1979 (MZUR); 1966 (CGMD). Chia (CA), 38°53'N-08°51'E, 10 m, 2002 (MSNTC). Foce Rio Piscinas (VS), 1 m, 1979 (ACP); (CRP). Giara di Gesturi (VS), 550 m, 1992 (ACP); 1994 (ACP); 2002 (ACP); 2006 (CDP). Gonnosfanàdiga (VS), 150 m, 1968 (EAUSS). Guspini (VS), 39°37'26.7"N-08°37'04.4"E, 50 m, 2006 (CGMD). Iglesias (CI), Lago Corsi, 150 m, 2000 (ACP). Isola di San Pietro (CI), 1 m, 1976 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1971 (Piras & Pisano 1972). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 1 m, 1984 (Carpaneto et al. 1997); 1993 (Carpaneto et al. 1997); 10 m, 1958 (EAUSS). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971 (Piras & Pisano 1972); 1993 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Perdas de is Ominis, 230 m, 1971 (Piras & Pisano 1972). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2006 (CGMD); (MSNTC). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Monte Arcuentu (VS),

western slope, 300 m, 2004 (MSNTC). Monte Linas (CI), SW slope, 39°29'29"N-08°31'01"E, 900 m, 2004 (MSNTC). Monte San Miai (CI), 500 m, 1971, (Piras & Pisano 1972). Muravera (CA), 10 m, 1963 (EAUSS). Pantaleo (CI), 250 m, 1987 (ACP). Pimentel (CA), 150 m, 1971 (MZUR). Porto Botte (CI), 1 m, 1971 (Piras & Pisano 1972); 1976 (CGMD); 20 m, 1976 (CGMD). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Punta Serpeddi (CA), 900 m, 1968 (MZUR). San Priamo (CA), Rio sa Picocca, 10 m, 1973 (CRP). Sant'Antonio di Santadi (VS), 39°40'52.2"N-08°33'18.1"E, 15–20 m, 2005 (CGMD). Sardara (VS), 160 m, 1969 (EAUSS). Stagno di Cagliari, 1 m, 1976 (ACP); 5 m, 1976 (CGMD). Villacidro (VS), 250 m, 1973 (CRP). Villacidro (VS), Cascata sa Spendula, 250 m, 1977 (ACP). Villasimius (CA), 40 m, 1976 (CRP).

CNBFVR RECORDS. Burcei (CA), 725 m, 13.XI.2006, MB, under stones, 1 ex (CNBFVR). Burcei (CA), Punta Serpeddi, 954 m, 13.XI.2006, GN, under stones, 2 ex (CNBFVR). Domusnovas (CI), Bega d'Aleni, 621 m, 24.V.2006, PCo MB DB DW, bovine dung, 1 ex (CNBFVR). Domusnovas (CI), Lago Siuru, 322 m, 6.VI.2004, GN, 1 ex (CNBFVR). Domusnovas (CI), Planargia-Scoveri, 625 m, 20.V.2006, PCo MB DB DW, 2 ex (CNBFVR). Domusnovas (CI), Valle Oridda, 592 m, 23.III.2006, DW, 3 ex (CNBFVR). Domusnovas (CI), Valle Oridda, 595 m, 24.III–24.V.2006, MB DB PCo DW, pt, 1 ex (CNBFVR). Domusnovas (CI), Valle Oridda, 643 m, 7.VI.2004, GN, 1 ex (CNBFVR). Gesturi (VS), Giara di Gesturi, 568 m, 15.VI.2004, GN, 1 ex (CNBFVR). Gonnosfanàdiga, Monte Linas, Pta su Filixi, 780 m, GN, under stones, 1 ex (CNBFVR). Iglesias (CI), Case Marganai, 660 m, 6.VI.2004, MT, nt, 1 ex (CNBFVR). Villacidro (VS), Canale Monincu, 450 m, 21.V.2006, DW MB DB PCo, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 382 m, 24.III.2006, DB DW, 3 ex (CNBFVR); 25.III.2006, PCo, 2 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19.V.2006, PCo MB DB DW, 1 ex (CNBFVR). Villacidro (VS), Sorgente s'acqua Frischedda, 372 m, 25.III.2006, MB, 1 ex (CNBFVR). Villacidro (VS), Torrente Leni, 300 m, 9.XI.2006, GN, under stones, 1 ex (CNBFVR).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. I–XII.

72. *Scarabaeus (Ateuchetus) semipunctatus* Fabricius, 1792

ICKMAP RECORDS. Cagliari, 10 m, 1955 (ACP); 1966 (ACP; CGMD). Donori (CA), 140 m, 1977 (Rastelli 2000). Foce Rio Piscinas (VS), 1 m, 1968 (ACP); 1979 (ACP; CRP); 2002 (ACP); 2006 (CDP). Isola di San Pietro (CI), 1 m, 1977 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 1 m, 1988 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971,

(Piras & Pisano 1972). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2006–2007 (CGMD); (MSNTC). Marina di Arbus (VS), 39°33'51.0"N-08°27'48.6"E, 50 m, 2005 (CGMD). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Poetto (CA), beach, 1 m, 1948 (MZUR); 1956 (MZUR); 1 m, 1956 (CGMD). Porto Pino (CI), 5 m, 1971 (Piras & Pisano 1972). Portoscuso (CI), 10 m, 1870 (Bargagli 1872). Stagno dei Molentargius (CA), 5 m, 1870 (Bargagli 1872). Stagno di Colostrai (CA), 1 m, 1974 (ACP); 1976 (CRP). Torre dei Corsari (VS), 10 m, 1995 (ACP).

CHOROLOGY. Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt), on sandy beaches.

PHENOLOGY. III–VI, VIII–XI.

73. *Scarabaeus (Scarabaeus) sacer* Linnaeus, 1758

ICKMAP RECORDS. Cagliari, 10 m, 1930 (Stolfa 1938); 1958 (ACP). Castiadas (CA), 165 m, 1962 (MZUR). Chia (CA), 10 m, 1967 (MZUR). Iglesias (CI), 150 m, 1989 (ACP). Foce Rio Piscinas (VS), 2006 (CDP). Isola di San Pietro (CI), Carloforte, 10 m, 1970 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1971 (Piras & Pisano 1972). Isola di San Pietro (CI), Stagno della Vivagna, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 1 m, 1970 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1971 (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Perdus de is Ominis, 230 m, 1971 (Piras & Pisano 1972). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2006 (CGMD). Matzaccara (CI), 10 m, 1971 (Piras & Pisano 1972). Monte San Miai (CI), 500 m, 1971 (Piras & Pisano 1972). Muravera (CA), 20 m, 1954 (ACP); (CRP). Muravera (CA), Foce F. Flumendosa, 1 m, 1950 (Mariani 1959). Muravera (CA), Porto Corallo, 1 m, 1966 (MZUR). Porto Botte (CI), 1 m, 1971 (Piras & Pisano 1972). Porto Pino (CI), 5 m, 1965 (ACP); 1965 (CGMD); 1966 (ACP); 1971 (Piras & Pisano 1972). San Priamo (CA), Rio sa Picocca, 39°21'52.1"N-09°34'40.6"E, 25 m, 1949 (MZUR). San Vito (CA), 15 m, 1872 (Capra 1954). Santa Margherita di Pula (CA), 15 m, 1930 (Stolfa 1938). Stagno di Chia (CA), 10 m, 1966 (MZUR); 1967 (MZUR); 1968 (MZUR). Stagno di Colostrai (CA), 1 m, 1974 (ACP; CRP). Villasimius (CA), 40 m, 1975 (ACP; CRP).

CNBFVR RECORDS. Arbus (VS), Capo Pecora, 15 m, 13.VI.2004, DB, 1 ex (CNBFVR). Arbus (VS), Piscinas, 0 m, 26.III.2006, DB, 1 ex (CNBFVR); 25.VI.2006, PCo, 1 ex (CNBFVR).

CHOROLOGY. Mediterranean (with extension to Caucasian areas).

ECOLOGY. Stenotopic (submediterranean-mediterranean belts), on sandy soils.

