

NOTE:

CONFIRMATION OF THE OCCURRENCE OF THE CORAL *PAVONA CHIRIQUIENSIS* GLYNN, MATÉ AND STEMANN (CNIDARIA: ANTHOZOA: AGARICIIDAE) IN THE COLOMBIAN PACIFIC

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RESUMEN

Confirmación de la presencia del coral *Pavona chiriquiensis* Glynn, Maté y Stemann (Cnidaria: Anthozoa: Agariciidae) en el Pacífico colombiano. El género *Pavona* comprende 18 especies de las cuales *Pavona chiriquiensis* ha sido recientemente descrita y registrada en varias localidades del Pacífico oriental tropical. A partir de observaciones y colecciones realizadas en arrecifes de las islas Gorgona y Malpelo entre 1999 y 2005 se confirma su presencia en Colombia. El tardío registro de *P. chiriquiensis* en estas islas pudo ser debido a su similitud y confusión con *P. varians*, o a su reciente colonización del Pacífico colombiano.

PALABRAS CLAVE: Colombia, Corals, Coral reefs, Gorgona I., Malpelo I., *Pavona chiriquiensis*, Tropical Eastern Pacific

The scleractinian coral genus *Pavona*, restricted to but widely distributed within the Indo-Pacific region (Veron, 2000), includes 18 valid species, eight of which occur in the Tropical Eastern Pacific (TEP; Glynn and Ault, 2000; Reyes-Bonilla, 2002). *Pavona chiriquiensis* Glynn, Mate and Stemann, 2001 is the most recently described species of this genus occurring in the TEP (Glynn *et al.*, 2001). Although this species had been observed since the early 1970's in shallow rocky outcrops in Panama and was believed to be rare, it is now known to be widely distributed on island sites of the TEP (Glynn *et*

al., 2001). *P. chiriquiensis* was known to occur in Colombian Pacific waters (Zapata, 2001; Zapata and Vargas-Angel, 2003) but only from anecdotal accounts (H.M. Guzmán, pers. com.; B. Vargas-Angel, pers. com) and a photographic record from Malpelo Island (Garzón-Ferreira and Pinzón, 1999). Here, we confirm the occurrence of *P. chiriquiensis* at Gorgona and Malpelo Islands (Colombia) based on observations, photographs or specimens collected between 2003 and 2005.

Most observations were made while skin or SCUBA diving on coral reefs located on the eastern, leeward side of Gorgona Island, Colombia (2° 58' N, 78° 11' W) during September 11-17, 2004 and October 22-28, 2005. During these periods, extensive observations of the coral communities at La Azufrada and Playa Blanca reefs were made while collecting data for a coral reef monitoring program (SIMAC; Garzón-Ferreira, 1999). Other observations at Gorgona Island were made on October 18-25, 2003 at the Old Pier Reef and La Azufrada, and on October 28, 2005 at El Laberinto, a rocky area composed of large boulders and located southwest of El Horno on the northern tip of the island (see Zapata, 2001 and Zapata and Vargas-Angel, 2003 for maps and description of Gorgona Island coral reefs). Additional observations were made by one of us (M.L.V.) at Malpelo Island (4° 00' N, 81° 36' W) on late September 2004. During these periods, we observed several isolated colonies of *P. chiriquiensis*, some of which were photographed and collected as reference material. This material is now deposited at the Museo de Historia Natural Marina de Colombia (Marine Natural History Museum of Colombia; MHNMC for its Spanish acronym) housed in the Instituto de Investigaciones Marinas y Costeras (INVEMAR) in Santa Marta and at the Marine Biology Reference Collection of Universidad del Valle (CRBMUV) in Cali. We also examined two additional specimens collected by J. Garzón-Ferreira at Malpelo in 1999 (see Garzón-Ferreira and Pinzón, 1999).

We first observed colonies of *P. chiriquiensis* at Gorgona on the back-reef of the Old Pier Reef and on the reef flat of La Azufrada reef in 2003. These were small (7.5-9.5 cm largest dimension), massive-looking colonies closely resembling unattached colonies of *Pavona varians*. However, their unusual morphology, sufficiently distinct from that of *P. varians*, led us to collect two specimens (Catalog Nos. CRBMUV-CORALES 2003001 and 2003002). This material remained unidentified until 2004 when we observed several additional colonies at different sites on La Azufrada Reef.

