

Terrestrial mammals of the satellite islands of Sardinia (Italy)

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ABSTRACT

The mammalian fauna of the satellite islands and islets of Sardinia (Italy) is still imperfectly known. Only few data are available for some of them, while several others are still almost regarded as terra incognita. Complete information on the extant non-volant terrestrial mammals is available only for Asinara, Tavolara, and Molara, whereas historical and present data are available on the mammals of San Pietro. Further information on the non-flying taxa occasionally appears in specialised literature. At present, 15 species occur in the circum-Sardinian archipelagos. Only 6 of them, however, have been reported from the largest island, San Pietro, whereas the smaller Asinara hosts at least 13 species, excluding local domestic breeds such as the dwarf donkey. Data on the distribution of chiropters have been provided by a few studies carried out over time. Of the 21 species of bats found in Sardinia, at least 11 were recorded from the small islands.

KEY WORDS

Non-volant terrestrial mammals; bats.

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INTRODUCTION

The mammalian fauna of the satellite islands and islets of Sardinia (Italy) is still imperfectly known.

Only few data are available for some species, while several others are still almost regarded as “*terra incognita*”. Complete information on the extant non-volant terrestrial mammals is available only for Asinara (Torre & Monbailliu, 1993; Cossu et al., 1994), Tavolara (Ranzi, 1971; Trainito, 2008), and Molara (Sposimo et al., 2012), whereas Zava et al. (1995) make available historical and present data on the mammals of San Pietro.

Further information on the non-flying taxa occasionally appears in specialised literature.

DISCUSSION

At present, 15 species occur in the circum-Sardinian archipelagos. Only 6 of them, however, have been reported from the largest island, San Pietro, whereas the smaller Asinara hosts at least 13 species, excluding the local dwarf donkey domestic breed. The only species which appears to be more widespread is the black rat, *Rattus rattus* (Linnaeus, 1758), occurring almost everywhere, a part from the islets of Spargiotto, Barrettini, and Foradada (Capo Caccia) (Martin et al., 2000).

The brown rat, *Rattus norvegicus* (Berkenhout, 1769), has been instead reported only from Asinara (Sarà, 1998) and Tavolara (Capizzi & Santini, 1999e, 2002e; Trainito, 2008, 2011). Recent surveys, however, did not confirm the occurrence of

this species on the latter island (Paolo Sposimo, 2014 pers. com.). The garden dormouse, *Eliomys quercinus* (Linnaeus, 1766) (Fig. 1), the wood mouse, *Apodemus sylvaticus* (Linnaeus, 1758), and the weasel, *Mustela nivalis* Linnaeus, 1766 (Fig. 2), are present on Asinara.

Another carnivore, the fox, *Vulpes vulpes* (Linnaeus, 1758), has been reported from Isola dei Cavoli where it was introduced after 1995 to prevent the damages produced by the rats, although its presence was defined by Scrugli & Cogoni (1995) “as only occasionally verifiable”. Observations of this carnivore are also available for San Pietro (Zava et al., 1995). The western European hedgehog, *Erinaceus europaeus* Linnaeus, 1758, occurs on Asinara (Torre & Monbailliu, 1993; Cossu et al., 1994; Amori & Masseti, 1996), San Pietro (Zava et al., 1996), and Caprera (Cossu et al., 1994). The North African white-toothed shrew or Pantellerian shrew, *Crocidura pachyura* (Küster, 1835) inhabits Asinara (Amori & Masseti, 1996; Torre & Monbailliu, 1993), and Caprera (Amori & Masseti, 1996; Thibault et al., 1988), whereas the pygmy white-toothed shrew, *Suncus etruscus* (Savi, 1822) has been only certainly reported from Asinara (Torre & Monbailliu, 1993; Amori & Masseti, 1996; Contoli & Amori, 2008). On Tavolara, data on the presence of the latter species are only known from the first half of 1970s (Ranzi, 1971; Pratesi & Tassi, 1973). Together with the house mouse, *Mus musculus* Linnaeus, 1758, dispersed on Asinara (Torre & Monbailliu, 1993; Amori & Masseti, 1996; Capizzi & Santini, 1999c, 2002c), Tavolara (Baccetti et al.,

