

Short Report

Title: Preliminary study on flora in the territory of *Stegastes nigricans* in American Samoa

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Background and Objective of Research

Recently, coral reef ecosystems all over the world are quite threatened by mass bleaching events, and territorial damselfish seems to be expanding their algal farms on dead corals (e.g., Hixon 2004). Many scientists have shown interest in the mechanisms of forming the algal farms and interaction between their extension and coral recruits after such a catastrophic event.

The damselfish *Stegastes nigricans* is one of the most dominant territorial fish that manages a conspicuous algal farm. In Okinawa, this fish manages a virtual monoculture of a filamentous rhodophyte *Polysiphonia* sp., but the algal composition of the farms in most other coral reefs is still unknown.

So, to provide this fundamental information, we conducted a preliminary study on algal assemblages inside the territories of *S. nigricans* at coral reefs in American Samoa where damselfish colonies are dominant (Mctee 2004).

Although collected algae will also be used for phylogenetic analyses to make clear the evolution of the interaction between the fish and algae inside its farm, this study is still in the middle of sampling and analyses in other targeted areas, so it will be compiled later. Here, we'll report species composition of algal farms within damselfish territories observed at Tutulia Island.

Materials and Methods

Sampling sites



We collected 6 samples of algal mat within damselfish territories in the Airport Lagoon and 4 samples at Alofau (Fig. 1). Each algal mat was collected from a different colony, and then immediately transferred into the bottle with ethanol.

Fig.1

Sampling sites at Tutuila Island

Identification

All algae were identified to the genus level under microscopes, based on the descriptions of Womersley (1998, 2003) and Abbott (1999).

Summary of Findings

Table 1. List of algae inside the territory of the damselfish *Stegastes nigricans* in Airport Lagoon and Alofau. D, dominant; C, common; R, rare; -, no occurrence; Cy, cyanophytes; Ch, chlorophytes; Rh, rhodophytes

		Airport Lagoon	Alofau
		n = 6	n = 4
Cyanophyta spp.	Cy	D	D
<i>Anotrichium</i> sp.	Rh	-	R
<i>Centroceras</i> sp.	Rh	-	R
<i>Chondria</i> sp.	Rh	R	-
<i>Gelidiopsis</i> sp.	Rh	D	C
<i>Herposiphonia</i> sp.	Rh	-	R
<i>Hypnea</i> sp.	Rh	R	-
<i>Jania</i> spp.	Rh	C	C
<i>Neosiphonia</i> sp.	Rh	-	C
<i>Polysiphonia</i> sp. 1	Rh	C	C
<i>Polysiphonia</i> sp. 2	Rh	C	R
<i>Cladophora</i> sp.	Ch	-	R
<i>Enteromorpha</i> sp.	Ch	R	R

Algal species collected inside the territories of *Stegastes nigricans* around Tutuila Island were similar to those around the Ryukyu Islands. The composition is, however, quite different. Around the Ryukyu Islands, algal farms of the fish are strongly dominated by one rhodophyte *Polysiphonia* sp. On the contrary, around Tutuila Island algal farms were not dominated by that alga. We think this discrepancy is partly due to the difference in substratum (i.e., most territories at the Ryukyu Islands and Tutuila Island are located on the massive rocks and on the branching corals, respectively) and difference in nutrient-supply conditions (i.e., lots of land-derived N and somewhat stagnant conditions in the former area, while less land-derived N and rapid dilution with offshore water in the latter area). We hope we can make a thorough study of the interaction between algal composition and substratum structure, and between algal composition and nutrient-supply conditions in algal farms of *S. nigricans* in the near future.

Acknowledgements

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References

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Our studies related to this survey.

In prep

- Umezawa Y and Hata H; Nitrogen dynamics within the damselfish *Stegastes nigricans* territories.

Published

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