

DISTRIBUTION OF PEARL MULLETT

Distribution of pearl mullet in Turkey : There is not much information available on when and how pearl mullet has originally moved to Lake Van . *Global and Turkey Zoogeography "Animal Geography"* (Demirsoy, 1996) claims that there was a huge freshwater lake including Muş Plain at where Lake Van is located today. Furthermore, Murat River which is on the border of Muş Province today used to flow into the freshwater lake, and thus some of West Asia and European forms might have migrated to the area via that inland lake.

We deduce from such research results that the root directory of pearl mullets can be traced back to Europe and West Asia . With Nemrut Volcano blocking the exit to Muş Plain, it had gradually become a brackish water ecosystem under the influence of some terrestrial volcanic areas around. We know that *Chalcalburnus*, originally a genus of freshwater forms, can adapt itself into living in brackish and salty waters in time. Presumably, *Chalcalburnus* sp of the inland lake before Lake Van ever existed, had adapted into living in salty-alkaline waters. It gradually became different from other species which later was named as *Chalcalburnus tarichi*. As noted earlier, the pearl mullet is an endemic species unique to Lake Van . It cannot find any exit out from the closed Lake Van Basin . Therefore, there is no distribution of pearl mullets elsewhere in Turkey . Only a few genera of *Chalcalburnus* are available at almost all inland waters in our country.

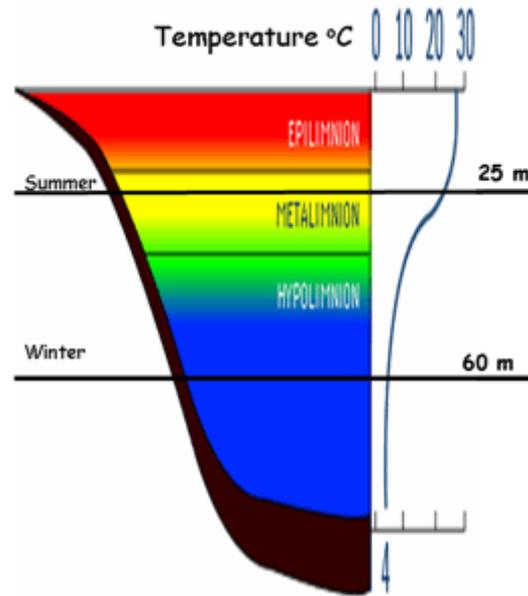
Distribution of pearl mullet at Lake Van Basin : Pearl mullet is mainly an inhabitant of Lake Van . In other words, its primary habitat is Lake Van . Fish moves to rivers only for reproduction purposes. It basically spends its entire life in the lake except for the reproduction season. This does not mean that pearl mullet is nothing

but a form of life surviving only in the lake. There is a second form living in almost every stream that flows into the lake. It spends its entire life in rivers without ever migrating. This form is smaller than pearl mullets living in the lake. When compared to them, the members of the second form become adults at a smaller length and weight. Therefore, the place selected for fish sampling is very important when studying reproduction, growth and population characteristics of the pearl mullet. If we use fish sampling taken from rivers in evaluating lake fish population, some incorrect management of data might occur. In 1985, the Provincial Directorate of Agriculture in Van has placed a pearl mullet population in Lake Erçek , located to the east of Lake Van with similar salty-alkaline waters and with 114 km² surface area. When compared to Lake Van , Erçek is warmer with lower salinity and pH levels. This leads to the higher amounts of zooplankton and phytoplankton at unit volume. For this reason, pearl mullets here are larger than those living in Lake Van . Another reason for higher magnitude of Lake Erçek fish population is the fact that it has not reached the carrying capacity of the environment yet. Thus, the amount of food available per individual fish is high enough. The distribution of pearl mullet can also be seen in Lake Nazik , located to the west of Lake Van within Bitlis-Ahlat area. It is assumed that fish had already moved to this lake via Karmış Stream flowing into Lake Van and later was connected to Lake Nazik by artificial water channels.

Pearl mullets can be found in almost dam reservoir built in the lake basin. But fish population both in Lake Nazik and in dam reservoirs have developed distinct characteristics from those inhabitants of the lake.

Distribution of pearl mullet in Lake Van: Depending on seasons, food distribution, and lunar cycles, the distribution of pearl mullet in Lake Van varies significantly. The lake water on the surface shifts with the water at the bottom two times in a year. As

commonly known, water reaches its highest density level and weight at +4 °C. The surface water temperature rarely reaches to +4 °C in winter. The lower temperatures are mostly observed. As the weather gets warmer in the spring, the surface water temperature also rises in the lake. When it reaches to +4 °C, the heavier water shifts downward, and in return, the colder but also less heavy water at the bottom moves upward to the surface. During this time period, any food items accumulated at the bottom area will also be transferred to the euphotic zone where it can easily be integrated with the biological process. After such shifting in the spring, temperature stratification occurs in direct relation to water depth of the lake. There is a layer of epilimnion around 15-20 m on the surface. Right below, there is a thermocline layer starting from 10°C and ending at 5°C with varying thickness. Down at the bottom, there is a deepwater layer around 4-6 °C with only a minor change in temperature. As the weather gets colder in autumn, the surface water temperature also decreases to +4 °C. This further leads to heavy surface water shifting downward to replace water at the bottom. So, temperature stratification occurred earlier in summer will be eliminated as well. In other words, while stratification can be seen in lake waters at summer depending on water depth and temperature, there is no such stratification during winter.



