

I-III2

The differentiation and distribution of the genus *Mastus* (Gastropoda, Enidae) in the Aegean Archipelago

K. VARDINOYANNIS and M. MYLONAS

Section of Ecology and Systematics, Biological Department, University of Athens, Panepistimioupolis Ilisia, 15771 Athens (Greece)

The genus *Mastus* Beck, 1837 with an almost continuous distribution from Italy to Turkey, is strongly differentiated in the Aegean. According to the existing data eight of the nine species of this genus appear in the Aegean (*M. dirphicus*, *M. pupa*, *M. pusio*, *M. turgidus*, *M. olivaceus*, *M. ehrenbergi*, *M. rossmaessleri*, *M. carneolus*). Five of them are endemic of the Greek Islands. Heller J. in 1976 tried to give an extensive taxonomic study and biogeographical conclusions based on the whole Enidae fauna of the Aegean. But the incomplete description of most species (no measurements, no description of genitalia) and the large gaps of their distribution led to a reasonable criticism for the taxonomy as well as the biogeographical conclusions (Mylonas 1982).

The systematic collection of samples in more than 40 islands in addition with ecological observations enabled us to study the characteristics of the shell and of the reproductive system of many populations of the genus *Mastus*.

The following represent our main observations and conclusions:

1. The biological cycles of all the mentioned species and their ecological requirements and positions resemble in a high degree.
2. There are only two cases where we met sympatric populations of different species. In Syros, the species *M. pupa* and *M. pusio* and in Terapetra (Crete) the species *M. pupa* and *M. olivaceus*.
3. Any one of the species, no matter how peculiar it is, appears variable in shell form and tends to reach the form of *M. pupa*.
4. The reproductive system has a main basic form with some peculiarities but no sharp discontinuities. Only in the populations of Makronissos isl. and Viannos (Crete) the divertikel of the bursa copulatrix is missing. But this is not of taxonomic significance (Forcart, 1940).
5. The ecological, morphological and anatomical observations do support the opinion that the species mentioned in the Aegean are only different forms, subspecies of a single species, *M. pupa*.
6. The sympatricity of *M. pupa* with *M. pusio* in Cyclades and *M. olivaceus* in Crete, may indicate that these forms are found very close to their complete differentiation into clear species.



The distribution of *Mastus* in the Aegean. *M. pusio* ■, *M. dirphicus* □, *M. turgidus* ●, *M. olivaceus* ◊, *M. ehrenbergi* ★, *M. rossmaessleri* ☆, *M. carneolus* ☆, *M. pupa* ▨

Bibliography

Forcart, L., 1940. Monographie der türkischen Enidae. Verh. naturf. Ges. Basel, 51:106-263, T. 1-3
 Heller, J., 1976a. The biogeography of Enid land snails of the Aegean Islands. J. of Biogeogr. 3(3):281-292
 Heller, J., 1976b. The taxonomy and distribution of the Enidae (Mollusca, Pulmonata) of the Aegean Islands. J. Moll. Stud. 42:371-393
 Mylonas, M., 1982. The Zoogeography and Ecology of the Terrestrial Molluscs of Cyclades. Ph.D. Thesis University of Athens.

I-III3

Genetic differentiation in *Albinaria* populations from the Aegean Region

A. AYOUTANTI*, C. KRIMBAS*, M. MYLONAS**, J. SOURDIS* and S. TSAKAS*

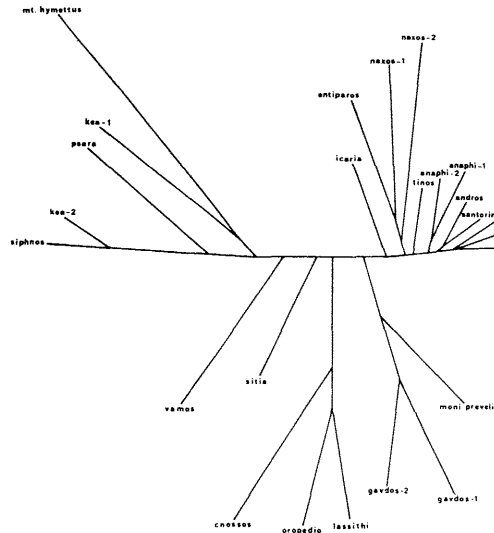
* Department of Genetics, Agricultural College of Athens, Iera Odos 75, 11855 Athens (Greece)