2009; Sposimo et al., 2012; Ragionieri et al., 2013), Isola Piana, Isola dei Cavalli, Proratora, Reulino or Isolotto rosso (present work), the rabbit, *Oryctolagus cuniculus* (Linnaeus, 1758), is one of the most widespread species and occurs on Isola Piana (off Tavolara) (Trainito, 2008; Trainito & Navone, 2011), San Pietro (Cetti, 1774; Vallebona, 1974; Racheli, 1981; Zava et al., 1996), Caprera, Santa Maria, Razzoli, Spargiotto, Spargi, Mal di Ventre, Vacca, Toro, and Isola Rossa (Spagnesi, 1999b and 2002b). Pratesi & Tassi (1971, 1973) noted that the latter species was also reported from Tavolara, but it is no more present. According instead to Segala (1991) and Spagnesi (1999a and 2002a), the brown hare, *Lepus europaeus* Pallas, 1778, occurs on Asinara; Spagnesi (1999a, 2002a) reported the occurrence of this species from Maddalena and San Pietro, too.

The situation of the ungulates is rather different and only three species of this taxonomic group are presently known for the satellite islands of Sardinia. Ancient populations of wild goats, *Capra aegagrus* Erxleben, 1777, are traditionally reported from Asinara (Toschi, 1953; De Beaux, 1955; Couturier, 1959; Massoli Novelli, 2003; Masseti, 2008, 2009, 2014) (Fig. 3) and Tavolara (Cetti, 1774; Valery, 1837; McGrigor, 1866; Toschi, 1953; Couturier, 1959; Masseti, 2008, 2009, 2014). Nowadays, their occurrence on both islands appears seriously compromised, and no individual of the original population still remains on Tavolara, where domestic goats were introduced by man. Most of the human population of Tavolara was displaced in 1962 when a



Figure 1. The garden dormouse, *Eliomys quercinus* (Linnaeus, 1766), is among the non-volant mammals present on Asinara (photo by Roberto Meloni).



Figure 2. The weasel, *Mustela nivalis* Linnaeus, 1766, is the sole carnivore which occurs on Asinara (photo by Riccardo Romanelli).

NATO radiogoniometric station was constructed on the eastern half of the island. As a result of this, the animals escaped from their guardians' control giving origin to a new population, the descendants of which have survived up to the present. According to Ruiu & Trainito (1999), Tavolara represents the territory in which the Sardinian subadults of golden eagle, *Aquila chrysaetos* (Linnaeus, 1758), coming in particular from the hills of Gallura and Monte Nieddu, spend their first winter to practice hunting techniques: "They mostly look for goats. First hair kids, to claw on the fly to avoid the furious defense of adult" individuals of the new population of feral goats today available on the small island. According to Couturier (1959), the original wild goats of Tavolara were instead the same as the goats of the northern Tyrrhenian island of Montecristo. They were characterised by morphological patterns which fall within the phenotype of *Capra aegagrus dorcas* Reichenow, 1888, typical of the island of Youra, in the Northern Sporades archipelago (Western Aegean Sea, Greece) (Masseti, 2009). A few original wild goats of Tavolara were collected before their extinction in the wild, and were bred in a free-ranging state until recently in the Ogliastra bush, within the perimeter of the Gulf of Orosei and Gennargentu National Park, where they returned to the wild after their abandonment by the shepherds (Fig. 4). They survived in the new territories of distribution at least up to the end of the first decade of 2000s. It seems that these goats were brought from Tavolara over 120 years ago, in the second half of the 800s.

