

A Marine Invertebrate

The Behavior and Natural History of the Caribbean Reef Squid *Sepioteuthis sepioidea*. With a Consideration of Social, Signal, and Defensive Patterns for Difficult and Dangerous Environments. MARTIN MOYNIHAN and ARCADIO F. RODANICHE. Parey, New York, 1982. 152 pp., illus. Paper, \$21.60. *Advances in Ethology*, no. 25. *Journal of Comparative Ethology*, supplement 25.

Cephalopods in general, and squids in particular, have long fascinated lay persons and professional biologists alike. Their complex behavioral repertoires and seeming intelligence have stimulated endless speculation about their social capabilities and evolutionary potential. For coral-reef biologists, such speculation is heightened by frequent but frustratingly brief observations of squids in the field, tantalizing glimpses of a bewildering complex of chromatic, positional, and motor displays used in what is clearly some social context. Detailed fieldwork on these animals cried out to be done, despite the obvious difficulties involved: working for long periods in a marine environment is difficult, and working there on a complex, highly mobile, and often shy species only that much more so.

Despite these problems, Moynihan and Rodaniche have made an excellent start toward unraveling and demystifying the behavior of squids. Based on several years of patient work on reefs off Panama, their monograph details, categorizes, and can often account for behavior many of us have glimpsed. The descriptions of foraging, antipredator behavior, and inter- and intraspecific interactions, including courtship and spawning, go far beyond the limited, often aquarium-based information available for other species. Whatever weaknesses the study might have, this systematically collected and comprehensive ethogram lays a solid foundation for future work on the family.

Many behaviorists, however, will be frustrated, as the authors must have been, on two accounts. First, the delicacy of the squids precluded tagging to permit individual recognition; indeed, identification of the sexes was difficult and often tentative. Consequently the authors were reduced to long-term, patient observations of groups of unidentified individuals. Assessment of social interactions and population dynamics remains unavoidably but frustratingly tentative. And second, the sheer complexity of the behavior observed, involving a bewildering diversity of color and motor patterns, not only makes for occasionally tedious reading but also necessitates

an extensive, quantifiable data base for analysis. The exigencies of fieldwork make obtaining such a data base difficult, and for the time being at least the authors draw only qualitative, and qualified, conclusions about much of the behavior observed.

For many, in fact, this lack of quantification will prove the major disappointment with the monograph. It is often clear, for example, that the authors have data on group sizes, habitat utilization, and the like, but none of these subjects is presented in any quantified or systematic fashion. One is forced to take the authors' word for many of the conclusions drawn. Similarly, quantitative analysis of behavior is largely lacking, although one finishes the monograph with the strong feeling that enough data are available to justify at least some such analysis. Moynihan and Rodaniche end the monograph by posing many interesting questions on social behavior, communication, and the evolutionary potentials of *S. sepioidea*. Their work provides a firm foundation for formulating such questions. By also demonstrating the feasibility of studying the animals in the field, it may also provide the stimulus necessary to obtain the answers.

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