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# Plasticity of Feeding Habits of Two *Plectroglyphidodon* Damselfishes on Coral Reefs in Southern Taiwan: Evidence from Stomach Content and Stable Isotope Analyses

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**Cheng-Tze Ho, Yi-Cheng Fu, Chi-Lu Sun, Shuh-Ji Kao, and Rong-Quen Jan (2009)** Plasticity of feeding habits of two *Plectroglyphidodon* damselfishes on coral reefs in southern Taiwan: evidence from stomach content and stable isotope analyses. *Zoological Studies* **48**(5): 649-656. On the west bank of the intake bay of a nuclear power plant at Nanwan, southern Taiwan, a recent outbreak of sea anemones has eliminated most branching corals at the site. In this habitat currently dominated by sea anemones, the abundance of Dick's damsel, *Plectroglyphidodon dickii* Lienard 1983, has increased more markedly than the sympatric congener, *P. johnstonianus* Fowler and Ball 1924. To study whether the distribution patterns of the 2 *Plectroglyphidodon* damselfishes were underlain by food availability and feeding habit plasticity, the reef area in the embayment was divided into 2 different zones, zone A dominated by *Acropora* corals and zone B dominated by a sea-anemone, and both stomach content and stable isotope analyses were used to delineate feeding habits of these 2 damselfishes in these 2 zones. Stomach contents showed that the major food items for *P. dickii* in zone A were filamentous algae (33.4%) and coral polyps (22.3%), while in zone B, they were filamentous algae (35.8%) and sea anemones (28.2%). In contrast, coral polyps were the major food item for *P. johnstonianus* in both zones (accounting for 75.5% in zone A and 67.5% in zone B). Analyses of $\delta^{13}$C and $\delta^{15}$N values concurred that coral polyps were the major nutrient source of *P. johnstonianus*. In addition, the contributions of both coral polyps and sea anemones to *P. dickii* were verified. Overall, it was postulated that in the sea anemone-dominated habitat, sea anemones were substituted for coral polyps in the diet of *P. dickii*, but similar plasticity did not occur in *P. johnstonianus*. Thus the higher feeding plasticity of *P. dickii* might have made it possible to more-successfully immigrate to the newly developed habitat. http://zoolstud.sinica.edu.tw/Journals/48.5/649.pdf

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Feeding habits of coral reef fish are generally adaptable (Dill 1983). While most food resources vary both spatially and temporally, fish can shift from feeding on 1 food type to another to take advantage of the most profitable food source at a particular time (Gerking 1994). For example, at Canos I. near Costa Rica, the puffer *Arothron meleagris* (Tetraodontidae) suffered from loss of its coral food, *Pocillopora*, due to a red tide epidemic. The puffers first switched to crustose coralline algae, a low-quality food, and then switched to *Porites*, a coral more resistant to red tides (Guzman and Robertson 1989). In contrast, when crown-of-thorns starfish (*Acanthaster planci* or COTS) decimated hard coral on parts of the Great Barrier Reef in 1983-1984, 2 species of butterflyfish, *Chaetodon rainfordi* and *C. aureofasciatus*, suffered large population losses due to their highly specialized feeding habits (Williams 1986). Moreover, *C. trifascialis*, a specialist which feeds on

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