Mouflons, *Ovis orientalis* (Gmelin, 1774), are only present on Asinara (Torre & Monbailliu, 1993; Massoli Novelli, 2003), and Figarolo (Pratesi & Tassi, 1973; Ruiu, 1993; Bocchieri & Satta, 1999; Trainito, 2008; Trainito & Navone, 2011) (Fig. 5). The stock of Asinara was introduced from the Natural Reserve of Capo Figari and the islet of Figarolo in 1952. Wild boars, *Sus scrofa* Linnaeus, 1758, occur permanently only on five islands: Asinara (Torre & Monbailliu, 1993; Pedrotti & Toso, 1999, 2002; Massoli Novelli, 2003), Spargi (Racheli; Pedrotti & Toso, 1999, 2002), Caprera (Pedrotti & Toso, 1999, 2002), Maddalena (Pedrotti & Toso, 2002) and Sant'Antioco, but they have been also reported swimming from Asinara to the near Isola Piana (Bazzoni, 2013). Modern scientific investigation considers wild boars as quite



Figure 3. Trophy of an adult male captured on the small island of Asinara in 1897, and preserved in the collection of the Museum of Natural History of the University of Florence Zoological Section (MZUF no. coll. 11943) (photo by Saulo Bambi, courtesy Zoological Museum "La Specola" of the University of Florence).

competent swimmers, although they cannot survive a crossing of more than a few miles of open sea. In fact, they have been often reported swimming across the narrow marine straits separating the islets from the continental shores of the Mediterranean (Masseti, 2007, 2012). All the wild boars have been introduced on the satellite islands of Sardinia for hunting purposes in rather recent times. Regarding the ungulate domestic breeds, Sardinia has always been considered the stronghold of donkeys. Nowadays, however, these equids are no longer as widespread as they were in the past. In a still recent past, they demonstrated a substantial variation in size, ranging from normal dimensions to those typical of the Mediterranean dwarf varieties (cf. Masseti, 2012), like the donkeys that are still reared on the island of Asinara (see Pinna et al., 1990; Pinna et al., 1993; Cossu et al., 1994) (Fig. 6).

Data on the distribution of chiropters on the satellite islands of Sardinia have been provided by Zava & Violani (1992), Grafitti & Mucedda (1995), Zava et al. (1995), Fornasari et al. (1997), Mocchi Demartis & Secci (1997), Skiba (2009), Winter et

al. (2015). Very recently, Mucedda et al. (2016) published an important overview of the bats of La Maddalena, Caprera, Santo Stefano, Spargi, Budelli, Santa Maria, Tavolara, Molara, Figarolo, Asinara, Isola Piana (off Asinara), San Pietro, Sant'Antioco, Serpentara and Isola dei Cavoli. Of the 21 species of bats found in Sardinia, at least 11 were recorded from the satellite islands. The species most widespread is the common pipistrelle, *Pipistrellus pipistrellus* (Schreber, 1774), which is present on 15 islands, followed by the European free-tailed bat, *Tadarida teniotis* (Rafinesque, 1814) (Fig. 7), on 12 islands. The Savi's pipistrelle, *Hypusugo savii* (Bonaparte, 1837), and the Kuhl's pipistrelle, *Pipistrellus kuhlii* (Kuhl, 1817) are instead reported from nine islands. The rarest species is the

Daubenton's bat, *Myotis daubentonii* (Kuhl, 1817), which has been observed only on Asinara. No individual of the endemic Sardinian long-eared bat, *Plecotus sardus* Mucedda, Kiefer, Pidinchedda and Veith, 2001, has been recorded from any of the islets, being its distribution limited to a few wooded areas of central and central-eastern Sardinia. Mucedda et al. (2016) are also of the opinion that the lesser mouse-eared bat, *Myotis blythi* (Tomes, 1857), has been erroneously reported from San Pietro by Zava & Violani (1992), since the only two species of the genus *Myotis* occurring in Sardinia are the long-fingered bat, *M. capaccini* (Bonaparte, 1837) - reported by Capizzi & Santini (1999d, 2002d) from La Maddalena, and Mucedda et al. (2016) from San Pietro - and the Maghreb



Figure 4. Original wild goats of Tavolara, before their extinction in the wild, were bred in a free-ranging state until recently in the Ogliastra bush, Gulf of Orosei and Gennargentu NP.



