REPTILES & AMPHIBIANS

Two Instances of Epibiosis in the Pelagic Seasnake, *Hydrophis platurus* (Squamata: Elapidae), on the Pacific Coast of Costa Rica

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In marine environments, a wide variety of small free-living and larval invertebrates tend to colonize living substrates as a strategy for survival (Harder 2009), and the bodies of seasnakes, which live partially or entirely in the ocean, are relatively common hosts of these pelagic epibionts (Zann et al. 1975; Wahl 1989). The widely distributed Pelagic Seasnake (*Hydrophis platurus*) is abundant along the Pacific Coast of Costa Rica (Solórzano 2004; Sasa et al. 2010), and is the only truly pelagic species that tends to stay and feed along the slicks or lines of foam and debris that form on the sea surface (Kropach 1975; Solórzano 2004). Its habits facilitate the approach and colonization of these floating organisms in various parts of the snake's body. These epibionts, especially larval decapods (Pfaller et al. 2012), are attracted to these lines or spots and often cling to floating debris, and snakes represent a potential surface within this space.

Herein we report two instances of epibiosis in *H. platurus* in two different geographical areas on the Pacific Coast of Costa Rica. The first ocurred in January 2017 during a research tour in Golfo Dulce, Puntarenas Province (8.91°N, -83.40°W), where an adult *H. platurus* of a "yellow" population of this species was collected (Solórzano 2011). The snake measured 53.6 cm in total length, and we noticed a crab larva of the genus *Portunus* (Crustacea: Decapoda: Portunidae) clinging onto one side of the back aproximately one-third of the way down the body (Fig. 1).

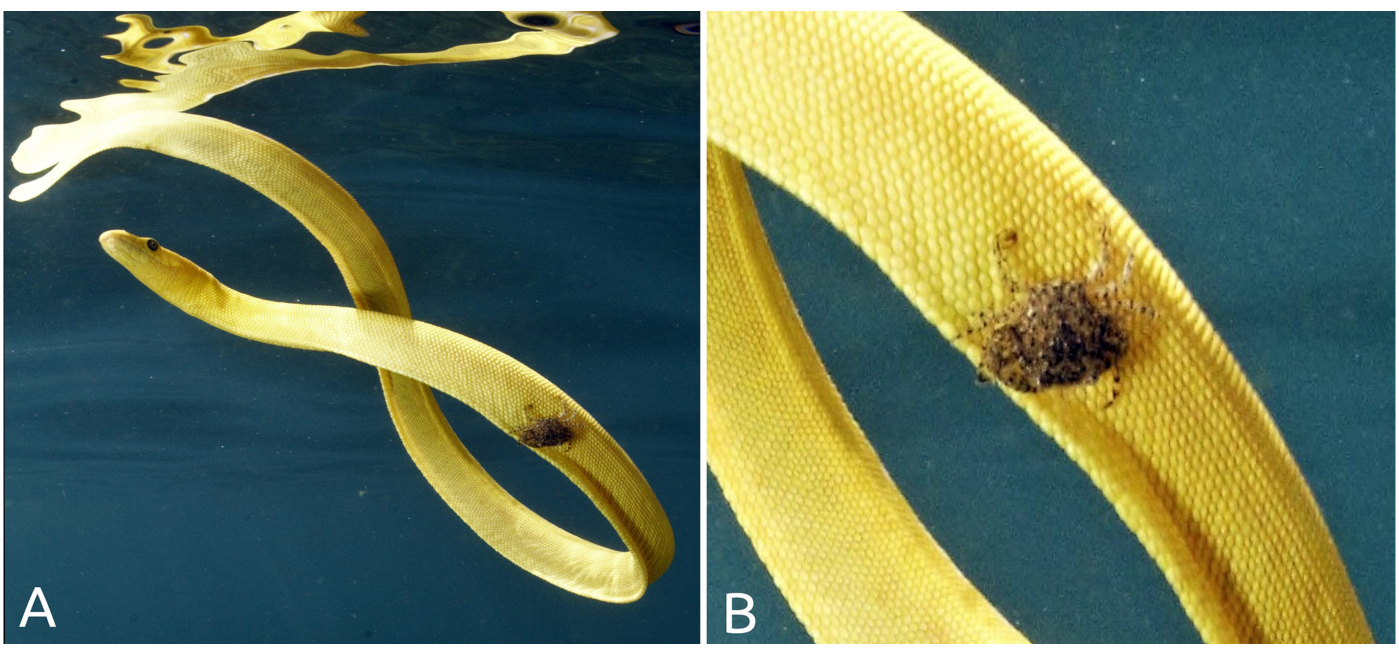

Fig. 1. Yellow Pelagic Seasnake (*Hydrophis platurus*) in Golfo Dulce, Puntarenas Province, Costa Rica, with a crab larva on one side of the dorsum, Photograph by Pepe Manzanilla.

