

DENSE POLYCHAETE (*Phyllochaetopterus socialis*) MATS ON THE SOUTH CAROLINA CONTINENTAL SHELF

Some polychaetes typically occur in dense aggregations, forming mounds (Bailey-Brock, 1979) or reef-like structures (Wilson, 1971) that provide a substratum for a diverse community of epifauna and infauna (Gore *et al.*, 1978). The most intensively studied groups are the sabellariids (Wilson, 1971; Eckelbarger, 1976) and serpulids (McCloskey, 1970; Haines and Maurer, 1980). This paper reports the occurrence of dense mats of the tube-dwelling chaetopterid polychaete *Phyllochaetopterus socialis* Claparede, 1870 on the South Carolina continental shelf. *Phyllochaetopterus socialis* is a cosmopolitan species that has been previously reported from the Mediterranean Sea, English Channel, tropical Indian Ocean, and Falkland Islands (Day, 1967), and forms the basis of a dense fouling-community mat at Seven and One-half Fathom Reef near South Padre Island, Texas (McCarty, 1974; Felder and Chaney, 1979). The species has also been previously reported from the east coast of the United States, in shallow water off North Carolina (Day, 1973), although no abundance estimates were provided.

The areas where *P. socialis* was noted were surveyed during September 1978 as part of a pre-lease baseline study of hard-bottom features in four oil and gas lease blocks located in the South Atlantic Bight (Figure 1). The four sites were initially surveyed with side-scan sonar and a sub-bottom profiler to delineate suspected hard-bottom areas for visual investigation. The sea bottom and associated biota were then inspected with a television camera system that was towed along several transects of 1 to 6 km length in each area. Still camera

photographs and dredge sample collections were also used to identify and map the biota. Detailed methods are provided by Continental Shelf Associates, Inc. (1979) and Gettleson *et al.* (1982).

Epibiotic assemblages typified by dense tube mats of *P. socialis* were observed along approximately 50 and 30% of the hard-bottom transect distances surveyed in James Island Area Blocks 380 and 463, respectively, generally in 50-to-60-m depths. The worm mats were the visually dominant assemblage along 80% of the length of some transects, frequently extending for several hundred meters (Figure 2) or occurring in patches separated by sand bottom (Figure 3). The worms were identified in 14 of 20 dredge samples from each of the two blocks. Worm mats were most common in low-relief areas where a veneer of coarse sand covered the hard substrate; sand was usually interspersed in the tube matrix (Figure 3). Associated biota included the red alga *Peyssonnelia rubra* (Greville) J. Agardh; several species of anthozoans (*Ellisella* sp.; *Telesto sanguinea* Deichman, 1936; *Lophogorgia* sp.; and species of Anthothelidae), echinoderms [*Astropyga magnifica* A. H. Clark, 1934; *Lytechinus variegatus* (Lamarck, 1816); and *Narcissia trigonaria*

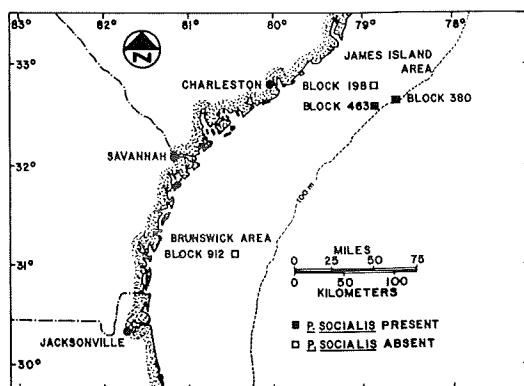


Figure 1. Locations surveyed in the South Atlantic Bight, and occurrence of the polychaete *Phyllochaetopterus socialis*.



Figure 2. A hard-bottom area at 50-60 m depth in James Island Area Block 463 (center of block at 32°29'58"N, 78°49'43"W) colonized by a dense mat of the polychaete *Phyllochaetopterus socialis* and associated organisms.

