

Last occurrences of large mammals and birds in the Late Quaternary of the Italian peninsula

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SUMMARY: The late Quaternary vertebrate assemblages of the Italian peninsula are characterized by the progressive extinction of those large mammals which date back to the Middle Pleistocene, and by the expansion of some “cold” taxa—both mammals and birds. The longest-surviving taxa include *Crocota crocuta*, *Panthera spelaea*, *Equus ferus*, *Equus hydruntinus*, *Megaloceros giganteus* and *Bison priscus*, while *Hippopotamus*, *Elephas* and *Stephanorhinus* survived until OIS 5a, 4 and 3 respectively. In the coldest phases *Nyctea scandiaca* and *Pinguinus impennis* among the birds, and the mammals *Mammuthus*, *Coelodonta* and *Gulo*, became widespread in the south-eastern part of the Italian peninsula and subsequently became extinct during the Tardiglacial. In addition, *Alces alces* was present in the northwest of the Italian peninsula during OIS 4 and 2, whereas *Rangifer tarandus* reached the westernmost border of Italy.

1. INTRODUCTION

The peculiar geographical position and morphology of the Italian peninsula, and the presence of natural physical barriers, affected the distributions of vertebrates and local speciations. This enable us to recognize the continental Plio-Pleistocene mammal associations of Italy as Faunal Units (FUs) of regional significance, with differing times of colonisation with respect to the rest of continental Europe, especially during the late Glacial phases. Moreover, in Italy the Mediterranean Sea, which surrounds the greatest part of its territory, seems to have softened the glacial/interglacial climatic extremes, resulting in the existence of refugia for several species (Alberdi *et al.* 1998).

2. DISCUSSION

Due to several factors, it is difficult to determine the chronology of the occurrences and

extinctions of Late Quaternary mammals and birds. The Italian peninsula is characterised by several distinct biogeographical areas, related to the presence of different migration paths, linked to sea level-climatic phases and to local climatic and microclimatic factors. Moreover, several faunal assemblages show the coexistence of taxa of different geographical origins and palaeoenvironmental habits. Few sites have a stratigraphical sequence long enough to record the real changes in faunal composition; and selective factors, such as the influence of human populations and the activities of predators, have modified the faunal composition of the assemblages. The absence of stratigraphical data for the old collections and for isolated fossils add to the difficulties of reconstructing the colonisation of the Italian peninsula by mammals.

The available data enable us to point out some considerations.

Among the “pachyderms” of Middle Pleistocene origin *Elephas antiquus* survived until

OIS 4. The occurrence of the elephant in the OIS 3 needs to be confirmed by further better defined discoveries. The presence of *Hippopotamus* is not recorded after the end of OIS 5, while *Stephanorhinus* together with *Dama dama dama* seems not to have survived OIS 3.

Among the large carnivores *Panthera pardus* definitely occurs during OIS 3, while the presence of the lion is testified by fossil bones in the temperate phase before 30 ky, and is represented in palaeolithic art referable to OIS 2. Also the cave lion survives into the early Holocene at Fredian Shelter (Tuscany) (Boschian *et al.* 1995). *Crocota crocuta* and *Ursus spelaeus* seem to occur until the end of the Epigravettian.

Finally, *Equus hydruntinus* survives until the beginning of the Holocene, while *Equus ferus* has been recorded in the Tardiglacial (OIS 2). *Alces alces* (Gallini & Sala 2001) and *Rangifer tarandus* are sporadic elements of the mammal faunas of northern Italy. *Alces alces* probably came from the Balkan area and became widespread in the Po plain during OIS 4, surviving throughout OIS 2. Coming from western Europe, *Rangifer tarandus* reached only the coastal region of Alpi Marittime, but did not enter northern Italy. The geographical distribution of these species and their migration pathways are still poorly known, but these cervids did not become widespread in the Italian peninsula, probably because of the Apennine natural barrier. On the other hand, the occurrence of "cold taxa" such as *Mammuthus primigenius*, *Coelodonta antiquitatis*, *Gulo gulo* (Sardella 2001) and *Alopex lagopus* in sites on the southern Adriatic coast, characterised by cold but dry climatic conditions, suggest a hypothesis of unfavourable environments for *Alces* diffusion.

Some problems involve the occurrence and/or the survival of other "cold" taxa such as *Mammuthus primigenius* and *Alopex lagopus*. Woolly mammoth certainly occurred in OIS 3, but the persistence of this taxon during the OIS 2 remains to be proved. It is possible that arctic fox, as well as the last jackal-like dog, are present in the latest Glacial fauna of Romanelli cave (Tagliacozzo, pers. comm.), but these data need to be confirmed.

During the Middle Pleistocene the modern species of avifauna seem to be already widespread in the Mediterranean area. In the Late Quaternary birds typical of cold climate condition, such as *Nyctea scandiaca*, *Pinguinus impennis* and perhaps *Falco rusticolus* occurred. *Lagopus* and *Pyrrhocorax*, today showing a less extensive geographic distribution range, were very frequent in the Italian peninsula probably until OIS 2 (Pavia 2000).

3. CONCLUSION

The late Quaternary vertebrate assemblages of the Italian peninsula are characterized by differential survival and progressive extinction of the large mammals of Middle Pleistocene tradition. Pachyderms have been most affected by climatic deterioration. *Hippopotamus* survived only until the end of the OIS 5a, whereas *Elephas antiquus* occurred also during OIS 4 and *Stephanorhinus* was still present during OIS 3. *Crocota crocuta*, *Panthera spelaea*, *Equus ferus*, *Equus hydruntinus*, *Megaloceros giganteus* and *Bison priscus* can be considered as long surviving taxa. *Mammuthus*, *Coelodonta* and *Gulo* were widespread in the south-eastern part of the Italian peninsula during OIS 4; the carnivores become extinct during Tardi-Glacial time, while the definite occurrence of mammoth during OIS 2 needs to be confirmed. In the coldest phases of the Pleniglacial some "cold" taxa, both mammals and birds, have been recorded. *Nyctea scandiaca* and *Pinguinus impennis* were widespread throughout the peninsula, while *Alces alces* occurred in the north-west of the peninsula during OIS 4 and 2. *Rangifer tarandus* reached the westernmost geographical boundary of the Italian coast, whereas *Alopex lagopus* probably occurred in the Adriatic region.

4. REFERENCES

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