

## **THE ABORE MARINE RESERVE (NEW CALEDONIA) – 2: ANALYSIS OF THE FISH DIVERSITY.**

LETOURNEUR Y., KULBICKI M., SARRAMÉGNA S., THOLLOT P., WANTIEZ L., GALZIN R. & C. CHAUVET

ORSTOM, Nouméa, Nouvelle-Calédonie

Fish diversity was studied on a New Caledonian barrier reef, using visual censuses on three major biotopes: the reef flat, the inner reef slope and the “forest” (e.g. a submerged reef of branching *Acropora*). In addition, the reef was divided in two zones (each included the three biotopes), one is a permanent reserve, and the other is a reserve opened to fishing in September 1993. One survey was done in August 1993 and another in August 1995. A total of 69 stations was investigated, in which the substrate variables were also considered. Globally, the total species richness is of 377, including 252 species in the reef flat, 298 species in the inner reef slope, and 243 species in the forest. The most speciose families are the Labridae (69 species), the Pomacentridae (53), the Chaetodontidae (25), the Serranidae and Scaridae (23 each), and the Acanthuridae (22). These patterns remained the same in the different biotopes and zones. The mean species richness per station (MSR) was significantly higher on the inner reef slope (82.2) than on the reef flat (65.1) and the forest (71.0). Most families had a similar pattern. The MSR decreased between 1993 and 1995, globally (77.6 vs 69.4, respectively), and in the three biotopes. It remained stable in the marine reserve zone (76.4 vs 75.8), but decreased in the zone opened to fishing (78.3 vs 67.2). Most families displayed similar trends, in particular those of commercial interest. These different results are likely to be linked to the persistence of a marine reserve in part of the reef and to the opening to fishing of the other part. Some changes are also probably linked to changes in the characteristics of the substrate and/or percentage of cover by living organisms.

## **HPLC/MS/MS DETECTION OF CIGUATOXINS AT PPB AND SUB-PPB LEVEL IN FISH FLESH.**

LEWIS R.J., VERNOUX J.P. & A. JONES

Queensland Agricultural Biotechnology Centre (QDPI) and Centre for Drug Design and Development, The University of Queensland, Australia

Ciguatera is a significant disease caused by potent polyether toxins (ciguatoxins) which accumulate in ciguateric reef fish at levels above 0.1 ppb. Ciguatera is a major problem in Pacific, Indian and Caribbean waters and it is estimated that ~ 25,000 people are affected each year. Two families of ciguatoxins have been characterised from Pacific and Caribbean fish (P-CTX and C-CTX), with P-CTX- and C-CTX-1 being the major toxin in each Ocean, respectively. Research on ciguatera has been severely hindered by the lack of an analytical method to detect low levels of toxin (>0.1 ppb in flesh) in crude extracts of ciguateric fish. Recently, we developed a turbo-assisted, gradient reverse phase HPLC/MS/MS method that detects spiked P-CTX-1, C-CTX-1 and PBTX-2 in crude extracts from fish at levels as low as 0.05 ppb. Clinically effective levels in fish flesh can be detected in an extract from as little as 2.5 g flesh. The method has proved robust and gives a linear relationship between the quantity of ciguatoxin present and response. HPLC/MS/MS can be used to confirm the presence of ciguatoxin in fish suspected of causing ciguatera and will be invaluable in the establishment of much needed rapid screening methods for ciguatera. A rapid extraction procedure is being developed to reduce the analysis time associated with HPLC/MS/MS.

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