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William M. Graham
Dauphin Island Sea Lab

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SHORT PAPERS AND NOTES

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FIRST REPORT OF *CARYBDEA ALATA* VAR. *GRANDIS* (REYNAUD 1830) (CNIDARIA: CUBOZOA) FROM THE GULF OF MEXICO.—A single large cubomedusa (Cnidaria: Cubozoa) was recovered from a shrimp trawl in the northern Gulf of Mexico on 8 April 1996. The location of the collection was approximately 20 km south of the mouth of the Mobile Bay estuary (30°2.8'N, 88°2.1'W). The trawl, which lasted approximately 20 min, contained no other large medusae of the classes Hydrozoa, Scyphozoa, or Cubozoa. Upon collection, the medusa was immediately placed in a 20-liter bucket of surface water and kept alive during transport back to the Dauphin Island Sea Lab. During this time, the medusa continued pulsing, indicating relatively good condition.

The 22-m water column was highly salt-stratified, with salinities of 16.5‰ and >34.0‰ at the surface and bottom, respectively, separated by a strong halocline between 4 and 8 m. Temperature was nearly uniform around 18 C throughout the water column. An oblique zooplankton tow (153- μ m mesh, 0.5-m-diameter net) over the vertical extent of the water column was collected near this site. Because both trawl and plankton tows were collected throughout the entire water column, no presumption can be made about the vertical distribution of the constituent taxa. However, it is reasonable to expect that the cubozoan was captured at or near the bottom.

The zooplankton tow reflected a mixed assemblage of both typical northern Gulf of Mexico species (dominated by the heterotrophic dinoflagellate *Noctiluca scintillans*) and numerous tropical species. In particular, numerous unidentified acantharians—surface-dwelling marine protozoans with strontium sulfate skeletons—suggested a mixing of the local plankton assemblage with one of tropical origin. Acantharians are not normally found in shallow coastal seas, but they are abundant in the zooplankton community of the eastern Caribbean and Sargasso Seas (Raymont, 1983). A tropical origin is further supported by the presence of two highly recognizable tropical copepods of the genera *Sappharina* and *Copilia*. These two genera are described as warm-water residents that may be carried to higher latitudes by warm currents (Raymont, 1983).

Identification.—In the laboratory, the cubomedusa was measured and photographed to aid in identification. The medusa measured 19.5 cm in bell height, from the base of the tentacle to the apex of the bell, and 15 cm across (flattened). Rhopalia on each corner of the medusa were 8.5 cm apart. The medusa had four simple interradial pedalia and tentacles and four stomach pouches without diverticulae, which places it in the family Carybdeidae. Biopsied gonadal material showed that the specimen was a male and was probably reproductively mature based on the presence of well-developed sperm follicles. The medusa was preserved in 3% formaldehyde in seawater and is currently housed in the author's collection at the Dauphin Island Sea Lab.

Taxonomic surveys of the Cubozoa are extremely limited, and attempts to identify the medusa using local and regional taxonomic surveys (e.g., Phillips and Burke, 1970; Kraeuter and Setzler, 1975) proved unsuccessful in identifying the specimen based on previously reported Carybdeids. With the assistance of several specialists in cubozoan biology (G. Matsumoto, R. Larson, W. Hamner), the medusa was tentatively identified as *Carybdea alata* var. *grandis* (Reynaud 1830). This identification was confirmed using the description (formerly *Charybdea grandis*, n. sp.) of Agassiz and Mayer (1902) and the compendium of Kramp (1961). This species is by far the largest of the Carybdeids and can reach 23 cm in height (Kramp, 1961).

***Carybdea alata* in the Caribbean Basin.**—A thorough review of generic indices indicates that no other record of this species exists anywhere in the Gulf of Mexico. *Carybdea alata* is described as a circumtropical species widely distributed in both the tropical Atlantic and Pacific Oceans (Kramp, 1961). Other accounts of Carybdeid cubomedusae in the Gulf of Mexico include *Tamoya haplonema* (Müller 1859) in the Mississippi Sound (Phillips and Burke, 1970) and *Carybdea aurifera* (Mayer 1900) by Hedgepeth (1954). However, the account of *C. aurifera* was most likely either a juvenile *C. sivicikisi* (Kramp, 1961) or a juvenile *T. haplonema* (Phillips and Burke, 1970). In addition to the Carybdeid cubomedusae, the Gulf of Mexico also contains the "sea wasp" *Chiropsalmus quadrumanus*, which causes a painful and potentially lethal (e.g., Fenner and Williamson 1996)

