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# *Paraergasilus longidigitus* Yin, 1954 (Copepoda: Poecilostomatoida) Infestations in the Bleak, *Alburnus alburnus* Lin.,1758 from Enne Dam Lake

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**SUMMARY:** In the present study, *Paraergasilus longidigitus* Yin, 1954 (Copepoda: Poecilostomatoida) was identified in branchial flaments of *Alburnus alburnus* Lin.,1758 caught from Enne Dam Lake for the first time in Turkish fauna. The study carried out monthly between June 98 - May 99, and a total of 208 fish was collected. The distribution of parasitic copepods in relation with the length, sex of fish were recorded. The fishes were infested with *P. longidigitus* with a mean intensity of 6.2 and an prevalence incidence of 56.7%. The infestation prevalence and mean intensity were seasonal with higher levels in autumn with 74.2%. No significant differences were noticed in the infestation of male and female fishes. A slight increase in the infestation prevalence was recorded as the size of fish increased.

**Key Words:** *Paraergasilus*, bleak, *Alburnus*, Enne Dam Lake, Turkey.

**Enne Baraj Gölünden *Alburnus alburnus* Lin.,1758, İnci Balığında *Paraergasilus longidigitus* Yin, 1954 (Copepoda: Poecilostomatoida) İnfestasyonları**

**ÖZET:** Bu çalışmada, Enne Baraj Gölü' nden yakalanan *Alburnus alburnus* Lin.,1758'un solungaç flamentlerinde Türk Faunası için ilk kez *Paraergasilus longidigitus* Yin, 1954 (Copepoda: Poecilostomatoida) teşhis edilmiştir. Çalışma Haziran 1998 - Mayıs 1999 arasında yürütülmüş ve toplam 208 balık toplanmıştır.Parazitik kopepodun dağılımıyla ilgili balığın cinsiyeti, uzunluğu kaydedilmiştir. Balıklar *P. longidigitus* ile %56,7'lik bir yüzde ve 6.2 ortalama intensite ile infeste olmuşlardır. İnci balıklarında mevsimsel infestasyon yüzdesi ve ortalama intensitede sonbahar %74,2 ile daha yüksektir. Erkek ve dişi balıklardaki infestasyonda belirgin bir fark görülmemiştir. Artan balık büyüklüğüne bağlı olarak infestasyon yüzdesinde bir artış kaydedilmiştir.

**Anahtar Sözcükler:** *Paraergasilus*, inci balığı, *Alburnus*, Enne Baraj Gölü, Türkiye.

## INTRODUCTION

The genus *Paraergasilus* exhibits a relatively low level of host specificity at the family level, since it parasitizes a total of 11 host families. *Paraergasilus* species also utilize more than 20 species of Cyprinidae, reacting the generally low specificity at the host species level within that family (12).

The genus *Paraergasilus with P. rylovi* Markevich, 1937 was described for the first time by Markevich (21). Later thirteen new species were described from Asia, Africa, Australia, America, Mexico; *P. brevidigitus* Yin, 1954, *P. longidigitus* Yin, 1954, *P. medius* Yin, 1956, *P. mimus* Yin, 1962, *P. minutus* Fryer, 1956, *P. lagoonaris* Paperna, 1969, *P. remulus* Cressey and Collette, 1970, *P. acanthopagri* Roubal, 1981, *P. inflatus* Ho, Jayarajan and Radhakrishan, 1992, *P. reductus* Reddy and Kasaiah, 1994, *P. dentatus* Ho et al. 1996, *P. dichotomus* El-Rashidy and Boxshall, 2001, *P. curtus* El-Rashidy and Boxshall, 2001 (12).

Seven species of ergasilids are currently known from Turkey; with six species in Ergasilus; one in Nipergasilus. These are; *Ergasilus briani* Markevich, 1932, *Ergasilus gibbus* Nordmann, 1832, *Ergasilus sieboldi* Nordmann, 1832, *Ergasilus* sp, *Ergasilus nanus* van Beneden, 1870, *Ergasilus mosulensis* Rahemo, 1982, *Nipergasilus bora* Yamaguti, 1939.

