SOME POLYCHAETES ASSOCIATED WITH THE SPONGE, *Anthosigmella sp.*

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INTRODUCTION

Polychaetes, which are commonly known as marine segmented worms, are one of the very common animals in the intertidal areas of our seas, but their secretive habits often result in their being frequently overlooked. Around 8,000-10,000 species of benthic polychaetes have been reported all over the world (Day, 1967a and 1967b). Most polychaetes, especially the benthic ones and those often associated with other organisms, are strikingly beautiful and come in red, pink, green or a combination of colors.

Segmented aquatic worms are being sought and eaten by members of native tribes in tropical and semitropical countries (Fitzpatrick, 1963). Palolo worms (*Eunice* sp.) are caught in nets and serve as a source of food in Fiji, Samoa and some parts of Japan. However, these worms are not deemed important major factors in direct food supply. They are more notable because they represent links in the food chains in which man participates.

Although a great majority of the worms dwell either in the sandy or muddy substratum, a considerable number of them are also found associated with crabs, sea stars, holothurians, sponges and other invertebrates in the intertidal zone. Associations may be said to exist when individuals of different species come together, not by preference for the same environmental factors, but by mutual relationships. The relationship between polychaetes and crabs is probably for the mechanical protection of the former. Polychaetes probably associate with the sea stars for the former's transport and camouflage. In turn the sea stars are rid of unwanted debris by the feeding activities of the polychaetes (Storch and Rosito, 1981).

Despite its obvious importance, there are but a few literature on polychaetes in the Philippines. Extensive studies on the taxonomy of these worms include those of Grube (1878) and Rosito (1980), while less-extensive accounts were also given by Hoagland (1920) and Treadwell (1920) during the Philippine Expedition of the Albatross, Holly (1934, 1935), Treadwell (1942, 1943) and Pillai (1965). Lesser still are works on polychaetes associated with invertebrates. Such works include those of Sankolli and Shenoy (1965), Storch and Niggerman (1967), Uebelacker (1978) and

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Wagner et al., (1979). The only study here in the Philippines was that of Storch and Rosito (1981) on the polychaetes associated with crabs, sea stars and holothurians collected off Cebu. No study on polychaetes associated with sponges has yet been found by the author.

This study thus aimed to identify some species of polychaetes associated with the sponge, *Anthosigmella* sp. (Phylum Porifera, Class Demospongiae, Family Choanotidae) and describe the identified polychaetes.

The study dealt mainly with the systematics of the polychaetes associated with the sponge. Identifications were done up to the species level, except in some cases wherein available literature did not provide sufficient characteristics for proper descriptions of the species obtained. Collection of sponges was limited to a period of three months (November, 1981 - January, 1982) in the tidal flat of the USC Marine Station, Maribago, Mactan Island, Cebu.

MATERIALS AND METHODS

Collection Area

Samples of sponge, *Anthosigmella* sp., were collected from the intertidal zone of the USC Marine Research Station, Maribago, Mactan Island, Cebu (123° 58' E; 10° 14' N) (Fig. 1). The collection area was about 200 sq.m. and usually exposed during low tide. The tidal flat housed a diverse array of invertebrate fauna which included echinoderms, sponges, molluscs, coelenterates, etc. The sponge of the genus *Anthosigmella* was quite abundant during the sampling period.

Collection of Sponges

A total of three samplings were made on three different sampling dates: November 2, 1981, December 5, 1981, and January 9, 1982. Sponges were collected during low tide with the aid of a diving knife. These were then placed in a pail half-filled with sea water. The samples were then taken to the laboratory for narcotization using 7.5% magnesium sulfate in sea water.

The identification of the sponge was confirmed using the works of Ruelo (1964) and Esmero (1978) as references.

Removal and Identification of Polychaetes

The removal of the polychaetes involved the use of a knife and a pair of forceps. The specimens obtained were temporarily preserved in 5% formalin buffered with borax, then later examined and permanently preserved in 70% alcohol (ethanol).

