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The study of population composition of *Artemia parthenogenetica* in Mighan Arak Lagoon, Iran

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Abstract

Arak Mighan Wetland is one of the highest salt marshes in Iran, which is located in the center of the country at a distance of 8 kilometers to the northeast of Arak city, and it is considered one of the valuable sources of *Artemia* in the country. *Artemia* has a great nutritional value for feeding the sensitive larval and brood stages of shrimp, sturgeon, ornamental and marine fish. In this study, 18 different stations were selected in Arak Mighan lagoon with the aim of evaluating the cyst and bio mass of *Artemia parthenogenetica*, during March 2018 to February 2019. The amounts of cysts, nauplii, metanapulii, female and male adult *Artemia* present in Mighan lagoon were determined. The maximum amounts of cysts (1076 cysts per liter) and the biomass of *Artemia* (42.22 nauplii per liter, 412.44 metanauplii per liter, 16.22 pieces per liter of adult female *Artemia* and 4.22 pieces per liter of adult male *Artemia*) were observed in December. Appropriate management solutions for the sustainable use of these valuable reserves require further investigations, taking into account the special and unstable conditions of Mighan wetland depending on each season and year. It is recommended to create an integrated management of the Mighan Lake catchment area in order to protect the lake and its biodiversity as a unique ecological resource and ecosystem.

Keywords: *Artemia*, Mighan lagoon, Cyst, Biomass

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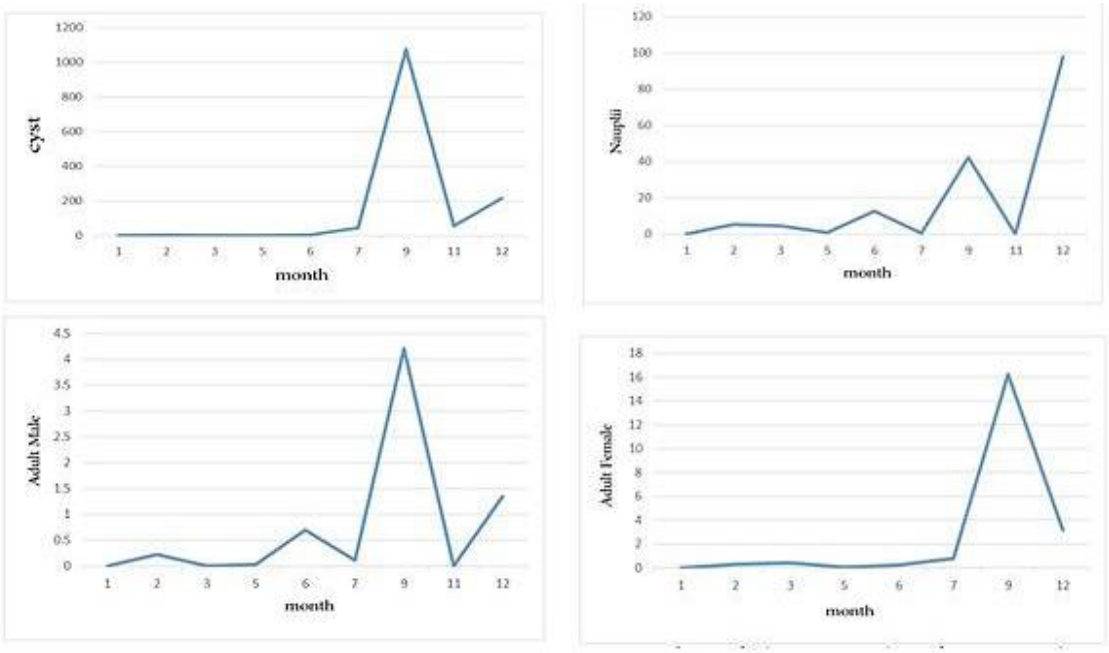
Introduction

Artemia is a crustacean that has found the ability to live in salty ecosystems. The salt lagoon of Mighan Arak is considered one of the valuable resources of this crustacean in the country. The Artemia strain of Mighan Arak lake has parthenogenesis reproduction (Hafezieh, 2003: Shoa Hassani and Jafari, 2003). Artemia has a lot of nutritional value for feeding the sensitive larval and brood stocks of shrimp, sturgeon, ornamental and marine fish (Sorgeloos *et al*., 1986).

In general, knowing the habitat needs of species and studying the factors affecting their habitat and survival is very important in the proper protection of species and their habitat (Sadeghi *et al*., 2013, 2014; Zarkami *et al*., 2014; Hesami *et al*., 2017). The catchment area of Mighan Lagoon with an area of 549,578 hectares is located in Markazi Province. The purpose of this research is to investigate the population composition of Artemia in Mighan Arak lagoon.



