

**Breeding birds on the Island of Naxos (Cyclades, Greece).
Eight breeding records new to the island.
Differences with those of Krüper and Watson.**

Stavros N. MAGIORIS

Section of Ecology and Taxonomy, Department of Biology, Athens University, Athens (Greece)

This paper contains new data about breeding birds on the island of Naxos, Cyclades, Aegean sea. We visited Naxos from Febr. 1984 - Dec. 1985 on a monthly basis, for 4-7 days at a time, as well as on March, April, June, August, November, 1986 and on May 1987. Observations were made mainly on the southeastern part of the island and on the lagoon near the capital, but very often we covered all the island by car. During the 19th and 20th century many observers have visited the island of Naxos. However the breeding birds have been studied only by Krüper and Watson in the past. Krüper visited Naxos during 1862 and recorded 42 bird sp. as definitely breeding as well as 9 sp. as doubtful breeding. Watson visited the island during 1954 and 1959 and recorded the breeding Passeriformes. With respect to his study 32 sp. are definitely breeding and 3 sp. (Wren, Whitethroat, Stonechat) are doubtful breeding on the island. (TAB. 1).

According to our observations 42 sp. have been recorded as definitely breeding on Naxos. 21 of these are Residents occurring all the year round and 21 sp. are Summer visitors. Although 4 sp. have been seen during the breeding season we keep our doubts and classify them as of uncertain seasonal status. (TAB. 2); Finally the birds n^o 5, 28, 29, 35, 38, 40 in Table 2, are here recorded for the first time breeding on Naxos and n^o 36, 37 for the first time in all the Cyclades.

Comparing our data with those of Krüper and Watson we must note that 17 sp. that were definitely breeding according to them, have not been observed during the breeding season (n^o 2, 4, 12, 14, 15, 17, 20, 22, 25, 28, 33, 34, 37, 38, 43, 44, 48, TAB. 1). Also 6 doubtful breeding species (n^o 49, 51, 52, 53, 54, 58, TAB. 1) have not been observed from which the Egyptian Vulture and the White-tailed Eagle have not been recorded in all the Cyclades during the 20th century. According to our data 10 sp. of TAB. 1. (n^o 4, 12, 15, 17, 22, 33, 34, 37, 53, 54) are Migrants, while 8 sp. (n^o 2, 14, 20, 25, 28, 38, 48, 52) were not observed from the study transects. Finally, 3 sp. are Winter visitors (n^o 43, 44, 58), but very often some of them delay their departure until mid April.

From the Residents no 8, 11, 13, 15, 18, 20 are very common while no 4, 6 and 16 are uncommon. Bonelli's eagle is very rare, Kestrel's population is constant. Concerning Summer visitors, no 25, 27, 28, 32 are numerous in their breeding areas while no 35, 36, 40 are very rare. Marmora's warbler was observed in areas with low vegetation where Cistus sp. was dominant.

TABLE 1. Species observed by Krüper and Watson

Definitely breeding: 1. Manx Shearwater 2. Cory's Shearwater 3. Shag 4. Lesser Kestrel 5. Kestrel 6. Eleonora's Falcon 7. Chukar 8. Herring Gull 9. Rock Dove 10. Scops Owl 11. Little Owl 12. Alpine Swift 13. Swift 14. Pallid Swift 15. Shorttoed Lark 16. Crested Lark 17. Gray Martin 18. Sand Martin 19. Swallow 20. Richard's Pipit 21. Tawny Pipit 22. Yellow Wagtail 23. White Wagtail 24. Woodshat Shrike 25. Lesser grey Shrike 26. Hooded Crow 27. Raven 28. Olive-tree Warbler 29. Olivaceous Warbler 30. Orphean Warbler 31. Garden Warbler 32. Sardinian Warbler 33. Subalpine Warbler 34. Spotted Flycatcher 35. Black-eared Wheatear 36. Blue-rock Thrush 37. Nightingale 38. Blue Tit 39. Great Tit 40. House Sparrow 41. Greenfinch 42. Goldfinch 43. Linnet 44. Corn Bunting 45. Cretzschmar's Bunting 46. Cirl Bunting 47. Black-headed Bunting 48. Common Bulbul.