The first colony observed in 2004 was found on the reef flat of La Azufrada reef at <1 m depth at low tide. This colony was 52 cm long x 47 cm wide x 3-4 cm high, irregularly shaped, massive-looking, and bumpy on the surface (Figure 1a). However, closer examination revealed that it consisted of a thin sheet of coral encrusting pocilloporid coral rubble. The surface exhibited a dense number of hydnothecae and short and low collines (Figure 1b). The live coloration was brown-orange to pinkish with clearly contrasting pale polyp mouths at the center of corallites. The latter characteristic

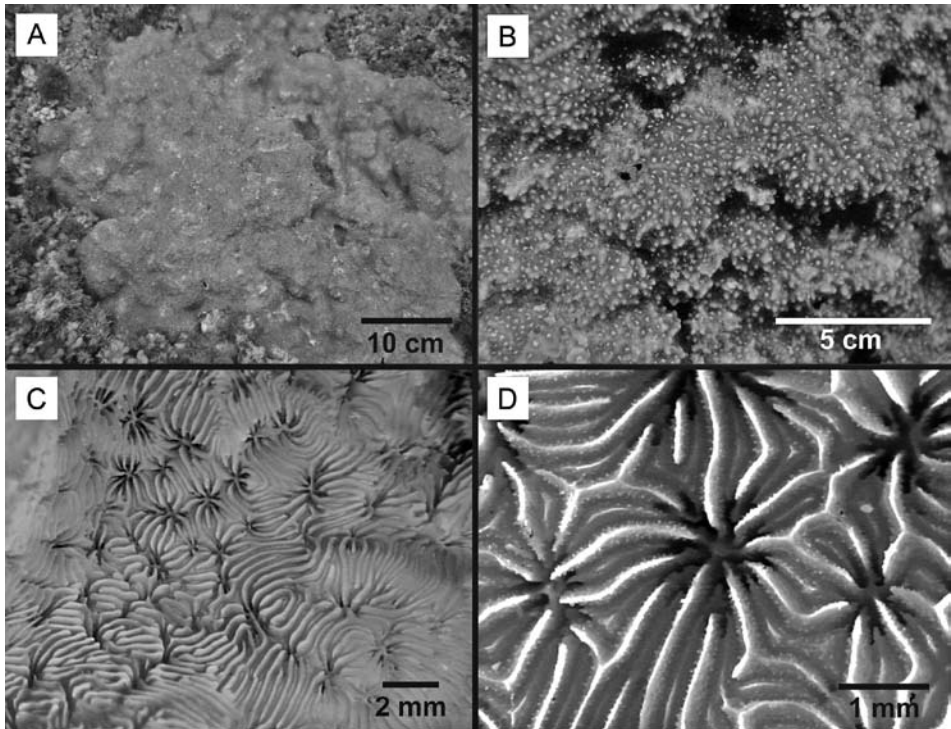


Figure 1. a) Colony of *Pavona chiriquiensis* found at the reef flat of La Azufrada, Gorgona Island, in early September, 2004. The substrate around the colony consists of pocilloporid coral rubble overgrown by algae and live, small colonies of *Psammocora stellata*. b) Close-up of a second colony of *P. chiriquiensis* encrusting a pocilloporid branch fragment on the reef crest of La Azufrada, Gorgona Island, September, 2004. Note numerous hydnothorae, short collines and contrasting pale polyp mouths. c) Portion of a *P. chiriquiensis* colony examined under magnification in the laboratory showing typical thamnasterioid arrangement of corallites. d) Close-up of a *P. chiriquiensis* corallite and its structures.

and the clearly encrusting growth allowed us to tentatively identify this colony as *P. chiriquiensis*. A number of additional, isolated colonies were later observed at several sites on La Azufrada reef in September 2004. These varied from small (<10 cm diameter) to relatively large (<80 cm) colonies that were almost invariably encrusting dead coral, most often pocilloporid branch fragments, but occasionally dead massive agariciids that were in deeper water (~7 m). All of these exhibited the same basic characteristics described for the first colony although live tissue coloration varied from tan to burned yellow or olive green. Because previous records of the occurrence of *P. chiriquiensis* at Gorgona were only anecdotal, we photographed and collected several specimens (CRBMUV-CORALES 2004001 and 2004002, and MHNMC -INV-CNI-2954), which were later examined in the laboratory. Corallites of these specimens were small, with indistinct walls and well-developed septo-costae in a thamnasterioid arrangement (Figure 1c). The collumella was solid and styloform; the septa were exert and profusely dentate on the sides, but less so