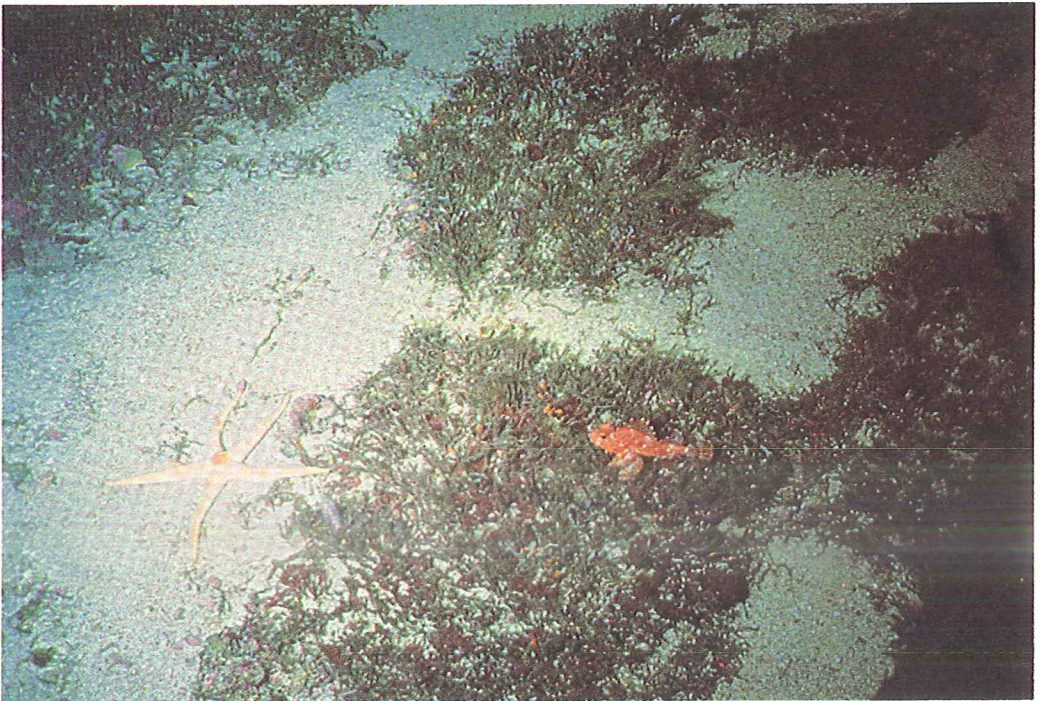


Figure 3. Patches of the polychaete *Phyllochaetopterus socialis* in James Island Area Block 463. Note the coarse sand surrounding the mats and interspersed throughout the tube matrix. Also visible are the red alga *Peyssonnelia rubra*, the asteroid *Narcissia trigonaria*, and the scorpionfish *Scorpaena* sp.

Sladen, 1889], and unidentified sponges. Another gregarious polychaete, *Salmacina dysteri* (Huxley, 1855) (or possibly *Filograna implexa* Berkeley, 1828; positive identification in doubt because of problematic taxonomy), was also frequently observed.

Although the worms clearly occur in very high local densities, factors responsible for their patterns of distribution and abundance on the shelf are unknown. A subsequent two-year study of hard-bottom habitats in the South Atlantic Bight (Marine Resources Research Institute, 1981, 1982) has not revealed any general distribution pattern for *P. socialis*. Densities of 441 tubes per 0.1 m² were noted in grab samples from one survey of a station in 60 m depth off northeastern Florida (Marine Resources Research Institute, 1981), an area from which there is also an unpublished report of the worm's occurrence (T. R. Perkins, 1984, personal communication, Florida Department of Natural Resources). Although James Island Area Block 463 was the site for three seasonal samples during the second year of the study (Marine Resources Research Institute, 1982), the reported abundance of *P. socialis* at the station was low (<1 per 0.1 m² sample). It is not known whether this reflects an overall reduction in abundance of the polychaete or merely sampling inadequacy; along our television transects, the occurrence of the polychaete mats was not uniform. In the present study, *P. socialis* was not found at depths greater than about 65 m in James Island Area Blocks 380 and 463 and was absent from two other surveyed blocks in shallower water (30 to 35 m) (James Island Area Block 198 and Brunswick Area Block 912) (Figure 1). The species has also been found in depths of over 100 m in the northern Gulf of Mexico (T. R. Perkins, personal communication), and in 14-m depths (Seven and One-half

Fathom Reef) off the coast of Texas, where the worm tubes form a dense reef-like mat that supports a diverse epifauna and infauna adapted to use the mat as shelter, food, or a feeding site (Felder and Chaney, 1979).

