

*Short Communication*

**First record of morphological abnormality in embryos of *Urotrygon rogersi* (Jordan & Starks, 1895) (Myliobatiformes: Urotrygonidae) in the Tropical Eastern Pacific**

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**ABSTRACT.** This is the first report of morphological abnormalities in embryos of Roger's roundray *Urotrygon rogersi* in the Tropical Eastern Pacific. The embryos of two pregnant females caught in artisanal shrimp trawl nets had incomplete, deformed pectoral fins that were separated from the head along the anterior margin. Moreover, one of the embryos presented a fin-like extension in the dorsal surface. Although the mouths of the embryos were normal and well-formed, the malformations in the pectoral fins could affect their mobility, limiting their capacity to capture preys and escape of predators.

**Keywords:** batoids, stingrays, *Urotrygon rogersi*, deformities, Tropical Eastern Pacific, Colombia.

**Primer registro de anomalía morfológica en embriones de *Urotrygon rogersi* (Jordan & Starks, 1895) (Myliobatiformes: Urotrygonidae) en el Pacífico oriental tropical**

**RESUMEN.** Este estudio constituye el primer registro de anomalía morfológica en embriones de *Urotrygon rogersi* en el Pacífico oriental tropical. Dos hembras grávidas capturadas con redes de arrastre de camarón en pesca artesanal, presentaron embriones con aletas pectorales deformes e incompletas, y con el margen anterior separado de la cabeza; uno de ellos también presentó una extensión a manera de aleta en la superficie dorsal. Aunque la boca de los embriones fue normal y bien desarrollada, las malformaciones en las aletas pectorales podrían afectar su movilidad, limitando así la capacidad para capturar sus presas y escapar de predadores.

**Palabras clave:** batoideos, rayas espinosas, *Urotrygon rogersi*, deformidades, Pacífico oriental tropical, Colombia.

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The thorny stingray or Roger's round ray *Urotrygon rogersi* (Jordan & Starks, 1895) is distributed in the Eastern Pacific Ocean, from Southern Baja California and the Gulf of California to Ecuador (Robertson & Allen, 2008), and inhabits soft bottoms among 2-30 m depth. *U. rogersi* is one of the common species in incidental capture in trawl gill nets used by industrial and artisanal fisheries in the Tropical Eastern Pacific coast, and does not have commercial importance (Navia *et al.*, 2009; Smith *et al.*, 2009).

Reported morphological abnormalities for elasmobranchs correspond to occurrences of bicephalia (Castro-Aguirre & Torres-Villegas, 1979; Goto *et al.*, 1981; Bornatowski & Abilhoa, 2009), albinism

(Joseph, 1961; Talent, 1973; De Jesus-Roldán, 1990; Ben-Brahim *et al.*, 1998; Clark, 2002; Ferreira & Goes, 2002; Rider *et al.*, 2002; Saïdi *et al.*, 2006; Sandoval-Castillo *et al.*, 2006; Bottaro *et al.*, 2005, 2008), anophthalmia (Gomes *et al.*, 1991; Ribeiro-Prado *et al.*, 2008) and deformities in the axial skeleton (Springer, 1960; Bensam, 1965; Du Built, 1978; Mancini *et al.*, 2006). However, the most common abnormalities in skates (Order Rajiformes) and rays (Order Myliobatiformes) is where the pectoral fins are not fused to the head. This type of abnormality had been recorded by different authors (i.e. Templeman, 1965; Honma & Sugihara, 1971; Lamilla *et al.*, 1995; Rosa *et al.*, 1996; Oldfield, 2005;

Ribeiro-Prado *et al.*, 2008; Escobar-Sánchez *et al.*, 2009) for several species of the family Rajidae (i.e. *Raja brachyura*, *R. asterias*, *R. clavata*, *R. radula*, *R. radiata*, *R. miraletus*, *Amblyraja radiata*, *Atlantoraja castelnaui*, *A. cyclophor*, *A. platana*), Torpedinidae (*Torpedo marmorata*), Rhinobatidae (*Rhynchobatus djiddensis*), Gymnuridae (*Gymnura poecilura*), Potamotrygonidae (*Potamotrygon motoro*), Dasyatidae (*Dasyatis longa*, *D. dipterura*, *D. akajei*, *Himantura uarnak*, *Pteroplatytrygon violacea*) and this paper reported it for first time to family Urotrygonidae, specifically to *Urotrygon rogersi* in the Tropical Eastern Pacific, its known distribution area.

