Abstract—The content and distribution of amathamide alkaloids within single colonies of the bryozoan *Amathia wilsoni* (Ctenostomata) varied depending on the location in the colony. Three colonies in all, collected from the same site at the same time, were analyzed and gave very similar results. The outermost, more exposed, tips of the colony had an alkaloid content of nearly 9% of dry weight, while basal parts were apparently devoid of alkaloids. Samples taken midway between tips and base yielded intermediate concentrations of about 1%. Very little variation in the proportions of individual amathamides A, B, C, E occurred between exposed tips of the colonies. However, some differences in ratios were found between tips from exposed and more protected regions.

Key Words—*Amathia wilsoni*, bryozoans, amathamides A, B, C, D, E, alkaloid distribution.

INTRODUCTION

Much of the interest in marine chemical ecology has developed from the study of marine natural products. These organic compounds, which are also known...
as secondary metabolites, are often postulated to be mediators in marine ecological interactions. The roles played by secondary metabolites in the terrestrial environment have been relatively well studied, particularly in the case of compounds from higher plants. This is not so for marine natural products. During the last three decades a considerable number of compounds, having a wide variety of novel functional groups and structures, have been discovered from marine organisms (Faulkner, 1990). Although some of these compounds have biological activity that is of potential pharmacological value, only a few of them have been investigated for their ecological functions (Bakus et al., 1986). Most studied have been the secondary metabolites from marine algae and their involvement in predator–prey relationships (Norris and Fenical, 1982; Van Alstyne, 1988). The ecological significance of compounds originating from marine invertebrates has been reviewed recently (Coll and Sammarco, 1988). Several functions have been ascribed to metabolites from soft corals, while antifouling agents from sponges (Sears et al., 1990), gorgonians (Gerhart, 1986; Rittschoff et al., 1985), and ascidians (Davis and Wright, 1990) have been reported also (Bakus et al., 1986).

The secondary metabolites of bryozoans have been relatively poorly investigated; one reason for this is collection constraints (Faulkner, 1990). Most bryozoan natural products are alkaloids. A wide range of structural types has been described, and some compounds have pronounced biological activity such as the antitumor action of the bryostatins (Suffness et al., 1989). In one of the very few investigations of the ecological significance of bryozoan metabolites, the roles played by tambjamine alkaloids have been described. These compounds are produced by the bryozoan *Sessibugula translucens* and have a range of activities including fish feeding inhibition and antimicrobial action. The tambjamines were also shown to be sequestered and utilized by two species of nudibranchs that grazed on a bryozoan and by a third nudibranch, which in turn preyed upon the two other bryozoan-eating nudibranchs (Carte and Faulkner, 1983).

*Amathia wilsoni* (Ctenostomata) is the largest and most common bryozoan occurring in Tasmanian coastal waters. Previously we have shown that this bryozoan gives rise to a series of amathamide alkaloids (A–F) and a possible biosynthetic precursor 2-(2,4-dibromo-5-methoxyphenyl)ethanamine (Blackman and Matthews, 1985; Blackman and Green, 1987; Blackman and Fu, 1991). The proportion of total alkaloid and relative amounts of alkaloids A–F from different colonies at the same locality was essentially identical and did not show any significant seasonal variation. Collections from different locations did, however, exhibit considerable variation in these characteristics. In this paper we report on the alkaloid distribution within single colonies collected at the same site and time.