RESTRICTED GENE FLOW BETWEEN TWO ALLEGED SUBSPECIES OF *ALBINARIA CRETENSIS* (GASTROPODA, PULMONATA, CLAUSILIIDAE)

by

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ABSTRACT

Two morphologically similar forms of pulmonate snails of the *Albinaria cretensis* complex, *Albinaria cretensis cf. vexans* and *Albinaria cretensis sphakiota*, with ribbed and relatively smooth shells, respectively, occur sympatrically but with a mosaic distributional pattern in the Imbros gorge (Crete, Greece). These forms were studied conchologically and using allozyme analyses and RAPD to investigate their genetic and phylogenetic relationships. Gene flow between the two forms is minimal. Genetic similarity between morphologically similar forms collected at different places in the gorge is larger than between distinguishable forms found at the same locality. Hybrids are formed only incidentally. There are neither sharp borderlines nor hybrid zones between the two forms. In a gorge c. 10 km to the west, a relatively smooth form is found together with *Albinaria cretensis tenuicostata* and *Albinaria sublamellosa heteroptyx*, both characterized by ribbed shells. Using the same methods, it turned out that the form with smooth shells is genetically almost identical to the conchologically indistinguishable one from the Imbros gorge, and different from the local *A. cretensis tenuicostata*. These data support the view that *A. c. sphakiota* is a separate species occurring in both gorges. The fact that *A. sublamellosa* clusters among *A. c. sphakiota*, does not allow for any conclusions because the analyses were not designed for an investigation including that species. The results are in favour of the view hitherto based on shell morphology mainly, that there are many genetically more or less isolated entities, sometimes with very restricted ranges, within the genus *Albinaria*.

KEY WORDS: Gastropoda, Pulmonata, Clausiliidae, *Albinaria cretensis*, taxonomy, hybridization, allozymes, RAPD.

INTRODUCTION

The NE-Mediterranean pulmonate gastropod genus *Albinaria* Vest, 1867, is well known for both its speciosity and the polytypy of its species. Currently, nearly 100 species are recognized, many of which are polytypic,

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with two or often more subspecies (Nordsieck, 1999; Gittenberger, unpublished data). Some authors (Mylonas et al., 1988; Mylonas, 1992) have argued that reproductive isolation, considered decisive for species status by Mousson (1849) and Schmidt (1856), and in the well-known definition of Mayr (1940: 120), is doubtful for many nominal taxa. Most Albinaria forms are allo- or parapatrically distributed (Gittenberger, 1991; Welter-Schultes, 1998). They are very similar or even indistinguishable in allozyme composition (Ayoutantti et al., 1988; Kemperman & DegenAars, 1992; Schilthuizen, 1992) but can be distinguished on the basis of shell morphology. Detailed field studies in Albinaria have shown that in several cases where different forms occur sympatrically, morphologically intermediate forms, considered indicative of hybridization, are either absent or rare (Schilthuizen & Gittenberger, 1996; Welter-Schultes, 1992). Such cases were traced while investigating contact- or hybrid-zones in between different forms. In Albinaria only exceptionally molecular techniques have been used to investigate in such areas whether separate gene pools are involved or not, and if this was done, only morphologically well differentiated forms were studied (Kemperman & DegenAars, 1992; Schilthuizen, 1994).

The present study aims at investigating the amount of gene flow in the Imbros gorge, in the island of Crete (Greece), between two morphologically similar, narrowly endemic, alleged subspecies of Albinaria cretensis (Rossmassler, 1836), viz. A. cretensis sphakiota (Maltzan, 1887) and A. cretensis cf. vexans (O. Boettger, 1883). These forms were regarded as subspecies on the basis of their supposed parapatric distributional pattern and because of morphological similarity, the most conspicuous difference being the presence versus absence of axial teleoconch ribs all over the shell.

It was investigated whether a population identified as A. cretensis sphakiota from a gorge 10 km west of Imbros (Aradena), can be distinguished from the presumed consubspecific Imbros populations, and from the two ribbed Albinaria forms living in the Aradena gorge, by analysing molecular and morphological data.

Only recently, Nordsieck (1999) revised the 14 subspecific taxa which he had combined into A. cretensis before (Nordsieck, 1977) and classified these as five separate species, without adding a detailed argumentation. Here we investigate whether there are reliable data in favour of the view that Albinaria, which is by far the most speciose genus in the Clausiliidae, should be split up into even more species, at least in this test-case in A. cretensis. For the time being, we prefer to use the actually most common nomenclature for the taxa involved (see Nordsieck, 1977), even though several specific and subspecific names