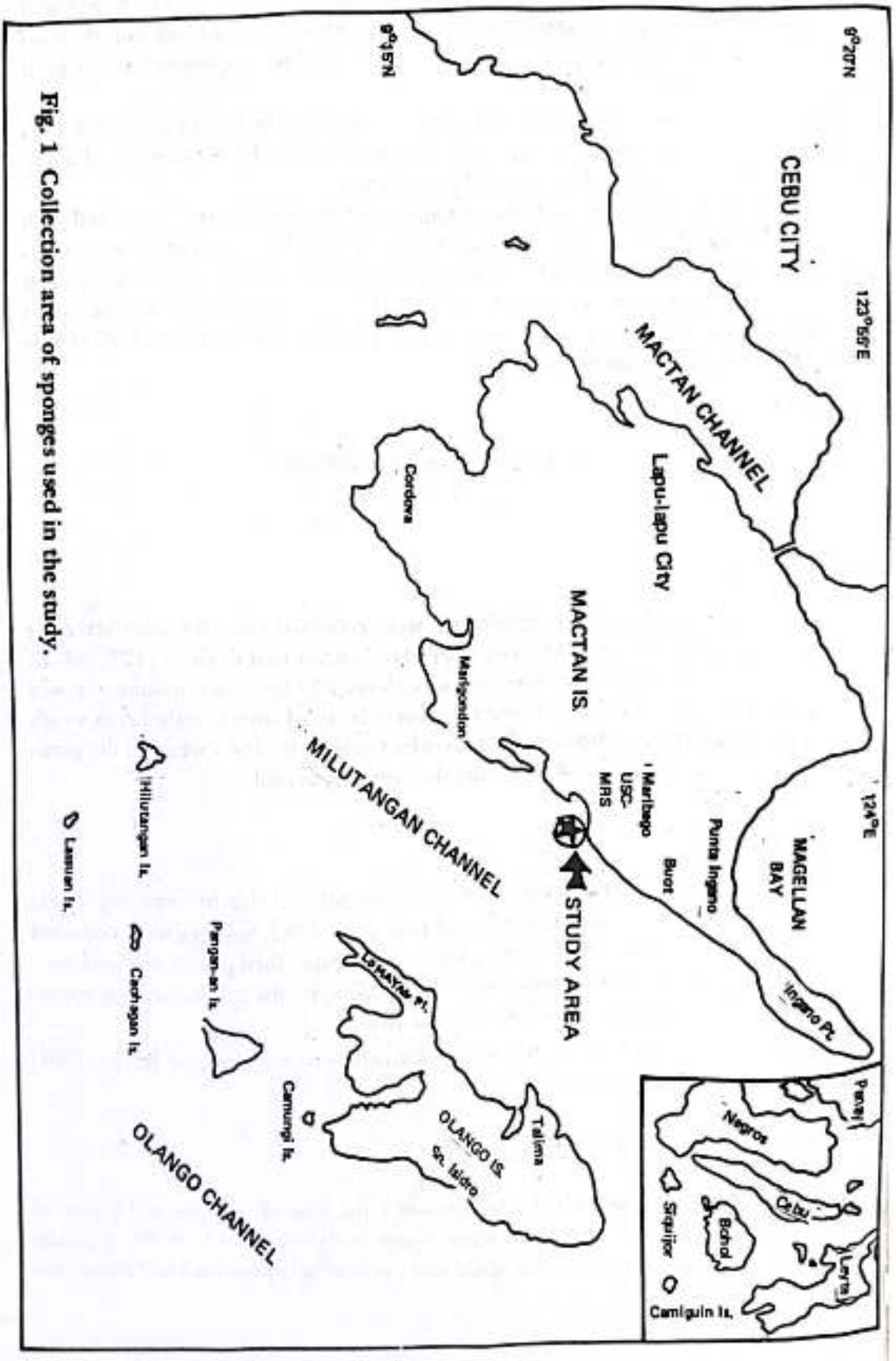

Fig. 1 Collection area of sponges used in the study.

The identification of the polychaetes was based mainly on the works of Fauvel (1953), Hartman and Imajima (1964), Day (1967a and 1967b) and Fauchald (1977) and verified by Ruby Rosito, a faculty member of the Biology Departmenf of the University of San Carlos, whose specialization is on who specialize on the study of these animals.

For identification made down to the species level, it was necessary to remove a parapodium of the worm in order to examine the setae which is of taxonomic value. The parapodium was mounted on a slide with the anterior side facing the observer. Glycerine was used as a mounting medium. Line drawings of the parapodia were made using a Camera Lucida and fresh mount photographs were made using a Nikkon photographic microscope.