Figure 5. Introduced populations of mouflons, *Ovis orientalis* (Gmelin, 1774), are present today on Asinara and Figarolo (photo by Marco Masseti).



Figure 6. A small race of donkey is still bred on the island of Asinara, off the northwestern coast of Sardinia (photo by Marco Masseti).



Figure 7. Portrait of an adult European free-tailed bat, *Tadarida teniotis* (Rafinesque, 1814) (photo by Bruno Zava).

island	species	references
Razzoli	<i>Oryctolagus cuniculus</i> ¹ ; <i>Rattus rattus</i> ²⁻³ ;	¹ Spagnesi, 1999b, 2002b; ² Capizzi & Santini, 1999d, 2002d; ³ Martin <i>et al.</i> , 2000;
Budelli	<i>Pipistrellus pipistrellus</i> ^{1,3} ; <i>Tadarida teniotis</i> ³ ; <i>Rattus rattus</i> ² ;	¹ Mucedda <i>et al.</i> , 2015; ² Martin <i>et al.</i> , 2000; ³ Mucedda <i>et al.</i> , 2015;
Spargiotto	<i>Oryctolagus cuniculus</i> ¹ ;	¹ Spagnesi, 1999b, 2002b;
Spargi	<i>Pipistrellus pipistrellus</i> ^{7,8} ; <i>Pipistrellus pygmaeus</i> ⁸ ; <i>Miniopterus schreibersi</i> ⁸ ; <i>Hypsugo savii</i> ⁸ ; <i>Tadarida teniotis</i> ⁸ ; <i>Oryctolagus cuniculus</i> ¹ ; <i>Sus scrofa</i> ^{2,3,4} ; <i>Rattus rattus</i> ^{5,6} ;	¹ Spagnesi, 1999b, 2002b; ² Racheli; ³ Pedrotti & Toso, 1999; ⁴ Pedrotti & Toso, 2002; ⁵ Capizzi & Santini, 1999d, 2002d; ⁶ Martin <i>et al.</i> , 2000; ⁷ Mucedda <i>et al.</i> , 2015; ⁸ Mucedda <i>et al.</i> , 2015
Santa Maria	<i>Oryctolagus cuniculus</i> ¹ ; <i>Pipistrellus pipistrellus</i> ^{2,4} ; <i>Rattus rattus</i> ³ ;	¹ Spagnesi, 1999b, 2002b; ² Mucedda <i>et al.</i> , 2015; ³ Martin <i>et al.</i> , 2000; ⁴ Mucedda <i>et al.</i> , 2016;
La Maddalena	<i>Rhinolophus ferrumequinum</i> ⁸ ; <i>Pipistrellus pipistrellus</i> ^{1,8} ; <i>Pipistrellus kuhlii</i> ^{1,4,7,8} ; <i>Pipistrellus pygmaeus</i> ⁸ ; <i>Myotis capaccini</i> ⁸ ; <i>Hypsugo savii</i> ⁸ ; <i>Tadarida teniotis</i> ⁸ ; <i>Lepus capensis</i> ³ ; <i>Sus scrofa</i> ⁵ ; <i>Rattus rattus</i> ⁶ ;	¹ Mucedda <i>et al.</i> , 2015; ² CK map recorded in 1987; ³ Spagnesi, 1999a, 2002a; ⁴ MZUF-13036; ⁵ Pedrotti & Toso, 2002; ⁶ Capizzi & Santini, 1999d, 2002d; ⁷ Zava <i>et al.</i> (1996); ⁸ Mucedda <i>et al.</i> , 2016;
