

## The Dietary Regime of the Pike (*Esox lucius* L., 1758) in Lake Uluabat (Bursa, Turkey)

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**Abstract:** In this study, 75 Pikes were caught with the help of several fishnets and fishhooks in Lake Uluabat between March 2006-March 2007. The analyses of the contents of the digestive system showed that there was only fish as the nutrition type.

**Key words:** Lake uluabat, pike (*Esox lucius* L., 1758), digestive system contents, nutrition, Turkey

### INTRODUCTION

The role of vegetable and animal protein in nutrition is unquestionable. However, the continuous increase of the human population, the spread of conscious nutrition and the scarcity of animal food hampers the fulfillment of the need for this protein. Fulfilling this need requires developing new production techniques. The fact that the fish contains high quality protein necessitates employing water resources in the best way for meeting, the lack of animal protein. In this respect, both rendering productive the stocks and paying attention to the breeding of the economical fish species present in natural resources would yield in the desired results. What should be done in order to meet this lack is to increase the fishing productivity by enriching the stocks in the natural resources (Alpbaz and Hossucu, 1996).

In order to enrich the fish stocks, primarily the nutrient preference of the fish to be bred should be determined and then this type of nutrient should be sufficiently provided in that environment. Thus, the breeding of the economically valuable fish would be accomplished in shorter period, more productively with an increased amount.

### MATERIALS AND METHODS

Lake Uluabat is a freshwater lake found in 40°10'N, 28°35'E coordinates and at 9 m altitude above sea level with a surface area of average 15700 ha. Lake Uluabat is in the provincial district of Bursa and 25 km away from the city of Bursa (Fig. 1). The lake is a shallow freshwater lake with a water level which varies according to the years and seasons, covering a surface area of 160 km<sup>2</sup> in normal water level. With an average depth of 2.5 m, the lake is

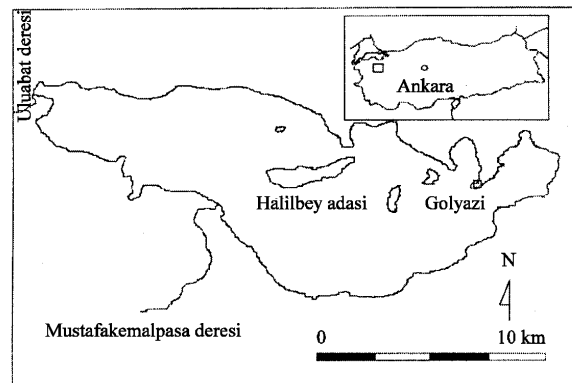


Fig. 1: The Map of Lake Uluabat

reported to be eutrophic in ecologic terms. The species found in this lake are *Rutilus rutilus* (L., 1758), *Scardinius erythrophthalmus* (L., 1758), *Blicca björkna* (L., 1758), *Alosa maeotica* (L., 1758), *Vimba vimba* (L., 1758), *Alburnus alburnus* (L., 1758), *Chalcalburnus chalcoides* (L., 1758), *Carassius carassius* (L., 1758), *Esox lucius* (L., 1758), *Tinca tinca* (L., 1758), *Cyprinus carpio* (L., 1758) and *Mugil cephalus* (L., 1758) (Kuru *et al.*, 2001; Balik and Cubuk, 2001).

Monthly fieldworks were done in Lake Uluabat between March 2006 and 2007. About 75 samples of Pike were caught by means of several fishnets and fishhooks with varying divisions. The process of digestion of the caught samples was blocked by immediately killing them, the digestive system (the part from the oesophagus to the anus) was removed and it was rolled in cheesecloth to be kept in 4% formaldehyde (Spataru and Gophen, 1986, 1987).

Opening up the digestive systems of the samples, the nutrition types were examined macroscopically and microscopically and the alimentation of the Pike was investigated with the obtained data.

**RESULTS**

Among the 75 samples investigated, nutrient type was not found in the digestive system of 7 samples. Nutrient types were discovered in the digestive system contents of all the samples caught in fall and winter, whereas in total 7 samples, 5 caught in spring and 2 caught in summer, did not contain nutrient types (Table 1).

The only nutrient type in the digestive system contents of the examined samples was fish. The species of the fish consumed as nutrients were identified as *Vimba vimba*, *Cyprinus carpio* and *Rutilus rutilus*. The other fish samples of the species alimentation could not be identified since they were partially digested.

The highest volume of seasonal digestive system contents of the Pike was in winter season with an average of 9.95 cm<sup>3</sup>, followed by 8.07 in fall and 4.97 in spring. The lowest value was observed as 3.69 in summer season (Fig. 2).

When seasonal presence frequency was considered, a ratio of 100% was observed in fall and winter, followed by 92% in summer and the lowest value of 79% in spring. The annual presence frequency was calculated as 91% (Fig. 3).

**DISCUSSION**

During the sampling period, also some physicochemical characteristics of Lake Uluabat were determined (Table 2).