PHENOLOGY. I, III–IX.

74. *Scarabaeus (Scarabaeus) typhon* Fischer von Waldheim, 1823

ICKMAP RECORDS. Cagliari, 10 m, 1922 (Capra 1954). Quartu Sant'Elena (CA), 5 m, 1922 (Capra 1954). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS). Villasimius (CA), 40 m, 1975 (CRP); 1976 (CRP); 1990 (ACP).

CHOROLOGY. Centralasiatic-European (with extension to Korea).

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. IV–VIII, X.

Sisyphini Mulsant, 1842

75. *Sisyphus schaefferi* (Linnaeus, 1785)

ICKMAP RECORDS. Giara di Gesturi (VS), 550 m, 2002 (ACP). Punta Sebera (CA, CI), 700 m, 1968 (ACP). Punta Serpeddi (CA), 900 m, 1962 (MZUR); 1968 (MZUR).

CNBFVR RECORDS. Domusnovas (CI), Bega d'Aleni, 621 m, 24.V.2006, PCo MB DB DW, 2 ex (CNBFVR). Domusnovas (CI), Valle Oridda, pine stand, 595 m, 24.III–24.V.2006, MB PCo DB DW, pt, 6 ex (CNBFVR). Domusnovas (CI), Valle Oridda, 643 m, 7.VI.2004, GN, 1 ex (CNBFVR). Iglesias (CI), Conca Margiani, 674 m, 11.VI.2004, GN, 1 ex (CNBFVR). Villacidro (VS), Canale Monincu, 450 m, 21.V.2006, PCo MB DB DW, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 375 m, 24.III.2006, DB DW, 2 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 382 m, 25.III.2006, DW, 3 ex (CNBFVR). Villacidro (VS), Sorgente s'acqua Frischedda, 372 m, 25.III.2006, MB, 1 ex (CNBFVR).

CHOROLOGY. Centralasiatic-European-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. III–XII.

PACHYPODINAE Erichson, 1840

76. *Pachypus candidae* (Petagna, 1786) (sensu lato)

ICKMAP RECORDS. Castiadas (CA), 1965. Muravera (CA), Foce F. Flumendosa, 1989. Muravera (CA), Torre Salinas, 2003. Santa Margherita di Pula (CA), 1980. Villasimius (CA), beach, 1980; all records quoted by Sparacio (2008). Foce Rio Piscinas (VS), 2006 (CDP). Santa Margherita di Pula (CA), 2003 (CDP).

CNBFVR RECORDS. Arbus (VS), Capo Pecora, 15 m, 13.VI.2004, GN, sn, 5 ex (CNBFVR). Arbus (VS), Marina di Arbus, 0 m, 14.VII.2006, MB DA DB PCe DW, sn, 2 ex (CNBFVR).

CHOROLOGY. Endemic of Tyrrhenian areas (Corso Sardinia and Italian Tyrrhenian coasts, with extension to Apulia).

ECOLOGY. Stenotopic (mediterranean belt), sandy and muddy soils.

PHENOLOGY. VI–VIII (most specimens collected in July).

NOTES. After the description of *P. melonii* Sparacio, 2008, all the literature records from Sardinia (Crovetto 1969; Piras & Pisano 1972; Carpaneto et al. 1997) have become unreliable and should be verified by examining the original specimens. In this paper we quote only the records examined by us and by Sparacio (2008), who separated the two species. Nevertheless, a revision of the genus *Pachypus* Serville, 1825, based on molecular analyses, is currently in progress (Ahrens et al., pers. comm.) and may disclose several hidden species. For this reason, we reported the records under the collective noun of "*Pachypus candidae* (sensu lato)".

77. *Pachypus melonii* Sparacio, 2008

ICKMAP RECORDS. Assémini (CA), rio Flùmini Mannu (typ. loc.), 1989–1990, 1993, 1996, 2000–2003, 2007. Assémini (CA), Rio Cixerri, 1991. Siliqua (CA), Puadas, 1976. Villaspeciosa (CA), Fraigheddas, 1976. Uta (CA), 1999; all records quoted by Sparacio (2008).

CHOROLOGY. Endemic to south-western Sardinia.

ECOLOGY. Stenotopic (submediterranean belt), along river basins.

PHENOLOGY. V–VI (most specimens collected in June).

MELOLONTHINAE Leach, 1819

Hopliini Latreille, 1829

78. *Hoplia (Hoplia) pubicollis* Küster, 1849 (fig. 2)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1978 (CRP); 1979 (CGMD). Isola di San Pietro (CI), Carloforte, 10 m (CGMD). Monte Arcosu (CA), 2006 (CDP). Villacidro (VS), Rio Leni, 310 m, [photo by P. Leo, 24.V.2010, www.entomologiitaliani.it].

CNBFVR RECORDS. Buggerru (CI), Foce Rio Mannu, dunes, 13.VI.2004, GN DB PCe MT DW, nt, 22 ex (CNBFVR); 14.VI.2004, PCe DB GN MT DW, 9 ex (CNBFVR).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Stenotopic (submediterranean-mediterranean belts), often near river basins, streams or canals.

PHENOLOGY. IV–VI (most records are from May).



Fig. 2. *Hoplia (Hoplia) pubicollis* ♂ (Medio Campidano prov., Villacidro) (photo by P. Leo).

Melolonthini Leach, 1819

79. *Anoxia (Mesanoxia) matutinalis* Laporte, 1832 ssp. *sardoa* Motschulsky, 1860

ICKMAP RECORDS. Cagliari, town, 2007 (CDP). Isola di San Pietro (CI), 10 m, 1962 (Sabatinelli 1976); Isola di San Pietro (CI), Nasca, 1 m, 1994 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 10 m (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1962 (EAUSS); 1974 (Sabatinelli 1976). Poetto (CA), beach, 1 m, 1954 (CRP); 1958 (Sabatinelli 1976); 1980 (CGMD); 1987 (ACP); 1 m, 1960 (CGMD). Santa Margherita di Pula (CA), 15 m, 1989 (CGMD). Villasimius (CA), Capo Boi, 80 m, 1985 (CGMD; MSNTC).

CNBFVR RECORDS. Buggerru (CI), Foce Rio Mannu, dunes, 13.VI.2004, PCe DB GN MT DW, nt, 6 ex (CNBFVR); 13.VI.2004, GN DB PCe MT DW, nt, 16 ex (CNBFVR).

CHOROLOGY. A Sardinian subspecies of a Mediterranean species.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. VI–VIII.

Pachydemini Burmeister, 1855

80. *Elaphocera emarginata* (Gyllenhal, 1817)

ICKMAP RECORDS. Cagliari, 10 m (CGMD); 1966 (CGMD); 30 m (Baraud 1987); 1974 (CRP); 1977 (CRP); 1980 (CRP; CGMD). Cagliari, Parco di Monte Urpinu, 70 m, 1967 (Cassola 1968). Cagliari: Monte Claro; Monte San Michele; Quartiere del Sole; Capo S. Elia [photo by R. Rattu, www.entomologiitaliani.it]. Cagliari, Stagno di Molentargius, 1991, 1992 (CDP). Isola di Sant'Antioco (CI), 10 m (Carpaneto et al. 1997).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. VI, IX–X (mainly in autumn, October–November, after rain).

81. *Elaphocera erichsoni* Jacquelin du Val, 1860

ICKMAP RECORDS. Cagliari, 10 m, 1922 (CGMD); 30 m (Baraud 1987). Cagliari, Parco di Monte Urpinu, 70 m, 1986 (ACP). Domusnovas (CI), 2006 (CDP). Isola di San Pietro (CI), 10 m (Piras & Pisano 1972). Monti dei Sette Fratelli (CA), 900 m, 1987 (ACP). Pula (CA), 10 m, 1969 (CRP); 1975 (EAUSS); 1991 (CDP). San Gregorio (CA) [photo by Roberto Rattu, www.entomologiitaliani.it]. Santa Margherita di Pula (CA), 15 m, 1975 (CRP); 1975 (CGMD).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Stenotopic (submediterranean-mediterranean belts).

