BLOOMS OF THE JELLYFISH *PELAGIA NOCTILUCA* (CNIDARIA, SCYPHOZOA) AND THE MODIFICATIONS OF GELATINOUS ZOOPLANKTON.

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Introduction: The fluctuations of the blooms of the jellyfish *Pelagia noctiluca* were studied in relation to climatic environment (Goy *et al.* 1989) and are herein compared here with the modifications of some gelatinous macroplanktonic species.

Material and methods: Examination of archival observations made daily between 1898 and 1914 while the Zoological Station at Villefranche-sur-mer was operated by Russians show that more than 80 species of zooplankton were cited. Sixteen of these were sufficiently common to permit a long-term analysis. Only one species, *Pelagia noctiluca*, shows an alternative presence-absence being present from 1898 to 1903, then becoming absent from 1903 until 1907, and then present again from 1908 to 1912. This phenomenon of "apparition and disparition" is so spectacular that we have found many data from two centuries since the first description of this species (1775 to 1985 in the literature and Museum's collections). A study was undertaken to compare the medusa's presence with climate change and to make a predictive model.This phenomenon has a periodicity of 12 years, which is the same as that of several other oceanographic phenomena (El Nino, Russell cycles, Herring's Cycles) (Southward *et al.* 1975); years with *Pelagia* were preceded by a period with hot and dry springs (Goy *et al.* 1989).We herein attempt to compare this phenomenon with that of the other species in the Russian archival observations and the series of gelatinous macroplanktonic species are analysed by a contingency periodogram method (Legendre *et al.* 1981; Morand et Dallot 1985).

Results and discussion:
- Ten species have a regular annual cycle with significant peaks 12 months apart: *Solmissus albescens, Physophora hydrostatica, Halistemma rubrum, Rosacea cymbiformis, Rhizostoma pulmo, Beroe ovata, Pterotrachea coronata, Cymbulia peronii, Phronima sedentaria, Pyrosoma atlanticum.* The variations of this regular species (examined by cumulative frequency method over a period of sixteen years) show a summer minimum corresponding to the decrease of zooplankton in surface waters between two maxima, one in spring and another in autumn, when the thermal gradient changes drastically in surface sea waters.
- Two with somewhat regular cycles: *Geryonia proboscidalis, Cestus veneris*;
- Four which show no regular cycles: *Pelagia noctiluca, Hippopodius hippopus, Leucothea multicornis, Salpa maxima.* Their phases of abundance are in opposition (Fig. 1).

Conclusion:
The analysis of a 16-year-long observation series show that the pelagic ecosystem is greatly affected by qualitative variations having a different composition in carnivore level whether or not *Pelagia* is present.. The data recently acquired by diving (Laval *et al.* 1989) and from daily samples from the Bay of Villefranche-sur-mer since 1965 allows the placement of each species into its trophic level: salps or larvacea are at the herbivore or filter-feeding level; *Pelagia* or *Hippopodius* and *Leucothea* at the carnivore level and finally sardines and anchovies at the top of the food pyramid (Bas *et al.* 1985). We have found a relationship between the Mediterranean climate and the medusa *Pelagia noctiluca* and an opposition between this species and some others in the same trophic level. The next research to be undertaken will deal with the effect of the climate on the dynamics of water masses, pelagic production and succession or oscillations in the trophic levels.

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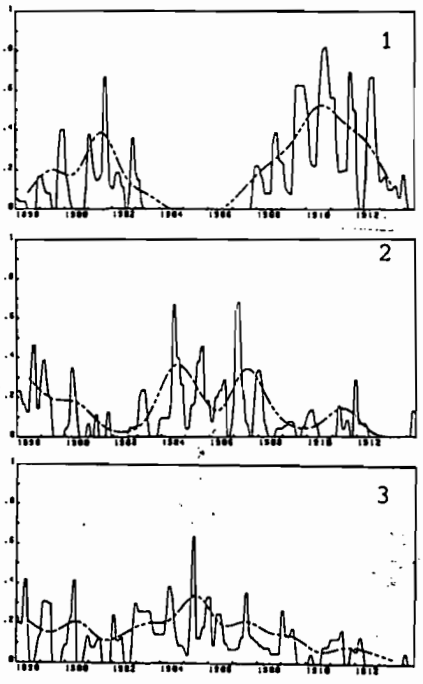

Monthly fluctuations of irregular species from 1898 to 1915 in the Bay of Villefranche-sur-mer (France).
1= *Pelagia noctiluca*, 2=*Leucothea multicornis*,
3= *Hippopodius hippopus* (smoothed curve of frequency)

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