

A possible approach to the “conservation” of the mammalian populations of ancient anthropochorous origin of the Mediterranean islands

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A b s t r a c t. Among the extant non-flying terrestrial mammals of the Mediterranean islands, we can find very few of the endemic elements that characterised the late Quaternary faunas. Instead, the existing faunas are almost exclusively dominated by continental taxa, as a rule regionally specific, related to species on the nearest mainland, and whose presence on the islands appears to be essentially related to human intervention. The legacy of this global reorganisation of the original ecological equilibrium brought about by man since prehistoric times raises considerable problems of conservation and management. First of all, in the vast majority of cases, it is impossible to reconstruct the natural ecosystems of the past, which have been degraded for millennia. However, this leaves the question of how to treat the anthropochorous mammalian populations of certified ancient origin. Several of them, in fact, represent invaluable historic documents. Frequently, they may also constitute the last survivors of continental populations which themselves vanished long ago. Their protection and their study can provide an opportunity for testing a range of different evolutionary theories, while also allowing them to be considered as an authentic “cultural heritage”.

Key words: Holocene, endemics, cultural heritage

Introduction

There is possibly no other place in the world which has been so intensively influenced by human activity over a prolonged period as the Mediterranean. Civilisations have been present continuously in this region for over 10 000 years, modifying entire landscapes, disrupting or destroying the majority of native communities, and introducing many new species. Virtually no ecosystems have been left untouched. As far as is presently known, less than a quarter of the mammalian species found in the continental Mediterranean region have been described as endemic to the area (C h e y l a n 1990), though they include very peculiar elements, such as the barbary macaque, *Macaca sylvanus*, and the wild rabbit, *Oryctolagus cuniculus* (cf. M a s s e t i 1998, 2002a).

However, the number of the endemics drastically decreases if we consider the composition of the extant mammalian fauna on islands. Recent genetic and morphometric analyses reveal that, of the entire universe of endemics that characterised the Mediterranean islands during the late Pleistocene, only a few endemic small mammals still survive. These belong to just four taxa: two species of shrew, the Sicilian shrew, *Crocidura sicula*, and the Cretan shrew, *C. zimmermanni* (M a s s e t i 1998); perhaps one gerbil, *Dipodillus zachariai*, the so-called short-tailed gerbil, reported from the Tunisian archipelago of Kerkennah (C o c k r u m et al. 1976, L a m i n e C h e n i t i 1988, C h e y l a n 1988, 1990), and

possibly also the newly discovered Cypriot mouse, *Mus cypriacus* (C u c c h i et al. 2006). Arguing against the formerly supposed endemism of the Cretan and the Cypriot spiny mice, *Acomys minous*, and *A. nesiotetes*, respectively, is the lack of any Pleistocene fossil of the genus recorded so far from the islands, whereas the genetic analyses demonstrate their closeness to the spiny mice found in south-western Asia (M a s s e t i 1998, B a r o m e et al. 1998, 2001). It is also interesting to note that wild rodents on Kerkennah are today represented by only two species, the aforementioned gerbil, and the greater jerboa, *Jaculus orientalis*, the commensal forms being represented by *Rattus rattus*, and *Mus musculus* (J.-D. V i g n e, pers. com.).

Results and Discussion

The extant non-volant mammals of the Mediterranean islands

Apart from these few exceptions, the extant insular fauna displays virtually the same species composition, being almost exclusively characterised by continental taxa whose appearance on the islands seems to be attributable to man. Previous authors often classified many of the modern non-flying terrestrial mammals of the Mediterranean islands as subspecific forms, almost entirely on the basis of arbitrary criteria and the examination of scattered materials. Throughout most of the 19th and 20th centuries, there was a widespread practice among scientific explorers of reporting an excessive number of subspecies from their explorations

