Aggregation of the siganid *Siganus unimaculatus* at Ishigaki Island, Okinawa, Japan

Atsushi NANAMI*

Ishigaki Tropical Station, Seikai National Fisheries Research Institute, Fisheries Research Agency, 148-446 Fukai-Ota, Ishigaki, Okinawa 907-0451, Japan

* Corresponding author: A. Nanami

E-mail: nanami@fra.affrc.go.jp

Communicated by Hiroya Yamano (Environment and Conservation Editor)

Keywords *Siganus unimaculatus*, aggregation, Okinawa

Fig. 1 The large aggregation of adult *Siganus unimaculatus* (orange coloration with black thumb print marking on dorsal surface) with specimens of adult *Siganus puellus* (yellow body coloration) on the reef flat at Ishigaki Island, Okinawa, Japan

Siganus unimaculatus (Evermann and Seale 1907), caught for fresh fish market and aquarium trade, is one of the siganid species commonly found in Ryukyu Islands, Philippines, North West Shelf and Western Australia (Carpenter and Niem 2001). Although the small juveniles form schools, larger juveniles and adults are usually found in pairs (Carpenter and Niem 2001). However, a large aggregation of adults of the species (>100 individuals) was found on the reef flat at Ishigaki Island, Okinawa, Japan (24°27' N, 124°11' E) at the new moon (3 July 2008) by scuba diving (Fig. 1). Although Masuda et al. (1984) reported that this species is occasionally seen in large aggregations around coral branches grazing on the algae growing on dead bases of corals, the large aggregation of the species did not feed and swam near the reef at this time. The species aggregated with another siganid *Siganus puellus* typically found as pairs (Carpenter and Niem 2001) that could form also spawning aggregations (Rhodes 2003) as observed here. It has been reported that some of siganid species show lunar synchronized with reproductive activity, as several species have been shown to spawn at or around the new moon (e.g. Hoque et al. 1999; Harahap et al. 2001). Based on the knowledge, the aggregation of *S. unimaculatus* might be a spawning aggregation.

Acknowledgments

I am grateful to the staff of Ishigaki Tropical Station, Seikai National Fisheries Research Institute and K. Kinjo for their support in the present study.

References

- Carpenter KE, Niem VH (2001) FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Volume 6. Bony fishes part 4 (Labridae to Latimeriidae), estuarine crocodiles, sea turtles, sea snakes and marine mammals, FAO, Rome
- Harahap AP, Takemura A, Nakamura S, Rahman MS, Takano K (2001) Histological evidence of lunar-synchronized ovarian development and spawning in the spiny rabbitfish, *Siganus spinus* (Linnaeus), around the Ryukyus. Fish Sci 67: 888–893
- Hoque MM, Takemura A, Matsuyama M, Matsuura S, Takano K (1999) Lunar spawning in *Siganus canaliculatus*. J Fish Biol 55: 1213–1222
- Masuda H, Amaoka K, Araga C, Uyeno T, Yoshino T (1984) The fishes of the Japanese Archipelago (text). Tokai University Press, Tokyo
- Rhodes KL (2003) SCRFA Spawning Aggregation Survey in the Federated States of Micronesia. Western Pacific Fisher Survey Series: Society for the Conservation of Reef Fish Aggregations, Volume 2. Federated States of Micronesia

Received: 13 September 2008/Accepted: 15 October 2008

© Japanese Coral Reef Society