Santo Stefano	<i>Rhinolophus ferrumequinum</i> ² ; <i>Pipistrellus pipistrellus</i> ^{1,2} ; <i>Hypsugo savii</i> ² ; <i>Tadarida teniotis</i> ²	¹ Mucedda <i>et al.</i> , 2015; ² Mucedda <i>et al.</i> , 2015;
Caprera	<i>Rhinolophus ferrumequinum</i> ⁸ ; <i>Rhinolophus hipposideros</i> ⁸ ; <i>Pipistrellus pipistrellus</i> ^{7,8} ; <i>Pipistrellus kuhlii</i> ⁸ ; <i>Pipistrellus pygmaeus</i> ⁸ ; <i>Myotis capaccini</i> ⁸ ; <i>Hypsugo savii</i> ⁸ ; <i>Tadarida teniotis</i> ⁸ ; <i>Erinaceus europaeus</i> ¹ ; <i>Crocodyrus pachyura</i> ^{2,3} ; <i>Oryctolagus cuniculus</i> ⁴ ; <i>Sus scrofa</i> ^{5,6} ;	¹ Cossu <i>et al.</i> , 1994; ² Amori & Masseti, 1996; ³ Thibault <i>et al.</i> , 1988; ⁴ Spagnesi, 1999b, 2002b; ⁵ Pedrotti & Toso, 1999; ⁶ Pedrotti & Toso, 2002; ⁷ Mucedda <i>et al.</i> , 2015; ⁸ Mucedda <i>et al.</i> , 2016;
Figarolo	<i>Pipistrellus pipistrellus</i> ^{1,7} ; <i>Pipistrellus kuhlii</i> ⁷ ; <i>Hypsugo savii</i> ⁷ ; <i>Tadarida teniotis</i> ⁷ ; <i>Ovis orientalis</i> ^{2,3,4,5,6} ;	¹ Mucedda <i>et al.</i> , 2015; ² Pratesi & Tassi, 1973; ³ Ruiu, 1993; ⁴ Bocchieri & Satta, 1999; ⁵ Trainito, 2008; ⁶ Trainito & Navone, 2011; ⁷ Mucedda <i>et al.</i> , 2016;
Tavolara	<i>Suncus etruscus</i> ¹ ; <i>Rhinolophus ferrumequinum</i> ^{2,20} ; <i>Pipistrellus pipistrellus</i> ^{6,20} ; <i>Pipistrellus kuhlii</i> ²⁰ ; <i>Miniopterus schreibersi</i> ^{1,3,4,20} ; <i>Hypsugo savii</i> ²⁰ ; <i>Myotis sp.</i> ²⁰ ; <i>Eptesicus serotinus</i> ²⁰ ; <i>Tadarida teniotis</i> ^{4,17,20} ; † <i>Oryctolagus cuniculus</i> ⁵ ; <i>Capra aegagrus</i> ^{6,7,8,9,10,11,12} ; <i>Rattus norvegicus</i> ^{13,14,15} ; <i>Rattus rattus</i> ^{14,15,16} ; <i>Mus musculus</i> ^{17,18,19} ;	¹ Ranzi, 1971; ² Graffiti & Mucedda, 1995; ³ Lanza & Agnelli, 1999a, 2002a; ⁴ Lanza & Agnelli, 1999b, 2002b; ⁵ Navone, 2014; ⁶ Pratesi & Tassi, 1971,1973; ⁷ Mucedda <i>et al.