Doubtful breeding: 49. Egyptian Vulture 50. Griffon Vulture 51. White-tailed Eagle 52. Golden Eagle 53. Little ringed Plover 54. Common Sandpiper 55. Turtle Dove 56. Wren 57. Whitethroat 58. Stonechat.

TABLE 2. Species observed by writer

Residents: 1. Shag 2. Griffon Vulture 3. Bonelli's Eagle 4. Buzard 5. Kestrel 6. Peregrine Falcon 7. Chukar 8. Herring Gull 9. Scops Owl 10. Little Owl 11. Crested Lark 12. White Wagtail 13. Hooded Crow 14. Raven 15. Sardinian Warbler 16. Blue-rock Thrush 17. Great Tit 18. House Sparrow 19. Greenfinch 20. Goldenfinch 21. Cirl Bunting.

Summer visitors: 22. Eleonora's Falcon 23. Rock Dove 24. Turtle Dove 25. Swift 26. Sand Martin 27. Swallow 28. House Martin 29. Tree Pipit 30. Woodchat Shrike 31. Olivaceous Warbler 32. Orphean Warbler 33. Garden Warbler 34. Whitethroat 35. Rüppell's Warbler 36. Marmora's Warbler 37. Red-breasted Flycatcher 38. Wheatear 39. Black-eared Wheatear 40. Ortolan Bunting 41. Cretzschmar's Bunting 42. Black-headed Bunting.

Doubtful breeding: Manx Shearwater (on 4.4.'85), Tawny Pipit (on 5.8.'84), Wren (on 12.3.'84 and 13-18.4.'84), Icterine Warbler (on 20.5.'84, one indiv.).

REFERENCES: CATSADORAKIS G. 1983. Some data on the Avifauna of Naxos island and the migration over the Aegean. Rpp. Comm. int. Mer Médit. 28: 8.

KRÜPER T. 1863. Die Brutvögel von Naxos. J. Orn. 11: 326-339.
MAGIORIS N. St. 1987. Migration over the Cyclades, central Aegean. Ringing and Migration 8, Oct. 1987: 109-114.
WATSON G. E. 1964. Ecology and Evolution of Passerine birds on the islands of the Aegean sea. Univ. Microfilms International, Ann Arbor, Michigan, USA.

**A first review on the insular endemic Spiny Mouse of Crete
Acomys minous (Rodentia : Murinae)**

A. TRIHAS

Department of Biology, University of Crete, Iraklion, Crete (Greece)

ABSTRACT

The subject of this review is a little known rodent of the Cretan fauna, *Acomys minous* Bate 1905, or as Dieterlen remarks (1963), "...the only European member of an arid and warm zones preferring genus...".

The literature that deals exclusively with the Cretan Spiny Mouse is very poor compared with the bibliography that concerns its African relatives. It is not surprising that the first study on the biology and ecology of the animal has been carried out just in 1963 by Dieterlen, while immediately after that, Matthey worked on the karyotype of a few specimens obtained by the former.

The exact taxonomic position of the Cretan Spiny Mouse is not clear enough, a fact common with most of its congeneric forms. Since 1905, the year that Dorothea Bate described the animal from a small number of specimens (3), only a few publications deal with this murid until today and almost none of them refer to the animal with the same name! Bate in her first publication (1905) named the Cretan Spiny Mouse as *A. dimidiatus minous*, giving also a brief description as well as basic measurements of the animal. In 1913, she mentioned it again in her "Mammals of Crete" but under the name *A. minous*, not making clear the reasons for this transition of the taxonomic level.

Aharoni (1932) treats *A. dimidiatus* as a subspecies of *A. cahirinus* and the same did Ellermann & Morrison-Scott (1951) in their "Checklist of Palaearctic and Indian Mammals" setting the Cretan form under the species level of *A. cahirinus*. Ellermann, in a previous publication (1949, reprinted in 1966) separated *A. cahirinus* and *A. dimidiatus* into different species treating the Cretan Spiny Mouse as *A. dimidiatus minous* again!