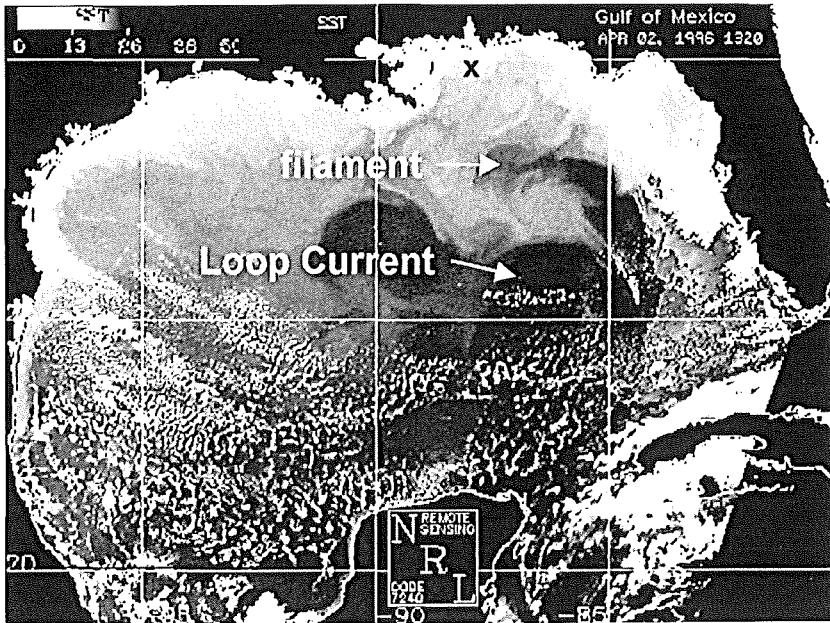


Fig. 1. AVHRR thermal satellite image of the Gulf of Mexico, 2 April 1996. Lighter areas indicate cooler water. Location of the periphery of the Loop Current and an associated warm filament are indicated. Location of collection is indicated by an "X". Image courtesy of R. Arnone, Naval Research Laboratory, Stennis Space Center.

sting. Inadvertent handling of the *C. alata* specimen during trawl sorting did not result in a noticeable sting. However, copious amounts of mucus in the bucket contained unfired stinging cells similar to those observed by Shanks and Graham (1988) for the scyphomedusa *Stomolophus meleagris*. Based on this lack of a painful sting, as well as the large size and other taxonomic characteristics discussed, the medusa collected off Mobile Bay cannot be mistaken for anything other than *C. alata* var. *grandis*.

The occurrence of this species in the northern Gulf of Mexico is most likely aberrant and does not reflect a local reproductive population. Based on historical accounts of the *C. alata* distribution and on the presence of acantharians in the nearby zooplankton collection, it is most likely that the specimen was transported into the northern Gulf of Mexico in a water mass of tropical origin. Advection and mixing of tropical water onto the northern Gulf of Mexico shelf can occur when the Gulf of Mexico Loop Current, deriving its physical and biological characteristics from the Caribbean Sea, pushes northward into the central Gulf. Eddies or filaments derived from the Loop Current can be entrained or diluted on the northern Gulf shelf. Of particular interest here is that the biological characteristics of the

Loop Current can be conserved even when the physical characteristics have been well-modified, as suggested by the cooler waters (18 C).

The occurrence of *C. alata* in the northern Gulf of Mexico can be attributed to the location of the Loop Current in the Gulf. Thermal satellite imagery from the days prior to this collection indicated a well-developed filament of the Loop Current extending to about 29°N latitude (Fig. 1). Such northward extensions of the Loop Current can be expected once to several times per year, with frequency of occurrence from historical accounts (Kelly, 1991) being independent of the time of year. Transport of other tropical organisms, such as Portuguese man-war (*Physalia physalia*) (Lane, 1960; Purcell, 1984), sargassum weed and associates (e.g., Stoner, 1983), and a variety of tropical fishes (R. Shipp, pers. comm.), into the Gulf of Mexico is not particularly unusual, and these organisms are considered at least temporary members of the local biological community. Therefore, in spite of its rarity, which is most likely due to infrequent sampling, the cubomedusa *C. alata* var. *grandis* must also be included as a temporary resident of the Gulf of Mexico.

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- WILLIAM M. GRAHAM, *Dauphin Island Sea Lab and Department of Marine Sciences, University of South Alabama, 101 Bienville Boulevard, Dauphin Island, Alabama 36528.*