The different taxonomically important parts essential for the identification of a polychaete are (Fig. 2):

1. prostomium – This part contains the eyes, antennae, palps and other sense organs.
2. proboscis – This is the eversible digestive tract of polychaetes which may be armed or unarmed.
3. parapodium – Polychaete parapodium may be biramous with a dorsal branch or notopodium and a ventral branch or neuropodium. It may also be uniramous wherein only the neuropodium is retained.
4. branchiae – These are the respiratory organs of the polychaete. The presence or absence of these structures is taxonomically important.
5. setae – The setae of polychaetes may generally be simple or unjointed and compound or jointed.

The different terms used in the identification and description of the different species in this study may be defined as follows:

acicular seta – a very stout projecting seta homologous with other setae but similar in thickness to an internal aciculum.

anal cirrus – one or more elongated projections from the pygidium or the terminal segments on which the anus opens.

antenna – a sensory projection arising from the anterior or dorsal surface of the prostomium.

biarticulate – two jointed.

bidentate – with two teeth.

biramous – having two rami or forks.

biramous parapodium – a foot or parapodium with two bundles of setae, one in the notopodium and one in the neuropodium.

capillary seta – strictly a hair-like bristle but often used to cover all long slender tapering setae.

cirrus – a sensory projection, usually tapered which is derived from the superior part of the notopodium (dorsal cirrus) or from the neuropodium (ventral cirrus).

compound seta – a jointed seta.

dentate – toothed.

