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FIRST DOCUMENTED OCCURRENCE OF THE TOXIC DINOFLAGELLATE GYMNODINIMUM BREVE IN MISSISSIPPI SOUND

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Gymnodinimum breve was first observed in water samples collected in MS Sound north of Petit Bois Island on 31 October 1996. Blooms spread north from the barrier islands to oystering areas, forcing reef closures. A combined drop in surface salinities and water temperatures ended the event. Detection and monitoring of this species began with charter boat operators, who reported unusual fish behavior south of the barrier islands on 26 October 1996 and collected a water sample; microscopic examination confirmed the presence of this species. Subsequent mouse bioassays and tissue toxicity tests confirmed the presence of brevetoxins at significant levels. Seasonally collected turbidity and salinity data indicated that these two parameters were significantly different in 1996 when compared to similar data for 1994 and 1995, which may have contributed to conditions conducive to the spread and development of this toxic algal species within Mississippi Sound.

Gymnodinimum breve usually blooms in warmer, saltier water that is associated with the summer months, but can bloom at lower temperatures. It does seem to require an infusion of vitamins, particularly B vitamins, which are produced by bacteria and bluegreen algae associated with surface sediments of coastal marshes and washed into estuarine and marine waters during rains. A pulse vitamin-rich water was provided by an intense rainfall event just a few weeks before the bloom event.

Red tides are a natural occurrence, and are an integral component of the estuarine ecosystem and its cycles that we are still trying to understand. Human impacts on the environment, such as increased levels of nutrients in coastal waters, may be related to an increase in the number of these blooms of algae as a whole, but is apparently unrelated to the occurrence of Gymnodinimum breve. As we learn more about the causes of red tides in general, and blooms of this toxic species in particular, we may be able to develop means of treatment to mitigate or alleviate the problems associated with these species and public health concerns.