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First record of giant trevally (*Caranx ignobilis*) around the Clipperton Atoll-La Passion Island (North-Eastern Tropical Pacific)

by

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Résumé. – Première identification de la carangue grosse tête (*Caranx ignobilis*) autour de l'île de Clipperton-La Passion (océan Tropical Nord-Est).

Une mission réalisée en février 2016 sur l'île de Clipperton-La Passion (océan Tropical Nord-Est) a permis l'identification inédite de la carangue grosse tête *Caranx ignobilis* (Forsskål, 1775).

Keywords. – Carangidae - *Caranx ignobilis* - North-Eastern Tropical Pacific - First record - Geographic distribution.

The first description of the fish fauna of the Clipperton atoll was conducted during the 1898-1899 Hopkins-Stanford Galapagos Expedition through the collection of eight species (Snodgrass and Heller, 1905). However, the remoteness of this atoll (Fig. 1A) postponed until the beginning of the 21st century the setting up of the first significant local list of fishes with 160 species (Robertson and Allen, 2002). This list was recently extended along with an assessment of the completeness of the inventory at Clipperton (Fourrière *et al.*, 2014). Following these authors, Clipperton waters host 197 fish species from 62 families, including 106 correspond to reef fishes, with an endemism of 6.6% (robustness of 95%).

The giant trevally *Caranx ignobilis* (Forsskål, 1775) is the largest Indo-Pacific carangid that can reach up to 170 cm in total length (TL) and a weight of up to 80 kg. It ranges from East-Africa, including the Red Sea to the Hawaiian and French Polynesian islands eastwards, the Marquesas Island being the most eastern range (Meyer *et al.*, 2007). A first identification of this species was however documented in the Eastern Tropical Pacific by Acuña-Marrero and Salinas-De-León (2013) in the Galapagos Archipelago. As the giant trevally is absent from the list by Fourrière *et al.* (2014), we present here the first record of *C. ignobilis* in the waters surrounding the Clipperton atoll.

MATERIAL AND METHODS

A scientific mission took place in the Clipperton atoll in February 2016, which included several scuba diving sessions dedicated

to underwater visual censuses of reef fishes. A total of six Nitrox dives of an average duration of 60 min were implemented in depths ranging from 10 to 30 m, including five on the western side of the atoll and one on the eastern side (Fig. 1B). The assessment of fish sizes was done visually and photographs were taken for specific purposes of identification.

RESULTS AND DISCUSSION

The giant trevally was sighted and photographed by one of the authors (EC) on 4 February 2016 on the eastern side slope of the Clipperton atoll (N10°18.800' - W109°12.253') at an approximate depth of 10 m (Fig. 1B). The specimen was an adult of approximately 110 cm of Total Length (TL), swimming in the water column close to the reef slope (Fig. 2). This species is unmistakably in adulthood, mainly due to its large size (> 100 cm TL) that cannot be reached by other Carangids that can be found in Clipperton waters, such as the blue trevally *Caranx melampygus*, the black trevally *C. lugubris* or the bigeye trevally *C. sexfasciatus*.

The deep water gap without islands that separates the Eastern Pacific from the Central Pacific, named as the Eastern Pacific Barrier, is far from being uncrossable as it did not prevent 80 fish species to likely migrate eastwards (Robertson *et al.*, 2004). The giant trevally, although mostly found around reefs of coastal areas, does frequent the open ocean as suggested by the gut contents of some specimens (Sudekum *et al.*, 1991). Such migrations in open ocean waters were also described based on the movement study of this species between Marine Protected Areas in Hawaii (Wetherbee *et al.*, 2004).

As stated by Acuña-Marrero and Salinas De Leon (2013), these unprecedented colonization events could be explained by long range dispersal during the larval stage by oceanic currents and active swimming behaviour (Planes *et al.*, 2009), the association of newly settled larvae or adults to drifting flotsam (Hunter and Mitchell, 1966) or direct migration of adults or sub-adults (Luiz *et al.*, 2011). This last option is actually supported by the absence of any young individuals of *C. ignobilis* either in Galapagos or Clipperton atoll. Based on that hypothesis supported by Acuña-Marrero and Salinas De Leon (2013), and given the position of Clipperton island

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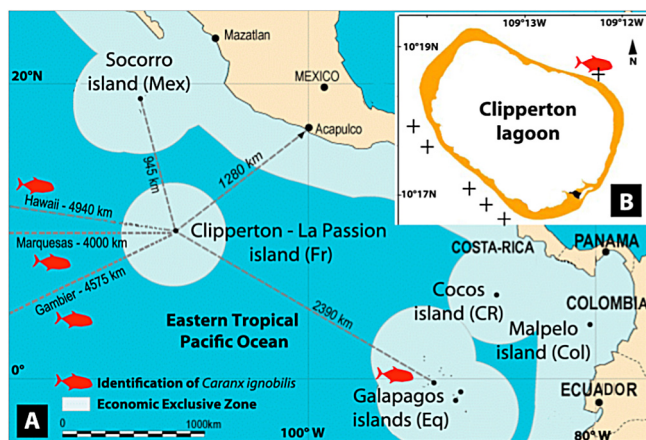


Figure 1. – A: The Clipperton-La Passion Island (France) lies in the North-Eastern Tropical Ocean at a minimum distance of 945 km from the first emerged ground constituted by Socorro Island in the Mexican Exclusive Economic Zone. The closest potential sources for the colonization are Marquesas (French Polynesia) on the Eastern side and Galapagos (Ecuador) on the Western side, respectively (map modified from “Carte de l’île de la Passion”, 2004, by C. Jost); B: Approximative location of the adult *Caranx ignobilis* identified on the 4 February 2016 (+ represent the location of the six dives).

between the Hawaiian Islands on one side, as potential sources for *C. ignobilis*, and the Galapagos Archipelago on the other side (Fig. 1A), we can hypothesize that the French atoll may have constituted a stepping stone for the small population of giant trevallies regularly spotted around Darwin Island (Galapagos). However, a colonization based on an East to West process from Galapagos remains so far another hypothesis. The Marquesas Archipelago (S9°25'–W139°29') or the Gambier Archipelago (S21°35'–W135°44') of French Polynesia, could originate the colonization of Galapagos islands from the Southern hemisphere, facilitated by the eastward SubTropical Counter Current (Kessler, 2006). The distance between Marquesas or Gambier and Galapagos archipelagos is of 5,530 km and 5,300 km, respectively, which is much closer than a northern hemisphere potential source such as Hawaii (7,400 km) (Source: Google Earth). Such a process would then position the Galapagos Islands as the first Eastern Tropical Pacific receptacle for *C. ignobilis* and as the most probable potential source of this species for the Clipperton Island.

Once just a single individual was observed in Clipperton, this species should also and so far be considered as a vagrant species such as in the Galapagos Archipelago (Acuna-Marrero and Salinas De Leon, 2013). From a prospective point of view, genetic tests on all these populations could allow the assessment of the genetic connectivity between them, and potentially the migratory patterns. We should also expect and then closely monitor the next extension of the geographical range of this species toward Malpelo (Colombia), Cocos (Costa Rica) and/or Revillagigedo Archipelago (Mexico).

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Figure 2. – Photograph of an adult individual of *Caranx ignobilis* on the eastern side reef slope of the Clipperton atoll on the 4 February 2016. The dorsal profile of steep and nearly straight snout, plus the silvery gray dorsal colour, shading to silvery white ventrally, with numerous scattered, very small black spots, are quite characteristic of this species of jack (Photo E. Clua).

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