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Sardine series in PELGAS surveys : PELGAS 2000 to 2005

Jacques Massé[1], Erwan Duhamel[2], Damien Delaunay[1]

(1) IFREMER, lab. Fisheries Ecology, BP 21105, F- 44311, Nantes, France.
 [tel: +33 240 374000, fax: +33 240 374075, e-mail: Jacques.Masse@ifremer.fr]
(2) IFREMER, lab. Fisheries Research, 8 rue François Toullec 56100 Lorient, France.
[tel: +33 297 87 38 37, fax: +33 297 87 38 36, e-mail: Erwan.Duhamel@ifremer.fr

1. Material and method

An acoustic survey is carried out each spring (generally in may) in the bay of Biscay on board the French research vessel Thalassa. The objective of PELGAS surveys is to study the abundance and distribution of pelagic fish in the Bay of Biscay. The target species were mainly anchovy and sardine and were considered in a multi-specific context. The results have to be used during ICES working groups in charge of the assessment of sardine, anchovy, mackerel and horse mackerel and in the frame of the Ifremer fisheries ecology program "resources variability".

The strategy was the identical to previous surveys (2000 to 2004) :

- acoustic data were collected along systematic parallel transects perpendicular to the French coast. The length of the ESDU (Elementary Sampling Distance Unit) was 1 mile and the transects were uniformly spaced by 12 nautical miles covering the continental shelf from 25 m depth to the shelf break.

-acoustic data were collected only during the day because of pelagic fishes behaviour in this area. This species is usually grouped very close to the surface during night and so "disappear" in the blind layer for the echo sounder between the surface and 10 m depth.

2. Length structure

Length distribution in the trawl haul were estimated from random samples. The population length distributions **(figure 1)** have been estimated by a weighted average of the length distribution in the hauls. Weights used are acoustic coefficients (Dev*Xe Moule in thousands of individuals per n.m.^{2}) which correspond to the abundance in the area sampled by each trawl haul.

The length distribution for the whole time series (all 6 years combined) is presented in the **figure 2**

3. Demographic structure

An age length key was constituted from the trawl catches. Sub-samples (764 otoliths for the whole survey) which were taken from the previous samples, according to a stratified scheme based on length classes. The population age-length key was estimated by a weighted average of the age length key in the hauls. Weights used are acoustic coefficients (Dev*Xe*Moule in thousands of individuals per n.m.^{2}) which correspond to the abundance in the area sampled by each trawl haul. The demographic structures are shown in **figure 3**.

4. biological data per area

For biological data from 2000 to 2004, a distinction is made between four areas: North offshore (ICES VIIIa), North coast (VIIIa), South offshore (VIIIb), and South coast (VIIIb).

The age distributions compared from 2000 to 2004 per area are shown in **figure 4.1**.

The length composition per year and zone shows the distinction between small (length < 18.5 cm) and big sardine (length > 18.5 cm). **Figure 4.2**.

Sexual maturity was also studied per area and year. It is shown in **figure 4.3**.

9. Conclusion

Survey data from 2000 to 2004 were used to analyse whether sardine show a preferential distribution in relation to bottom depth and/or latitude. For this analysis, four strata were considered; North or South of latitude 46°N (separating VIIIa and VIIIb) and bottom depths deeper or shallower than 110m. Sardine length distributions are plotted as the proportion of small (< 18.5 cm) or big (larger than 18.5 cm) fish on the samples over the years. This division was chosen to take into account the bimodal structure of sardine length distributions (usually with a "valley" at 18.5 cm fish length).