</i> , 2015; ⁸ Cetti, 1774; ⁹ Valery, 1837; ¹⁰ McGrigor, 1866; ¹¹ Toschi, 1953; ¹² De Beaux, 1955; ¹³ Couturier, 1959; ¹⁴ Masetti, 2002a, 2003a, 2008, 2009, and 2014; ¹⁵ Capizzi & Santini, 1999e, 2002e; ¹⁶ Sarà, 1998; ¹⁷ Trainito, 2008; ¹⁸ Trainito & Navone, 2011; ¹⁹ Capizzi & Santini, 1999d, 2002d; ²⁰ Paolo Agnelli, <i>in verbis</i> 2016; ¹ Baccetti <i>et al.</i> , 2009; ¹⁸ Sposimo <i>et al.</i> , 2012; ¹⁹ Ragionieri <i>et al.</i> , 2013; ²⁰ Mucedda <i>et al.</i> , 2016;
Isola Piana off Tavolara	<i>Pipistrellus pipistrellus</i> ^{1,4} ; <i>Pipistrellus kuhlii</i> ⁴ ; † <i>Oryctolagus cuniculus</i> ² ; <i>Rattus rattus</i> ³ ; <i>Mus musculus</i> ³ ;	¹ Mucedda <i>et al.</i> , 2015; ² Trainito, 2008; ³ Trainito & Navone, 2011; ⁴ Paolo Sposimo, <i>in litteris</i> 2014; ⁵ Mucedda <i>et al.</i> , 2016;
Isola dei Cavalli	<i>Rattus rattus</i> ¹ ; <i>Mus musculus</i> ¹ ;	¹ Paolo Sposimo, <i>in litteris</i> 2014;
Proratora	<i>Rattus rattus</i> ¹ ; <i>Mus musculus</i> ¹ ;	¹ Paolo Sposimo, <i>in litteris</i> 2014;
Reuloino or Isolotto Rosso	<i>Mus musculus</i> ¹ ;	¹ Paolo Sposimo, <i>in litteris</i> 2014;
Molarotto	† <i>Rattus rattus</i> ¹ ;	¹ Paolo Sposimo, <i>in litteris</i> 2014;
Molara	† <i>Oryctolagus cuniculus</i> ² ; <i>Pipistrellus pipistrellus</i> ^{1,5} ; <i>Hypsugo savii</i> ⁵ ; <i>Tadarida teniotis</i> ⁰⁵ ; <i>Rattus rattus</i> ^{3,4} ;	¹ Mucedda <i>et al.</i> , 2015; ² Dario Capizzi, <i>in litteris</i> 2014; ³ Ranzi, 1971; ⁴ Navone, 2014; ⁵ Mucedda <i>et al.</i> , 2016;
Serpentara	<i>Pipistrellus pipistrellus</i> ^{1,3} ; <i>Tadarida teniotis</i> ³ ; <i>Rattus rattus</i> ² ;	¹ Mucedda <i>et al.</i> , 2015; ² Capizzi & Santini, 1999d, 2002d;
Isola dei Cavoli	<i>Pipistrellus pipistrellus</i> ^{1,3} ; <i>Pipistrellus kuhlii</i> ³ ; <i>Vulpes vulpes</i> ² ; <i>Rattus rattus</i> ²	¹ Mucedda <i>et al.</i> , 2015; ² Scrugli & Cogoni, 1995; ³ Mucedda <i>et al.</i> , 2015;
Isola Rossa	<i>Oryctolagus cuniculus</i> ¹ ;	¹ Spagnesi, 1999b, 2002b;
Vacca	<i>Oryctolagus cuniculus</i> ¹ ; <i>Rattus rattus</i> ² ;	¹ Spagnesi, 1999b, 2002b; ² Capizzi & Santini, 1999d, 2002d;
Toro	<i>Oryctolagus cuniculus</i> ¹ ;	¹ Spagnesi, 1999b, 2002b;

