

Date	12/04/2010
Reference	Web_EstPopInd_PresentationIndic_EN.Doc

The population indices available in the website

[1] The indices calculated

The indices presented have been selected from their capacity to give some information on fishery impact, in view of integration in comprehensive dashboards on fishery ecosystems evolution (Rochet & Trenkel 2003; Trenkel & Rochet 2003; Bertrand 2004; Rochet *et al.* 2005).

1.1 For all the selected species

- Natural Logarithm of abundance: **Log(N)** (Natural Logarithm of the number of individuals in the area)
- Total biomass in the area: **W** (in kg)
- Average individual weight in the population: **Wbar** (in kg)

1.2 For the species which individual length is collected

- Mean length in the population (Fig. 2): **Lbar** (in cm)
- Length at the fifth percentile of the length distribution: **L 0.05** (in cm)
- Length at the twenty-fifth percentile of the length distribution: **L 0.25** (in cm)
- Length at the seventy-fifth percentile of the length distribution: **L 0.75** (in cm)
- Length at the ninety-fifth percentile of the length distribution: **L 0.95** (in cm)
- Sampling variance of length: **Lvar**

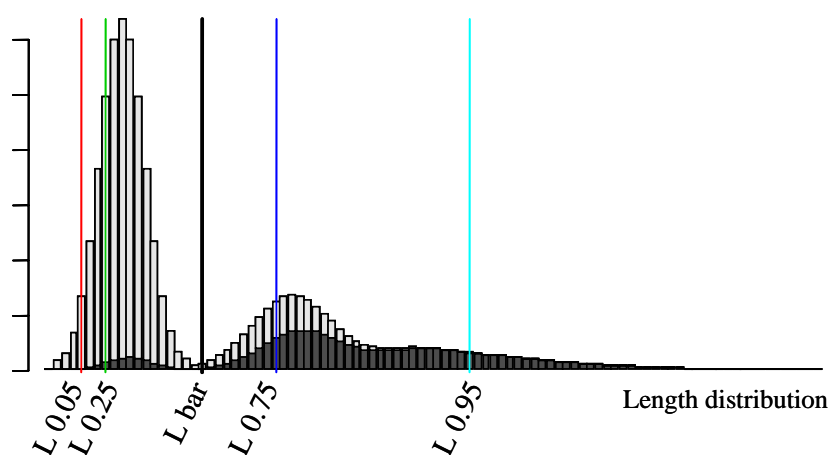


Figure 2. Theoretical representation of the metrics related to length.

[2] Methodology for the calculations

All the indices are calculated for the whole areas, without distinction between shelves and slopes.

Symbols used :

Data	Description
$N_i(t)$	Index of total abundance for the species i
$N_{l,i}(t)$	Index of abundance in the class l for the species i
$B_i(t)$	Index of total biomass for the species i
A_i	Surface of the stratum j

$a_{k,j}$	Swept area for the haul k in the stratum j
$y_{l,i}$	Catch number in the size class l for the species i
$y_{i,k,j}$	Catch number for the species i in the haul k in the stratum j
$w_{ij,k,j}$	Catch weight for the species i in the haul k in the stratum j

- Natural Logarithm of abundance: **Log(N)**

$$N_i = \sum_j N_{i,j} = \sum_j A_j \sum_{k=1}^{n_j} y_{i,k,j} / \sum_{k=1}^{n_j} a_{k,j} \quad \text{Var}(N_i) = \sum_j \frac{A_j^2}{n_j - 1} \sum_{k=1}^{n_j} \left(\frac{y_{k,j}}{a_{k,j}} - \frac{\sum_{k=1}^{n_j} y_{k,j}}{\sum_{k=1}^{n_j} a_{k,j}} \right)^2$$

- Total biomass in the area: **W**

$$W_i = \sum_j W_{i,j} = \sum_j A_j \sum_{k=1}^{n_j} w_{k,j} / \sum_{k=1}^{n_j} a_{k,j} \quad \text{Var}(W_i) = \sum_j \frac{A_j^2}{n_j - 1} \sum_{k=1}^{n_j} \left(\frac{w_{k,j}}{a_{k,j}} - \frac{\sum_{k=1}^{n_j} w_{k,j}}{\sum_{k=1}^{n_j} a_{k,j}} \right)^2$$

- Average individual weight in the population: **Wbar**

$$W_{bar_i} = W_i / N_i$$

- Mean length in the population: **Lbar**

$$L_{bar} = \frac{1}{y_i} \sum_{l=1}^L y_{l,i} l$$

- Length at the percentiles of the length distribution

$$L_{q,i} = l_{q,i} \left| \frac{\sum_{l=1}^L y_{l,i}}{y_i} = q \right|$$

- Sampling variance of length: **Lvar**

$$L_{var_i} = \left(\frac{\sum_{l=1}^L y_{l,i} l^2}{y_i} - L_{bar_i}^2 \right)$$

All the calculations have been made using one unique software (the R-SUFI software) integrating the whole data analyses (Rochet *et al.* 2004).

[3] The data available through the website

All the data available through the website are the values of each of the indices described above. The information has been validated by an international working group in an integrated approach for

elaboration of population and community indicators (Medit 2007). The results are given by GSA and by species for the whole available data series.

The user may select the geographical area, the species and the index. For the selections for which the information is available, the system produces a graph showing the time series of the index, with the confidence interval at 95 %. It gives the possibility for downloading the corresponding data table, including the values of the index by year, as well as the standard error and its coefficient of variation.

[4] References

- Bertrand J. A. ed 2004. L'état des communautés exploitées au large des côtes de France. Application d'indicateurs à l'évaluation de l'impact de la pêche. DRV/RH/RS. Vol. 04-001. Ifremer: 172 p.
- Medit, 2007. Assessment of indicator trends related to exploited demersal fish populations and communities in the Mediterranean. DCR Medits Working group. Nantes (France), 15-18 March 2005 and Kavala (Greece), 2-6 April 2006. Available at <http://www.ifremer.fr/docelec/default-en.jsp>. 168 p.
- Rochet M. J. & V. Trenkel, 2003. Which community indicators can measure the impact of fishing? A review and proposals. *Can. J. Fish. Aquat. Sci.* **60**: 86-99.
- Rochet M. J., V. M. Trenkel, R. Bellail, F. Coppin, O. Le Pape, J.-C. Mahé, A. Morin, J.-C. Poulard, I. Schlaich, A. Souplet, Y. Vérin & J. A. Bertrand, 2005. Combining indicator trends to assess ongoing changes in exploited fish communities: diagnostic of communities off the coasts of France. *ICES Journal of Marine Science* **62**: 1647-1664.
- Rochet M. J., V. M. Trenkel, J. A. Bertrand & J.-C. Poulard, 2004. R routines for survey based fisheries population and community indicators (R-SUFI). Ifremer, Nantes. Limited distribution.
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