Small fish (mainly 1 year old) are generally found close to the coast and preferentially in the southern part. The year 2003 is different to the others but this year was totally atypical for all species and sardine was rather absent of the Bay of Biscay at the time of the survey.
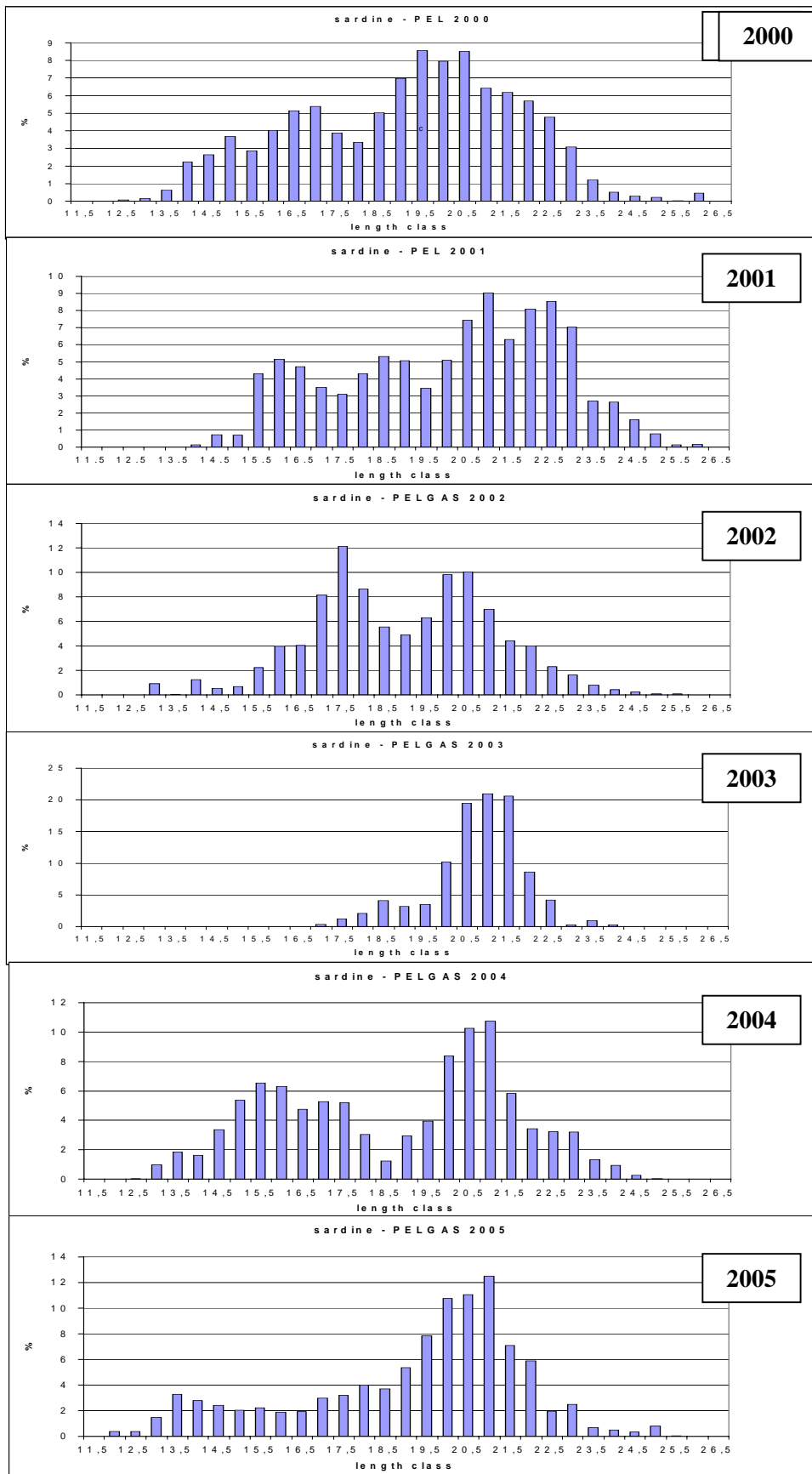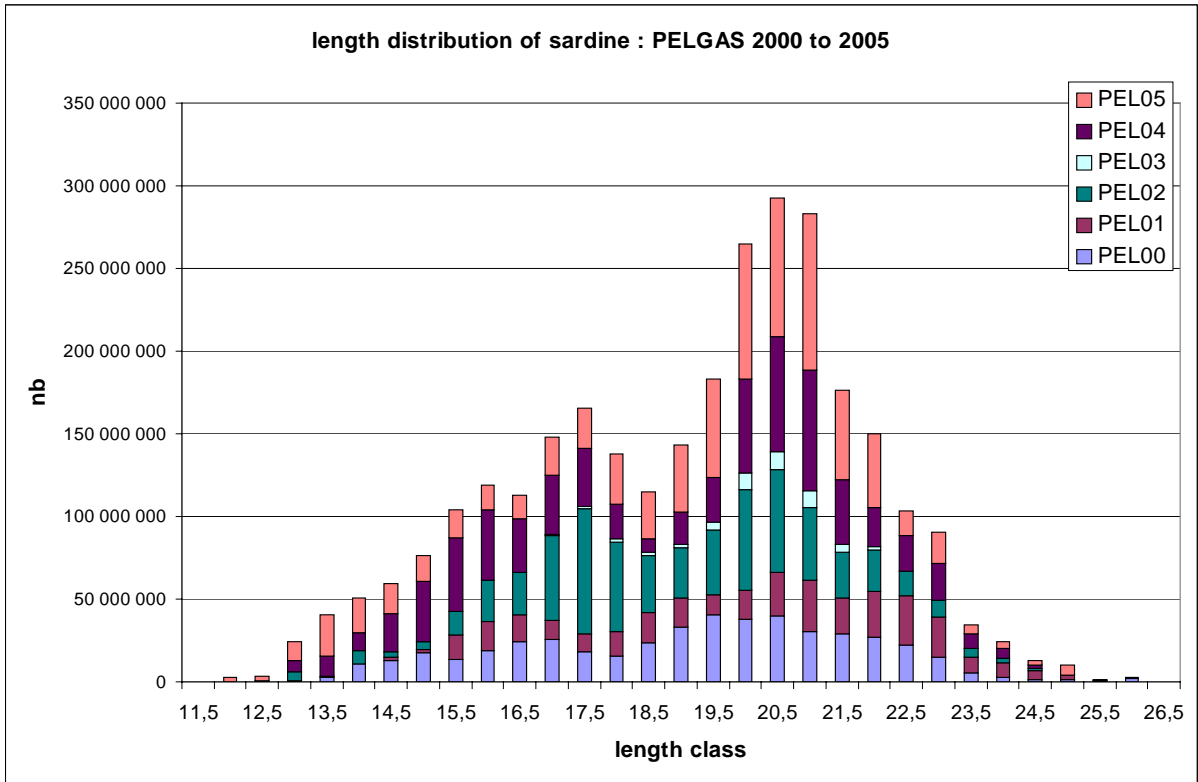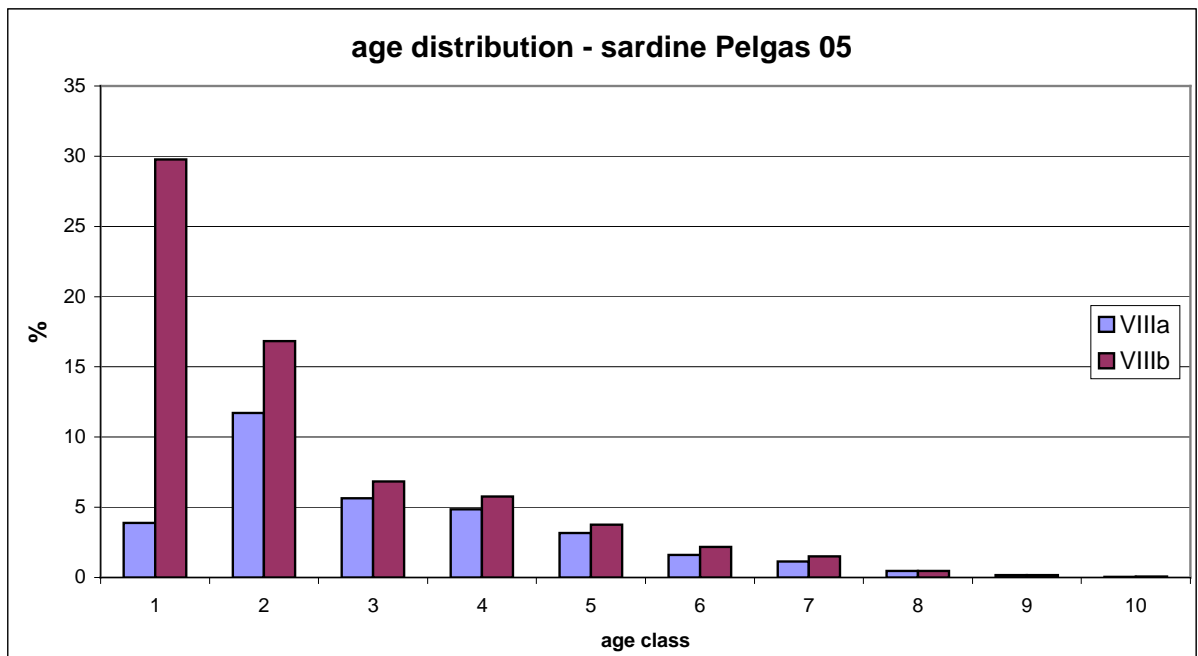