

SUPPLEMENTAL INFORMATION

An analysis of the sponge *Acanthostrongylophora igens*' microbiome yields an actinomycete that produces the natural product manzamine A

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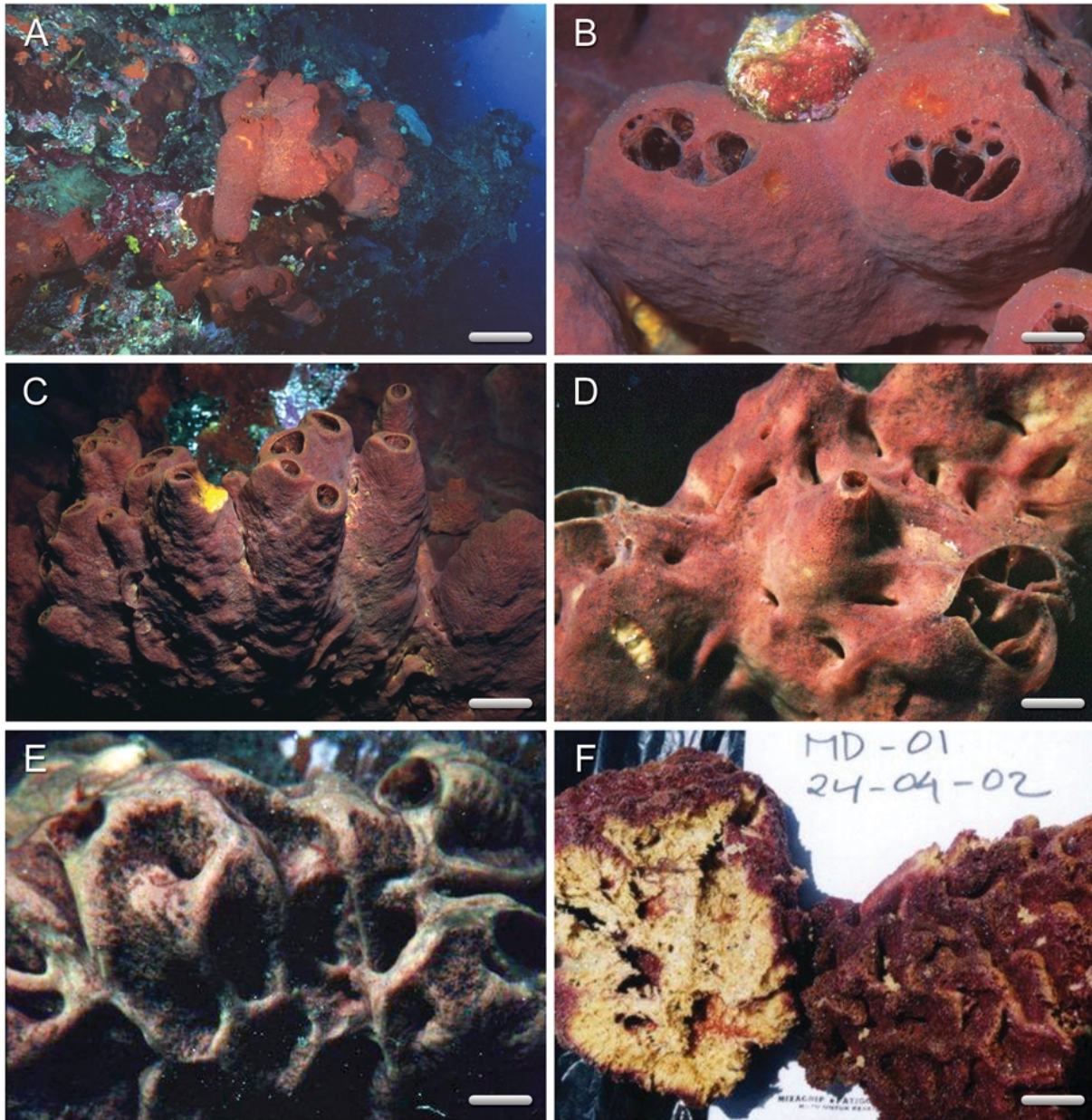
Supplementary Table 1. Revised classification of marine sponges known to yield manzamines and related compounds.

| Taxonomy and Classification | | | Locality | References |
|-----------------------------|-------------------------------|--|-------------------------------------|------------|
| Order | Family | Genus and Species | | |
| HAPLOSCLERIDA Topsent | Chalinidae Gray | <i>Haliclona tulearensis</i> Vacelet, Vasseur & Lévi, 1976 | East Coast South Africa | 1 |
| | | <i>Haliclona (Rhizoniera)</i> <i>sarai</i> Pulitzer-Finali, 1969 | Bay of Naples, Italy | 2 |
| | | <i>Haliclona (Reniera)</i> sp. undet. | Naples, Italy | 3 |
| | | <i>Haliclona</i> sp. undet. | Okinawa | 4 |
| | Niphatidae van Soest | <i>Amphimedon</i> sp. undet. | Okinawa | 5 |
| | Petrosiidae van Soest | <i>Acanthostrongylophora</i> <i>ashmorica</i> Hooper, 1984 | Philippines | 6 |
| | | <i>Acanthostrongylophora</i> <i>ingens</i> (Thiele, 1899) | Indonesia, Micronesia, NW PNG | 7 |
| | | <i>Acanthostrongylophora</i> sp. undet. | Okinawa | 8 |
| | | <i>Acanthostrongylophora</i> sp. undet. | Palau | 9 |
| | | <i>Acanthostrongylophora</i> sp. undet. | Milne Bay, Eastern PNG | 10 |
| | | <i>Neopetrosia exigua</i> (Kirkpatrick, 1900) | Motupore Island, S PNG | 11 |
| | | <i>Neopetrosia contignata</i> (Thiele, 1899) | Milne Bay, Eastern PNG | 12 |
| | <i>Neopetrosia</i> sp. undet. | Madang, NW PNG | 12 | |
| DICTYOCERATIDA Minchin | Thorectidae Bergquist | <i>Hyrtios erecta</i> Keller | Red Sea | 13 |
| | Irciniidae Gray | <i>Ircinia</i> Nardo | Okinawa | 5a-c |
| | | <i>Ircinia</i> sp. undet. | Okinawa | 5a-c |