PHENOLOGY. IV, VI, IX–XI (mainly in autumn, from the end of September to the first half of October, after rain).

Rhizotrogini Burmeister, 1855

82. *Amadotrogus vicinus* (Mulsant, 1842) (= *Rhizotrogus rugifrons* Burmeister, 1885)

ICKMAP RECORDS. Arbus (VS), Piscinas [photo by R. Rattu, 9.X.2010, www.entomologiitaliani.it]. Isola di Sant'Antioco (CI), Calasetta, 5 m, 1968 (EAUSS). Muravera (CA), Foce F. Flumendosa, 1 m, 1977 (CRP). Porto Pino (CI), 5 m, 1970 (CRP). Sardara (VS), 160 m, 1989 (ACP).

CHOROLOGY. W-Mediterranean, restricted to southern France (Marseille, type locality), Corsica and Sardinia.

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. VII–X.

NOTES. *Amadotrogus rugifrons*, formerly considered a Sardo-Corsican endemic, has now been reduced to a synonym of *A. vicinus* (Coca-Abia & Martín Piera 2002). Further taxonomic investigation is required to

clarify the taxonomic status of the Sardinian populations.

83. *Amphimallon solstitiale* (Linnaeus, 1758)

CNBFVR RECORDS. Iglesias (CI), Monte Marganai, 700 m, 10.XI.2006, GN, 2 dead specimens in the litter (CNBFVR).

CHOROLOGY. Asiatic-European.

ECOLOGY. Eurytopic (subalpine-mediterranean).

PHENOLOGY. Poorly known (in peninsular Italy: V–IX). The two specimens collected in November were found dead by sieving the soil and cannot provide any information on phenology.

84. *Firminus fossulatus* (Mulsant & Rey, 1859)

ICKMAP RECORDS. Monti dei Sette Fratelli (CA), Su Gunventu [photo by R. Rattu, 10.X.2008, 9–10.X.2010, www.entomologiitaliani.net]. San Gregorio (CA) (photo by R. Rattu, 21.IX.2008, www.entomologiitaliani.net).

CNBFVR RECORDS. Villacidro (VS), Punta Piscina Argiolas, 282 m, 9.IX.2006, GN, al, 1 ex (CNBFVR).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Oligotopic (montane-submediterranean belts).

PHENOLOGY. IX–X.

NOTES. This species was transferred to the new genus *Firminus* by Coca-Abia (2003) within her phylogenetic revision of the genus *Rhizotrogus* Berthold, 1827. It was quoted of Isola di Sant'Antioco (CI), 10 m (Piras & Pisano 1972) but the record is doubtful because not congruous with the submontane ecology of the species.

85. *Geotrogus genei* (Blanchard, 1851)

ICKMAP RECORDS. Cagliari, 30 m, 1974 (ACP). Cagliari, 2005 (CDP).

CNBFVR RECORDS. Villacidro (VS), Punta Pranu Ilixis, 563 m, 20.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR).

CHOROLOGY. Endemic to Corso-Sardinia; quoted of Capraia Island in the Tuscan Archipelago (Sabatini 1975, as *Rhizotrogus insularis* Reiche, 1862).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. I–VII, IX, XI–XII.

NOTES. This species was transferred to the genus *Geotrogus* Guérin-Méneville, 1842 by Coca-Abia (2003)

within her phylogenetic revision of the genus *Rhizotrogus*.

86. *Rhizotrogus maculicollis* A. Villa & G. B. Villa, 1833

CNBFVR RECORDS. Domusnovas (CI), Valle Oridda, 592 m, 22.VIII–5.IX.2006, GC, mt, 1 ex (CNBFVR). Iglesias (CI), Case Marganai, 660 m, 24.IX.2004, PCe, 1 ex (CNBFVR). Iglesias (CI), dint. colonia Beneck, 636 m, 5–19.IX.2006, GC, mt, 1 ex (CNBFVR).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (submontane-submediterranean belts).

PHENOLOGY. Poorly known (VIII–IX).

87. *Rhizotrogus sassariensis* Perris, 1869

ICKMAP RECORDS. Sinnai (CA), Monte Cresia, 650 m, 1990 (ACP).

CHOROLOGY. Tyrrhenian endemic (Corsica, Sardinia and southern Italy).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. III–VIII

Sericini Kirby, 1837

88. *Triodontella alni* (Blanchard, 1850) ssp. *luteipes* (Fairmaire, 1881)

ICKMAP RECORDS. Geremeas (CA), 30 m, 1989 (ACP). Stagno di Colostrai (CA), 1 m, 1972 (CRP). Poetto (CA) [photo by R. Rattu, 8.V.2010, www.entomologiitaliani.net]. Torre delle Stelle (CA), 20 m, 39°08'54"N-09°24'09"E, 2007 (Keith et al. 2010).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Stenotopic (submediterranean-mediterranean belts).

PHENOLOGY. V–VIII.

NOTES. The populations occurring in southern Sardinia, near sea level, were assigned to ssp. *luteipes* (Fairmaire, 1881), while the populations of central Sardinia (Gennargentu mountains) were referred to the nominal subspecies (Keith et al. 2010). Like all *Triodontella* species, the adults are nocturnal and attracted by light.

89. *Triodontella mimula* Leo & Fancello, 2007

ICKMAP RECORDS. Arbus (VS), Capo Pecora, 1982 (Leo & Fan-

cello 2007). Foce Rio Piscinas (VS), 1991, 1996 (Leo & Fancello 2007). Pabillonis (VS), Is Arenas, 1988, 1989 (Leo & Fancello 2007).

CHOROLOGY. Endemic to south-western Sardinia (from Sinis peninsula to Capo Pecora) (Leo & Fancello 2007).

ECOLOGY. Stenotopic (mediterranean belt), at sea level on sandy soils.

PHENOLOGY. V–VII (from second half of May to early July).

90. *Triodontella raymondi* (Perris, 1869)

ICKMAP RECORDS. Gonnese (CI), Fontanamare, 1982 (Leo & Fancello 2007). Isola di San Pietro (CI), Giunco, 1977 (Leo & Fancello 2007). Isola di San Pietro (CI), 10 m (Prota 1963). Isola di San Pietro (CI), La Caletta, 2000 (Leo & Fancello 2007). Isola di Sant'Antioco (CI), 1 m (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Cala Lunga, 1 m, 1989 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1959 (EAUSS); 1961–1963 (EAUSS); 1974 (Carpaneto et al. 1997); 1974 (Leo & Fancello 2007). Isola di Sant'Antioco (CI), Cussorgia, 1 m (Prota 1963). Quartu Sant'Elena (CA) (Baraud 1962; Prota 1963). San Giovanni Suergiu (CI) (Prota 1963). Sinnai (CA), Solanas beach, 1988 (Leo & Fancello 2007). Villasimius (CA), 40 m, 1976 (CRP). Villasimius (CA), Capo Carbonara, 1976 (Leo & Fancello 2007). Villasimius (CA), Campus beach, 1996 (Leo & Fancello 2007). Villasimius (CA), Stagno Notteri, 1980 (Leo & Fancello 2007).

CNBFVR RECORDS. Buggerru (CI), Foce Rio Mannu, dunes, 13.VI.2004, GN DB PCe MT DW, nt, 6 ex (CNBFVR). Fluminimaggiore (CI), Portixeddu, 6 m, 13.VI.2004, PCe DB GN MT DW, nt on sand dunes, 1 ex (CNBFVR).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Stenotopic (mediterranean belt), at sea level on sandy soils.

PHENOLOGY. IV–VII (most records from May–June).

91. *Triodontella sardoa* (Baraud, 1962)

ICKMAP RECORDS. Stagno di Colostrai (CA), 1 m, 1972 (CRP). Monti dei Sette Fratelli (CA), Baccu Malu [photo by R. Rattu, 30.V.2008, www.entomologiitaliani.net]. Monte Serpeddi (CA), 1000 m [photo by R. Rattu, 29.V.2010, www.entomologiitaliani.net]. Rio Ollastu (S.Vito) (CA) [photo by R. Rattu, VI.2009, www.entomologiitaliani.net].

