

## IH291 Ecology and behaviour of fiddler and sentinel crab populations, Indonesia

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Fiddler crabs are small, intertidal crustaceans of the genus *Uca*, characterized by extreme cheliped asymmetry in males. Fiddler crab distribution and zonation in the intertidal zone mainly depends on abiotic factors such as shore level, temperature, salinity, sediment grain size and organic content. Fiddler crabs (genus *Uca*) are one of the most characteristic groups of animals associated with intertidal shores, in particular with mangrove forests. Many *Uca* species live together in large groups and are rarely seen living alone, these groups can consist of just one single species or a few species living together. They are among the best invertebrates for behavioural and comparative study, they are prevalent, accessible and due to the fact that they are largely active at low tide their behaviour is easy to study.

Where resources are sufficient many different species can coexist in the same area; but how they manage to live in such close proximity and share resources is not yet fully understood. Although many accounts of sympatric behaviour have been recorded, the sympatry observed at this research site in the Wakatobi is remarkable, as the co-existence of this many species has never before been recorded.

A preliminary attempt was made to assess the distribution of these sympatric crabs in 2009, the area of study being situated at the interface of a mangrove and a mudflat at Ambeua on the Indonesian Island of Kaledupa. Seven species were recorded at the time; their distribution along the shore line was recorded with the use of quadrats and visual counts, there has now been nine species seen co-existing which is more than half the *Uca* species known from the entire region of Wallacea.

Usually, where several species of *Uca* live together competitive exclusion will occur – where it is common for the larger or stronger crab species to dominate the habitat. This then poses the question, how do *Uca* species coexist without competitive exclusion occurring? This can primarily be studied via behavioural observations; looking at the colonisation patterns of the species in the area, whether there are interspecific interactions and if the species have different feeding habits.

The bulk of a fiddler crabs' diet consists of algae, bacteria and fungi scraped off of sand particles, and detritus. *Uca* spp. feed using specialised brush-like mouthparts called setae, used to scrub diatoms etc from individual sand grains; different species are known to have different shaped setae that hold the sand grains. Different shaped setae allow for the sifting of various types of sediment; a spoon shaped seta is mainly used to filter sandy sediment, whilst the filtering of muddier sediments will require a less distinctly shaped seta. Sediment samples can be collected from where species are feeding, to examine the biotic material present and the sediment composition.

Other sites within the Wakatobi contain co-existing species, however not in such great numbers - Pantai Pogo and the neighbouring mangrove on the Island of Hoga is home to at least four species. At Pantai Pogo there are monospecific populations which would allow for comparisons to be made with the sympatric population at Ambeua, with the ultimate aim of assessing whether the numbers of species present effects the behaviour of the crabs. By extension this research could contribute to

a general biological understanding of how different ecologically-equivalent species manage to coexist at biodiversity hotspots.

Current research being undertaken at the site is aiming to understand how and why this many species are co-existing – transects are being conducted at various times of the tide to establish which species are on the surface feeding at what times of the tidal cycle, one question that could be addressed is; what is the difference in the feeding strategies of the species living in the lower intertidal zones compared to the species living in the upper zones?

Other research includes carrying out behavioural observations with the aim to understanding if this co-existence is altering the ‘normal’ behaviour of the crabs, questions could include; What are the behavioural differences between the species living at Ambeua compared to the species living at Pantai Pogo? And Does sympatry affect niche breadth when concentrating on one specific species?

### **Suggested Reading**

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