

Phylogeny of Iranian species of the genus *Daphnia* O. F. Müller, 1785 (Crustacea: Branchiopoda: Anomopoda) based on morphological characters

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Daphnia is a wide spread member of Cladocera living in different aquatic environments ranging from hypersaline swamps to freshwater lakes, lagoons, streams and rivers. To improve our knowledge on the diversity of the genus *Daphnia* and promote its biogeographical information in Iran, an investigation on the morphology and identification of the Iranian species of the genus was carried out during the spring of 2013 and 2014. The Southern Caspian Sea Basin (SCSB) and Urmia Lake Basin (ULB) *Daphnia* fauna has been studied based on historical literature records and new collections. Zooplanktons were sampled from 29 randomly chosen localities across ca. 2500 km in the SCSB and ULB basins including both permanent habitats (lakes and reservoirs), and small temporary water bodies (ponds and lagoons), both freshwater and saline. Cladistic analysis of Iranian species of genus *Daphnia*, based on 64 morphological characters obtained from the literature, confirmed the traditionally basic division of the genus into two subgenera, *Daphnia* and *Ctenodaphnia*. This split was supported by enough number of synapomorphies. The relationships between all species within both subgenera were determined clearly. A regional identification key to ten Iranian species of the genus *Daphnia* was provided.

Key words: Cladocera, *Daphnia*, Cladistic Phylogeny, Morphology, Key, Iran, SEM

INTRODUCTION

The cosmopolitan genus *Daphnia* O. F. Müller, 1785 (Class: Branchiopoda, Order: Anomopoda, Family: Daphniidae), includes more than 200 known species of freshwater zooplanktons found around the world (Kotov et al. 2013). These filter feeder organisms are ecologically well-known and inhabit most types of freshwater habitats; in a range of water bodies, from small temporary pools to very large lakes (Ebert, 2005). *Daphnia* are one of the important taxa that used as a model organism in aquatic ecology, molecular and evolutionary biology (Jaromir & Petrusek, 2011).

Two out of three *Daphnia* subgenera (*Ctenodaphnia* and *Daphnia*) are known to occur in Iran. Three species of the subgenus *Ctenodaphnia* known from the Palearctic region, including *D. magna* Straus, 1820; *D. atkinsoni* Baird, 1859; *D. similis* Claus, 1876 were listed from Iran (Loffler 1961). Also, the members of the subgenus *Daphnia* including *D. longispina*, O.F.M. 1776; *D. pulex* Leydig, 1860; *D. obtusa* Kurz, 1874 exist in Iran (Loffler 1961). Recently some already reported species such as *D. similis*, *D. magna*, *D. pulex*, and *D. longispina* (Aghaei moghadam & Aslan Parviz, 2003), *D. longispina*