** Department of Ecology and Systematics, Biology, University of Athens, Panepistimioupolis-Kouponia, Athens (Greece)

New data, presented here, have been assembled concerning the genetic differentiation and speciation occurring in populations belonging to the genus *Albinaria*. This land mollusc inhabits many islands of the Greek archipelago including the Cyclades, Dodecanese and Crete as well as the continental masses East and West of the Aegean. Local populations and especially those from different islands may display different morphological features that enabled taxonomists to distinguish several taxonomic units (subspecies, species). However, their taxonomic status has been recently questioned and is subject to revision (Mylonas et al., 1987).

A genetic study was undertaken using 27 different electrophoretic markers comprising more than one hundred segregating allozymes. Samples of 25 populations were examined (14 from the Cyclades, 1 from Icaria, 6 from Crete, 2 from Gavdos, 1 from Attica and 1 from Psara). The genetic distances between populations were computed using the D_s estimator (Krimbas and Sourdis, 1987) and an unrooted tree was constructed by the Neighbor Joining Method, which seems the most efficient for recovering reliable trees.

The examination of the tree reveals a rather good general correspondence between genetic similarity and geographical position. As a matter of fact there is a significant positive correlation coefficient (0.39) between geographic distance and genetic distance for every couple of populations, but the correlation is not very high. The topology of the tree provides an explanation for this situation. All east Cycladian populations together with the one from Icaria are clustered in a rather compact group. This might indicate that the taxonomic units *Albinaria coerulea*, *A. brevicollis* (and perhaps *A. puella*) belong to the same biological species. Cretan populations are found together and subsequently, in the central part of the tree but not necessarily in their geographic order within this island. The left part of the tree includes all "western" populations, those from Attica and the West Cyclades, together with the northern population from Psara. In this respect the tree agrees with the taxonomists who recognize different species in these areas (*A. arisae*, *A. discolor*, *A. turrita* and *A.* sp. aff. *chia*). Thus East and West Cyclades are set apart, Cretan populations intercalating between them.



This pattern is also exhibited by the distribution of the values of the first principal component of the gene frequencies: West populations have negative values followed by those of Crete with the same sign but near zero while the East Cycladic populations display positive values.

How could we interpret this pattern? Obviously the relation of Crete to the Cyclades is not a direct one but twofold, to an eastern and to a western branch, as if a barrier, an internal sea between Crete and Cyclades, prohibited at the times of the genus expansion a direct contact. Is this pattern compatible with the hypothesis of a land arc connecting Peloponnesus-Crete-Dodecanese islands as postulated by biogeographers or is the present *Albinaria* distribution much more recent as taxonomists are driven to believe? The distribution of fossil dwarf hippopotami and elephants as well as that of the extant scorpion species *Jurus dufoureae* (Brulle) were taken to plead in favor of an old land bridge (Vachon 1953). Of course more data are needed especially on Peloponnesian population of *Albinaria* in order to elucidate this situation.

Krimbas, C.B. and J. Sourdis, 1987: Recent improvements in handling allelic isozyme data for tree construction. *Isozymes: Current Topics in Biol. Med. Res.* 15:49-62
 Mylonas, M., C. Krimbas, S. Tsakas and A. Ayountanti, 1987: The genus *Albinaria* Vest. (Clausidae, Gastropoda). Is there any true species? *Biol. Gallo-Hell.* 13:161-164
 Vachon, M., 1953: Sur la repartition du grand scorpion noir des îles de la mer Egee: *Jurus dufoureae* (Brulle). *Revue Gen. Sci.* 60:96-100