Table 1/1. Terrestrial mammals of the satellite islands of Sardinia. MZUF: Museo di Zoologia “La Specola” dell’Università di Firenze; MCSNM: Museo Civico di Storia naturale di Milano.

island	species	references
Sant'Antioco	<i>Pipistrellus pipistrellus</i> ¹ ; <i>Myotis punicus</i> ^{2,3,4,5} ; <i>Sus scrofa</i> ^{6 C} ;	¹ Mucedda <i>et al.</i> , 2015; ² MSNM 722; ³ Zava & Violani (1992); ⁴ Mucedda <i>et al.</i> 2016; ⁵ Zava <i>et al.</i> (1996); ⁶ present work;
Isolotto di Cala Vinagra	<i>Tadarida teniotis</i> ¹ ;	¹ Fomasari <i>et al.</i> , 1997;
San Pietro	<i>Erinaceus europaeus</i> ¹ <i>Crocidura pachyura</i> ² ; <i>Rhinolophus hipposideros</i> ^{1,3,4,10,12} ; <i>Myotis capaccini</i> ¹² ; <i>Myotis punicus</i> ^{1,10,13} ; <i>Pipistrellus pipistrellus</i> ^{1,3,5,6,10,11,12} ; <i>Pipistrellus kuhli</i> ^{1,3,10,12} ; <i>Tadarida teniotis</i> ^{1,3,6,10,12} ; <i>Lepus capensis</i> ⁷ ; <i>Oryctolagus cuniculus</i> ^{1,8} ; † <i>Vulpes vulpes</i> ? ¹ ; <i>Rattus rattus</i> ^{1,9} ;	¹ Zava <i>et al.</i> , 1996 ^E ; ² Sarà, 2008; ³ Fomasari <i>et al.</i> , 1997; ⁴ Lanza & Agnelli, 1999c, 2002c; ⁵ Mocci Demartis & Secci, 1997; ⁶ Lanza & Agnelli, 1999d, 2002d; ⁷ Mocci Demartis & Secci, 1997; ⁸ Lanza & Agnelli, 1999e, 2002c; ⁹ Spagnesi, 1999a, 2002a; ¹⁰ Cetti, 1774; ¹¹ Vallebona, 1974; ¹² Racheli, 1981; ¹³ Capizzi & Santini, 1999d, 2002d; ¹⁴ Zava & Violani, 1992; ¹⁵ Mucedda <i>et al.</i> , 2015; ¹⁶ Mucedda <i>et al.</i> , 2016; ¹⁷ Skiba, 2009;
Mal di Ventre	<i>Oryctolagus cuniculus</i> ¹ ; <i>Rattus rattus</i> ² ; <i>Mus musculus</i> ^{2,3} ;	¹ Spagnesi, 1999b, 2002b; ² Capizzi & Santini, 1999c, 2002c; ³ Andreotti <i>et al.</i> , 2001;
Foradada		
Isola Piana, off Asinara	<i>Rattus rattus</i> ¹ ; <i>Sus scrofa</i> ² ;	¹ Martin <i>et al.</i> , 2000; ² Bazzoni, 2013;
Asinara	<i>Erinaceus europaeus</i> ¹ ; <i>Suncus etruscus</i> ^{1,2,3,4} ; <i>Crocidura pachyura</i> ^{1,3} ; <i>Lepus capensis</i> ^{5,6} ; <i>Rhinolophus hipposideros</i> ^{25,30 B} ; <i>Rhinolophus ferrumequinum</i> ^{29,30} ; <i>Myotis daubentoni</i> ³⁰ ; <i>Miniopterus schreibersi</i> ³⁰ ; <i>Pipistrellus pipistrellus</i> ^{28,30} ; <i>Pipistrellus kuhli</i> ³⁰ ; <i>Pipistrellus pygmaeus</i> ³⁰ ; <i>Hypsugo savii</i> ³⁰ ; <i>Eptesicus serotinus</i> ³⁰ ; <i>Nyctalus leisleri</i> ³⁰ ; <i>Tadarida teniotis</i> ³⁰ ; <i>Mustela nivalis</i> ^{1,3,7,9} ; <i>Equus africanus</i> ^{10,11,12,13} ; <i>Sus scrofa</i> ^{1,14,15,16} ; <i>Capra aegagrus</i> ^{17,18,19,20,21} ; <i>Ovis orientalis</i> ^{1,13} ; <i>Apodemus sylvaticus</i> ^{3,22} ; <i>Rattus norvegicus</i> ^{3,23,24} ; <i>Rattus rattus</i> ²⁶ ; <i>Mus musculus</i> ^{1,3,26} ; <i>Eliomys quercinus</i> ^{1,3,27} ;	¹ Torre & Monbailliu, 1993; ² Pratesi & Tassi, 1973; ³ Amori & Masseti, 1996; ⁴ Contoli & Amori, 2008; ⁵ Segala, 1991; ⁶ Spagnesi, 1999a, 2002a; ⁷ Cossu <i>et al.</i> , 1994; ⁸ Masetti, 1995; ⁹ De Marinis & Masseti, 2003; ¹⁰ Cherchi Paba, 1974; ¹¹ Casu <i>et al.</i> , 1989; ¹² Pinna <i>et al.</i> , 1990, and Pinna <i>et al.</i> , 1993; ¹³ Massoli Novelli, 2003; ¹⁴ Torre & Monbailliu, 1993; ¹⁵ Pedrotti & Tosso, 1999; ¹⁶ Pedrotti & Tosso, 2002; ¹⁷ Massoli Novelli, 2003; ¹⁸ De Beaux, 1955; ¹⁹ Masetti, 2008, 2009, 2014; ²⁰ De Beaux, 1955; ²¹ Couturier, 1959; ²² Masetti, 2002a, 2003a, 2008, 2009, and 2014; ²³ Capizzi & Santini, 1999a, 2002a; ²⁴ Sarà, 1998; ²⁵ Capizzi & Santini, 1999e, 2002e; ²⁶ Winter <i>et al.</i> , 2015; ²⁷ Capizzi & Santini, 1999c, 2002c; ²⁸ Capizzi & Santini, 1999b, 2002b; ²⁹ Mucedda <i>et al.</i> , 2015; ³⁰ Bardi <i>et al.</i> , 2014; ³¹ Mucedda <i>et al.</i> , 2016;

