

**In-situ observations on ommastrephid squids in the western North Atlantic.**

Michael Vecchione<sup>1</sup>, Clyde F. E. Roper<sup>2</sup> and Michael Sweeney<sup>2</sup>

<sup>1</sup>National Marine Fisheries Service, Systematics Laboratory, National Museum of Natural History, Washington, DC 20560, USA

<sup>2</sup>Dept. of Invertebrate Zoology (Mollusks), National Museum of Natural History, Smithsonian Institution, Washington, DC 20560, USA.

**ABSTRACT.**—We have compiled numerous observations on deep-sea cephalopods from submersibles. This video database includes numerous records of ommastrephid squids from continental slope waters of the western North Atlantic. Species observed include *Illex illecebrosus*, *I. coindetii*, *Ornithoteuthis antillarum*, and *Hyaloteuthis pelagica*. Morphometric differences known to distinguish the *Illex* spp. are not easily recognized in-situ. Both *Illex* spp. commonly rest on the bottom, apparently selecting areas with little benthic epifauna. In contrast, among our many observations on *O. antillarum* we have seen no such behavior, although we have seen the latter species swimming very close to the bottom. Feeding behavior has been observed in both *Illex* and *Ornithoteuthis*.

Keywords: cephalopod, behavior, submersible, multimedia, video database.

**Introduction**

Most published information on the behavior of deep-sea cephalopods comes either from inferences based on morphology or from short-term observations of trawl-caught specimens in aquaria. Since common use of research submersibles began in the early 1960s, observations have been made on benthic and midwater faunas. While most biological research programs using submersibles are directed toward specific habitats or faunal components, observations of cephalopods from submersibles have been largely incidental. Photography of cephalopods from unmanned vehicles has yielded valuable information about habitats, orientation, size, locomotion, and gross morphology and, more recently, videotapes from remotely operated vehicles (ROVs) have provided data about aggregations, schooling behavior, and spawning.

Research submersibles, both manned and unmanned, provide an opportunity for a novel perspective on cephalopods. We have begun to compile a collection of observations on cephalopods made by numerous investigators using submersibles. This collection includes in-situ videotapes and photographs, collected specimens, and shipboard observations and photographs of live animals. We report here the observations collected from a large number of submersible dives conducted over a broad geographic range in the western North Atlantic. Multiple sightings of *Illex illecebrosus* and *Ornithoteuthis antillarum* indicate that these species are abundant in some areas and readily observable in situ. *Illex illecebrosus* has been seen in many areas in both pelagic and benthic habitats. As this species is an extremely important fishery resource, about which little biology is understood, submersibles could be used as an aid in studying its areal and diel vertical distribution, predatory behavior, and possible

spawning sites.

### Materials and Methods

Observations presented here come from a variety of sources at various locations and depths. Several investigations by personnel from Harbor Branch Oceanographic Institution have supplied us with material. In the presentation that follows, an observation refers to a single encounter with a cephalopod. Such an encounter may result in photographs, one or more videotape sequences, a collected specimen, a reliable description in the dive log, or any combination of these; all would be counted as a single observation. In some cases, a single observation includes more than one cephalopod, such as a school of *Illex*.

### Results

1. *Illex illecebrosus* (LeSueur, 1821): 35 observations from Gulf of Maine and area of North Carolina and South Carolina slope; 0930-2030 hours; depth observed, 180-890 m and depth above bottom (where noted), 0-1000 m; no specimens collected.
2. *Illex coindetii* (Verany, 1839): 10 observations (1 questionable) from northern Gulf of Mexico; 1000-1700 hours; depth observed, 350-572 m and depth above bottom (where noted), 0-1 m; no specimens collected.
3. *Illex* sp.: 3 observations from Barbados and St. Lucia wall; 0830 hours; depth observed, 326-412 m and depth above bottom (where noted), 0-1 m; 1 specimen collected.
4. *Ommastrephes bartrami* (LeSueur, 1821): 3 observations (1 questionable) from southern Florida/Bahamas; 1230-0030 hours; depth observed, 621-757 m, 1 specimen collected.
5. *Ornithoteuthis antillarum* Adam, 1957: 16 observations (1 questionable) from southern Florida/Bahamas; 1000-0100 hours; depth observed, 457-878 m and depth above bottom (where noted), 1-88 m; 7 specimens collected.
6. *Hyaloteuthis pelagica* (Bosc, 1802): 2 observations from southern Florida/Bahamas; 1300-0100 hours; depth observed, 510-686 m; no specimens collected.

### Discussion

These observations, based on videotapes recorded previously for other purposes, allow us to develop hypotheses about behavioral interactions between cephalopods and their milieu. Behavioral observations are numerous and unexpected, e.g., the "J-shaped" posture of several species, benthic resting by *Illex* spp., feeding by *Illex* along a vertical rock wall, and the ability of *Ornithoteuthis* to bend its mantle double to use the ventral arms for removal of irritants from the fins and tail. The important point is that these observations represent some of the first data available on living ommastrephids in their natural environments. They allow us a glimpse, however incomplete, into the lives and habits of these important members of marine ecosystems.