ACKNOWLEDGMENTS

Continental Shelf Associates, Inc. conducted the study of hard-bottom areas in the South Atlantic Bight for the U. S. Department of the Interior, Bureau of Land Management (Contract No. AA551-CT8-25). Funds for the preparation of this manuscript were provided by the Minerals Management Service under Contract No. 14-12-0001-30097. Identification of *P. socialis* was confirmed by Dr. Kristian Fauchald (National Museum of Natural History, Smithsonian Institution) and Dr. Thomas Perkins (Florida Department of Natural Resources).

LITERATURE CITED

- Bailey-Brock, J. 1979. Sediment trapping by chaetopterid polychaetes from a Hawaiian fringing reef. *J. Mar. Res.* 37(4):643-656.
- Continental Shelf Associates, Inc. 1979. South Atlantic Hard Bottom Study. Bureau of Land Management, Contract No. AA551-CT8-25. 356 p. Available through NTIS, PB-300-821.
- Day, J. H. 1967. A Monograph on the Polychaeta of Southern Africa. *Brit. Mus. National Hist. Publ.* 656, 878 p.
- _____. 1973. New Polychaeta from Beaufort with a key to all species recorded from North Carolina. *NOAA Tech. Rept., NMFS Circ.* 375. 141 p.
- Eckelbarger, K. J. 1976. Larval development and population aspects of the reef-building polychaete, *Phragmatopoma lapidosa*, from the east coast

- of Florida. Bull. Mar. Sci. 26:117-132.
- Felder, D. L. and A. H. Chaney. 1979. Decapod crustacean fauna of Seven and One-half Fathom Reef, Texas: species composition, abundance, and species diversity. Contrib. Mar. Sci. 22:1-29.
- Gettleson, D. A., R. M. Hammer, and R. E. Putt. 1982. Geophysical and biological seafloor mapping of four oil and gas lease blocks in the South Atlantic Georgia Embayment. Oceans 82 Conference Record, p. 803-808.
- Gore, R. H., L. E. Scotto, and L. J. Becker. 1978. Community composition, stability, and trophic partitioning in decapod crustaceans inhabiting some subtropical sabellarid worm reefs. Studies on decapod Crustacea from the Indian River region of Florida. IV. Bull. Mar. Sci. 28(2):221-248.
- Haines, J. L. and D. Maurer. 1980. Benthic invertebrates associated with a serpulid polychaete assemblage in a temperate estuary. Int. Revue ges. Hydrobiol. 65(5):643-656.
- Marine Resources Research Institute, South Carolina Wildlife and Marine Resources Department. 1981. South Atlantic OCS Area Living Marine Resources Study. A report for the U. S. Department of the Interior, Bureau of Land Management, Contract No. AA551-CT9-27.
- _____. 1982. South Atlantic OCS Area Living Marine Resources Study, Year 2. A report for the U. S. Department of the Interior, Bureau of Land Management, Contract No. AA551-CT1-18.
- McCarty, D. M. 1974. The polychaetes of Seven and One-half Fathom Reef. M. S. Thesis, Texas A & I Univ., Kingsville. 136 p.
- McCloskey, L. R. 1970. The dynamics of the community associated with a marine scleractinian coral. Int. Revue ges. Hydrobiol. 55:13-81.
- Wilson, D. P. 1971. *Sabellaria* colonies at Duckpool, North Cornwall, 1961-1970. J. Mar. Biol. Assoc. U.K. 51:509-580.

David A. Gettleson, Neal W. Phillips, and Richard M. Hammer, *Continental Shelf Associates, Inc., 759 Parkway Street/P.O. Box 3609, Jupiter/Tequesta, FL 33458.*