The pregnant females were caught by artisanal fishermen who use trawl gill net (2.75 inch mesh size) to catch shrimp. One of them was captured in December 2007 in El Tigre (3°52'N, 77°19'W), the and another one in April 2008 in El Bajo de Punta Soldado (3°47'N, 77°11'W), central Pacific coast of Colombia. The females were dissected and their embryos were photographed and preserved in 10% formalin. The species identification was based on characters described by McEachran & Di Sciara (1995) and Robertson & Allen (2008). These *U. rogersi* were distinguished from other species of the genus, for showing small denticles on snout along the margin of disc, the area behind scapular region at midline of disc; a row of thorns from nape along middle of the back and top of the tail to base of spine; denticles arranged in longitudinal rows on top of body cavity; a plain light brown to brown coloration without distinctive marks in the top and white below. Morphometric measurements of the females and embryos were taken to the nearest 0.1 mm according to McEachran & Di Sciara (1995).

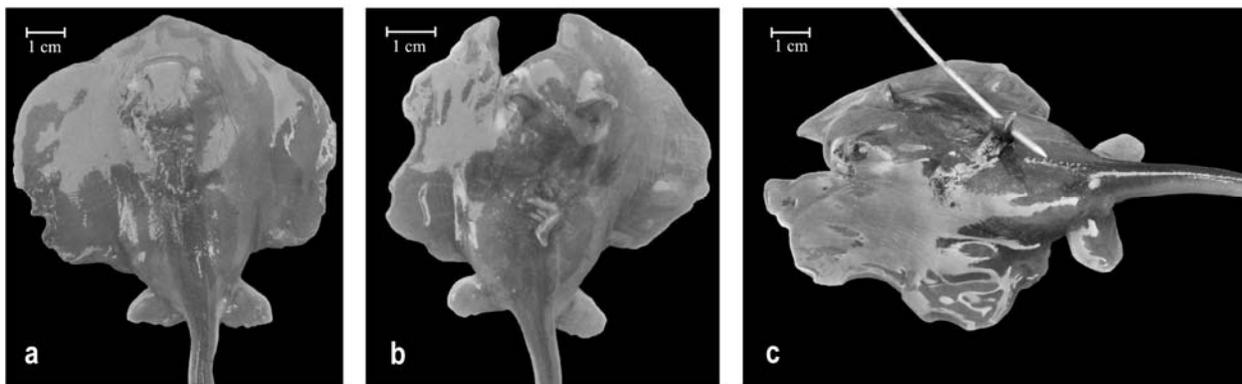
A pregnant female was 29.0 cm total length (TL), 15.5 cm disc width (DW) and 151 g, with two male embryos in the left uterus. One of the males was well developed (12 cm TL, 7.5 cm DW, 8 g) (Fig. 1a), but the smaller one (9.5 cm TL, 6.0 cm DW, 5 g) presented abnormality in the disc. The left pectoral fin was neither well-formed nor fused in front of its head, its snout was not completely free, and only its right pectoral fin was projected forward on side; also the pelvic fins were rounded and not located at the same level; and the spiracles were very open (Fig. 1b). In addition, its dorsum presented a fin-like projection or "dorsal fold" in the middle zone (Fig. 1c), and its mouth and nostrils were well developed.

The smaller pregnant female (23.2 cm TL, 12.5 cm DW and 65.44 g) had one abnormal developing male embryo of 6.2 cm TL, 3.7 cm DW and 0.9 g in the left uterus. This embryo also presented a left pectoral fin not fused in front of its head, its snout was not

completely free, and only its right pectoral fin was projected forward on side (Fig. 2a). The nostrils and mouth were well developed, although the last one was slightly to one side, but apparently functional (Fig. 2b).

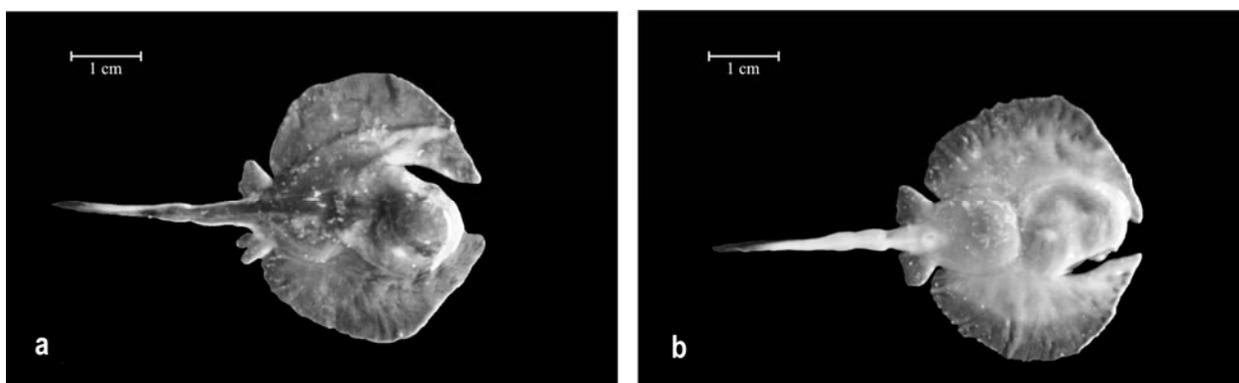
How was cited above, the morphological abnormalities more frequent in rays correspond to the pectoral fins non-adherent to the head which is produced in the early development and is known as "Batman" ray; in this abnormality, the rays present its snout free and its pectoral fins projected forward on each side. In the two found abnormal embryos, only the left pectoral fin was not fused to the head, its snout was not completely free, and only its right pectoral fin was projected forward on side. Those characteristics could be indicating an interruption on the early development; however, the fin-like projection on the disc in one of them could correspond to a malformation, which not presented its bigger and well-developed sib.

