Macrofaunal invertebrates associated with live scleractinian corals as indicators of coral reef status in Cayos Cochinos Islands (Honduras)

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Coral reefs are critically important for the ecosystem goods and services they provide to maritime and subtropical nations (Moberg & Folke, 1999). Reefs are currently in serious decline (Bellwood et al., 2004) due primarily to over-harvesting (Jackson et al., 2001), pollution (McCulloch et al., 2003), disease (Harvell et al., 2002), and climate change (Wilkinson, 2004; Hughes et al., 2003). Already 20% of the coral reefs have been destroyed (Wilkinson, 2004) and show no immediate prospects of recovery, 24% are under imminent risk of collapse through human pressures and a further 26% are under a long-term threat of collapse. The worst scenarios, prospected by Woolridge et al., (2005), suggest that reefs will become devoid of significant coral cover and associated biodiversity by 2050. The managing and a strong focus of key functional groups have become today a priority as part of insurance for sustainability (Hughes et al., 2003).

Coral associates represent one of these key groups. Scleractinian corals provide microhabitats and are used by a large number of parasites and other associated organisms, which use the tissue and skeleton of the coral colonies as food or substrata (Frank et al., 1995; Floros et al., 2005). Many taxa are involved and most of these coral associates stress the coral to some degree. Coral associates can be classified into two groups: endolithic bioeroders living within the coral skeletons and epilithic organisms living and feeding directly on exposed surfaces. Bioerosion and predation on scleractinian corals are an important part of coral reefs dynamics. Excessive damage by predators may affect the general health of reefs or alter the composition of reef communities (Whitman, 1988). The bioerosion process can lead to important coral damage and even, depending on the intensity, can lead to mortality of coral colonies (Kleemann, 2001). Bioerosion plays an important part in the degradation of the reefs and affects coral reef health. Any natural or anthropogenic disturbances that lead to the loss of live coral tissue will ultimately increase the chances of bioeroder invasion. Although very important, the community structure of macrofaunal invertebrates associated with live coral colonies is relatively poorly documented especially in the Caribbean. Therefore, the purpose of this study is to link the different assemblages of organisms inhabiting coral colonies on reefs around Cayos Cochinos Islands in Honduras with the health of these reefs.

Qualitative and quantitative surveys of macrofaunal invertebrates associated with live scleractinian corals in Cayos Cochinos Islands will be carried out at different sites and at different depths. Coral associates will be surveyed by SCUBA-diving using two non-destructive methods: a visual survey of coral associates using quadrats and a reef-wide search for all hermatypic coral species for *in situ* examination of associates. For the quantitative surveys, the size dimension of each study site will be approximately 50 x 50 m and forty 1m² quadrats will be located haphazardly at each site. In each quadrat, all coral associates will be counted, coral colonies bearing associates will be identified to species and the diameter of each colony will be measured in two perpendicular dimensions. Surface area of a coral colony will be calculated following the realistic estimation developped by Dahl (1973). Coral colonies will be classified into massive, encrusting, foliaceous, branching and ridge-like forms and different conversion factors will be applied for each category. The average of two diameters in perpendular directions will be used to estimate the surface area of encrusting and

foliaceous forms. The surface area of massive corals will be estimated as $2\pi r^2$, where r is the average diameter of a coral colony. For corals of branching and ridge-like forms, the projective area of each colony will be calculated and then multiplied by the conversion factors of 3 and 5.6 respectively to estimate their surface (Dahl, 1973).

In order to link the different assemblages of organisms inhabiting coral colonies with the status of the reef, the coral cover at the selected sites will be estimated. To describe the cover of the major functional groups and dominant coral taxa, a point-intercept counts (Ohlorst et al., 1988) will be used on the same quadrats as the macrofaunal surveys. Each 1 m^2 quadrat will be divided by string so that 25 intersection points will be contained within the quadrat. The type of bottom cover under each point will be identified as sediment, bare hard-bottom, algae, sponges, scleractinian corals, octocorals and other benthic cnidarians (Ohlorst et al., 1988).

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