

# Seasonal occurrence of ostracod species in Lake Kara Murat (Bolu, Turkey)

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**Introduction:** Depending on several limnoecological (a/biotic) factors, seasonal occurrence of ostracods can be varied among the species (Hoff 1943; Külköylüoğlu 1998, 1999; Rossetti et al. 2004). If the levels and relationships of those effective factors are known or estimated, using this information will aid to understand ecological characteristics of the habitats. For example, knowledge can be used to determine when and which ostracod (or any species) will cooccur. In such a case, possible and accurate estimations about species diversity and richness can be made along. However, seasonal and monthly studies on nonmarine ostracods are not common despite the fact that seasonality is one of the most unique proxies of ostracods respond to the changes in the habitats. Recently, Gürer and Külköylüoğlu (2019) indicated that ostracod diversity can also be related to habitat types such as artificial (e.g., troughs, canal) and natural habitats (e.g., lakes, creeks, wetlands) where artificial habitats tend to carry more cosmopolitan species than the natural one. The authors pointed out that both seasonality (referring to seasonal changes and/or climatic changes) and habitat types can have different levels of influences on species assemblages. The present study includes several different hypotheses. However, at the moment, aims of this study are: 1) to make the first monthly study on ostracods seasonal occurrences in Lake Karamurat, and 2) to determine limnoecological characteristics of the lake. Detailed results will be presented or published elsewhere.

**Materials and Methods:** Lake Kara Murat (40°33'51"N, 30° 57'19"E) (Fig. 1) is a small and shallow monomictic lake located in the west of Bolu city. There are no previous studies on the lake ostracods. To investigate seasonality of nonmarine ostracods and compare species assemblages between the lake and the spring source which is the main flowing creek to the lake, we sampled seven (five from the lake, one upper (head of the flowing water) spring source, one lower site) stations 12 months from 2019 and 2021. Sediments are gathered from littoral zones by plankton hand net while Ekman dredge was used for sampling from the deepest parts (Fig. 2). We use YSI Professional Plus-Multiprobe and anemometer to measure values of water variables and air, respectively. Samples were put into 250 ml container and fixed in 70% alcohol. In the laboratory, samples were filtered from three sieves and kept in 70% alcohol. Ostracods are picked from sediment under Olympus BX-51 stereo microscope for species description. Seasonality of individual species was illustrated with Ostracod Watch Model (OWM) (Küçüköylüoğlu, 1998). Further analyses will be done for species ecological preferences.

**Results:** We measured maximum length, width and the depth of Lake Kara Murat is 310 m, 170 m, and ca. 9.25 m., respectively (this study). The lake shows a monomictic type where there is one mixing in a year. It receives couple of inflows along with one outflow. The lake shows relatively cool/cold average water temperature (ca. 14°C) and dissolved oxygen (10 mg/L). Regarding to the ostracods (Fig. 3), 10 living taxa (Table 1) were found while *Darwinula stevensoni* (Fig. 4) and *Cypria ophthalmica* were the dominant species the lake. *Potamocypris cf. similis*, *Psychrodromus cf. fontinalis* and *P. olivaceus* were reported from outside of the lake, from the spring sources. A relatively rare species, *Notodromas monacha*, was found in May and June while two species (*D. stevensoni*, *C. ophthalmica*) were encountered from almost all stations in each month. Temporary conclusions about ostracods are provided in here because studies on different taxonomic groups and analyses of the data are still under the process.



Fig 2. Lake Kara Murat, sampling sites, and several views from different perspectives.

The materials that we are using is :

Kestrel Anemometer  
YSI Professional Plus, Multiprobe  
Secchi Disk  
Ekman Dredges, Ponar Dredge  
Hand dredge,  
Sieve,  
Stereo microscope

Fig. 1. Tools used during the study.

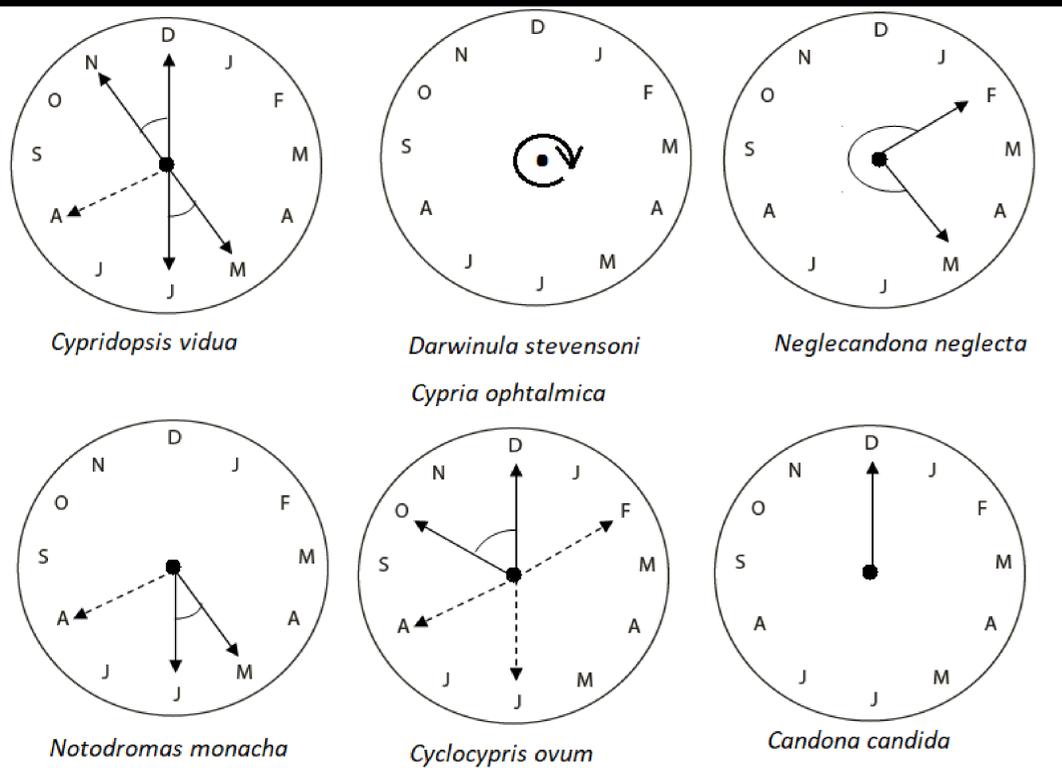


Fig. 3. Monthly occurrences of seven species based on Ostracod Watch Model (OWM). (D, December, J, January,...). Full circle shows occurrence is all year around while angle shows species occurrence.

#### Acknowledgments:

Çağdaş Güleç is thanked for his help during the field work.

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Taxa	Habitat
<i>Cypria ophthalmica</i>	lake
<i>Darwinula stevensoni</i>	lake
<i>Neglecondona neglecta</i>	lake
<i>Candona candida</i>	lake
<i>Candona sp.1</i>	lake
<i>Cypridopsis vidua</i>	lake
<i>Cypridopsis sp.1</i>	lake
<i>Cyclocypris ovum</i>	lake
<i>Ilyocypris bradyi</i>	lake
<i>Notodromas monacha</i>	lake
<i>Potamocypris cf. similis</i>	stream/spring
<i>Psychrodromus cf. fontinalis</i>	stream/spring
<i>Psychrodromus olivaceus</i>	stream/spring



Fig. 4. *Darwinula stevensoni*