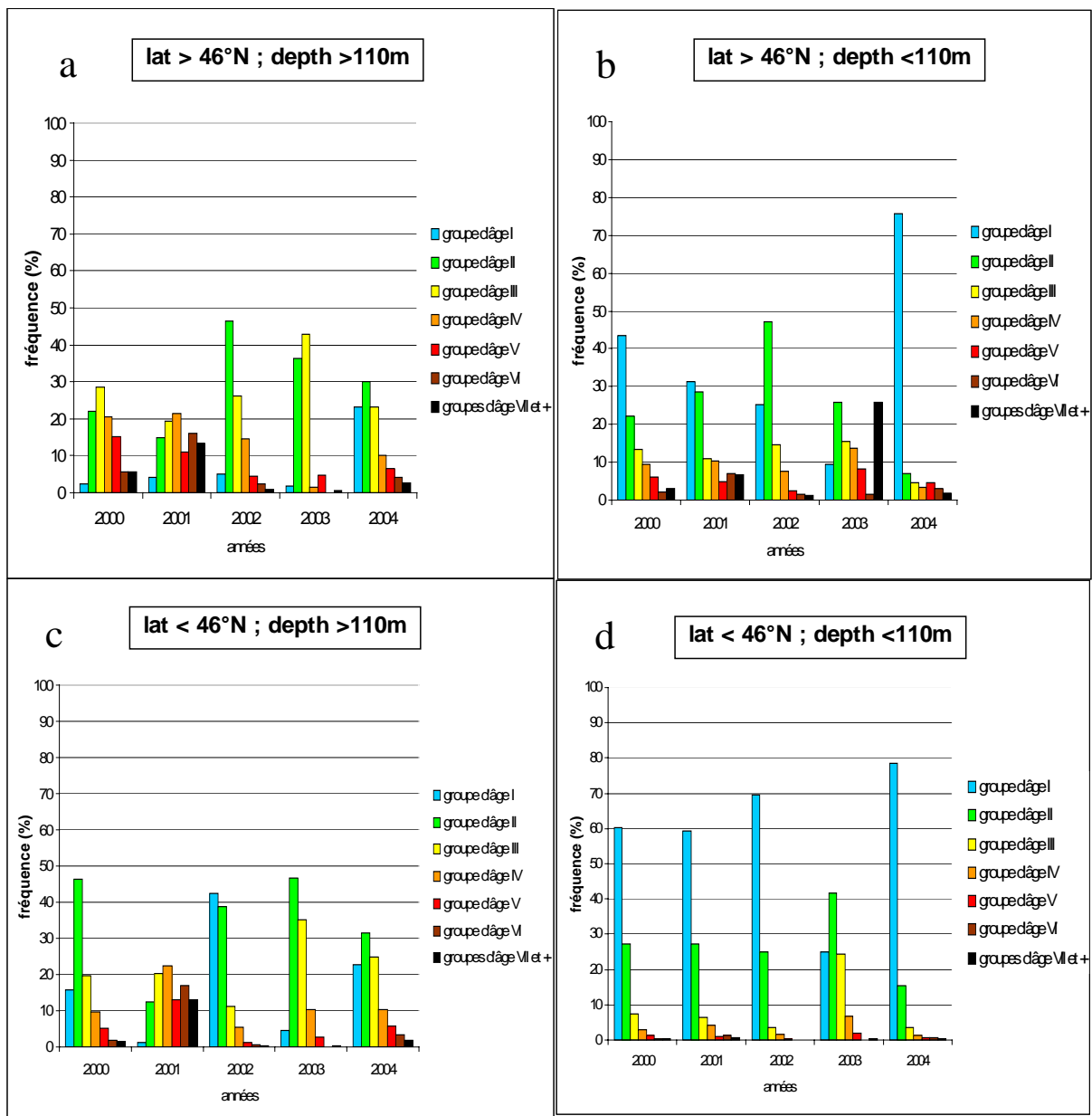
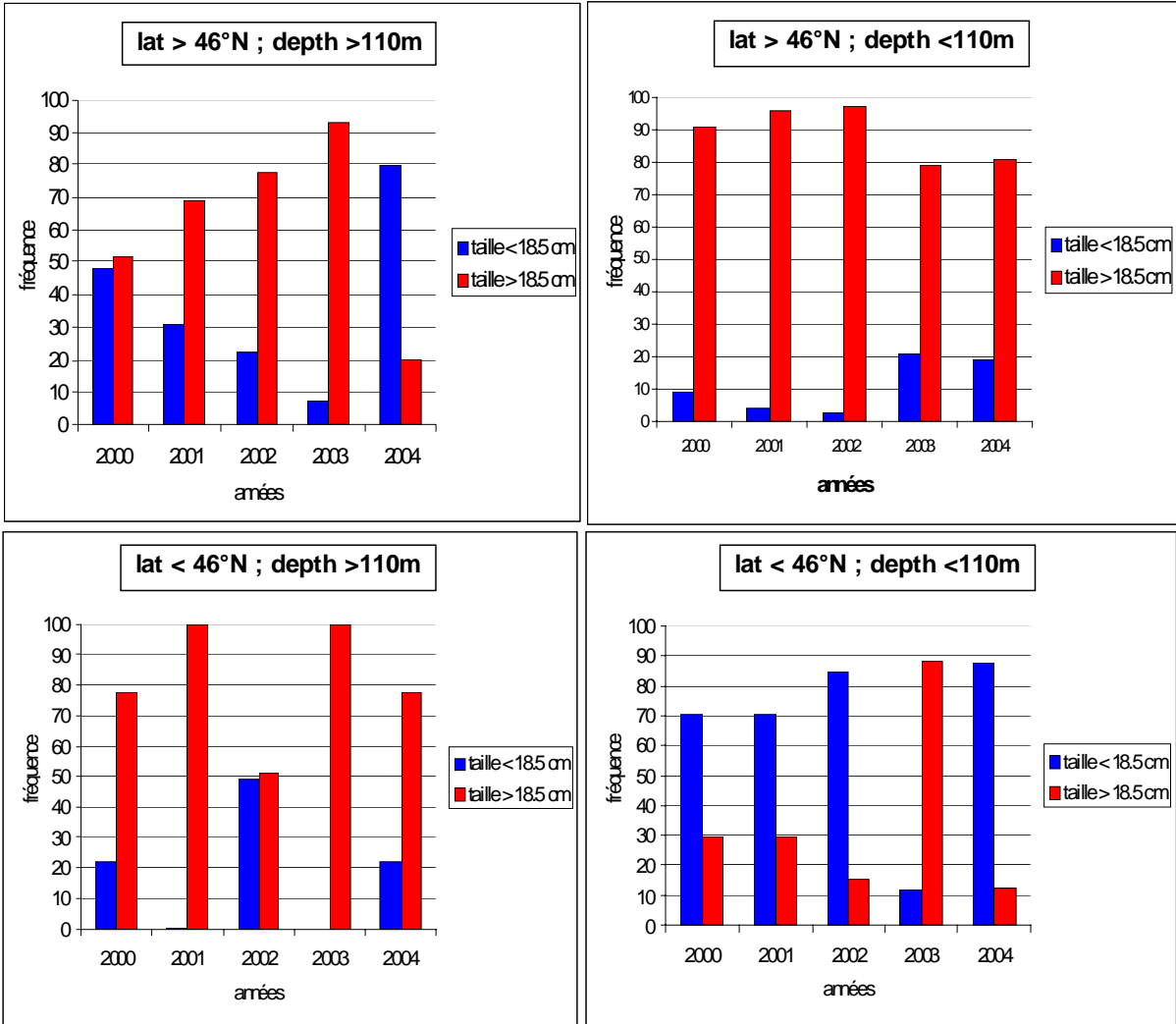fig 1. Length distribution of sardine from 2000 to 2005