The reason why the Pike gets less nourishment in summer is because the increase in temperature speeds up their metabolism and therefore, the nutrients taken are digested in a short time. Since, the digestion slows down with the decrease in temperature and thus, the nutrients taken cannot be digested in a short time, more nutrients were found in their digestive system contents (Table 2, Fig. 2 and 3). During the research, the nutrient type found in the digestive systems of the Pike was only fish. Therefore, fish constitutes the major nutrient source for the Pike. This observation is in line with the research of many researchers, however, differently from them, the examinations found out only fish as the nutrient type (Yilmaz and Polat, 2005; Alp *et al.*, 2008; Cortes, 1997; Geldiay and Balik, 2002; Lorenzoni *et al.*, 2002; Altindag *et al.*, 1999). This shows us that the Pike selects

Table 1: Seasonal alimentation of the Pike in Lake Uluabat

Seasons	Full digestive system	Empty digestive system	Percentage of the full digestive system (%)
Spring	19	5	79.16
Summer	25	2	92.59
Fall	13	-	100.00
Winter	11	-	100.00
Total	68	7	89.76

Table 2: Some physicochemical characteristics of Lake Uluabat

Months	Temperature °C	pH	Dissolved oxygen (mg l <sup>-1</sup> )
March	13.36	8.76	14.62
April	19.08	8.25	7.62
May	22.50	8.32	7.12
June	23.04	8.36	7.63
July	25.68	8.79	6.34
August	23.80	8.50	6.40
September	23.06	8.21	5.38
October	18.25	8.29	7.38
November	12.03	8.03	9.34
December	9.70	8.21	8.26
January	8.20	8.42	8.41
February	8.10	8.12	9.54

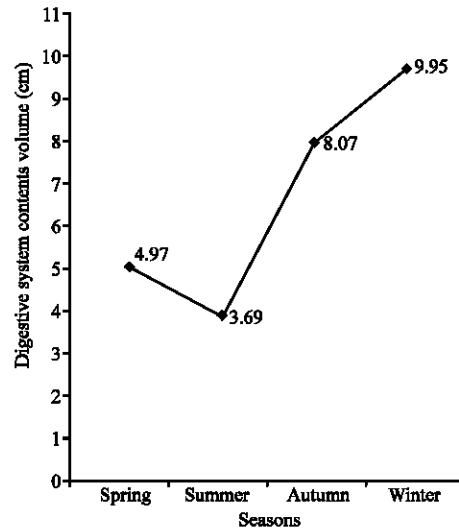


Fig. 2: Seasonal digestive system contents volume of the Pike

its nutrients. The seasonal volume of the digestive system contents of the Pike was found the highest in winter with an average of 9.95 cm<sup>3</sup>, followed by 8.07 in fall and 4.97 in spring. The lowest value was observed in summer as 3.69. When seasonal presence percentage was tackled, a ratio of 100% was observed in fall and winter seasons followed by 92% in summer and the lowest value of 79% in spring. When considered annually, the presence frequency was calculated as 91% (Fig. 3). It was reported that the Pike has a high metabolism rate in high temperature (Diana, 1979; 1983). For the metabolism speeds up with an

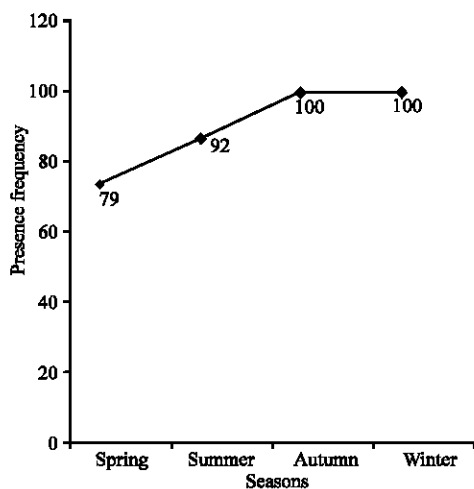


Fig. 3: Seasonal presence frequency of the Pike

increase in temperature, the nutrients would be digested faster. This situation is due to the fast digestion of the nutrients, rather than less alimentation of the fish during summer. As a result of the slow digestion caused by a decrease in temperature, the nutrients cannot be digested in a short period and thus, nutrient types are found abundantly in the digestive system contents. This is in line with one of our previous studies.

### CONCLUSION

Consequently; it is observed that the Pike, taken from Lake Uluabat, preferred only fish as their nutrient type and did not use the other types of nutrients present in their environment as nutrients.

This is because the Pike can alter its alimentation according to the nutrient capacity of their environment. While the fish is the primary nutrient of preference, when there is a lack of fish, it can consume the other nutrient types. The fact that Lake Uluabat is a eutrophic lake ensures that the nutritiousness capacity is high. The nutrition preference of the Pike in Lake Uluabat towards fish could be considered an indicator of this situation.

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