on the margins (Figure 1d). These characteristics were compared with descriptions of *P. chiriquiensis* (Glynn *et al.*, 2001; Maté, 2003) and led us to confirm our tentative field identification. Further confirmation was provided by P.W. Glynn (pers. comm.) after examining some photographs of our specimens. Comparisons with the specimens collected in 2003 revealed that these were also *P. chiriquiensis*. Examination of specimens collected by J. Garzón-Ferreira at Malpelo Island in 1999 (MHNMC -INV-CNI 234 and 239) and that had been tentatively identified as *P. chiriquiensis* by P.W. Glynn from a field photograph, confirmed the original report of this species at Malpelo (Garzón-Ferreira and Pinzón, 1999). Since our initial observations in 2003 and 2004, we have observed more colonies of *P. chiriquiensis* at Gorgona and Malpelo Islands. On September 29, 2004 several colonies (0.5 - 1 m largest dimension) were observed at El Arrecife, in Malpelo Island, at 8-10 m depth, some of them in direct contact and apparent space competition with a colony of *Pavona cf. gigantea* (M.L.V., pers. obs.). One specimen was collected on this occasion (MHNMC -INV-CNI 2955). On October 28, 2005 several colonies were also observed at El Laberinto in Gorgona Island, at ~10 m depth (F.A.Z., pers. obs.). In both of these cases all colonies were encrusting basaltic rock.

Our findings confirm the occurrence of *P. chiriquiensis* both at Gorgona and Malpelo Islands. Although not abundant at either locality, at Gorgona *P. chiriquiensis* is now frequently observed encrusting coral substrates on coral reefs, even though it appears to be more abundant on rocky outcrops as it is elsewhere in the TEP (Glynn *et al.*, 2001; Maté, 2003). The frequency with which *P. chiriquiensis* is now observed at both localities raises the question as to why, in spite of much work (particularly at Gorgona since 1997), this species had been only rarely observed previously. Although *P. chiriquiensis* was not described until 2001, it had been observed in Panama since the early 1970's (Glynn *et al.*, 2001), and the existence of an undescribed species of *Pavona* under study by P.W. Glynn was known to many since the late 1990's. The morphological similarity between *P. varians* and *P. chiriquiensis* suggests that the latter may have been overlooked by confusion with the former. Alternatively, it is also plausible that *P. chiriquiensis* may have only relatively recently invaded Colombian Pacific coral communities and that its abundance may be increasing there as it has in other localities in the TEP where it is now more abundant than *P. varians* (Glynn *et al.*, 2001). Its thin laminar corallum may allow for rapid colony growth. Additionally, short-term aggressive dominance experiments have shown that *P. chiriquiensis* is more aggressive than *P. varians*, which in turn is dominant over *Pavona frondifera* (Maté, 2003). One of the specimens from Gorgona observed in the laboratory was found to have two recently settled recruits of what appeared to be *P. chiriquiensis* (Figure 2). This is evidence of sexual reproduction and active recruitment and represents an additional mechanism by which *P. chiriquiensis* may be increasing its population at Gorgona. Thus, *P. chiriquiensis* appears to be an opportunistic species with a capacity for rapidly colonizing available substrates and invading coral communities. However, *P.*

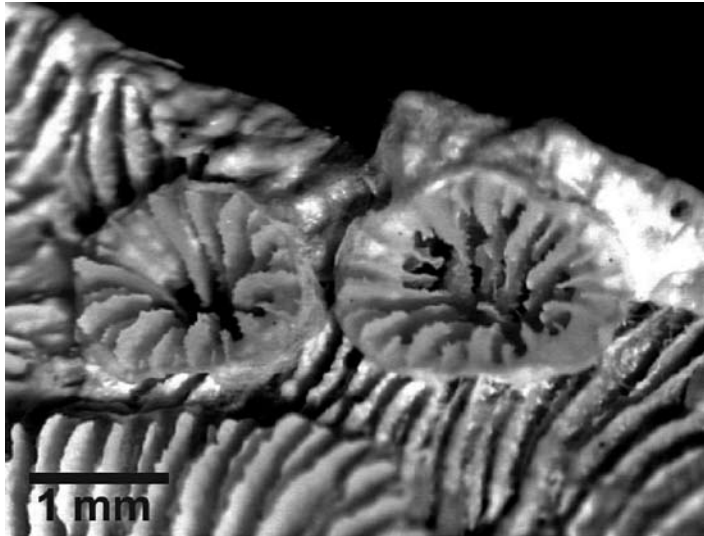


Figure 2. Two individual corallites of what appear to be juveniles of *Pavona chiriquiensis* recently settled on a larger conspecific colony. Number of septa, their arrangement and sculpture (dentate sides) match those of adult *P. chiriquiensis*.

chiriquiensis has a lower bleaching and mortality threshold during sea warming than *P. varians* (Maté, 2003) and this may have slowed down its rate of invasion, particularly during the 1997-1998 El Niño warming event, which caused greater bleaching and mortality in massive agariciids than in branching pocilloporids (Vargas-Angel *et al.*, 2001).

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