Bears on Islands: The Fossil Record, a Re-appraisal

Alexandra van der Geer
Naturalis Biodiversity Center, Darwinweg 2, PO Box 9517, 2300 Leiden, The Netherlands; National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Department of Historical Geology and Palaeontology, Panepistimiopolis, 15784 Zografou, Greece; Alexandra.vandergeer@naturalis.nl

Hara Drinia
National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Department of Historical Geology and Palaeontology, Panepistimiopolis, 15784 Zografou, Greece; cntrinia@geol.uoa.gr

Insular faunas are generally unbalanced: they lack certain functional groups, for example, carnivores (Sondaar, 1977). Despite this, fossil terrestrial mammalian carnivores are not rare on oceanic or oceanic-like islands (= those that were not reached by landbridge). The vast majority of insular carnivores is small or medium-sized. Otters, for example, are known from practically every island with a fossil record (van der Geer et al., 2010). They are all endemics to their island and sometimes even placed in a genus on their own e.g., Isolatutra cretensis (Late Pleistocene, Crete), Megalenhydris barbarieina (Middle or Late Pleistocene, Sardinia). More rare is the presence of dwarfed canids: Cynoherium sardous (Sardinia, Early–Late Pleistocene) and Mecocyon trinilensis (Java, Middle Pleistocene), which evolved from large-sized wolf-like ancestors that acquired jackal size as a result of shift in prey spectrum (Lytras et al., 2010).

What about large-sized mammalian carnivores? Bear fossils have been reported from two Mediterranean islands with endemic faunas: Malta and Tilos. The Maltese fossil (BM/M4679, Natural History Museum, London; Fig. I) was retrieved from the Red Clay layers at Ghar Dalam cave in 1882 that also yielded abundant fossils of endemic small red deer (Cervus cf. elaphus), a small fox (Vulpes sp.), a vole (Pitymys melitensis), etc., but also human artefacts and remains (Cooke, 1892). The bear fossil was described as the left lower mandible of a brown bear (Ursus cf. arctos; Lpm4 14 mm, L1 m1 23 mm, Lm2 25 mm) (Woodward, 1893), smaller than a continental brown bear (Zammit-Maempel, 1989). However, its context is unclear, because Ghar Dalam cave lacks a clear stratiography, and biozones likely are mixed. The Tilos fossil (lower canine, University of Athens) comes from a Late Pleistocene–Holocene level (depth 1.1 m) with dwarf elephants fossils and traces of human activity (Bachmayer et al., 1976). It was never described in detail but suggested to be a hunter trophy from Asia Minor, because of its unlikely co-occurrence with dwarf elephants. Single remains from Chios (Final Neolithic/Chalcolithic) and Samos (Bronze Age) are considered trophies (Masseti 2012).

In our view, these rare findings should be reconsidered in the light of what we know today on insular carnivores. Large and medium-sized carnivores were thought to be lacking in insular biotas but the numerous exceptions show otherwise. At present, many islands of northern America (British Columbia, Alaska) harbour bears. These bears are either larger or smaller than conspecific mainland bears (ISB database), largely as a function of the availability of nutritionally rich food (salmon). This is in line with the observation that carnivore body size on islands is mainly driven by prey size, type and availability and not on island size (Lytras et al., 2010). The successful persistence of bears on islands today indicates their survival capacity in isolation, provided there is sufficient food. The partially omnivorous character of bears in general likely enhances their survival despite their large size.

This research was co-financed by the European Union and Greek national funds (Research Funding Program THALIS-UOA MIST2010, KA:703/11669).

Literature


Fig. I Left lower mandible of Ursus cf. arctos from the Late Pleistocene / Holocene of Malta (BWWM4679, Natural History Museum, London). Lateral view, scale bar 1 cm. Photograph: George Lytras.