



Two new *Gammarus* species (Crustacea, Amphipoda) from warm springs in the south-east pre-alpine area of the Zagros, Iran: habitats with physiological challenges

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Abstract

Despite the prospering results emerging from some recent works on Iranian amphipod fauna, continental waters in the south-east edges of the Zagros Mountain ranges had not been investigated for gammarids before. This paper introduces two new epigeic species, *G. shirazinus* and *G. loeffleri*, distributed in many running waters of four catchment areas in a broad region in the south of Iran. The most important ecological features of the habitats of these species in comparison with previously studied gammarids are higher water temperature and salinity, and lower dissolved oxygen in their habitats, coinciding with decreasing elevation. A comparison of the ultra-structure of the cuticle of the head capsule by scanning electron microscopy between these two new species, and some other species is given. A detailed species description is provided. In addition, the geographical and ecological range of the new species is discussed.

Key words: Amphipoda, Gammaridae, *Gammarus shirazinus*, *Gammarus loeffleri*, Zagros, Fars, Iran, SEM, water temperature, salinity

Introduction

Biodiversity of amphipod crustaceans in the Southern Zagros Region has been investigated in some recent works (Mateus & Mateus, 1990; Stock *et al.*, 1998; Zamanpoore *et al.*, 2009). All these studies introduced several new species to science, as well as those of central Zagros Mountains (Khalaji-Pirbalouty & Sari, 2004; 2006), revealing a high potential of amphipod speciation in the region. Almost all of the analyzed samples, however, were collected from cold springs of mountainous highlands, while a broad region in the south-east skirts of the Zagros mountain-chain was entirely deprived of scientific attention.

Southern margins of Zagros are comprised of many of totally or partially isolated catchment areas. It is well known that among several environmental mechanisms involved in isolation of populations in the course of evolving new taxa, geographical isolation by river catchments is of special importance for aquatic life (Banareescu, 1990). On the other hand, some ecological factors like water temperature and salinity shift to much higher levels as habitats lose altitude at the mountains' peripheries.

This paper presents results of examination of samples from fresh water springs and rivers in various catchment areas in southern margins of the Zagros Mountains, Fars Province, Iran. Two new species are described in detail using macro-morphology and cuticular micro-structures, with an emphasis on the usefulness of scanning electron microscopy (SEM) in amphipod taxonomy. Some ecological data with important variations to the habitats of previously established species are presented and their possible roles are discussed.