Subsequently, Zimmermann (1953) brings back the Aharoni statement, referring to the animal as *A. c. minous*. He also gave a more detailed description and complete morphometric data, based on twenty-five specimens. However, Zahavi & Wahrman (1956) separated the "minous" form again as a species "per se" on a chromosomal basis, while Dieterlen a few years later (1963), seems to be in doubt when referring to the systematic status of the rodent. (Although he shows the tendency to set apart the Cretan *Acomys*).

The situation appeared to be more clear after the exhaustive study, both on the number and the morphology of the chromosomes, made by Matthey in 1963. He claimed that the Cretan Spiny Mouse belongs to a different species than those of Palaestina and Cyprus, while he gave a dendrogram of the possible evolutionary relationship between the three murids.

From that period on, the animal has been treated as an endemic species of the island (Ondrias 1966, 1967, Graf 1986), while any further research concerning whichever aspect of its biology, seems to be interrupted. It is therefore evident, that additional studies on this point need to be done in the near future.

The exact routes that explain the present distribution of Spiny Mice in Crete, Asia Minor and Cyprus remain still unknown, but some considerations on this point may be expressed. The latest theories concerning the Oligocene and Miocene geology of the Aegean archipelago, impose the existence of a landmass extending over the present Aegean area, including Crete (Sondaar, De Vos & Dermitzakis 1986 and Dermitzakis 1987). The fossil mammals of that age being found on the island of Crete, belong to a "balanced, continental" fauna, suggesting a normal connection between Crete and the mainland of Greece (Dermitzakis & Sondaar 1978). A complete lack of fossil mammals in the Pliocene strata of the island, indicates a possible disappearance of a big part of the existing fauna during that time (Dermitzakis & De Vos 1987). The mammal fauna that appeared again on the island, is not over 2 million years old (Lower Pleistocene) and "unbalanced" in structure (Dermitzakis and De Vos 1987).

The only possible routes of a Pleistocene European murid invasion to the island of Crete are those from Peloponessus via Kythera and Antikythera and from Rhodes via Karpathos and Kasos (Derm. & De Vos 1987). The ancestor of the Cretan Spiny Mouse seems to have followed one or both of the above routes of immigration, since Miocene *Acomys* occupied an area extending over the Greek and Asia Minor mainland (Dieterlen 1963).

Not so much is known until now about the reproduction, feeding habits and behavior of the Cretan Spiny Mouse. The only data available, are the morphometric studies of Bate (1905) and Zimmermann (1953) and the observations on an experimental population that Dieterlen created (1963) from 7 animals captured on the island. The environment that seems to be optimal for the Cretan Spiny Mouse consists (according to Dieterlen 1963) of rocky phryganic areas of southern exposure with many rifts for sheltering. All the sites, where the animal has been recorded up to now (Bate, 1905, Zimmermann 1953, Dieterlen 1963, Graf 1986), belong to the above described biotopes and were placed in the vicinity of the coastal region of Crete. No information on the altitude that the animal can reach has been provided until now. Here, it must be underlined that there is clear evidence of an extensive disturbance or even destruction of a big part of the possible biotopes of this species, mainly because of the uncontrolled urbanisation and the increased touristic activities over the last fifteen years.

Also we have no idea about the ecological relationship, as well as the competitiveness of the Spiny Mouse against its relative murids (house mice and rats). Bate (1905) and Dieterlen (1963) noted the ability of the animal to enter the human habitations in periods of harsh natural environmental conditions, but there is no evidence about its ability to compete against other mice, already settled there.

A second point of interest is the study of the highest altitude that the species can survive on Crete. The purpose of such an investigation is to provide information on the ecological plasticity of the mammal and therefore to give some ideas on how long (on the point of time) it inhabits the island. Since no total submergence of Crete has taken place in the Late Cenozoic era (Dermitzakis 1987), it is more reasonable to suggest an older existence of the genus on Crete, than to accept the immigration way as the only possible for its present existence on the island. If the animal can survive in altitudes higher than 1000-1500 m, the possibility of a withdrawal of the species on higher biotopes, during the Pliocene tectonic events, has to be also in mind.

In conclusion, we should underline the necessity of a further research both on systematic and ecological directions in order to keep a viable population level of this rare (?) and endemic species on the island of Crete.