CHOROLOGY. Sardinian endemic.

ECOLOGY. Stenotopic (submediterranean-mediterranean belts).

PHENOLOGY. V–VI.

NOTES. A rare species, only known from few localities.

DYNASTINAE MacLeay, 1819

Oryctini Mulsant, 1842

92. *Oryctes nasicornis* (Linnaeus, 1758) s.l.

ICKMAP RECORDS. Cagliari, 10 m, 1966 (CGMD). Isola di San Pietro (CI), 10 m, (Piras & Pisano 1972). Isola di San Pietro (CI), Carloforte, 10 m, 1974–1975 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 10 m (Piras & Pisano 1972). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1975 (Carpaneto et al. 1997). Samassi (VS), 1892 (Marcialis 1892). Santa Margherita di Pula (CA), 15 m, 1967 (EAUSS); 1989 (CGMD). Sestu (CA), 1892 (Marcialis 1892). Sinnai (CA), 1892 (Marcialis 1892).

CNBFVR RECORDS. Villacidro (VS), 239 m, 8.IX.2006, GN, 1 ex (CNBFVR). Villacidro (VS), Canali s'Otti, 520 m, 24.V.2006, MB DB PCo DW, al, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 483 m, 17.VII.2006, PCe DA MB DB DW, 1 ex (CNBFVR).

CHOROLOGY. Centralasiatic-European-Mediterranean. ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. IV–IX.

NOTES. The subspecific status of *Oryctes nasicornis* in Italy is very confused. According to Krell (2002) the Sardinian populations belong to *grypus* (Illiger, 1803), a W-Mediterranean subspecies also occurring in southern Italy (Sicily and Calabria). Nevertheless, in Fauna Europaea (Krell 2011a) the same author referred the Sardinian populations to the subspecies *corniculatus* A. Villa & G.B. Villa, 1833 (= *laevigatus* Heer, 1841), which occurs in northern and central Italy.

Pentodontini Mulsant, 1842

93. *Calicnemis sardiniensis* Leo, 1985

ICKMAP RECORDS. Fontanamare di Gonnese (CI), 5 m, 1983 (CGMD); 1985 (Leo 1985); 1996 (CDP). Nebida (CI), 2001 (CDP). Portixeddu, near Capo Pecora (CI), 1979 (Leo 1985).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Stenotopic (mediterranean belt), in sand beaches.

PHENOLOGY. IV

94. *Pentodon algerinum* (Herbst, 1789) ssp. *algerinum* (Herbst, 1789)

ICKMAP RECORDS. Assemini (CA), 10 m (Leo & Pisano 1984). Cagliari, 10–30 m (Leo & Pisano 1984). Decimomannu (CA), 10 m (Leo & Pisano 1984). Elmas (CA), 10 m (Leo & Pisano 1984). Flumini (CA), 70 m (Leo & Pisano 1984). Geremeas (CA), 1991 (CDP). Isola di San Pietro (CI), Carloforte, 10 m (Leo & Pisano 1984); 1994 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m (Leo & Pisano 1984). Isola di Sant'Antioco (CI), Coaquaddus, 10 m, 1989 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 1 m, 1975 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Canisoni, beach, 1 m (Leo & Pisano 1984). Muravera (CA), Foce F. Flumendosa, 1 m (Leo & Pisano 1984). Porto di Teulada (CA), 10 m (Leo & Pisano 1984). Quartu Sant'Elena (CA), 5 m (Leo & Pisano 1984). San Priamo (CA), Rio Picocca, 1 m (Leo & Pisano 1984). Santa Margherita di Pula (CA), 15 m (Leo & Pisano 1984); 1989 (CGMD). Siliqua (CA), 60 m (Leo & Pisano 1984). Stagno di Colostrai (CA), 1 m, 1977 (CRP). Stagno Simbirizzi (CA), 10 m (Leo & Pisano 1984). Villasimius (CA), 40 m (Leo & Pisano 1984); 1975 (CRP); 1976 (CRP).

CHOROLOGY. A Mediterranean subspecies of a widespread Afro-Indo-Mediterranean species.

ECOLOGY. Stenotopic (submediterranean-mediterranean belts).

PHENOLOGY. VI–XI.

95. *Phyllognathus excavatus* (Forster, 1771)

ICKMAP RECORDS. Isola di San Pietro (CI), Carloforte, 10 m, 1994 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di San Pietro (CI), Tacche Rosse, 10 m, 1994 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Coaquaddus, 10 m, 1978 (Carpaneto et al. 1997).

CHOROLOGY. Turano-Mediterranean.

ECOLOGY. Stenotopic (mediterranean belt).

PHENOLOGY. V–XII.

CETONIINAE Leach, 1815

Cetoniini Leach, 1815

96. *Cetonia carthami* Gory & Percheron, 1833 ssp. *carthami* Gory & Percheron, 1833

ICKMAP RECORDS. Cagliari, 30 m (Mikšić 1982). Isola di San Pietro (CI), Cala Lunga, 1 m, 1995 (Carpaneto et al. 1997). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto

et al. 1997). Isola di San Pietro (CI), Montagna Gianchin, 50 m, 1989 (Carpaneto et al. 1997). Monte dei Sette Fratelli (CA), 800 m, 1954 (CRP).

CNBFVR RECORDS. Buggerru (CI), Foce Rio Mannu, dunes, 14.VI.2004, GN DB PCe MT DW, 1 ex (CNBFVR). Gonno-sfanàdiga (VS), Ovile Linas, 710 m, 22.V.2006, PCo MB DB DW, 1 ex (CNBFVR). Gonno-sfanàdiga (VS), Monte Idda, road to Monte Linas, 474 m, 22.V.2006, DW MB DB PCo, sn, 1 ex (CNBFVR).

CHOROLOGY. A Sardo-Corsican endemic subspecies of a W-Mediterranean species (absent in N-Africa).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. III–VI, IX.

97. *Protaetia (Netocia) morio* (Fabricius, 1781) ssp. *morio* (Fabricius, 1781)

ICKMAP RECORDS. Cagliari, 30 m, (Mikšić 1987). Guspini (VS), 50 m, 1967 (EAUSS). Isola di San Pietro (CI), 10 m, (Piras & Pisano 1972). Isola di San Pietro (CI), M. Guardia dei Mori, 50 m, 1987 (Carpaneto et al. 1997). Isola di San Pietro (CI), Montagna Gianchin, 50 m, 1989 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 10 m (Piras & Pisano 1972). Monte Arcosu (CA), 654 m, 2009 (ACP).

CNBFVR RECORDS. Domusnovas (CI), Grotta di San Giovanni, 325 m, 12.VI.2004, GN, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19-24.V.2006, MB, on *Quercus suber*, 7 ex (CNBFVR).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. IV, VI–VII.

98. *Protaetia (Netocia) sardea* (Gory & Percheron, 1833)

ICKMAP RECORDS. Cagliari, Ponte Vittorio, 30 m, 1979 (CGMD). Cala Mosca (CA), 1 m, 1975 (CRP). Capo Sant'Elia (CA), 50 m, 1988 (ACP). Isola di San Pietro (CI), 10 m, (Piras & Pisano 1972). Monti dei Sette Fratelli (CA), 900 m (CGMD).

CHOROLOGY. Sardo-Corsican endemic.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. VI–VII.

99. *Protaetia (Potosia) cuprea* (Fabricius, 1775) ssp. *cuprea* (Fabricius, 1775)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1987 (ACP). Isola di San Pietro (CI), 10 m (Piras & Pisano 1972). Isola di Sant'Antioco (CI), 10 m (Piras & Pisano 1972).

CHOROLOGY. European.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. IV–VII, IX.

NOTES. The Sardinian populations belong to the nominal subspecies, endemic to the Italian peninsula, Corsica, Sardinia and Sicily.