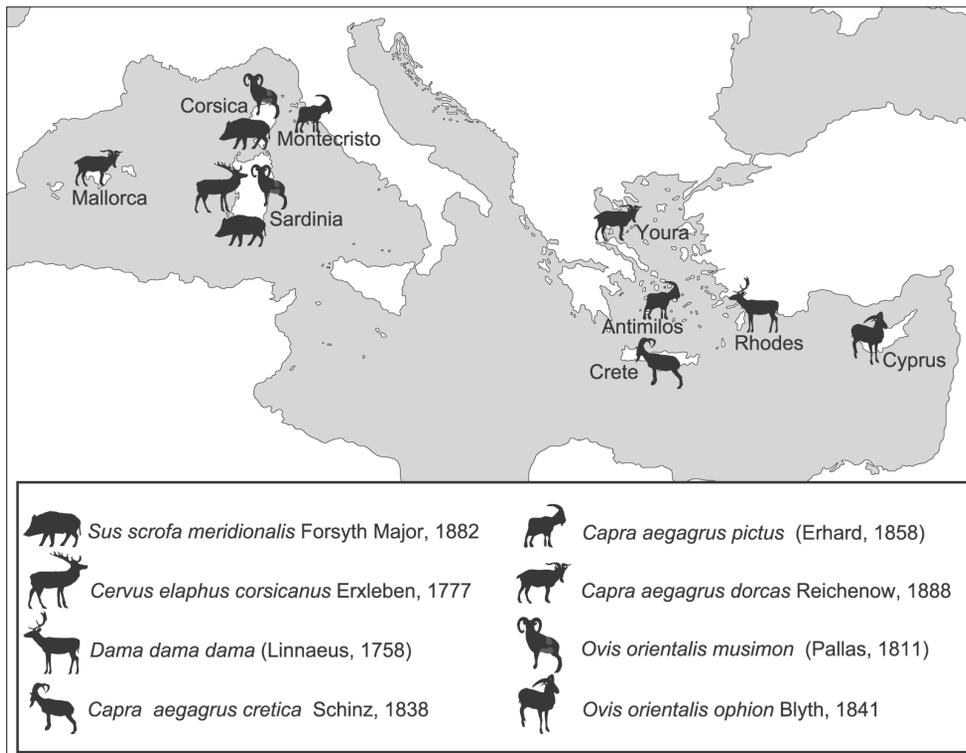


Fig. 1. Distribution of the introduced large ungulates in the Mediterranean.

of the Mediterranean islands. Based on the data provided in literature, the various subspecies are distinguished by the coat patterns and by the size of body and skull. As is consequently understandable, this led to a multiplication of forms which now, however, demand more precise taxonomic and genetic definition. In this respect, we ought to re-consider the taxonomic treatment of the lagomorphs, the mustelids, the genets, and the wild goats of the Balearic, Tyrrhenian and Aegean islands, as well as the Tyrrhenian and Cypriot mouflons, or the wild boars and the red deer of Sardinia (M a s s e t i 1995, 1998, 2002b, 2007, M a s s e t i & D e M a r i n i s 2007). All these populations are the result of ancient introductions started by man in prehistoric times, and continuing possibly without interruption throughout the historical period (Fig. 1).

To assess the original distribution of the species, the ranges prior to the Neolithisation of the Near-East and the Mediterranean should be considered. Subsequently, improved human seafaring skills and the commercial networks established among the various countries enabled the artificial exportation of animal of practical interest, together with those already involved in the process of domestication (M a s s e t i 1998, L o r e n z i n i et al. 2002). In fact, man brought with him the animals he needed as economic supplies for the colonisation of the new geographical areas.

Archaeozoological research at sites in eastern Turkey (P e t e r s et al. 1999), such as Hallam Çemi, Çayönü Tepesi, and Nevali Çori, reveals an intensification of the relationship between man and mouflons, bezoar goats, wild cattle and wild boars, during the second half of the 9th millennium BC. Together with sheep, goats, pigs, cattle and dogs, a variety of wild species were also brought onto the Mediterranean islands, including shrews, hedgehogs, hares, mice, spiny mice, dormice, foxes, weasels, martens, badgers, cats, and red and fallow deer. As far as is presently known, the first transfers of allochthonous mammals onto Mediterranean islands were to Cyprus, attributed to the end of the 9–8th millennium BC (G u i l a i n e et al. 1996, 2000). In the Aegean region, the date of 7 530 BC – 7 100 BC (8th millennium BC) was obtained for the oldest wild boar/pig bone from the island of Youra (Northern Sporades, Greece), through radiocarbon analysis (M a s s e t i 2007).

The legacy of the global redefinition of the original ecological equilibrium

The legacy of this global redefinition of the original ecological equilibrium raises considerable problems of conservation and management. First of all, in the great majority of cases it is impossible to reconstruct the natural ecosystems of the past, irretrievably destroyed and lost thousands and thousands of years ago.

