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UNIVERSITY OF CALIFORNIA

SAN DIEGO

Studies of the Natural Products Chemistry of Selected
Caribbean Gorgonians

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Oceanography

by

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ABSTRACT OF THE DISSERTATION

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This dissertation focuses on the natural products chemistry of selected species of Caribbean gorgonians (the sea feathers, sea whips and sea fans). The diversity and abundance of these cnidarians is highest in the West Indian region where they are among the most conspicuous and characteristic invertebrates in the shallow-water reef community.

Early studies showed that the Caribbean Gorgonacea are a rich source of biologically-active (antimicrobial, antineoplastic) and structurally novel secondary metabolites. Prior to my research, numerous unique, active compounds were reported from the gorgonians.

CHAPTER I

Introduction

A. Summary of the Dissertation

This dissertation focuses on the natural products chemistry of the Caribbean gorgonians (O. Gorgonacea, Ph. Cnidaria) which include the sea feathers, sea whips and sea fans. The diversity and abundance of this group of invertebrates is highest in the West Indian region where they comprise one of the most conspicuous and characteristic components of the shallow-water reef community.

Early studies clearly demonstrated that the Caribbean Gorgonacea are a prolific source of biologically-active (antimicrobial, antineoplastic) and structurally novel secondary metabolites. Prior to my research, numerous unique, active compounds were reported from the gorgonians. Only a small percentage of the total number of gorgonian species known from the West Indian region, however, were examined for natural products. In the study presented here, the natural products chemistry of the Gorgonacea was explored further in order to expand our knowledge and understanding of the diversity of secondary metabolites produced by the Gorgonacea.

Research discussed in the following chapters is divided into two parts: one strictly chemical and the other more biological. Chemical studies focus on the isolation, structure elucidation, spectral characteristics and chemical reactivity of new natural products isolated from Caribbean gorgonians. The second part concentrates on aspects of secondary metabolite biosynthesis in certain gorgonians. In particular,

the role of endosymbiotic algae known as zooxanthellae in the biosynthesis of terpenoid natural products is examined. The potential for chemotaxonomy in the Gorgonacea is also discussed.

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