100. *Protaetia (Potosia) opaca* (Fabricius, 1787)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1988 (ACP). Decimomannu (CA), 10 m, 1974 (ACP). Foce Rio Piscinas (VS), 2006 (CDP). Isola di San Pietro (CI), 10 m, 1956 (CRP). Isola di San Pietro (CI), Carloforte, 10 m, 1994 (Carpaneto et al. 1997). Siliqua (CA), 60 m, 1954 (CRP).

CHOROLOGY. W-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. IV–VII.

101. *Tropinota (Epicometis) paulae* Leo, 2010

ICKMAP RECORDS. Gonnostranadiga (VS), Genna Eidadi, 900–1000 m (Leo 2010). Gonnostranadiga (VS), Genna Farracelus, 700 m (Leo 2010). Gonnostranadiga (VS), Perda 'e Pibera, 380–550 m (Leo 2010). Villacidro (VS), Conca Turriga, 540 m (Leo 2010). Villacidro (VS), Cuccurdoni Mannu, 790 m (Leo 2010). Villacidro (VS), Piscina Irgas, 560 m (Leo 2010). Villacidro (VS), Rio Cannisoni, 390 m (Leo 2010). Villacidro (VS), Rio Coxinas, 590–760 m (Leo 2010). Villacidro (VS), Rio d'Oridda, 380 m (Leo 2010).

CNBFVR RECORDS. Villacidro (VS), Canale Monincu, 450 m, 21.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR); 21.V.2006, DW MB DB PCo, sn, 2 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 390 m, 24.III.2006, MB, sn, 1 ex (CNBFVR); 24.III.2006, DB, nt, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 18–24.V.2006, MB DB PCo DW, lt, 1 ex (CNBFVR); 19–24.V.2006, MB, on *Quercus suber*, 2 ex (CNBFVR).

CHOROLOGY. Sardinian endemic.

ECOLOGY. Oligotopic (submontane-submediterranean belts) from 370 to 1000 m.

PHENOLOGY. III–VI.

NOTES. See *Tropinota (Tropinota) squalida*.

102. *Tropinota (Tropinota) squalida* (Scopoli, 1763)

ICKMAP RECORDS. Barumini (VS), 200 m, 1969 (Crovetti 1970a). Cagliari, 10 m, 1966 (CGMD); Cagliari, 30 m, 1969 (Crovetti

1970a). Cagliari, Monte San Michele, 30 m, 1970 (CGMD); 1971 (CGMD). Cagliari, Parco di Monte Urpinu, 70 m, 1970 (CGMD). Castiadas (CA), 160 m, 1968 (Crovetti 1970a). Domusnovas (CI), 140 m, 1966 (Crovetti 1970a). Elmas (CA), 10 m, 1952 (Crovetti 1970a). Furtei (VS), 100 m, 1966 (Crovetti 1970a). Iglesias (CI), 150 m, 1966 (Crovetti 1970a). Isola di San Pietro (CI), Cala Lunga, 1 m, 1982 (Carpaneto et al. 1997). Isola di San Pietro (CI), Stagno Cala Vinagra, 1 m, 1988 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), 10 m, 1957 (Carpaneto et al. 1997); 1957 (EAUSS); 1958 (EAUSS). Isola di Sant'Antioco (CI), Cala Sapone, 1 m, 1982 (Carpaneto et al. 1997). Isola di Sant'Antioco (CI), Calasetta, 5 m, 1969 (Crovetti 1970a). Isola di Sant'Antioco (CI), Capo Sperone, 1 m, 1968 (Crovetti 1970a). Mandas (CA), 450 m, 1966 (Crovetti 1970a). Marina di Arbus (VS), 39°33'34.2"N-08°27'51.2"E, 50 m, 2006 (CGMD). Muravera (CA), 1 m, 1967 (Crovetti 1970a). Orroli (CA), 500 m, 1966 (Crovetti 1970a). Pabillonis (VS), 40 m, 1968 (Crovetti 1970a). Portoscuso (CI), 10 m, 1969 (Crovetti 1970a). Pula (CA), 10 m, 1966 (Crovetti 1970a). Senorbì (CA), 200 m, 1966 (Crovetti 1970a). Serrenti (VS), 100 m, 1967 (Crovetti 1970a). Siliqua (CA), 60 m, 1969 (Crovetti 1970a). Stagno di Cagliari, 5 m, 1976 (CGMD). Stagno di San Giovanni (VS), southern shore, 39°41'43.5"N-08°30'51.5"E, 10 m, 2006 (CGMD). Teulada (CA), 50 m, 1957 (EAUSS); 60 m, 1957 (Crovetti 1970a).

CNBFVR RECORDS. Arbus (VS), Piscinas, 0 m, 25.V.2006, MB DB PCo DW, sn, 1 ex (CNBFVR). Buggerru (CI), Foce Rio Mannu, dunes, 13.VI.2004, GN DB PCe MT DW, 2 ex (CNBFVR); 14.VI.2004, GN DB PCe MT DW, 1 ex (CNBFVR). Domusnovas (CI), Bega d'Aleni, 621 m, 24.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR). Domusnovas (CI), Gutturu Seu, 140 m, 20.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR). Domusnovas (CI), Lago Siuru, 322 m, PCo MB DB DW, 23.V.2006, 2 ex (CNBFVR); 322 m, 6.VI.2004, GN MT, sn, 2 ex (CNBFVR). Domusnovas (CI), Planargia-Scoveri, 8.VI.2004, DW, 1 ex (CNBFVR). Domusnovas (CI), Planargia-Scoveri, 625 m, 20.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR). Gonnostranadiga (VS), Ovile Linas, 710 m, 22.V.2006, PCo MB DB DW, 1 ex (CNBFVR). Iglesias (CI), Cantoniera Marganai, 491 m, 23.V.2006, PCo MB DB DW, nt, 1 ex (CNBFVR). Iglesias (CI), Conca Margianai, 674 m, 11.VI.2004, GN, 2 ex (CNBFVR). Iglesias (CI), Monti Marganai, Tintillonis, 480 m, 13.VI.2004, GN, sn, 3 ex (CNBFVR). Vallermosa (CA), Cantoniera de s'Acquacotta, 83 m, 19.V.2008, GN PA MB MTr, sn, 8 ex (CNBFVR). Villacidro (VS), Lago di Montimannu, 256 m, 18.V.2008, GN PA MB MTr, sn, 1 ex (CNBFVR). Villacidro (VS), Punta Pranu Ilixis, 563 m, 20.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 375 m, 21.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19–24.V.2006, MB, on *Quercus suber*, 2 ex (CNBFVR).

CHOROLOGY. Turano-Mediterranean (with extension to Pakistan and Macaronesia).

ECOLOGY. Oligotopic (submontane-mediterranean belts).

PHENOLOGY. II–XII.

NOTES. In Sardinia, *T. squalida* is reported to have caused serious damage to vineyards (Ortu et al. 2001) and is the target of pest control operations. No information on this subject exists for *T. paulae*, the endemic species recently described which seems to have a very restricted range. The control procedures against *T. squalida* could affect negatively the conservation of this rare endemic species, a risk that should be evaluated by impact assessment studies.

103. *Oxythyrea funesta* (Poda, 1761)

ICKMAP RECORDS. Capoterra (CA), 50 m, 1987 (ACP). Gonnosfanàdiga (VS), Riu Linas, 700 m, 2006 (CGMD). Ingurtosu (VS), 200 m, 1966 (EAUSS). Isola dei Cavoli (CA), Cao, 1 m, 1989 (Carpaneto et al. 1997). Isola di San Pietro (CI), 10 m (Piras & Pisano 1972). Isola di San Pietro (CI), Cala Lunga, 1 m, 1976 (Carpaneto et al. 1997); 1989 (Carpaneto et al. 1997); 1989 (CGMD). Isola di Sant'Antioco (CI), 10 m (Piras & Pisano 1972); 1957–1958 (EAUSS). Isola di Sant'Antioco (CI), Su Pruni, 10 m, 1988 (Carpaneto et al. 1997). Isola Serpentara (CA), 10 m, 1989 (Carpaneto et al. 1997).