In view of the vulnerability of the ecosystems of the Mediterranean islands, it is also critical to prevent further introductions. In the future, from both a scientific and a cultural point of view, it would be advisable to take seriously into consideration the eradication of the alien species of very recent invasion, such as *Myocastor coypus*, in Sicily and/or *Mustela vison*, in Sardinia. But this leaves the question of how to treat the allochthonous populations of evidenced ancient anthropochorous origin (M a s s e t i 2002b). Each of such cases has to be considered individually. If, in fact, the eradication of rats, feral goats, and rabbits imported in recent historical times is in many cases fundamental for the recovery of island ecosystems, several of the other anthropochorous taxa represent invaluable historic documents: images which remain fixed in time and history. Unlike the case of artistic monuments, however,

here we are dealing with living organisms which interact with the environment in which they have survived since ancient times. Their protection and their study can provide an opportunity for testing a range of different evolutionary theories. While the importance of these anthropochorous populations is not comparable, from a biological point of view, to that of authentic wild populations in their natural habitat, their elevated importance as environmental entities lies in their representing singular historical and cultural documents (M a s s e t i 2002b). Nor should we overlook the fact that many of them constitute some of the few available points of reference for an understanding of the biological and ecological characteristics of their wild continental ancestors, by now long extinct. They therefore deserve to be protected, on the basis that they constitute a veritable “cultural heritage”. Just as human artefacts and sites of archaeological and historical interest are subject to conservation strategies, so we should also protect the populations of animals of ancient anthropochorous origin, recognising their importance as a common heritage of humanity, the study and observation of which enable us to acquire fundamental information about the progress of man through the millennia of his process of civilisation. These populations should therefore be designated as significant “cultural heritage”, and subjected to zoological research. Genetic analyses should be of fundamental importance, and must always be assessed through a critical examination of the information derived from biogeographical and historical research (M a s s e t i 2002b). Another significant aspect is the evaluation of the anthropozoological and zooethnographical importance of these populations.

The fallow deer of the island of Rhodes, Dodecanese (Greece)

The latest techniques for investigating population genetics have shown, for example, that the fallow deer which still survive on the island of Rhodes (Dodecanese, Greece) are very special, being of ancient lineage distinct even from the relic populations sampled in Anatolia, the supposed source of the Rhodian stock introduced in Neolithic times (M a s s e t i et al. 1996, 2002, 2006, 2008). Archaeological evidence reports the occurrence of fallow deer on Rhodes since at least the 6th millennium BC (H a l s t e a d & J o n e s 1987, T r a n t a l i d o u 2000, 2002). On the contrary, it was long believed that the species was introduced onto the island from Asia Minor by the Knights of Saint John of Jerusalem, who conquered Rhodes at the beginning of the 14th century. The genetic data clearly show that the split between the Anatolian and the Rhodian population occurred long before then. This example illustrates that the human-driven foundation of animal populations does not necessarily result in erosion and/or depletion of the original genetic variability of the species involved (cf. P o p l i n 1979, P o p l i n & V i g n e 1983, R y d e r 1983, H e m m e r 1990, M a s s e t i 2002b, B r u f o r d et al. 2003, Z e d e r et al. 2006), and demonstrates that it is possible for some unique enclaves with a significant portion of the original genetic diversity to evolve (M a s s e t i et al. 2008). It can be argued that this extraordinary process would be more likely with species selected for domestication, and additionally for hunting (M a s s e t i 1998, 2002a). All of the available evidence appears to confirm that common fallow deer were employed as game animals in the majority of the geographical areas where they have been artificially introduced outside their natural distribution range. The general opinion is that *D. d. dama* was imported onto Rhodes in order to be hunted (M a s s e t i 1998, 1999, 2002b, T r a n t a l i d o u 2002). Instead, it is unlikely that the common fallow deer was ever fully domesticated (C r o f t 1991, M a s s e t i 1998). The probable foundation of the Rhodes’ fallow deer population by humans in Neolithic times

has resulted in the chance preservation of a significant portion of the mitochondrial genetic variability of the species up to the present (M a s s e t i et al. 2008). The current challenge is how to use this specific knowledge to manage and conserve this anthropochorous population. The survival of this population represents not only the first documented instance of ‘ad hoc conservation’, but is also significant in historical, archaeological and ecological terms. For these reasons too, its importance has to be considered on a par with that of a human artefact, as the dynamic testimony of ancient intervention which is still available for our evaluation and our appreciation, with all the consequences that such an estimate brings with it. Like several other Mediterranean island populations of remote introduction, however, the Rhodian deer has never been recognised as an endemic *taxon*, nor has it appeared in the international conservation lists. We would argue that permitting the extinction of several of the ancient anthropochorous mammalian populations of the Mediterranean islands would, from an ethical and historical point of view, be equivalent to destroying an artistic or archaeological monument.

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