Elysia leucolegnote (Opistobranchia: Sacoglossa) Jensen 1990, a new record for the Verde Island Passage, Philippines

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ABSTRACT

Aggregations of *Elysia leucolegnote* were observed from Silonay Mangrove and Ecopark, Calapan, Oriental Mindoro, occurring on mudholes with water retained from retreating tide waters. The individuals in the aggregations has white markings on the parapodia and the rhinophores, and yellow marking on each quadrant of the body. This is the first report of the occurrence of the mangrove-associated species from the Philippines which increased the number of *Elysia* species records to 10 species.

Keywords: biodiversity, biogeography, Molluska, new records

INTRODUCTION

Sacoglossans are cryptic slugs, characterized by having no jaw and with longitudinal row of teeth (Swennen 2011) used for piercing algal cells which they feed on (Jensen 2015). Elyssidae, the largest family of the order with over 300 valid species identified to date (Jensen 2007), is closely associated with seaweeds and other marine plants either using these as a substrate or food material (Händeler and Wagele 2007; Jensen 2007; Swennen 1997). The group is known to sequester algal chloroplast and retain them for their photosynthetic functions in a process called kleptoplasty (Rudman 2006).

Elysia, the most speciose genus is characterized by a wing-like parapodia that spreads out giving them a leaf-like appearance. The reef dwelling *Elysia* had been discovered over a hundred years ago, but mangrove-associated species are recent discovery. *Elysia leucolegnote* was identified by Jensen from Hong Kong in 1990. Swennen, on the other hand first described *Elysia bangtawensis* and *E. siamensis* in 1997, and *E. singaporensis* and *E. bengalensis* in 2011.

Jensen (2007) conjectured that the Indo-Malayan and Central Pacific sub provinces as the center of origin and evolution of new Sacoglossan species by having twice the number of species occurring in tropical Australia and West

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Indian Ocean. The biogeographic province also has more than twice the number of species in South Pacific and Ryuku Islands. This makes the biogeographic area of Malaysia, Indonesia and the Philippines the most probable center of species diversity for Sacoglossan.

Despite the biogeographic probability, no mangrove-dwelling *Elysia* had been described from the Philippines. This paper provided some notes on *E. leucolegnote* from the Silonay Mangrove Ecopark in Silonay, Calapan, Oriental Mindoro province, a protected area within the Verde Island Passage, the biogeographically recognized center of marine shorefish diversity (Carpenter and Springer 2005).

METHODS

Surveys of the mollusk population was done in Mahal na Pangalan, Calapan (13° 25.980' N and 121°11.503'E), Silonay, Calapan (N13° 24.114' E121° 13.507') and Estrella, Naujan (13°44.569'N and 121°22.783E') (Figure 1). These mangrove areas form a continuous coastal ecosystem on the northeastern coast of Oriental Mindoro.

Figure 1. Study sites of mangrove-associated mollusk survey. *Elysia leucolegnote* was noted only from Silonay but not on two other sites.

The species was found serendipitously at Silonay Mangrove Ecopark, Silonay, Calapan. They appear like seagrass leaves which perfectly camouflage them on the flooded mangrove floor. *Elysia leucolegnote* was found in several aggregations of more than 20 to over a hundred individuals within puddles

from October to December 2016. Holes dug by mudcrabs are often occupied as they retain water from incoming tide.

Photos of individuals as well as of aggregations were taken. Initial identity of the slugs was established from the photos provided by Swennen (2011) who also confirmed the identity of the species.

RESULTS

Aggregations of *E. leucolegnote* were noted in Silonay Mangrove Ecopark during the mangrove-associated mollusks survey in Mindoro, Philippines. The species measured about 3-3.5cm, was characterized by distinctive white markings around the parapodia and on its rhinophores. The green coloration on the parapodia appears mottled. The specimens found here possess four yellow dots, one of each quadrant near the margin of the parapodia (Figure 2). The dots are also visible on the underside. All individuals observed have white spots on the dorsal side of the parapodia but prominence varied among individuals.

Figure 2. *Elysia leucolegnote* from Silonay Mangrove Ecopark with white margin on the parapodia, white rhinophores, and a yellow dot on each quadrant of the body.

Figure 3. A dense aggregation of *Elysia leucolegnote* in a mudhole in Silonay Mangrove Ecopark.

There is no recorded predator yet of the species. Crabs, however, were observed to be picking on individuals within aggregations (Figure 4).

DISCUSSION

Elysia leucolegnote was first identified from Lantau Island, Hong Kong by Jensen in 1990 (Rudman 2003). Swennen (1997) later documented the same species from Thailand together with two other new *Elysia* species. This is the first time that the species is reported from the Philippines.

Extent of occurrence of *Elysia* is currently unknown although it is highly likely that Indo-Malayan region is a hotspot for diversity (Carmona et al. 2011; Jensen 2007). To date, there are nine *Elysia* species documented from the Philippines (GBIF 2018). Documentation of *E. leucolegnote* from the Philippines increased the range of occurrence of the species which were previously documented only from Hong Kong, Singapore, Thailand, and India (Swennen 2011). The documentation of the species from the Philippines,

specifically within the Verde Island Passage is ecologically significant in the biogeography of the group by lending support to Jensen's conjecture that Malaysia-Indonesia-Philippines may be the center of species diversity, being the central point between Japan and Australia where habitat complexity provided for by the archipelagic islands could trap dispersing species and retain them in the area.

Figure 4. Juvenile mudcrabs pick on individual *Elysia leucolegnote* in a mudhole.

Exploration of neighboring mangrove area, particularly from Mahal na Pangalan, Calapan (13°25.980' N and 121°11.503' E) and Estrella, Naujan (13°44.569' N and 121°22.783' E) failed to locate any aggregations indicating that local distribution of the species may be patchy on the scale of tens of

kilometers. As an algal-eating species (Händeler and Wagele 2007), species distribution may follow distribution of their food materials. Crypsis, as well as the dynamic nature of the mangrove forest floor may also contribute to the difficulty in finding the species.

Surveys done in October until November documented the species. Further surveys done in December, however, showed absence of the species. Tides usually inundate the mangrove forest floor in different degrees throughout the year where holes are filled with water. Temporal occurrence of the species thus may be affected by the degree of inundation of sites where holes may serve as retreat sites from desiccation. The variability of tidal inundation throughout the year may also affect growth of their food materials.

Elysia leucolegnote is the fifth *Elysia* species that is documented within the Verde Island Passage, and the oly mangrove-associated species so far, underscores the need for more exploration within the area.

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