A Study on Some Ecological Aspects of Snow Trout (Schizothorax pelzami) from Laiinsoo River in Northeastern Iran

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Abstract

Samples of Schizothorax pelzami were collected by electroshocker from Laiinsoo River (n=150) in northeastern Iran in January 1995. The growth and diets rates of S. pelzami were examined. For 30 specimens in Laiinsoo River, the length-weight relationships were estimated as W= -12.108 × L^{3.134} (r =0.999) for females and W= -10.594 × L^{2.796} (r = 0.849) for males. Stomach contents were examined to determine the kind, number, and volume of organisms present. Classification of the stomach contents of individual fish in Laiinsoo River revealed different groups of benthic invertebrates. Chironomidae, were the most abundant benthic invertebrates among the categories of organisms collected. The Ivlev index showed that odonata, at 1; Chironomidae (larva), at 0.6, and Simulidae (larva), at 0.5, were the most important food items for S. pelzami. The ratio of male to female for specimens caught from Laiinsoo River was 2.5:1.

Keywords: Schizothorax pelzami, diet, growth, benthic invertebrate, Iran.

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Introduction
The snow trout species *Schizothorax pelzami* (Kessler, 1870) is distributed in the Tedzhen and Murgab rivers of Afghanistan and Turkmenistan including Iranian drainages of the former known as the Hari River in its Iranian reach (Aliev et al., 1988). It is recorded from the Jam River, the Sharak River, the Akhland River near Mashhad, the Kashaf River and various smaller water bodies in Khorasan, the upper Kal Shur, Jajarm and Jovein rivers in the Kavir basin, as well as Cheshmeh Ali at Damghan and Cheshmeh Badash near Shahrud further west, the western most distribution of the schizothoracine fishes (Günther, 1889; Nikol'skii, 1897; 1899; Abdoli, 2000; Coad and Abdoli, 2000, Coad, 2002). About ecology and biology of inland water fishes of Iran, particularly fishes that have not commercial value little studies were carried out (Abdoli, Rahmani, Rasooli, 2000) and the snow trout is no exception. We could not find any paper about food habits of this species in Iran or other countries for comparison. This study was performed to describe feeding biology of *S.pelzami* in Laiinsoo River.

Materials and methods
Fish specimens were collected in January 1995 by using an electroshoker with 200-300 V, 50 Hertz frequency and one anode in Laiinsoo River (Table 1) that is located in south-east of Caspian Sea in Iran and all specimens were preserved in 10% formalin. At the same time, benthic invertebrates were sampled by a surber sampler 30 cm x 30 cm large and with a mesh size of about 300 μm. In the laboratory, the total length and weight of each specimens from Laiinsoo River (n=127; F=36, M=91) was measured to the nearest millimeter and 0.01 gr respectively, and also, stomachs were opened (n=137) and their contents were analyzed. The abundance of food items in the digestive tracts was determined by counting the food items. Food selectivity was measured by the Ivellev index (Ivelev, 1961) with the following formula:

\[ E_i = (p_i - q_i) / (p_i + q_i) \]

where \( p_i \) is fraction of an ith category of prey, \( q_i \) = fraction of an ith category of prey in the benthic community.

### Table 1- Some characters of Laiinsoo River.

<table>
<thead>
<tr>
<th>some characters</th>
<th>Laiinsoo River</th>
</tr>
</thead>
<tbody>
<tr>
<td>depth (m)</td>
<td>0.25</td>
</tr>
<tr>
<td>wide (m)</td>
<td>8</td>
</tr>
<tr>
<td>Water velocity (m/s)</td>
<td>1.6</td>
</tr>
<tr>
<td>Water temperature (°C)</td>
<td>9</td>
</tr>
<tr>
<td>Air temperature (°C)</td>
<td>7</td>
</tr>
<tr>
<td>Water discharge (m³/s)</td>
<td>1.623</td>
</tr>
<tr>
<td>elevation</td>
<td>800</td>
</tr>
</tbody>
</table>

The relation of weight to length was calculated applying the exponential regression equation, \( W = a L^b \), where \( W \) is the total weight in gram, \( L \) the total length in centimeter, a and b are the parameters to be estimated (Ricker, 1975). Some characters of this river are showed in Table 1.

Results and Discussion
The length frequency was determined for both sexes (Figure 4). In Laiinsoo River total weight varied from 1 to 146.5 g for males and 1.7 to 428 g for females and total length varied from 44 to 233 mm and 55 to 340 mm for males and females, respectively. The average total length for females was more than for males. The range of total length and weight was estimated. The ratio of male to female was estimated as 2.5:1 from Laiinsoo River (n=127). In Laiinsoo River, Length-weight relationship calculated for 30 specimens by using the length and weight were found as \( \ln \text{ weight} = -10.594 + 2.796 \ln \text{ length} \) for males and \( \ln \text{ weight} = -12.108 + 3.134 \ln \text{ length} \) for females, respectively. The slopes (b values) of the length-weight regression were not significantly different between sexes (ANOVA, p<0.001) Figure 3.
During the study, the stomachs of 137 *S. pelzami* in Lainsoo River were examined. The published data on diet and growth of *S. pelzami* is somewhat limited. The diet of *S. pelzami* consists almost of benthic invertebrate that belong to 11 different taxonomic groups (Figure 1). We conclude that chironomidae and Simulidae represent an important part of food intake and are an important factor growth (Figure 5). A total of 990 aquatic insects were analysed in the stomachs. The diet of this species is shown in Figure 2. Of the 137 fish studied in Lainsoo River, 40 (29.19%) had empty guts. In terms of their frequency of occurrence and overall weight contribution, chironimid (pupa) and Simulidae (larva) dominated the diet.

![Figure 1](image1.png)

**Figure 1** - Frequency of benthic invertebrate in Lainsoo River.

![Figure 2](image2.png)

**Figure 2** - Frequency of benthic invertebrate in the diet of *S. pelzami* in Lainsoo River. Number of stomach analysed= 137.
Figure 3- Total length-weight relationships of *S. pelzami* from Laiinsoo River.
Figure 4- The frequency of total length of *S. pelzami* in Lainsoo River.
Figure 5. Iveliev index of food selectivity for *S. pelzami* in Laiinsoo River.

1= Ephemeroptera; 2= Chironomidae (Larva); 3= Chironomidae (pupa);
4= Trichoptera (pupa); 5= Simulidae (pupa); 6= Ceratopogonidae; 7= Tricoptera; 8= plecoptera; 9= Oligochaeta; 10= Simulidae (Larva); 11= Amphipoda;
12= Tabanidae; 13= Coleoptera (Larva); 14= Odonata; 15= Decapoda

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