Supplementary Table 2. Morphological and habitat characteristics for specimens currently considered to be species of *Acanthostrongylophora ingens* (Thiele, 1899) (Order Haplosclerida, Family Petrosiidae).

The skeleton of *A. ingens* ranges in density (thickness of the various tracts and tightness of the general network) from the most dense (A) with swathes of thick relatively large regular circular meshes with large open spaces between swathes, secondary and primary tracts the same thickness (thick), to (B) swathes of thickish relatively regular smaller circular meshes with large open spaces between swathes, secondary and primary tracts the same thickness, key characteristic is small circular meshes in swathes, rendering the skeleton ladder-like, to (C) less dense than 2 (B), with less regular secondary joint tracts, to the least dense (D) with long fine primary tracts emanating through choanosome with irregular thin and angular connections, the tracts are fine and almost wispy, mesohyl more abundant than in (A) or (B).

| | 92-IND-50 | 92-IND-82 | 94-IND-136 | 00-IND-76 | 01-IND-35 | 01-IND-51 | 01-IND-52 |
|--------------------------------|--------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|------------------------------------|---------------------------------------|---------------------------------|
| References | Ichiba et al (1994) ^{7a} | Ohtani et al (1995) ^{7b} | El Sayed et al (2001) ^{7d} | Yousaf et al (2002) ^{7l} | Yousaf et al (2002) ^{7l} | Yousaf et al (2002) ^{7l} | Peng et al (2003) ⁷ⁿ |
| Original identification | <i>Pachypellina</i> sp. | <i>Prianos</i> sp | Petrosiidae ng nsp | Petrosiidae ng nsp | Petrosiidae ng nsp | Petrosiidae ng nsp | Petrosiidae ng nsp |
| Location | Manado Bay, Sulawesi, Indonesia | Manado Bay, Sulawesi, Indonesia | Manado Bay, Sulawesi, Indonesia | Manado Bay, Sulawesi, Indonesia | Manado Bay, Sulawesi, Indonesia | Manado Bay, Sulawesi, Indonesia | Manado Bay, Sulawesi, Indonesia |
| Habitat | 10 m | silty sand, 37 m | reef slope, 20 m | reef slope, 10-20 m | reef slopes, verticals, 6-30 m | reef slopes, verticals, 33-40 m | silty sand, 6-23 m |
| Abundance in Habitat | | abundant | common | common | abundant | abundant | common |
| External colour | blackish-brown | brownish-orange | maroon | maroon | maroon-brown, slightly green uw | brown | maroon-brown |
| Internal color | yellowish-brown | orange | yellow | yellow | mustard | brown | tan |
| Morphology | spherical to thickly encrusting mass | large coalescent tubes | irregularly massive | irregularly massive | thick encrusting variable + mounds | thickly encrusting | thickly encrusting + fingers |
| Smell/exudates | | | smells | | | putrid | putrid |
| Oscule diameter | | | 1-2 cm | | 5 cm and less | 1-2 cm | 1-3 cm |
| Texture | compressible | soft, fragile, crumbly | tough crumbly | tough crumbly | tough crumbly | very soft, extremely fragile, elastic | fragile, crumbly |
| Strongyle Length | 90-140 µm | 70-150 µm | 80-140 µm | 110-140 µm | 110-150 µm | 100-150 µm | 120-150 µm |
| Skeleton density | B | C | B | B | A | A | D |



Supplementary Figure 1. Morphological and color variation in *Acanthostrongylophora ingens* (Thiele, 1899).

(A) Thick encrusting form with coalescent lobes, maroon exterior, gold interior, from Puerto Princessa, Sulu Sea, Philippines, 18 m depth; (B) Close-up of thick encrusting form with coalescent lobes, maroon exterior, gold interior, from Ritter Island, Dampier Straits, Papua New Guinea, 30 m; (C) Thick encrusting form with coalescent tubes, rusty exterior, gold interior, from Biaro, Sulawesi Island, Indonesia, 12 m; (D) Thick encrusting form with low tube oscules and coalescent ridges, from Manado, Indonesia; (E) Thick encrusting form with low tube oscules and coalescent ridges, from Manado, Indonesia; (F) Ragged hemispherical form with depressed oscules and coalescent ridges, from Manado, Indonesia, note gold interior under heavy maroon surface. Images A–C courtesy of Dr. Patrick L. Colin, Coral Reef Research Foundation (CRRF), Palau, Micronesia.

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