Fig. 2. The length distribution for the whole time series (all 6 years combined)
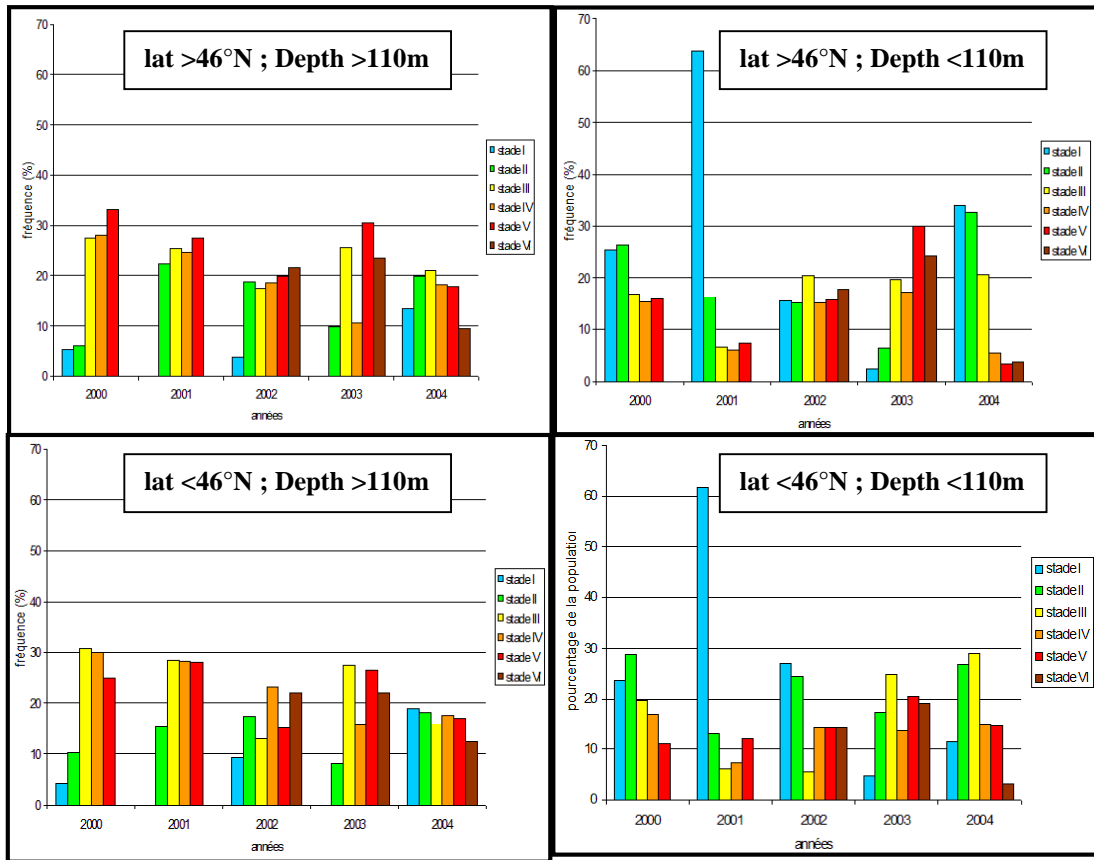

Fig. 3. The demographic structure of sardine – Pelgas 05.

Fig. 4.1. Age composition of sardine per year (2000 to 2004) and per area.

Fig. 4.2. length composition of sardine per year (2000 to 2004) and per area.

Fig. 4.3. sexual maturity of sardine per year (2000 to 2004) and per area.