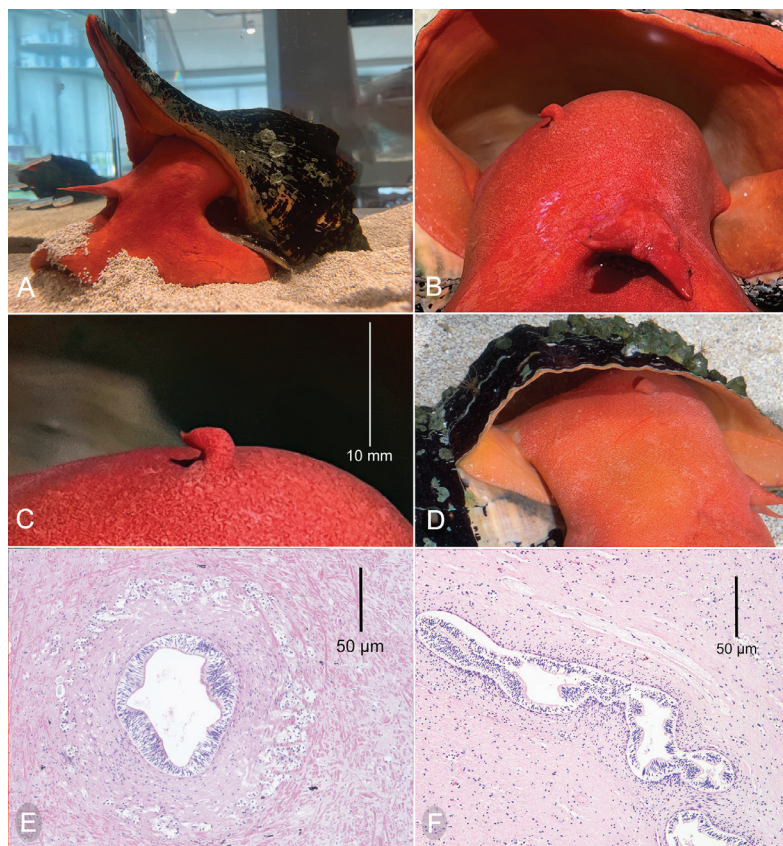


## First record of imposex in the horse conch, *Triplofusus giganteus* (Mollusca: Gastropoda: Fascioliariidae)

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We report the first record of imposex in *Triplofusus giganteus* (Kiener, 1840). *Triplofusus giganteus* (Panel A), the largest shelled mollusk in the Atlantic Ocean, is a top predator living in shallow water marine habitats from North Carolina to Florida, the Gulf of Mexico, and the Atlantic coast of Mexico. Imposex is an irreversible disorder in female caenogastropod snails caused by exposure to biocidal organotin compounds identified in vessel antifouling paints, chiefly tributyltin (TBT) and/or triphenyltin (TPT). Exposure can lead to the disruption of endocrine control over sexual development processes (Bryan et al. 1987, Giulianelli et al. 2020). Exposed snails can develop nonfunctioning male reproductive structures, including a pseudopenis. When these abnormal structures develop, harmful sequelae occur including gradual blockage of the oviduct, limited production of gametes, sterility, and eventually death (Bryan et al. 1987).

Four *T. giganteus* were collected by Gulf Specimen Marine Lab in December 2023 at Alligator Harbor, Franklin County, in the Florida Panhandle. They were acquired by the Bailey-Matthews National Shell Museum & Aquarium and kept in a 398-gallon saltwater pool. The specimens are deposited in the museum's permanent collection (acronym: BMSM) and denoted herein by their individual collection numbers.

Upon arrival, examination confirmed one male snail and three imposex snails each bearing a small pseudopenis behind the right tentacle. The latter three snails had female gonads and pedal glands in addition to the pseudopenises. The largest individual (BMSM 135084; Panel A) measured approximately 360 mm. The pseudopenis measured approximately 4 mm in length (Panels B and C). For comparison, the penis of the male individual (BMSM 135085) of similar shell length measured 65 mm. Panel D illustrates the pseudopenis in BMSM 135086 (shell length 327 mm). Imposex female BMSM 135083 (shell length 307 mm) and male BMSM 135085 (shell length 330 mm) are not illustrated.

The pseudopenis and adjacent body wall of BMSM 135084 were histologically examined using routine hematoxylin-eosin staining. Transverse (Panel E, body wall) and longitudinal (Panel F, pseudopenis) sections revealed a tubular vas deferens lined by columnar epithelium supported by longitudinal and circular muscle layers. The luminal diameter ranged from 50 to 90  $\mu$ m. These microscopic characteristics of the pseudopenis and vas deferens correspond largely to those of other imposex-affected neogastropod species (e.g., Giulianelli et al. 2020). From a phylogenetic standpoint, the closest species to *T. giganteus* for which imposex has been verified are the fascioliariids *Leucozonia nassa* (Gmelin, 1791) and *Leucozonia ocellata* (Gmelin, 1791) (Costa et al. 2014).

The presence of imposex in *Triplofusus giganteus* is of particular concern for the long-term conservation of this apex predator. Herbert et al. (2022) determined that its lifespan is relatively short, with large specimens not living longer than 16 years. Additionally, females show delayed maturation: first maturity apparently occurs after six to seven years and large females only spawn three to five times in a lifetime (Herbert et al. 2022), which restricts the reproductive output of the species. Further research is needed to assess the incidence of imposex within the sampled population of *T. giganteus*, confirm the presence and source of organotins in the Alligator Harbor marine environment, and understand the impact on species fecundity or presumptive loss of reproductive-age females.

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