CNBFVR RECORDS. Buggerru (CI), Foce Rio Mannu, on sand dunes, 13.VI.2004, GN DB PCe MT DW, 3 ex (CNBFVR). Domusnovas (CI), Lago Siuru, 322 m, 20–23.V.2006, PCo MB, 2 ex (CNBFVR). Domusnovas (CI), Planargia-Scoveri, 625 m, 20–24.V.2006, MB PCo DB DW, mt, 1 ex (CNBFVR). Domusnovas (CI), Valle Oridda, 592 m, 23.III.2006, PCo, sn, 1 ex (CNBFVR). Iglesias (CI), Cantoniera Marganai, 491 m, 9.VI.2004, GN, sn, 1 ex (CNBFVR). Iglesias (CI), Case Marganai, 725 m, 21.III.2006, PCo, under bark, *Beris* sp., 1 ex (CNBFVR). Iglesias (CI), Monti Marganai, Tintillonis, 480 m, GN, 1 ex (CNBFVR). Vallerrosa (CA), Cantoniera de s'Acquacotta, 83 m, 19.V.2008, GN PA MB MTr, sn, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 390 m, Orto Botanico Corpo Forestale, 24.III.2006, PCo, sn, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19.V.2006, MB DB PCo DW, sn, 1 ex (CNBFVR); 19–24.V.2006, MB, on *Quercus suber*, 25 ex (CNBFVR). Villacidro (VS), rive Rio Cannisoni, 390 m, DB, 1 ex (CNBFVR).

CHOROLOGY. Centralasiatic-European-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. I–VII.

Trichiini Fleming, 1821

104. *Trichius rosaceus* (Voet, 1769) ssp. *zonatus* Germar, 1831

CNBFVR RECORDS. Domusnovas (CI), Grotta di San Giovanni, 325 m, 12.VI.2004, GN, 1 ex (CNBFVR). Gonnosfanàdiga (VS), Monte Idda, road to Monte Linas, 474 m, 22.V.2006, DW MB DB PCo, sn, 1 ex (CNBFVR). Iglesias (CI), dint. colonia Beneck, 636 m, 30.V–13.VI.2006, GC, mt, 1 ex (CNBFVR); 13–27.VI.2006, GC, mt, 1 ex (CNBFVR). Iglesias (CI), Monti Marganai, Tintillonis, 480 m, 13.VI.2004, GN, sn, 1 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, PCo MB DB DW, sn, 1 ex (CNBFVR); 19–24.V.2006, MB, on *Quercus suber*, 1 ex (CNBFVR).

CHOROLOGY. European, with extension to the Maghreb.

ECOLOGY. Oligotopic (montane-submediterranean belts).

PHENOLOGY. V–VI.

NOTES. The populations from Sardinia and the Maghreb are usually referred to the subspecies *zonatus* Germar, 1831; nevertheless, other authors believe that *zonatus* is the valid name for the species and *rosaceus* its synonym (cf. Krell 2011b).

Valgini Mulsant, 1842

105. *Valgus hemipterus* (Linnaeus, 1758)

CNBFVR RECORDS. Domusnovas (CI), Lago Siuru, 322 m, 6.VI.2004, DW, sn, 1 ex (CNBFVR). Domusnovas (CI), Planargia-Scoveri, 8.VI.2004, DW, 2 ex (CNBFVR). Domusnovas (CI), Valle Oridda, 590 m, 12.VI.2004, GN, 1 ex (CNBFVR). Domusnovas (CI), Valle Oridda, pine stand, 595 m, 24.III–24.V.2006, MB PCo DB DW, wt, 2 ex (CNBFVR). Gonnosfanàdiga (VS), Monte Idda, road to Monte Linas, 474 m, 22.V.2006, DW MB DB PCo, sn, 1 ex (CNBFVR). Iglesias (CI), Cantoniera Marganai, 491 m, 9.VI.2004, GN, sn, 3 ex (CNBFVR). Iglesias (CI), Case Marganai, 725 m, 7.VI.2004, GN, on Apiaceae in shaded area, 1 ex (CNBFVR). Iglesias (CI), Case Marganai, 725 m, 13.VI.2004, GN, sn, 3 ex (CNBFVR). Iglesias (CI), Monti Marganai, dint. Reigraxius, 703 m, 7.VI.2004, GN MT, 4 ex (CNBFVR). Iglesias (CI), Monti Marganai, Tintillonis, 480 m, 7.VI.2004, GN, 4 ex (CNBFVR); 9.VI.2004, GN, sn, 7 ex (CNBFVR). Villacidro (VS), Rio Cannisoni, 401 m, 19.V.2006, PCo MB DB DW, sn, 1 ex (CNBFVR).

CHOROLOGY. Turano-Mediterranean.

ECOLOGY. Oligotopic (montane-mediterranean belts).

PHENOLOGY. III–VI, VIII (mainly in April–June).

DISCUSSION

The results of the present research are summarized in tab. 1, where we report the number of species for

each family, subfamily and tribe of lamellicorn beetles (Coleoptera Scarabaeoidea) in southern Sardinia, Sardinia and the whole of Italy. Percent values are given for each taxonomic group with respect to the total number of species occurring in each area (tab. 1). On the whole, southern Sardinia harbours 105 species of lamellicorn beetles, i.e. 82% of the whole island's fauna and 28% of the Italian fauna. Some species the presence of which on the island is ascertained do not figure in this paper because we did not find records from southern Sardinia; probably, at least some of them only occur in the central and northern parts of the island. These are *Aphodius (Euorodalus) paracoenosus* Balthasar & Hrubant, 1960, *A. (Planolinoides) borealis* Gyllenhal, 1827, *Rhyssemus marqueti* Reiche, 1863, *Hemichaetoplia pallidipennis* (Gyllenhal, 1817), *Melolontha sardiniensis* Drumont, Muret, Hager & Penner, 1999, *Pentodon bidens punctatum* (Villers, 1789), and *Eupotosia affinis tyrrhenica* Mikšić, 1957.

Moreover, several species quoted of Sardinia in the old literature have not been observed during all the recent surveys conducted on the island. According to ourselves and to the local entomologists who have explored Sardinia during the last four decades, the old records of these species are due to mislabelled specimens or erroneous identifications (P. Leo and C. Meloni, pers. comm. to G. Carpaneto). For instance, *Dorcus parallelipipedus* (Linnaeus, 1758) was generically quoted by Franciscolo (1997) of Sardinia, but not recorded in the database of Italian Lucanidae prepared for the CKMAP Project by Bartolozzi & Maggini (2007). Probably, the old records are due to confusion with *D. musimon*, a Sardo-Maghrebinian endemic species. Many dung beetle species were generically quoted of Sardinia in the old literature, mainly by Bargagli (1872), whose unreliable records were not confirmed by subsequent surveys. In particular, we refer to the following species, the occurrence of which in Sardinia was never confirmed: *Ceratophyus rossii* Jekel, 1866, *Geotrupes (Stereopyge) douei* Gory, 1841, *Aphodius (Acrossus) luridus* (Fabricius, 1775)¹, *A. (Chilothorax) distinctus* (O.F. Müller, 1776), *A. (C.) paykulli* Bedel, 1907, *A. (Euorodalus) tersus* Erichson, 1848, *A. (Nialus) varians* Duftschmid, 1805, *A. (Nimbus) contaminatus* (Herbst, 1783), *A. (N.) johnsoni* Baraud, 1976, *A. (Phalacrothous) biguttatus* Germar, 1824, *A. (P.) quadrimaculatus* (Linnaeus, 1761), *A. (Plagiogonus) arenarius* (Olivier, 1789) (= *putridus*

(Geoffroy in Fourcroy, 1785)), *A. (Subrinus) vitellinus* Klug, 1845, *Oxyomus sylvestris* (Scopoli, 1763), *Copris lunaris* (Linnaeus, 1758), *Onitis belial* Fabricius, 1798, *O. ion* (Olivier, 1789), *Scarabaeus (Ateuchetus) variolosus* Fabricius, 1787, *Gymnopleurus flagellatus* (Fabricius, 1787), *G. geoffroyi* (Fuessly, 1775), *Euonthophagus amyntas* (Olivier, 1789), *Onthophagus fracticornis* (Preyssler, 1790), *O. furcatus* (Fabricius, 1781), *O. verticicornis* (Laicharting, 1781), *O. coenobita* (Herbst, 1783).

