1 Introduction

In 1999 Procambarus clarkii (Girard, 1852) was not reported for the Umbrian region (Central Italy) even if in the last 15 years fishermen of lake Trasimeno registered isolated cases of capture, considering this species as extremely rare. From the beginnings of 2000 P. clarkii became object of professional fishery in the masonry zone of the lake called “La Valle” and was sold in the local fish markets (Dörre et al., 2001). The aim of this study was to get more information about the biological characteristics of P. clarkii and to investigate the reasons which are on the basis of its rapid expansion in Lake Trasimeno, giving a short description of the life cycle of this species.

2 Study area

Lake Trasimeno, situated in the province of Perugia (Umbria, Central Italy), is the largest lake of the Italian peninsula (26 km²). This lentic lake is characterized by an average depth of 4.72 m and a theoretical water renewal time of 24 years. Trasimeno is considered as pSC and ZPS according to BioITALY (Biopos Inventory of Italy, reception Italian Directives of the UE Directives HABITAT 92/43).

3 Materials and Methods

Data collection started in October 2000 and finished in November 2001. P. clarkii was collected by a professional fisherman within 48 hours using 2 fyke nets in a depth of about 2 m. Specimens were transported to the laboratory to check body color (mature, immature), sex, moult stage (soft shell, hard shell) and, for females, reproductive state (internal egg stages and hatched juveniles). Each crayfish was characterized by total length (TL), carapace length (CL), chela length (CHL), measured within 1 mm accuracy, and weight (W) within 0.1 g.

4 Results

A total of 1569 crayfish was collected. In table 1 the descriptive statistics of the 4 morphometric variables are reported.

The length-weight relationships for $\varphi$ and $\varphi$ were determined by regression analysis. For both sexes $b$ values were greater than 3. $b_{\varphi} = 3.38$ ($R^2 = 0.97$) and $b_{\varphi} = 3.55$ ($R^2 = 0.95$)(Fig. 2).

5 Conclusion

In lake Trasimene P. clarkii shows an allometric growth more in weight than in length ($b > 3$). In particular, growth juveniles grew well and sexually mature females were large and abundant, and thus potential reproducers. This combination could explain the rapid expansion of P. clarkii in this shallow and mesotrophic lake. Both sexes had synchronized molts and this species started to reproduce when the water temperature increased and lake level decreased. Therefore the reproduction period in Trasimene is Autumn. These results highlight that the crayfish population seems to be well acclimated and fits in with the natural cycle of the lake.

6 References


La Porta, Gianandrea Pedicillo, Giovanni Dipartimento di Biologia Cellulare e Ambientale Università di Perugia, Italia

Dörre, A. J. Martin

Lorenzoni, Massimo elia@unipg.it

lorenzon@unipg.it

Fig. 1 - Lake Trasimeno

Tab. 1 - Descriptive statistics. $\mu$ in mm, $\sigma$ in mm, $\varphi$ in mm

<table>
<thead>
<tr>
<th>TL (mm)</th>
<th>143</th>
<th>140</th>
<th>96.1</th>
<th>96.6</th>
<th>115</th>
<th>116</th>
<th>91.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL (mm)</td>
<td>19.3</td>
<td>19.5</td>
<td>12.6</td>
<td>12.7</td>
<td>16.7</td>
<td>16.8</td>
<td>11.9</td>
</tr>
<tr>
<td>CHL (mm)</td>
<td>1.8</td>
<td>1.9</td>
<td>1.0</td>
<td>1.0</td>
<td>3.7</td>
<td>3.8</td>
<td>1.2</td>
</tr>
<tr>
<td>W (g)</td>
<td>11.7</td>
<td>14.6</td>
<td>14.6</td>
<td>12.7</td>
<td>23.4</td>
<td>23.5</td>
<td>12.5</td>
</tr>
</tbody>
</table>

Fig. 2 - Length-weight relationships

Fig. 3 - Length pyramid

Sex ratio for the whole population was 1:1. $\varphi$ were more abundant in December 2000 and January 2001, period after hatching of the juveniles (Fig. 4). In February and March 2001 no specimen was captured, in those months water mean temperatures were 6.5 and 12.7°C respectively. The low temperature seems to inhibit the activity of this species in lake Trasimeno.

Fig. 4 - Fluctuations in the ratio of $\varphi$ and $\varphi$

Analysis of TLs, separated by body color, showed significant differences (1-way ANOVA $F = 91.7, p < 0.001$) between red and all green classes. In particular, given gradient seems to be correlated with the growth stages of crayfish (Bingegesser and Copp, 1985)(Fig. 5). Moreover given juvenile $\varphi$ had smaller chela than the red adult $\varphi$ (Huner and Barr, 1991).

Fig. 5 - Crayfish body color

With the increasing of water temperature in April 2001 (mean 14°C) moult started in both sexes but diminished in May. Only $\varphi$ started to moult again in June and carried on until July. No moult was recorded for both sexes in August, September and October but moult started again in November 2001 (Fig. 6).

Fig. 6 - Fluctuation in moult for $\varphi$ and $\varphi$

May 2005 - Made with $\LaTeX$ under Debian Linux.