

#### **THE ABORE MARINE RESERVE (NEW CALEDONIA) - 4: PRELIMINARY RESULTS OF THE EFFECT OF MARINE RESERVE ON FISH BEHAVIOUR.**

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Coral reef fish assemblages were sampled by underwater visual censuses, using line transect method, on Aboré Reef, New Caledonia. Sampling took place after 3 years of protection in 1993, prior to the opening of the northern part of the reef to fishing. Similar sampling was undertaken in 1995. Consequently, four sets of data were available: South Aboré reef 1993 (Protected I), North Aboré reef 1993 (Unfished), South Aboré reef 1995 (Protected II) and North Aboré reef 1995 (Fished). Distance of fish to the line transect (DLT) were compared in order to assess behavior changes which may be related to protected measures. Fished vs Unfished data was used to test the effect of the opening of the reserve to fishing, Protected I vs Protected II was used as control. 29 commercial species, recorded adequately in all 4 conditions, were used in the analysis. Similar trends in average DLT changes on both areas were recorded for most species (increase: 12 spp., decrease: 3 spp.) An increase of average DLT in the area opened to fishing together with a decrease of average DLT in the marine reserve was observed for 8 species, mainly Scarids (5 spp.). This finding may indicate that these target fishes became scared because of the fishing pressure in the northern part of Aboré reef. However, the significance of such could not be established, using either average DLT or DLT frequency distribution data. Fish size, school size and biotope which are known to influence DLT may explain some of the differences between 1993 and 1995. These results indicate that interannual variations in fish behavior may have a great influence on the results of underwater fish censuses. The effects of such variability could be much more important than the expected effects of marine reserves on fish behavior.

#### **STABLE-ISOTOPE ANALYSIS OF REEF-FISH TROPHIC RELATIONSHIPS IN A SOUTH PACIFIC LAGOON.**

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The sources of sustenance to large fishery species in the coral reef environment are little known and need to be identified. ( $^{15}\text{N}$  and  $^{13}\text{C}$  values were determined for potential source materials and various fish species from three lagoonal sites (coastal, intermediate and barrier reef stations) in the Southern Province of New Caledonia, in order to help identify the principal trophic pathways supporting fishery species. Incremental enrichment in  $^{15}\text{N}$  was found across trophic levels, but relatively low  $^{15}\text{N}$  enrichment found at the top trophic level, in comparison to other ecosystems, suggests high levels of nitrogen fixation in the reef environment. Depleted  $^{13}\text{C}$  was characteristic of planktonic food-chains. The data suggest diet variability within the planktivore trophic group; certain planktivorous fish exhibited clear signs of an omnivore diet, but stable-isotope data did not reveal site-specific feeding strategies, indicated by such studies elsewhere. The planktivore pathway was not shown to contribute a substantial source of carbon to fish productivity at any of the three lagoonal sites. Relatively enriched  $^{13}\text{C}$  was associated with benthic trophic pathways; turf algae and macrophytes were indicated as the main source of sustenance to grazing fishes, and the benthic algal pathway contributed significantly to piscivore production. In spite of its poor nutritional quality, the high benthic algal production is probably the principal support for the large lagoonal reef fishes examined.

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