

## **Microclimate and distribution of mangrove soil carbon in mud lobster (*Thalassina anomala* Herbst 1804) mounds**

### **ABSTRACT**

Although the role of mud lobsters (*Thalassina anomala* Herbst 1804) in influencing mangrove succession, structure and soil chemistry has been given a great deal of attention, there are still large knowledge gaps. We are unable to incorporate mud lobsters into model of carbon dynamics. This study examines the variations of microclimate (temperature and light intensity) in mud lobster mounds. The effects of burrowing activity of mud lobster on carbon distributions were investigated by comparing the content of organic matter (SOM) and organic carbon (SOC) extracted from both mud lobster mound and surrounding mangrove soils in Sibuti Wildlife Sanctuary (Sarawak, Malaysia). Our study demonstrates that mud lobsters, with microclimate (light and temperature) variation, are spatially distributed along the seaward and landward intertidal zone of the Sibuti mangrove. The transport of soil from deeper in the soil profile to the soil surface by the mud lobster resulted in significantly higher SOM and total C in freshly excavated mud than in older mud in the mound of the mud lobster. The vertical distribution of SOM was not influenced by the behavior of mud lobsters and had a slight negative impact on total soil C. There was no substantial evidence that the activity of the mud lobsters in mangrove soils increased SOM and total C. Because mangrove soils are known to trap or store belowground C, the burrowing activities may be doing the opposite by releasing the stored C to the surface. While mud lobsters have not had a significant impact on C, other processes (e.g., regeneration, productivity, and subsidence) are highly affected and may therefore have indirect effects on soil carbon stocks. Information on the contribution of mud lobster mound activities to C distribution in mangrove environment would be critical for national carbon estimation.

**Keyword:** Organic matter; Temperature; Light intensity; South China Sea; Malaysia