

IH275: The distribution and social structure of Anthias, Indonesia

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Coral reef fish provide many of the dynamic processes which allow a coral reef to function, and are key to the future survival of these fragile ecosystems. This makes them a vital component of ecological research. Significant effort is spent studying those functional groups with obvious and direct impacts on reef functioning, such as the herbivores. However, other groups remain relatively understudied, including planktivores such as Anthias. Even though they have been shown to play an important community role themselves, only a handful of studies have been carried out on their ecology, and thus a significant gap exists in our knowledge of coral reef community ecology.

Anthias belong to the family Serranidae, which they share with groupers, and within the subfamily Anthiinae. This subfamily includes 17 genera and approximately 170 species. The most common group in the subfamily is the genus *Pseudanthias*, totaling around 60 species. Most of the members of this subgroup are small, colourful reef-dwellers, typically orange and pink. They form groups or shoals over the reef where they hover and capture zooplankton brought in by oceanic currents, retreating into the complex structure of the reef when threats are perceived.

Shoal sizes of Anthias vary enormously, ranging from small, isolated groups that are scattered sporadically over the reef, to dense shoals numbering in excess of 3,000 individuals. Despite the high abundance of Anthias on many Indo-Pacific reefs, there has been surprisingly little research examining their ecology. However, studies on artificial reefs and into recovery from blast fishing have identified Anthias as one of the first taxonomic fish groups to colonise these sites. This is believed to be partly due to their ability to exhibit a dietary shift at the end of their juvenile development. The opportunistic feeding strategy may be key in allowing them to colonise these isolated and impacted reef structures.

There has been some documentation regarding their social structure which appears to be quite complex. Within the large aggregations found on reefs, Anthias populations are broken down into more intimate subdivisions called "harems". Within a typical harem is one dominant, colourful male, anywhere from 2-12 females, and up to two "subdominant" males. The dominant males exhibit stronger territorial behaviours, typically a U-swim display. An ability to switch gender has also been identified in Anthias, which has important implications for long term social structure.

There are many aspects of Anthias ecology that can be studied in the Wakatobi Marine National Park. Initially, surveys could be conducted examining their distribution patterns, to species level, using belt transects with visual census techniques at reef sites of varying habitat quality and at different depths. Along these transects, benthic data can also be collected to assess the habitat preferences of Anthias populations present.

Other aspects that can be studied are the mechanisms controlling their social structure; for example school size, number of harems and harem size. Essentially, once a school of Anthias is identified, physical and biological factors relating to their habitat can be assessed. These physical and biological factors can include habitat type, habitat size, surrounding habitat and depth. Anthias populations could also be compared to other fish taxa, to identify any effects of overall fish community structure on Anthias

abundance and diversity. Lastly, a behavioural study could be conducted on specific *Anthias* species, producing time budget analyses and assessing the effect of habitat quality on their behavioural patterns.

Reading List

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