



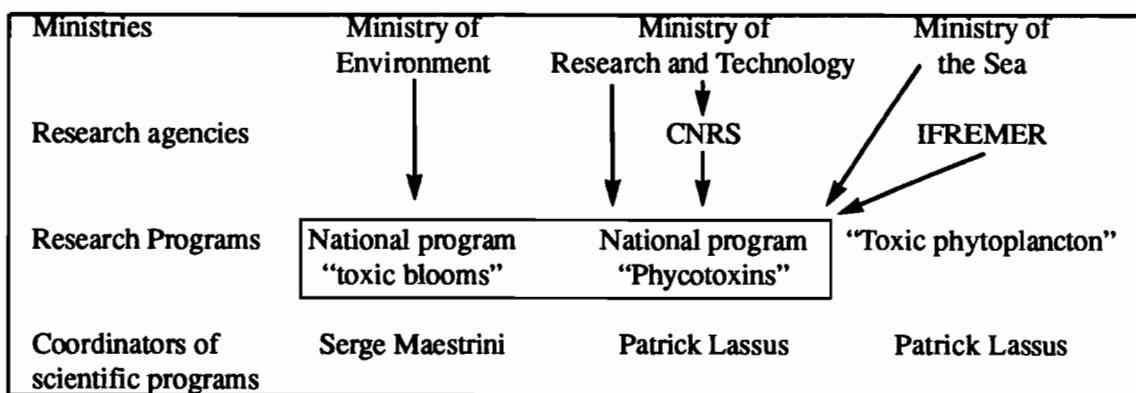
## FRENCH NATIONAL PROGRAM ON "HARMFUL MARINE ALGAL BLOOMS"

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From the recent available literature, there is provocative evidence of recent significant increase in algal biomass and production, as well as changes in community structure and species distribution in some inshore waters worldwide. It also seems that blooms of toxin-producing species are particularly more frequent. As far as french coastal waters are concerned, three main species have recently caused casualties to shellfish farming or have appeared to be potentially harmful for man health : *Alexandrium minutum* (PSP toxin producer), *Gyrodinium* cf. *aureolum* (hemolysin producer) and *Dinophysis* spp. (DSP Producers). Few other species which have been reported elsewhere to be harmful are present but harmless at the moment : *Chrysochromulina polylepis*, *Dictyocha* sp., *Prorocentrum minimum*.

In 1989, a national program has been established under the auspices of the Ministries of Environment, Research and Technology and the Sea, and two national research agencies : CNRS and IFREMER, to stimulate fundamental research on physiological algal capabilities and environmental conditions which lead to toxic blooms (Fig. 1). Multilaboratory cooperative research is greatly encouraged. Integral laboratory and field approaches are recommended with special attention to time series. Toxin structures and effects are not taken into account; they pertain to a parallel national program : "Phycotoxin".



CNRS; "Centre national de la Recherche scientifique";  
IFREMER: "Institut français de Recherche pour l'Exploitation de la Mer".  
Arrows indicate sources of fundings.

**Figure 1: Relationship web between french state departments (Ministries), state research agencies and interlaboratory scientific programs.**



Within 1989-1990, 13 projects have been funded; one is dedicated to *A. minutum*, five to *Dinophysis* spp., four to *Gymnodinium nagasakiense* (alias *Gyrodinium aureolum*), two to *Prorocentrum micans* and one to *Phaeocystis pouchetii*, and one to all potentially harmful species (e.g. *Chattonella*, *Olisthodiscus*, etc...). A summary of all available information pertaining to these species has also been done (1). For 1991-92, *P. minutum* and *P. pouchetii* have been withdrew, and possible role of bacteria in toxin production considered as a priority; twelve projects are financially supported. Participants belong mostly to CNRS, IFREMER and University laboratories.

Significant results have been already obtained with the three key species. They are summarized in Maestrini *et al* (1991) (2).

- (i) Research done in the vicinity of the shellfish area of Marennes-Oléron and baie de l'Aiguillon (Charente-Maritime, Vendée) by author's team brings the evidence that *Dinophysis* spp. increases in cell density are associated with warm and stratified waters and occur first in offshore areas,
- (ii) anthropic nutrient enrichment does not favour *Dinophysis* growth,
- (iii) *Dinophysis* growth cannot at the moment be related to any typical algal nutrients. `

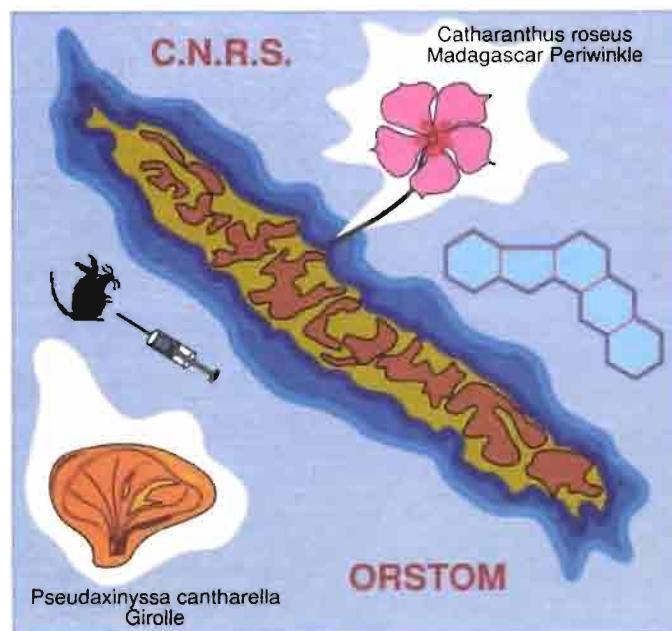
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## ACTES



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