Spatial and temporal aspects of the lagoon cockle and its commensal amphipod in the southwestern Caspian Sea

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Abstract. Bivalves and amphipods represent the two most species-rich groups of the Caspian Sea invertebrate fauna. This diversification has led to adaptations of which the commensalism of the amphipod *Cardiophilus baeri* inside the lagoon cockle *Cerastoderma glaucum* is studied here. Animals were sampled at three depths: at 2, 5, and 10 metres, and in different seasons during 1999 and 2000. To study the influence of the amphipod upon the growth of the lagoon cockle,comparisons were made between shell size, biomass, and the number of individuals for eight different regions where the amphipod *Cardiophilus* was present and where it was absent.

Kurzfassung. Muscheln (Bivalvia) und Flohkrebse (Amphipoda) stellen im Kaspischen Meer die artenreichsten Gruppen von Invertebraten dar. Diese Diversifizierung hat zu einer Reihe von Anpassungen geführt, von denen hier der Kommensalismus des Flohkrebses *Cardiophilus baeri* im Inneren der Lagunen-Herzmuschel *Cerastoderma glaucum* untersucht wird. Tiere wurden in Tiefen von 2, 5 und 10 Metern sowie in zwei verschiedenen Jahren (1999 und 2000) gesammelt. Um den Einfluß des Flohkrebses auf das Wachstums der Muschel herauszufinden, wurden in acht verschiedenen Regionen, in denen *Cardiophilus* vorkommt bzw. fehlt, Vergleiche zwischen Schalengröße, Biomasse und der Bestandsdichte angestellt.

Key words. Caspian Sea, commensalism, Bivalvia, *Cerastoderma glaucum*, Crustacea, Amphipoda, *Cardiophilus baeri.*

Introduction

The molluscs in the Caspian Sea are represented by some 120 species (KASYMOV 1994). Eight species originate from the Mediterranean basin, of which three are bivalves. One of these bivalves is *Cerastoderma lamarcki* (Reeve, 1845) which occurs at a salinity of 8-20 ppm in the Caspian Sea. It was found that it cannot survive at a salinity lower than 5 ppm in the northern Caspian Sea (KASYMOV 1994), and it is not tolerant of the low oxygen concentrations that occur in near-bottom waters following falls in the water-level (KATUNIN et al. 1994).

Another cockle, the lagoon cockle *Cerastoderma glaucum* (Poiret, 1789), has a continuous distribution throughout Europe and in areas bordering the Mediterranean and Black Sea. Many taxonomists have reported *Cardium edule* (Linnaeus, 1758) from the Black Sea, the Caspian Sea and the Aral Sea. However, they did not recognise this *Cardium* as the *forma typica*, and noted that varieties were found throughout these waters (RUSSELL 1971). ZENKEVITCH (1957) referred *Cardium edule* to the bottom fauna of the Caspian and Aral Seas. That these cockles should be listed as *C. glaucum* has been suggested by BOWDEN & HEPPELL (1968) (in: RUSSELL 1971). KASYMOV (1995) and MOISEIEV & FILATOVA (1985) made

Zoology in the Middle East 37, 2006: 63–72.
ISSN 0939-7140 © Kasparek Verlag, Heidelberg