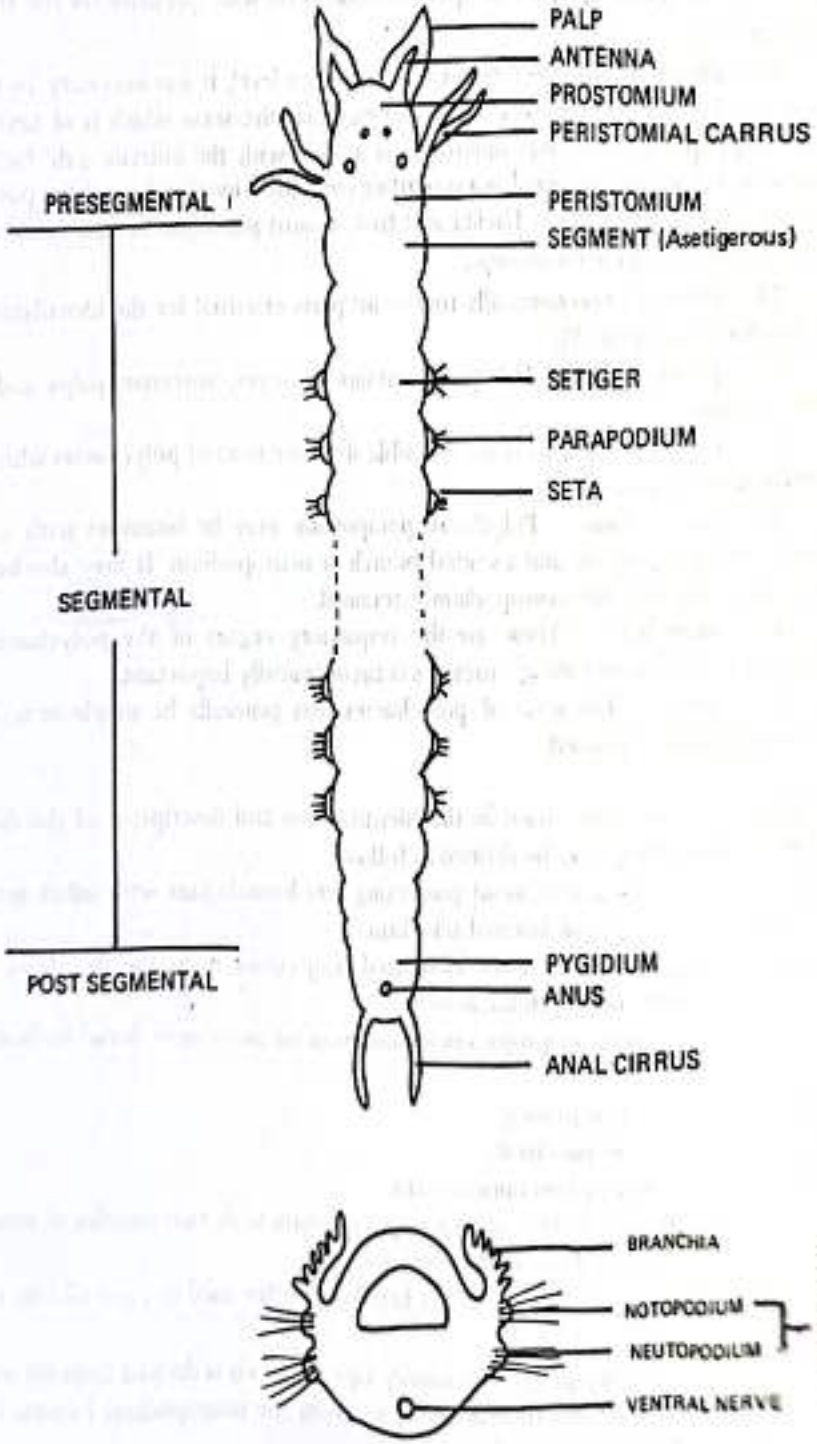

Fig. 2. Diagram showing the major morphological features of a generalized polychaete.

denticulate – with minute teeth or denticles.

falciger – a compound seta having a stout, hooked blade in the apex.

foliaceous – leaf-like.

hooded hook – a stout blunt or apically toothed seta with the apex protected by a delicate chitinous envelope or guard.

inferior – the more ventral of the two structures.

neuroseta – arising from the neuropodium.

neuropodium – the lower or ventral part of the parapodium.

notopodium – a seta arising from the notopodium.

palps – growing projections from the sides of the head of a polychaete.

peristome – the segment behind the prostomium which is modified to form part of the head and surrounds the mouth.

postsetal – posterior to the setae.

presetal – anterior to the setae.

pygidium – the anal segment or terminal part of the body.

ramus – a branch or prong.

setiger – segment with setae.

spinigerous seta – a compound seta whose blade appears to be a fine point.

uniramous – with a single lobe or prong where two might be expected; the opposite of biramous.

Systematic List of Species Recorded

The following species were identified in this study:

Order Phyllodocida

Family Phyllodocidae Williams, 1851
Genus *Phyllodoce* Savigny, 1818
1. *Phyllodoce madierensis* Langerhans, 1880

Family Hesionidae Sars, 1862
Genus *Hesione* Savigney, 1818
2. *Hesione splendida* Savigny, 1818

Family Glyceridae Grube, 1850
Genus *Glycera* Savigny, 1818
3. *Glycera tesselata* Grube, 1863

Family Aphroditidae Malmgren, 1867
Genus *Iphione* Kingberg, 1855
4. *Iphione muricata* Savigny, 1818

Family Syllidae Grube, 1850
Genus *Syllis (Typosyllis)* Savigny, 1818
5. *Syllis (Typosyllis)* sp.

Family Nereidae Johnstone, 1845
Genus *Namanereis* Chamberlin, 1919
6. *Namanereis* sp.

Genus *Nereis (Neanthes)* Linnaeus, 1758

7. *Nereis (Neanthes)* sp.

Order Eunicidae

Family Eunicidae Savigny, 1818

Genus *Lysidice* Savigny, 1818

8. *Lysidice collaris* Grube, 1870

Genue *Eunice* Cuvier, 1817

9. *Eunice* sp.

Order Spionida Grube, 1850

Family Spionidae Grube, 1850

Genus *Laonice* Malmgren, 1867

10. *Laonice* sp.

Order Amphinomida

Family Amphinomidae Savigny, 1818

Genus *Eurythoe* Kinberg, 1757

11. *Eurythoe complanata* Pallas, 1766

Order Capatellida

Family Maldanidae Malmgren, 1867

Genus *Axiothella* Verril, 1900

12. *Axiothella* sp.

Order Opheliida

Family Opheliidae Malmgren, 1867

Genus *Armandia* Filippi, 1861

13. *Armandia intermedia* Fauvel, 1902

Description of Species

Subclass Errantia

Family Phyllodocidae

Phyllodoce madeirensis Langerhans, 1880

The body is tapered and greenish. The dorsal cirri are rhomboidal in sh and often curve over the dorsum. The ventral cirri are oval, distally pointed slightly longer than the setigerous lobe. Setae are fairly numerous and have o strongly striated shaft-heads and long blades.