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There are reports concerning species belong to Ergasilidae family from freshwater fish (1, 3, 5, 8, 14, 23, 27, 28) and marine fish (2, 4, 22) of Turkey. Little is known about *P. longidigitus*. This study is specifically aimed to investigate the distribution of this copepod in relation with the length, sex of *A. alburnus.*

## MATERIAL AND METHOD

Fish were caught monthly by beach seining (18 mm mesh) during the period August 1998- May 1999 from Enne Dam Lake. A total of 208 fish were investigated. The fish were usually kept in fish boxes after capture. Total length, weight and sex of the fish were recorded to parasite cards. Parasites were collected from the host in the laboratory (Dumlupınar University, Science-Literature Faculty, Department of Biology) and fixed in 70% alcohol.

Enne Dam ($36^0$ 41' N $37^0$ 49' E, Kütahya) has been constructed for to obtain water to thermic santral (88 %), to irritate (12 %). The dam lake has a total area of 1000 decare and varying in depth from 13 to 22m. Seven fish species (*A. alburnus, Leuscis cephalus, Cyprinus carpio, Nemachlius* sp., *Barbus plebejus, Carassius carassius, C. auratus)* are found in the Enne Dam Lake.

Identification was done according to by Bykhovskaya-Pavlovskaya et al. (6), Yamaguti (33), Yin (34).

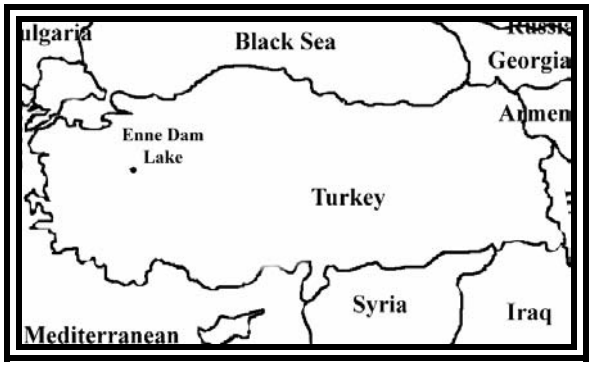


**Figure 1.** Sampling site for *Alburnus alburnus*

## RESULTS

*Paraergasilus longidigitus* Yin, 1954 and *Paraergasilus* genus not previously documented in Turkey were identified.

Of the 208 fish specimens examined, 118 fish were infested with a prevalence 56.7% and mean intensity level of 6.2 *P. longidigitus* per infested fish. Infestation prevalence levels in all the seasons stayed above 34% during the examination. In seasonly basis, the highest prevalence of *P. longidigitus* was recorded with 74.2% in autumn and the lowest prevalence with 34.8% in spring 98. The highest and lowest of mean *P. longidigitus* intensity were recorded with 7 in autumn, 5.2 in summer, respectively (Table 1).

A total of 136 female and 72 male fish were examined for the presence of *P. longidigitus*. No significant differences were noticed in the infestation of male and female fishes (Table 2).

A slight increase in the infestation prevalence was also recorded as the size of fish increased. Very close mean intensity values on each length class of fish were determined (Table 3).

## DISCUSSION

*P. longidigitus* was described on 12 species of Cyprinidae and on three other hosts of the families Siluridae, Moronidae and Channidae in China for the first time by Yin (34). As pointed out by Chernysheva and Purasjoki (9), the subspecies *P. rylovi borysthenicus* Sukhenko, 1967, described from the river Dnieper (30), is a synonym of *P. longidigitus*. *Paraergasilus longidigitus* was later reported on members of the Bagridae and Cyprinidae in Japan (10), and on the pinfish, *Lagodon rhomboides* along the Gulf of Mexico (17). El-Rashidy and Boxshall (12) record *P. longidigitus* on two species of Cichlidae: *Oreochromis mossambicus* and *Cichlasoma urophthalmus* collected on a brackish water fish farm at Puerto Ceiba in Mexico. The new records of *Paraergasilus* in the Americas are associated with aquaculture facilities, and it is possible that its presence around the Gulf of Mexico region may be a result of anthropogenic introduction according to El-Rashidy and Boxshall (12).

