



## Diversity and distribution patterns of large branchiopods (Crustacea: Branchiopoda) in temporary pools (Iran)



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### ABSTRACT

A survey on the distribution and status of large branchiopod crustaceans (Branchiopoda: Anostraca, Notostraca, Conchostraca) in Iran was carried out from spring 2008 to summer 2011 with the purpose of providing a systematic contribution to the knowledge of these crustaceans in the region. Data from literature on Iranian large branchiopods are briefly reviewed, and field surveys allowed us to add new data on their presence and co-occurrence in the area. Eleven large branchiopod species were collected, including five Anostraca, three Notostraca and three Conchostraca species. Anostraca have been recorded previously from Iran, but all of the Conchostraca (*Leptesteria* sp., *Caenestheriella* sp. and *Cyzicus* sp.) and *Triops granarius* are new records. Species richness was correlated to pool size and salinity. Diversity analysis revealed that large-size low-salinity (0.5–3 g l<sup>-1</sup>) pools housed more species than the other pool categories. This may suggest strong species-sorting mechanisms and possibly monopolization of resources in small saline pools. Most of the observed large branchiopod species are threatened or remain data deficient due to inadequate knowledge of their distribution. Local extinction risks are high for species with one or two populations due to consecutive years of drought.

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### 1. Introduction

Temporary aquatic habitats have a global distribution being most abundant in semi-arid and arid regions (Brendonck et al., 2008; Jones and Day, 2003). Due to the threats (e.g. land use for agriculture, construction of roads, etc) to these special habitats, there is a need to understand the factors and processes structuring their animal communities. Understanding the processes and factors that structure communities has always been a primary objective in aquatic ecology. Temporary pools have a widespread distribution in all types of habitats but they are an integral part of the landscape of dryland regions. These water bodies can be very important habitats for certain endangered animals in the absence of predators. Among the many invertebrates adapted to breed in vernal pools, large branchiopods take a particular position, as they are ancient and are real specialists of temporary water bodies. The large Branchiopoda (Anostraca, Notostraca, and Conchostraca) are the flagship taxa of temporary aquatic systems having specially evolved in these

variable habitats over many millennia (Brendonck et al., 2008). They possess characteristics such as diapause that have enabled them to persist as permanent residents in conditions that most aquatic taxa find intolerable (Brendonck et al., 2008). They inhabit alkaline pools, ephemeral drainages, rocky outcrop pools, ditches, stream oxbows, stock ponds, vernal pools, vernal swales, and other seasonal wetlands (Eriksen and Belk, 1999). Physico-chemical properties play a central role in shaping temporary habitats and their communities (Angélibert et al., 2004), and it is important to understand factors that influence their temporal and spatial development. Potential factors affecting their distribution include water chemistry, hydrology and depth of unfrozen water in the winter and presence of algae in the spring. Certain environmental conditions are required by the encysted embryos for maturation and hatching, including soil moisture conditions, precipitation patterns and freezing (Colburn, 1997).

Large branchiopods have a worldwide distribution, occurring in some of the most remote places on earth such as Antarctica (Brendonck et al., 2008). Unfortunately the patterns of diversity, distribution and conservation status of these taxa are still poorly known. However, in comparison with the rest of the Middle East, the fauna of Iran appears to be better studied. Nevertheless very little is known about the large branchiopod fauna of this country,

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