IH293 Detrimental impacts upon mangrove faunal community structure facilitated by wood removal

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By definition, intertidal mangrove habitats are extreme ecosystems. In particular, the mangroves located within the Wakatobi Marine National Park experience extreme changes of tidal inundation, salinity and temperature on a daily basis. As a consequence, life within mangrove habitats is challenging for both the flora and fauna.

The habitats available for the resident mangrove fauna can be defined in to three distinct substrates 1. Sediments, 2. Tree trunk and root surfaces, and 3. Large woody detritus (LWD). Mangrove sediments are anoxic, and therefore animal diversity is low. The external surface of mangrove aerial root structures offer an available hard substrata, that become colonised by many sessile epifaunal communities such as encrusting and branching sponges, ascidians and many filter feeding bivalves. However, LWD is prime mangrove real-estate. Both sessile and motile fauna will exploit large fallen logs; therefore the biodiversity in decaying logs within mangroves is very high. Woody detritus provides a stable environment in an otherwise unstable dynamic environment.

Animals such as *Parioglossus interruptus*, the interrupted dartfish and *Desis martensi*, the reef spider are commonly found inside LWD within the Wakatobi mangroves (*fig. 1*). Dartfish are found in large shoals at hightide within the complex root systems. However, during low tidal events the dart fish do not leave the mangrove environment, they are found within emerged large fallen logs. In addition, the reef spider also exploits LWD within mangrove habitats. The spider does not venture out of its woody cryptic habitat, and remains within the decaying log.

Figure. 1. *a*, the reef spider, *Desis martensi* removed from its woody cryptic habitat, and *b*, the interrupted dartfish, *Parioglossus interruptus* exposed from its cryptic woody environment.

Mangrove harvesting – the felling and removal of trees used for construction, fishing and cooking is very common within the Wakatobi (*fig. 2*). As a consequence, the removal of LWD may have further detrimental impacts. Large fallen logs within forested habitats will enhance the deposition of fine

sediments, increase the organic content of sediments and in addition decaying logs greatly enhance the habitat complexity. Thus, removal of LWD within mangrove systems may mediate an increased rate of sedimentation upon adjacent ecosystems and ultimately the reduction of LWD will lead towards a reduced habitat complexity. Thus, for the fauna that rely upon woody detritus, removal of the substrate may have huge detrimental ecological implications towards the life history of the many animals that either obligatory or facultatively utilise LWD.

1. **<u>Brief experimental design</u>**:
   Using mangrove sites spanning the Wakatobi, analyse the infauna diversity within the sediments, analyse the epifauna diversity upon the intricate prop-roots and analyse the LWD cryptic faunal communities. The faunal community data base generated from these data can then be tested and compared using Shannon-Weiner diversity Indices, and rarefaction species accumulation curves. This research will demonstrate the ecological value towards mangrove biodiversity.

Figure. 2. *a*, the detrimental ecological impact of mangrove harvesting is clearly illustrated from this image defined by the many tree stumps and fallen trees. *b*, harvested *Bruguiera gymnorhiza* trunks made ready for construction in Sampela, Wakatobi.