Materials and methods

Mighan Arak Wetland is located in the center of the country and 8 kilometers northeast of Arak city. In this research, 18 stations were selected and sampling was done monthly from March 2017 to February 2018. Artemia samples were fixed by 4% Luol's solution immediately after harvesting. In the laboratory of the National Artemia Research Center, the life stages of Artemia were recorded with the help of a Nikon model stereomicroscope, including: cyst, nauplii, metanauplii, post-metanauplii, young and adult male and female Artemia (Hafzieh, 2003; Van Stappen, 1996).

Results

The results of changes in the number of *Artemia* cysts, Nauplii, adult males and adult females in each liter of Mighan wetland during March 2018 to February 2019 were shown below.

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Discussion

Wetlands become one of the most diverse and productive ecosystems in the world. Mighan wetland is one of the saline and limited wetlands in Iran. In order to preserve *Artemia* stock, it is necessary to manage its cysts and biomass harvesting. In the study of Hesami *et al*. (2017), reported that the lowest abundance of *Artemia* was observed in the month of February, and with the passage of time until September, an increasing trend was observed in the abundance of *Artemia* in Mighan wetland, and then a decreasing trend was observed from September to February. In the present study, the first and second peaks were observed during June and September, and then the highest production occurred from September to early December. The findings of the researchers (Wayne *et al*., 2001; Al Dhaheri and Saji, 2013) also confirmed this issue and it was found that the lowest abundance of *Artemia* is seen in the winter season, especially in the month of February, and the overall trend of decreasing the abundance of these organisms started from December and it will last until April. Special environmental factors and conditions such as low rainfall and increase in temperature in saltwater wetlands such as the desert ecosystem of Mighan wetland can increase the amount of evaporation from the water surface of the wetland and this in turn causes an increase in salt concentration in the water, so according to these factors we can conclude It was found that with the increase in temperature during the late spring and the whole summer and even early autumn, the growth of phytoplankton and the subsequent increase in the population of *Artemia* can be observed. It has also been reported that different seasons of the year can affect the presence of saltwater animals, so that it will witness the highest density in autumn and less in the rest of the year. The results showed that the maximum amount of cysts and adults of *Artemia* was observed in December and lower peaks were also observed in June and September. Applying proper management for sustainable productivity of these valuable reserves requires further investigations, taking into account the special and unstable conditions of Mighan wetland depending on each season.

References

Al Dhaheri, S. and Saji., A., 2013. Water quality and brine shrimp (*Artemia* sp.) population in Al Wathba Lake, Al Wathba Wetland Reserve, Abu Dhabi Emirate, UAE. *International Journal of Biodiversity and Conservation*, 5, pp. 281-288.

Hafezieh, M., 2003. Artemia (Brine shrimp). Iranian Fisheries Science Research Institute, 240 P.

Hesami, H., Zarkami, R. and Agh., N., 2017. Habitat suitability of Artemia parthenogenetica in Meighan wetland (Markazi province) using multivariate analysis. *Animal Research Journal (Iranian Biology Journal)*, 30(**4**), 413-427.

Naessens, E., 1990. Artemia stock assessment in Grate Salt Lake, Utah,

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[DOI: 10.22034/INJBIR.1.2.73]

USA. In: Grate Salt Lake Book, 1991, Sunders and Sons, USA.

Sadeghi, R., Zarkami, R., Sabetraftar, K. and Van Damme, P., 2013. Application of genetic algorithm and greedy stepwise to select input variables in classification tree models for the prediction of habitat requirements of *Azolla filiculoides* (Lam) in Anzali wetland, Iran. Ecological Modelling, 251, pp. 44-53.

Sadeghi, R., Zarkami, R. and Van Damme, P., 2014. Modelling habitat preference of an alien aquatic fern, Azolla *filiculoides* (Lam), in wetland using data-driven methods. Ecological Modelling, 284, pp. 1-9.

Shoa Hassani, A. and Jafari, M., 2003. *Artemia* (Fist Volume). Daryasar Publications. 127p.

Sorgeloos, P., Lavens, P., Léger, P., Tackaert, W. and Versichele, D., 1986. Manual for the culture and use of brine shrimp *Artemia* in aquaculture. State University of Ghent, Ghent, Belgium, 319 P.

Van Stappen, G., 1996. Introduction of bilology and ecology of Artemia. Laboratory of Aquaculture & Artemia Reference Center University of Gent, Belgium. Manual on the production and use of live food for aquaculture. *In FAO Fisheries Technical Paper*, 361. pp.79-106.

Wayne, A., Wurtsbaugh, W.A. and Gliwicz, Z.M., 2001. Limnological control of brine shrimp population dynamics and cyst production in the Great Salt Lake, Utah. Hydrobiologia, 466, pp. 119-132.

Zarkami, R., Sadeghi, R. and Goethals, P., 2014. Modelling occurrence of roach "*Rutilus rutilus*" in streams. *Aquatic Ecology*, 48, pp. 161-177.

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