The causal factors of malformations could be parasitic infection, arthritis, injury, tumors, bad nutrition, congenital abnormality (Heupel *et al.*, 1999), or unfavorable environmental conditions during embryonic development, such as pollution (Haaker, 1977; Rodríguez-Romero *et al.*, 1990; Grady, 1992). Although in the case of *U. rogersi*, the cause of morphological deformities is uncertain, could be suggested, initially, that a bad nutrition and/or a congenital abnormality could be the causes of this malformation. The first reason can be considered by the presence of another well developed embryo (sib), which could have taken more feed from its mother, securing its development and better growing, supported that by the bigger length and weight. However, the second reason is supported by the presence of a fin-like projection or "dorsal fold" that is not present in these species, so corresponding to a congenital abnormality; this malformation had been recorded to *Gymnura micrura* in Brazilian waters (Silva-Nunes & Magalhães-Piorski, 2009). On the same way, the other unique embryo appeared to have a faster embryonic grow than the average of that population, since with only 6.1 cm TL, it presented a light brown dorsum, while others embryos of similar size have a light pink dorsum (*pers. obs.*) indicating an earlier development state. However, this faster growth was not an advantage to this animal, since it was not a well-developed embryo. Taking this into consideration, it is suggested that the cause of the morphological deformities during embryonic development in these individuals could be a congenital abnormality and not caused by bad or poor nutrition.



**Figure. 1.** Sibling embryos of *Urotrygon rogersi* with differential development. a) Dorsal view of the normal male embryo of 12 cm TL, b) Dorsal view of the abnormal embryo of 9.5 cm TL, c) Lateral view of the last one, showing a projection like-fin on the dorsum.

**Figura. 1.** Embriones hermanos de *Urotrygon rogersi* con desarrollo diferencial. a) Vista dorsal del embrión macho normal de 12 cm TL, b) Vista dorsal del embrión anormal de 9,5 cm TL, c) Vista lateral del último embrión mostrando una proyección dorsal en forma de aleta.



**Figure. 2.** Dorsal a) and b) ventral view of an abnormal developing male embryo of *Urotrygon rogersi* of 6.2 cm TL.

**Figura. 2.** Vista dorsal a) y ventral b) de un embrión macho en desarrollo de *Urotrygon rogersi* de 6,2 cm TL.

The unfavorable environmental conditions are discard, not only because the other embryo was well developed, but also because the areas where the pregnant females were captured are conserved zones, without contamination, industrial discharges, and at present one of them is in process of be declared natural reserve (INVEMAR *et al.*, 2006).

Rosa *et al.* (1996) propose that this type of abnormality does not affect the survival of individuals of *Potamotrygon motoro* based on the capture of juveniles and adults alive with this malformation; while Escobar-Sánchez *et al.* (2009) suggest that specimens of *Dasyatis longa* may die before reaching the adulthood. Based on the degree of deformity in the disc of the analyzed embryos and since the mobility of

*U. rogersi* is specially based on the undulation of pectoral fins (rather than the tail) (Wilga & Lauder, 2004), it is possible that these individuals had difficulties in swimming and escaping from potential predators (sharks), and secondly, its capabilities as a predator would be significantly limited, even with their well-formed mouths that will allow them to feed on their prey such as polychaetes, shrimps and crabs (Navia *et al.*, 2009).

Finally, one record of similar abnormality was presented in a male embryo of *Pteroplatrygon violacea* captured in southeastern Brazil, which presented an incomplete fusion of the left pectoral fin and the body and also an asymmetry regarding the pectoral fins (Ribeiro-Prado *et al.*, 2008); the authors

proposed than the percentage of this abnormality is low for this specie (1.3%), even being the highest from other species of the same area. Although that authors proposed that the percentage of abnormalities estimated in several studies are not representative of the real number, because in all cases samples came from fisheries, where the capture total are uncertain, in this study, the samples were collected from monthly scientific surveys during three years, obtaining a low percentage of this abnormality to *U. rogersi* (0.31%), suggesting that in the study area this embryonic abnormality is not frequent. However, it is suggested to evaluate the presence of abnormalities in other sympatric species of the genera *Dasyatis*, *Gymnura*, *Narcine* and *Rhinobatos*, comparing them with abnormalities recorded in other areas of the world, and including radiographies and dissections to try to assess the causes of that abnormalities.

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