

***Pyrodinium* cysts in manatee stomach contents: harmless tourists or Trojan horses?**

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Pyrodinium bahamense is a bioluminescent dinoflagellate which forms a resting cyst as part of its life cycle. These cysts are not easily broken and can lay dormant in sediments for decades before excysting and forming a bloom. They are found in the tropical waters of the Atlantic and Pacific oceans, and in Florida are commonly found in Tampa Bay and the Indian River Lagoon. The Atlantic strain of *P. bahamense* was recently discovered to produce a neurotoxin known as saxitoxin (STX), a capability previously thought to be exclusive to the Pacific strain. STX is capable of entering the food web, and in 2002 STX was implicated in several human illnesses following consumption of contaminated puffer fish originating from the Indian River Lagoon. In the investigation that followed, *P. bahamense* was identified to be the putative source of the toxin. The discovery of *P. bahamense* cysts on seagrass blades during an ongoing bloom raised the question of whether Florida manatees (*Trichechus manatus latirostris*), who feed predominately on seagrass, could be at risk of exposure to STX if cysts were inadvertently ingested during feeding. Manatees are indiscriminate herbivores and tend to stir up the sediments while they feed, ingesting anything on or under the seagrass. Even when no *P. bahamense* bloom is occurring there are still cysts in the sediments, and it is highly likely that manatees are ingesting these cysts. However, there is no evidence to date that suggests manatees have been exposed to STX.

The aim of this study was to determine whether *P. bahamense* cysts are digested in the manatee GI tract or if they simply pass through intact. To test this, methods needed to be developed to add and successfully recover cysts from GI content samples from a recently recovered manatee. These methods could then be used to determine whether cysts break down over time or remain intact during simulated digestion. However, the development of the methods proved more difficult than anticipated and no successful method could be developed in the time available. Despite numerous modifications and trials, cyst recovery was extremely low (<26%) and no explanation for cyst loss could be found. A more qualitative approach was then used to determine whether there is any evidence that manatees are ingesting *P. bahamense* cysts. Archived stomach content samples from previously recovered manatees were tested for presence of cysts, and although only low numbers were observed they could be representative of ingestion on a much larger scale when considering the low recovery observed in the earlier trials.

Due to the hardy nature of *P. bahamense* cysts, it is unlikely that they are being digested by manatees and instead are more likely to be passing through the GI tract intact. However, it is possible that manatees could be exposed to STX through other vectors such as small fish and invertebrates. Manatees are known to inadvertently ingest such organisms during the course of normal feeding, and should they be contaminated they might provide a more readily digestible form of STX. Manatees may also be serving as vectors of *P. bahamense* cysts to areas with few or no cyst beds, and the potential for range expansion may warrant attention.

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