The occurrence of *Aphodius (Melinopterus) prodromus* (Brahm, 1790) in Sardinia has been considered as likely even in the most recent literature, but it was probably confused with *A. (M.) tingens*, a related W-Mediterranean species.

Many species of plant feeders were quoted of Sardinia in the old literature but were not found during recent surveys, i.e. *Aplidia hirticollis* Burmeister, 1855, *A. transversa transversa* (Fabricius, 1801), *Rhizotrogus bellieri* Reiche, 1862, *R. cicatricosus* Mulsant, 1841, *Anoxia scutellaris* Mulsant, 1842, *Mimela junii* (Duftschmid, 1805), *Anomala dubia* (Scopoli, 1763), *Anisoplia tempestiva* Erichson, 1847, and *Homaloplia nicolasi* Baraud, 1965. Nevertheless, these phytophagous beetles can hardly be detected in the field, owing to the short duration of their adult life, rareness or patchy distribution. For this reason, prudence advises us to maintain these species in the Sardinian checklist, even if they are considered doubtful. The lack of recent records concerns also two presumed endemic Sardinian species: *Aplidia attenuata* Reiche, 1862 (species inquirenda, type unknown) and *Amphimallon montanum* zur Strassen, 1954 (described on a single female).

Among the Cetoniinae, *Tropinota hirta* (Poda, 1761) and *Cetonia aurata* (Linnaeus, 1758) should be deleted from the Sardinian checklist, because the previously published records were probably referred to *T. paulae* and *C. carthami*, respectively.

Dung and plant feeders of the study area (tab. 2, figs 3–4) are respectively 57.1% and 40.9% of the southern Sardinian fauna, against 46.8% and 50.5% of the whole Italian fauna (cf. Carpaneto et al. 2007b). These different (almost reversed) percent values may be explained by the traditional land use of the Sardinian territory, which is devoted to pastoral activities and often fire-managed to revive the pastures during the summer. These traditional practices may favour dung beetle assemblages but affect negatively the phytophagous insect communities, mainly where livestock density is higher than the carrying capacity of the grasslands. Numbers and percent values of the whole of Sardinia cannot be used for a comparison

¹ Two specimens of this species from Assémini [(CA)], U. Lostia leg., are preserved in MCSNG (G. Binaghi collection) (Dellacasa 2004), but no further Sardinian record is known.

because of the ten or so phytophagous species the presence of which on the island is still doubtful. Notwithstanding the gaps of knowledge still concerning several phytophagous species, we can infer that the number of scarab beetle species occurring in

Sardinia is lower than in continental areas, whereas the number of endemic species is high: 15 (12.0% of lamellicorn beetles occurring on the island) endemic to Sardinia and 12 others endemic to Corso-Sardinia (tab. 3). On the whole, these endemic species repre-

Tab. 1. Number of species for each family of lamellicorn beetles (and details of the Scarabaeidae taxa) occurring in southern Sardinia, in the whole of Sardinia, and in Italy. Four species introduced in the past and not recaptured in the last decades were excluded from the count of the Italian species: *Omorgus melancholicus* Fähræus, 1857 (Trogidae), *Chiron cylindrus* (Fabricius, 1798) (Chironidae), *Euoniticellus intermedius* (Reiche, 1849) (Scarabaeidae Scarabaeinae) and *Liogenys excisa* (Reitter, 1918) (= *Peritryssus excisus* Reitter, 1918) (Scarabaeidae Melolonthinae). The presence in Sardinia of *Ochodaeus chrysomeloides* (Schrank, 1781) (Ochodaeidae) (cf. Carpaneto & Piattella 1995; Lopez-Colon 2011) is here considered as doubtful since no precise Sardinian record is available in the CKMAP database.

SCARABAEOIDEA	S SARDINIA		SARDINIA		ITALY	
	N	%	N	%	N	%
LUCANIDAE	2	1.9	2	1.6	9	2.4
TROGIDAE	2	1.9	2	1.6	10	2.7
GEOTRUPIDAE	7	6.7	7	5.5	18	4.8
BOLBOCERATIDAE	0	0.0	0	0.0	4	1.1
HYBOSORIDAE	1	0.9	1	0.8	1	0.3
OCHODAEIDAE	0	0.0	1?	0.8	2	0.5
GLAPHYRIDAE	0	0.0	0	0.0	2	0.5
SCARABAEIDAE	93	88.6	115	89.8	328	87.7
TOTAL	105	100.0	128	100.0	374	100.0
APHODIINAE	44	41.9	51	39.8	136	36.4
Aphodiini	33	31.4	38	29.7	108	28.9
Psammodiini	11	10.5	13	10.2	28	7.5
SCARABAEINAE	19	18.1	20	15.6	48	12.8
Coprini	1	1.0	1	0.8	3	0.8
Gymnopleurini	2	1.9	2	1.6	4	1.1
Oniticellini	3	2.9	3	2.3	3	0.8
Onitini	3	2.9	3	2.3	6	1.6
Onthophagini	5	4.8	6	4.7	25	6.7
Scarabaeini	4	3.8	4	3.1	6	1.6
Sisyphini	1	1.0	1	0.8	1	0.3
ORPHNINAE	0	0.0	0	0.0	5	1.3
PACHYPODINAE	2	1.9	2	1.6	3	0.8
MELOLONTHINAE	10	9.5	18	14.1	74	19.8
Hopliini	1	1.0	1	0.8	15	4.0
Melolonthini	1	1.0	3	2.3	12	3.2
Pachydemini	2	1.9	2	1.6	3	0.8
Rhizotrogini	6	5.7	12	9.4	44	11.8
SERICINAE	4	3.8	4	3.1	13	3.5
RUTELINAE	0	0.0	4	3.1	15	4.0
DYNASTINAE	4	3.8	5	3.9	6	1.6
Oryctini	1	1.0	1	0.8	1	0.3
Pentodontini	3	2.9	4	3.1	5	1.3
CETONIINAE	10	9.5	11	8.6	28	7.5
Cetoniini	8	7.6	9	7.0	19	5.1
Trichiini	1	1.0	1	0.8	8	2.1
Valgini	1	1.0	1	0.8	1	0.3

Tab. 2. Number of species and percent values for each trophic group (guilds) in southern Sardinia, in Sardinia and in Italy. Keratophagous = feeding on fibrous structural proteins such as hair, skin, nails, etc.; Coprophagous = mainly feeding on dung; Phytophagous = feeding on vegetable matter such as leaves, flowers, fruits, roots, wood mould, fungi, etc.