There is no information in the literature about the infestation *Paraergasilus* of bleak from Turkish freshwater systems. However, the present results of the prevalence of *Paraergasilus* in Turkish bleak can be compared with those from other ergasilid infestations. Heavy infestations of *Paraergasilus* and *Ergasilus* species studied from natural and cultured populations have also been reported by several authors in Turkey and other countries.

In the seasonaly fluctuations, the highest prevalence of infestation of *Alburnus alburnus* with *Paraergasilus longidigitus* was recorded with 74.2% in autumn and the lowest prevalence with 34.8% in spring. The highest and lowest of mean *Paraergasilus longidigitus* intensity were recorded with 7 in autumn, 5.2 in summer respectively. Similar trends in the fluctuations in incidence were noted in case of *Ergasilus nanus* from Turkey (2, 22, 23), and Israel (25) and Montenegro (26), *Ergasilus mosulensis* from Mosul (13) and Basrah (18); *Ergasilus gibbus* from Lake Ontorio of Canada (31) and Macedonia (29); *Dermoergasilus varicoleus* from Basrah (19); *Ergasilus lizae* from Australia (7); *Ergasilus sieboldi* from Macedonia (29).

Such changes in the prevalence and mean intensity levels are due to the death of old parasitic females as mentioned in the case of other ergasilids (31). Host behaviour may influence the composition of fish parasitic fauna (11). Bleaks spawn and feed during spring and summer in shallow waters with dense

**Table 1.** Infestation prevalence and Mean Intensity levels of *P. longidigitus*

| Seasons | No of fish examined | No of fish infested | Prevalence (%) | Total parasite | Mean Intensity | Parasite per infested fish |
|---|---|---|---|---|---|---|
| **Summer** | 63 | 33 | 52.4 | 170 | 5.2 | 1-10 |
| **Autumn** | 62 | 46 | 74.2 | 320 | 7 | 2-15 |
| **Winter** | 37 | 23 | 62.2 | 148 | 6.4 | 1-20 |
| **Spring** | 46 | 16 | 34.8 | 93 | 5.8 | 2-10 |
| **Total** | 208 | 118 | 56.7 | 731 | 6.2 | 1-20 |

**Table 2.** Infestation prevalence and Mean Intensity levels of *P. longidigitus* according to the sex of *A. alburnus*

| No of fish examined | | No of fish infested | | Prevalence (%) | | Total parasite | | Mean Intensity | |
|---|---|---|---|---|---|---|---|---|---|
| **F** | **M** | **F** | **M** | **F** | **M** | **F** | **M** | **F** | **M** |
| 136 | 72 | 82 | 36 | 60 | 50 | 568 | 163 | 7 | 4.5 |

**Table 3.** Infestation prevalence and Mean Intensity levels of *P. longidigitus* according to fish lengths

| Length of fish (mm) | No of fish examined | No of fish infested | Prevalence (%) | Total parasite | Mean Intensity |
|---|---|---|---|---|---|
| **85-100** | 66 | 35 | 53 | 217 | 6.2 |
| **101-115** | 77 | 32 | 42 | 181 | 5.7 |
| **116-130** | 52 | 40 | 77 | 268 | 6.7 |
| **131-160** | 13 | 11 | 84 | 65 | 6 |
| **Total** | 208 | 118 | - | 731 | - |

vegetation (15). Such environment factors is favorable for the ergasilids and their infective stages.

The numbers of parasites collected from male and female fishes in the current study did not differ significantly. This confirms the findings of Hanek and Fernando (16) on the role of sex of *Amblopties rupestris* on gill parasites *Achteres ambloplites*, *Ergasilus caeruleus*, *Ergasilus centrarchidarum*; Tsotetsi et al (32) on aspects of the ecology of *Lamproglena clariae* on *Clarias gariepinus*. Kruger and Avenant- Oldewage (20) also observed this for *Mugilicola smithae* on *Liza alata*, *L. macrolepsis*, *Myxis capensis*, *Valamugil seheli*, *Oreochromis mossambicus*, *Clarias gariepinus*, *Sphyraena barracuda*.

A increase in the prevalence of *P. longidigitus* infestation was recorded with an increase in the fish size in the present study. Our findings are also in agreement with results by Fattohy (13) and Tedla and Fernando (31). In fish populations, parasite infection may increase with increasing host size. Larger fish may accumulate parasites than smaller ones do.

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