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Subsequently, in January 2021, in the Gulf of Papagayo, Guanacaste Province (11.12°N, 85.12°W), we collected a bicolored adult *H. platurus* that measured 61.9 cm in total length within a line of foam and floating debris, and noticed an aggregation of barnacles (Crustacea: Cirripedia: Lepadidae) attached to the end of the tail, where we observed two associated species, *Conchoderma virgatum* and *Lepas* cf. *anserifera* (Fig. 2). We maintained this individual in a saltwater pond for six days, and then noticed that it was beginning to shed. During this process the snake managed to free itself from the barnacles, which we preserved and deposited in the Museum of Zoology at the University of Costa Rica (*Conchoderma virgatum* MZUCR-3710-01; *Lepas* cf. *anserifera* MZUCR-3710-02). The edge of the snake's tail where these barnacles were attached was visibly compressed (Fig. 2c).

Epibiosis in seasnakes is not uncommon (Zann 1975; Zann et al. 1975). In the case of *Hydrophis platurus*, colonization by certain species of pelagic invertebrates in their larval stages, which are attracted to scum and debris patches or lines, apparently is due mostly to a physical factor related to the availability of space or a surface to which they can cling. Because of its exclusively pelagic habits, *H. platurus* is susceptible to colonization by a large number of pelagic epibionts, and thus is host to almost one-half of the recorded species in seasnakes (see the comprehensive review by Pfaller et al. 2012). The amount of floating debris and the number of snakes within a slick can vary considerably (Kropach 1975; Solórzano 2004), and thus can have a significant impact on the frequency of epibiosis (Pfaller et al. 2012). These authors also noted the scarcity of floating debris during the dry months, and both of the encounters we are reporting ocurred during this time of year. In one event (northwestern Guanacaste), little or no floating debris was evident, and in the other (in Golfo Dulce), the surface was free of debris.

Seasnakes, and especially *H. platurus*, shed their skins at intervals ranging from about two to six weeks (Heatwole 1987), probably as an evolutionary response to rid themselves of these pelagic epibionts by vigorously knotting their bodies (Pickwell 1971; Zann et al. 1975), despite the fact that the presence of these organisms does not seem to represent an additional physical or energetic cost to the snakes. Unlike barnacles that attach to specific points, however, decapod larvae can move to another part of the body and thus avoid being removed by molting (Pfaller et al. 2012). Conversely, we are unaware if the temporary anchoring of these epibionts to a snake's body can cause any significant effect that compromises health or mobility, such as the herein recorded superficial compression of the skin caused by the peduncles of barnacles (Fig. 2c).

The decapod crab larva clinging to the back of a yellow seasnake is the first record for the Golfo Dulce population, and follows the report by Pfaller et al. (2012) for the northwestern Pacific Coast of Costa Rica. Since barnacles usually have been found individually attached to the end of a snake's tail, the association of two species of pedunculated barnacles (*Conchoderma virgatum* and *Lepas* cf. *anserifera*) sharing the end of the tail of a seasnake is the second known record for *H. Platurus*, following a report in Mexico by Alvarez and Celis (2004) of *C. virgatum* and *Dosima fascicularis* on the tail of an adult seasnake.

Long-term studies are still required to further evaluate all the factors involved in the ecospatial relationships of this complex interaction between seasnakes and these small pelagic epibionts.

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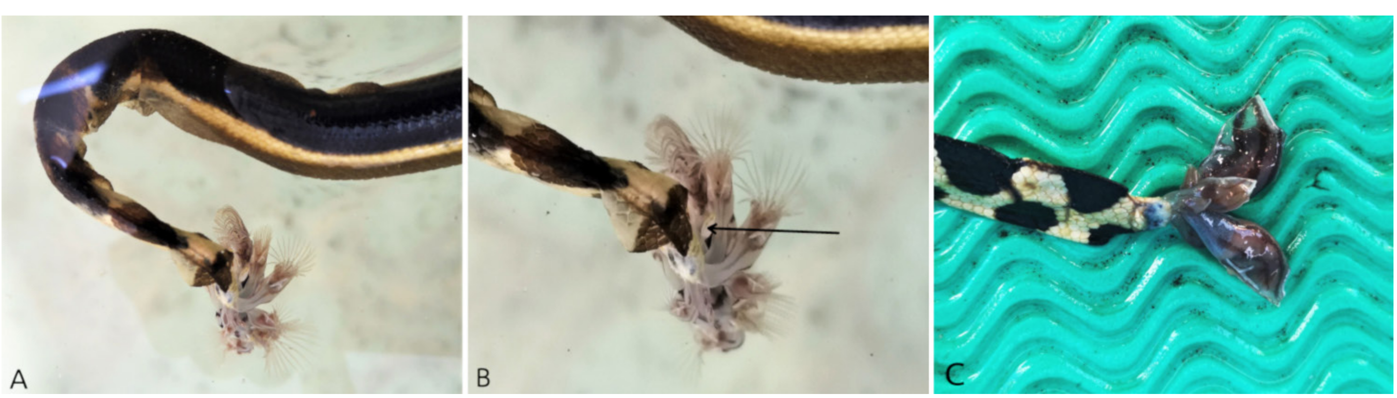

Fig. 2. A Pelagic Seasnake (*Hydrophis platurus)* in the Gulf of Papagayo, Guanacaste Province, Costa Rica, with an aggregation of barnacles (*Conchoderma virgatum* and *Lepas* cf. *anserifera*) attached to the end of the tail. The arrow indicates the position of the barnacle (*Lepas* cf. *anserifera*) near the center of the group (A–B); compressed edge of the snake's tail caused by the peduncles of barnacles (C).

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