SCARABAEOIDEA	S SARDINIA		SARDINIA		ITALY	
	N	%	N	%	N	%
Keratophagous	2	1.9	2	1.6	10	2.7
Trogidae	2	1.9	2	1.6	10	2
Coprophagous	60	57.1	66	51.6	175	46.8
Geotrupidae	7	6.7	7	5.5	18	4
Hybosoridae	1	0.9	1	0.8	1	0
APHODIINAE (Aphodiini)	33	31.4	38	29.7	108	28.9
SCARABAEINAE	19	18.1	20	15.6	48	12.8
Phytophagous	43	40.9	60	46.9	189	50.5
Lucanidae	2	1.9	2	1.6	9	2
Bolboceratidae	0	0.0	0	0.0	4	1
Ochodaecidae	0	0.0	1?	0.8	2	0
Glaphyridae	0	0.0	0	0.0	2	0
APHODIINAE (Psammodiini)	11	10.5	13	10.1	28	7
ORPHNINAE	0	0.0	0	0.0	5	1
PACHYPODINAE	2	1.9	2	1.6	3	0
MELOLONTHINAE	10	9.5	18	14.1	74	19
SERICINAE	4	3.8	4	3.1	13	3
RUTELINAE	0	0.0	4	3.1	15	4
DYNASTINAE	4	3.8	5	3.9	6	1
CETONIINAE	10	9.5	11	8.6	28	7
TOTAL	105	100.0	128	100.0	374	100.0

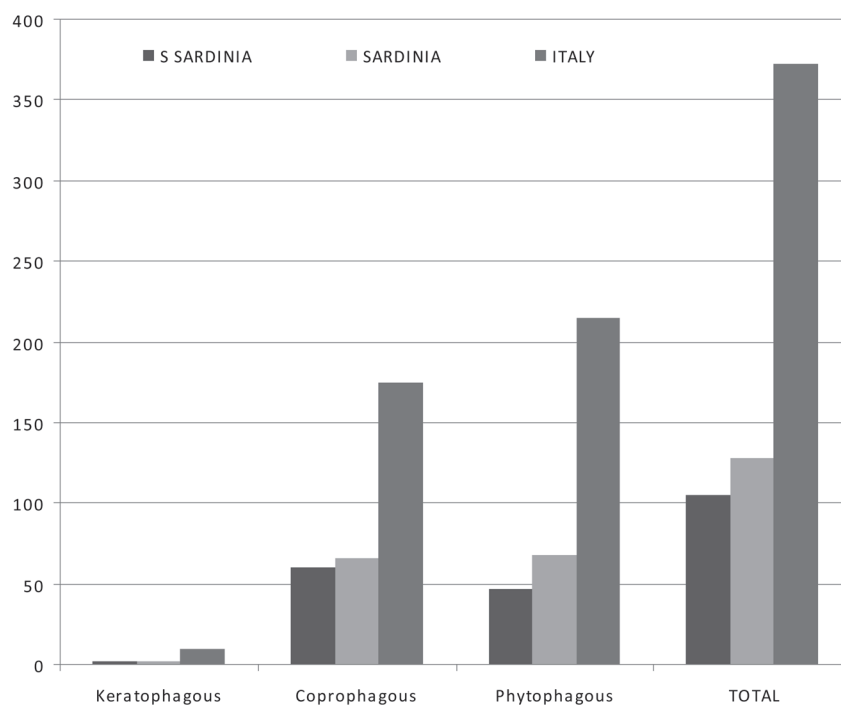


Fig. 3. Number of species for each trophic group (guilds) in southern Sardinia, Sardinia and Italy. Keratophagous = feeding on fibrous structural proteins such as hair, skin, nails, etc.; Coprophagous = mainly feeding on dung; Phytophagous = feeding on vegetable matter such as leaves, flowers, fruits, roots, wood mould, fungi, etc.

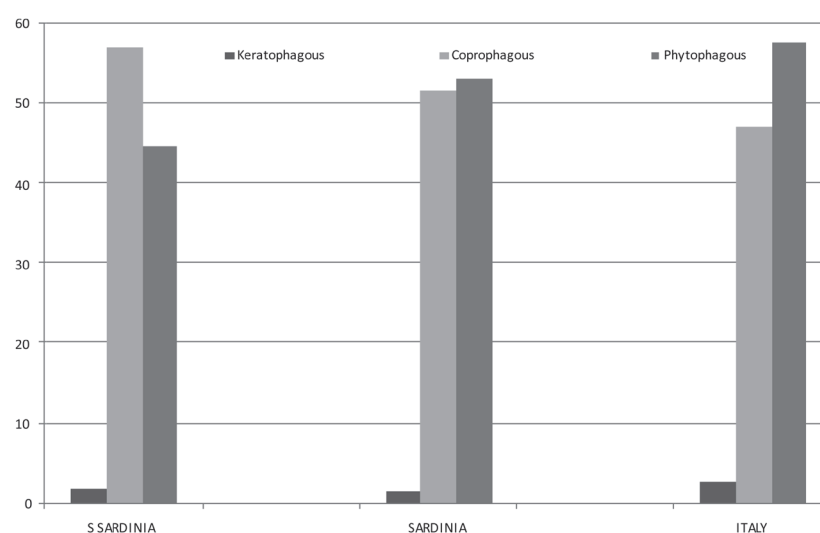


Fig. 4. Percent values for each trophic group (guilds) in southern Sardinia, Sardinia and Italy. Keratophagous = feeding on fibrous structural proteins such as hair, skin, nails, etc.; Coprophagous = mainly feeding on dung; Phytophagous = feeding on vegetable matter such as leaves, flowers, fruits, roots, wood mould, fungi, etc.

Tab. 3. Tyrrhenian endemic species known from Sardinia and their distribution.

Endemic species	Sardinia	Corsica	Other areas / Notes
<i>Trox cribrum</i> Gené, 1836	X	X	
<i>Trox nodulosus</i> Harold, 1872	X	X	
<i>Chelotrupes hioistius</i> (Gené, 1836)	X		
<i>Chelotrupes matutinalis</i> (Baudi di Selve, 1870)	X		
<i>Thorectes (Jekelius) sardous</i> Erichson, 1847	X	X	
<i>Thorectes (Baraudia) geminatus</i> (Gené, 1839)	X	X	Probably introduced to S France and Menorca
<i>Aphodius (Anomius) crovettii</i> Dellacasa, 1983	X		
<i>Aphodius (Nimbus) franzinii</i> Pittino, 1978	X	X	
<i>Rhyssemus sardous</i> Pierotti, 1980	X	X	
<i>Pachypus melonii</i> Sparacio, 2008	X		
<i>Triodontella alni</i> (Blanchard, 1850)	X		
<i>Triodontella mimula</i> Leo & Fancello, 2007	X		
<i>Triodontella raymondi</i> (Perris, 1869)	X		
<i>Triodontella sardoa</i> (Baraud, 1962)	X		
<i>Hoplia (Hoplia) pubicollis</i> Küster, 1849	X	X	
<i>Aplidia attenuata</i> Reiche, 1862	X		Species inquirenda
<i>Firminus bellieri</i> (Reiche, 1862)	X	X	No detailed records in Sardinia
<i>Firminus fossulatus</i> (Mulsant & Rey, 1859)	X	X	
<i>Geotrogus genei</i> (Blanchard, 1851)	X	X	Also in Capraia Island (Tuscan Archipelago)
<i>Amadotrogus vicinus</i> (Mulsant, 1842) (= <i>Amadotrogus rugifrons</i> (Burmeister, 1885))	X	X	Also in S France (taxon under evaluation: <i>A. rugifrons</i> may be a valid species of Corsica and Sardinia)
<i>Amphimallon montanum</i> zur Strassen, 1954	X		
<i>Melolontha sardiniensis</i> Drumont, Muret, Hager & Penner, 1999	X		
<i>Elaphocera emarginata</i> (Gyllenhal, 1817)	X		
<i>Elaphocera erichsoni</i> Jacquelin du Val, 1860	X		
<i>Calicnemis sardiniensis</i> Leo, 1985	X		
<i>Tropinota (Epicometis) paulae</i> Leo, 2010	X		
<i>Protaetia (Netocia) sardea</i> (Gory & Percheron, 1833)	X	X	

sent 7.2% of the Italian lamellicorn beetles. Among the Sardinian endemic species only 3 are coprophagous, all the others are plant feeders. The low number of scarab beetle species (especially plant eaters) on the island compared to mainland Italy may be explained by the geographic isolation of Sardinia from the continent but could also be a consequence of recent extinction events having followed the anthropogenic alteration of the habitat through deforestation, fire management and overgrazing.

The conservation of biodiversity in lamellicorn beetles may depend upon a right balance between the number of grazing animals and soil surface. A too high pressure in terms of livestock density will cause the degradation of plant cover and the extinction of plant-eaters. On the other hand, the abandonment of pastoralism will undoubtedly cause the extinction of dung-eaters after a short period of time. Over a long temporal scale, however, the shortage of free ranging livestock will produce a strong reduction of open areas (e.g. clearings and pastures), affecting also the

populations of plant-eaters which feed on flowers and herbs, and cannot live in closed forest ecosystems.

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