Thermal stratification in Lake Van and pearl mullet distribution by season

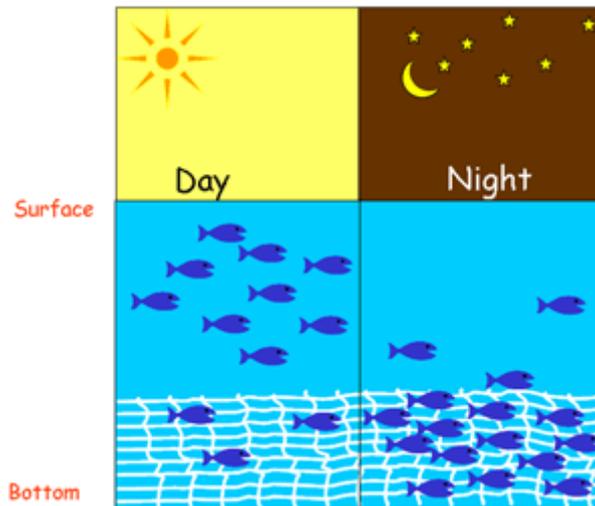
The distribution of pearl mullets is inherently affected by temperature stratification. During summer, the distribution of pearl mullets can be seen up to 25 m water depth and to 60 m at maximum during winter. When the water is very rough and cold on the surface, pearl mullets rarely move deeper than 60 m and goes back very shortly. Because copepods as the main food items of the pearl mullet cannot survive deeper than 60 m. There is some general information about the distribution of pearl mullet in Lake Van as provided in the following charts.

Months	Water dept by fish found, m	Finding Location	
		Lake	Rivers
January	40-60	*	
February	40-60	*	
March	20-30	*	
April	5-20	**	*
May	1-15	**	***
June	1-15	*	***
July	5-20	***	*
Agust	5-20	*	
September	10-25	*	
October	15-35	*	
November	25-40	*	
December	40-60	*	

Pearl mullet disribution in Lake Van by months and migration period to rivers

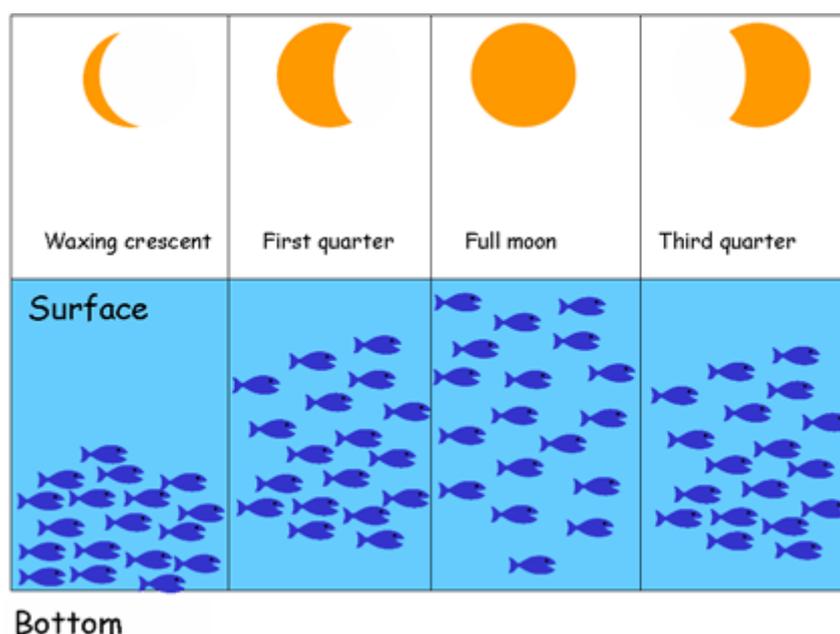
The distribution of adult and juvenile pearl mullets in the lake is different from each other. Data given in the chart are valid mostly for adult fish members. Although the distribution of juvenile pearl mullets gets closer to adult members, it is still different from them. Juvenile pearl mullets move nearby the shores of the lake with 50 cm depth at summer. Like adult fish members, they tend to move deeper as the weather gets colder.

The distribution of pear mullet in Lake Van also varies with several times of the day. During the day, fish distribution tends to be more on the water surface whereas during the night it gets closer to the bottom.



Pearl Mullet distribution at day and night by water dept

Moonlight is another influential factor on the distribution of pearl mullet in the lake. At dark lunar phases, fish are distributed closer to the bottom whereas at bright phases they tend to move closer to the surface as they do at daylight. Varying distribution at day and night together with behavioral differences at several lunar phases are all caused by copepods moving in response to the stimulus light (positive phototaxis). This is commonly a well known behavioral pattern for such marine fish species as European anchovy, European pilchard, etc.



Pearl Mullet distribution according to moon phase by water depth

View more <https://mvatoi.com.vn/incikefali.html>