Table 1/2. Terrestrial mammals of the satellite islands of Sardinia. MZUF: Museo di Zoologia “La Specola” dell’Università di Firenze; MCSNM: Museo Civico di Storia naturale di Milano.

mouse-eared bat, *M. punicus* Felten, Spitzenberger et Storch, 1977, recorded by Skiba (2009) from Sant’Antioco.

CONCLUSIONS

According to the data collected in the present study the terrestrial mammalian fauna of the circum-Sardinian islands amounts to 28 species, including 13 bats (*Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*, *Myotis capaccini*, *Myotis daubentoni*, *Myotis punicus*, *Pipistrellus pipistrellus*, *Pipistrellus kuhli*, *Pipistrellus pygmaeus*, *Miniopterus schreibersi*, *Hypsugo savii*, *Eptesicus serotinus*, *Nyctalus leisleri*, and *Tadarida teniotis*) and 15 non-volant mammals (*Erinaceus europaeus*, *Crocidura pachyura*, *Suncus etruscus*, *Lepus*

capensis, *Oryctolagus cuniculus*, *Vulpes vulpes*, *Mustela nivalis*, *Sus scrofa*, *Capra aegagrus*, *Ovis orientalis*, *Apodemus sylvaticus*, *Rattus norvegicus*, *Rattus rattus*, *Mus musculus*, and *Eliomys quercinus*) (Table 1). Today, a part from the bats, the faunistic horizons of all these islands are no more characterised by endemic Pleistocene species. The exclusive present occurrence of non-volant continental mammals on the satellite islands of Sardinia seems to be linked essentially to the introduction by man during the Holocene.

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