Family Hesionidae

Hesione splendida Savigny, 1818

The anterior pair of eyes are larger and wider apart than the posterior p The setigerous lobe is stout with presetal and postsetal lips, and a superior coni papilla. Setae falcigerous with blades of varying length tipped with the two stro teeth and a fine, straight accessory tooth below the secondary one. The ventral ci are indistinctly jointed and relatively short.

Family Glyceridae

Glycera tesselata Grube, 1863

Its proboscis is very long and grooved. Its papillae do not have rings. Jaw supports are forked with one short limb and a very steep notch between it. Peristome and the next few segments have biramous parapodia. Notosetae are all simple capillaries while neurosetae are compound and spinigerous.

Family Aphroditidae

Iphione muricata Savigny, 1818

The elytra or scale is large, reniform and tough. Dorsal and ventral cirri papillose. The notopodium is short and bears numerous, very fine biserrate capillaries. Its neuropodium is large and truncated with numerous stout unidentate setae ornamented with transverse striations.

Family Syllidae

Syllis (Trypanosyllis) sp. Savigny, 1818

The body is flattened and ribbon-like with short segments. The head has three antennae, two pairs of tentacular cirri and separate palps.

Family Nereidae

Namanereis sp. Chamberlin, 1919

The prostomium has two antennae and two biarticulate palps. The parapodia is sesquiramous. The neuropodia has two bundles of setae: the superior ones being spinigerous and the inferior ones, falcigerous.

Nereis (Neanthes) sp. Linnaeus, 1758

The peristomial segment is apodous. The first two feet are uniramous and the rest are biramous. Both spinigers and falcigers are usually present, but simple setae are either absent or very rare.

Family Eunicidae

Lysidice collaris Grube, 1870

Each parapodium has a short conical dorsal cirrus set well above the broad setigerous lobe and a papilliform ventral cirrus. Superior setae are limbate capillaries and cob-setae, inferior ones are bidentate falcigers.

Eunice sp. Cuvier, 1817

The parapodia are uniramous with tapered dorsal cirri. Branchiae arise from the dorsal cirri and may be simple or pectinate. Setae usually include simple limbate capillaries and cob-setae superiorly and compound inferiorly with one or more acicular setae at the base of the series.

Family Spionidae

Laonice sp. Malmgren, 1867

The branchiae are free from the notopodial lamellae and present from

setiger 2 to the middle of the body. Notosetae are capillaries throughout. Neurosetae are capillaries anteriorly and hooded hooks posteriorly.

Family Amphinomidae

Eurythoe complanata Pallas, 1766

Branchiae proceed from setiger 2 onwards. Notosetae are of three types: 1) smooth pointed setae, 2) harpoon setae with a small spur or step, and 3) a long slender blade with very faint serrations. Neurosetae are of two types: forked setae with smooth prongs of unequal length and slender setae with a small spur at the base of a long blade.

SUBCLASS SEDENTARIA

Family Maldanidae

Axiothella sp. Verril, 1900

Head with a flattened cephalic plate with a raised rim. Anus sunk in a funnel rimmed with cirri or more crenulations. Neurosetae are essentially similar throughout from the first setiger onwards, sometimes acicular, always with a vertical series of teeth above the main fang.

Family Opheliidae

Armandia intermedia

The body has twenty-seven setigers with gills extending over 24-25 segments from setiger two to the last two or three. Its anal funnel is short with a long internal ventral cirrus and 10-20 clavate dorsal papillae.

SUMMARY AND RECOMMENDATIONS

A total of 13 species belonging to 11 families of Class Polychaeta were recorded to be associated with the sponge, *Anthosigmella* sp. Both Subclasses Errantia and Sedentaria were represented. All of the species of polychaetes recorded in this study are also known to exist independently from their hosts.

Future related researches such as those which will deal with: a) ecological relationships between sponges and polychaetes; b) other associations of the sponge, *Anthosigmella;* and c) other invertebrates with which polychaetes are associated among others, are recommended. The field of polychaete associations and other type of associations are still wanting for further knowledge.

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