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New Species of the Pennatulacean Genera *Acanthoptilum* and S*tylatula* (Octocorallia: Virgulariidae) from New Zealand and the Campbell Plateau: Both Genera Previously Considered Endemic to the West Coast of the Americas and Atlantic Ocean

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The pennatulacean genera *Renilla*, *Ptilosarcus*, *Stylatula*, and *Acanthoptilum* have formerly been treated as taxa endemic or restricted to particular regions of North and South America and parts of the Atlantic. Undescribed species of two of these genera (*Stylatula* and *Acanthoptilum*) have been collected from the region of New Zealand in the southwestern Pacific. The present paper reports this discovery and provides descriptions of these two new species.

Four genera of pennatulacean octocorals (*Renilla* – Renillidae; *Stylatula* and *Acanthoptioum* – Virgulariidae; and *Ptilosarcus* – Pennatulidae) have previously been recorded as geographically restricted to the Pacific Coast of the Americas and the Atlantic Ocean (Kükenthal 1915; Williams 1995; Zamponi and Pérez 1995; López-González et al. 2001; Castro and Medeiros 2001). In the past half century, two of these genera (*Stylatula* and *Acanthoptilum*) have been collected off New Zealand (from both the North and South Islands, as well as the Campbell Plateau), in the southwestern Pacific. One new species of each of these genera is described here, thereby extending the range of *Stylatula* and *Acanthoptilum* to the southwestern Pacific Ocean.

Material and Methods

Material representing a broad spectrum of pennatulacean taxa was collected during survey cruises (1959–1962) of the NZOI – New Zealand Oceanographic Institute, Wellington (now known as NIWA – National Institute of Water and Atmospheric Research), or NMNZ – National Museum of New Zealand. All material was fixed and preserved in 40% isopropyl alcohol or 75% ethanol. One other abbreviation appearing in the text is CAS – California Academy of Sciences.

Systematic Account

Family Virgulariidae Verrill, 1868

Five genera of circumglobal distribution — in subarctic, temperate, and tropical latitudes, 0–1100 meters in depth.

Genus *Acanthoptilum* Kölliker, 1870

Acanthoptilum Kölliker, 1870:569. Balss, 1910:41. Kükenthal, 1915:63. Bayer, 1957:382. Williams, 1995: 123.

Distribution.— California, Gulf of Mexico, Lesser Antilles, New Zealand region (Fig. 6).

Acanthoptilum longifolium Williams, sp. nov.

Figures 1, 2, 3A–C, 6.

Material examined.— Holotype: CAS 173205, Sta. No. NIWA (NZOI) Z8440: New Zealand, Head of Dusky Sound, Fiordland, 30 m depth, 5 January 1988, coll. Chris Glasson; one specimen in three pieces. Paratype: CAS 173206, Sta. No. NIWA (NZOI) Z8440: same data as holotype; one entire specimen. Other material: CAS 173207, Sta. No. NIWA (NZOI) J965: Campbell Plateau (50.80°S, 173°36.70′E), 118 m depth, 20 June 1981, coll. NIWA; one specimen in two pieces. CAS 173208, Sta. No. NIWA (NZOI) S371: Campbell Plateau (56.40°S, 170°01.40′E), 200 m depth, 28 January 1983, coll. NIWA; five specimens total: one entire specimen, three specimens in several pieces each, and one partial specimen.

Description of the holotype.— The entire length of the holotype is 450 mm total length, 275 mm of which is rachis. The total length of the peduncle is 175 mm, which is in two parts (Fig. 1A). The axis is present throughout the entire length of the specimen, < 1.5 mm in diameter; lustrous white in color; generally cylindrical in cross section, but may have three rounded corners in the region of the peduncle. Polyp leaves are sickle-shaped, alternately disposed along rachis, up to 18 mm in length and 4 mm in width. The bases of the polyp leaves are without armature (irregular clusters of sclerites), although scattered sclerites are found in the polyp leaves, including the basal regions. Autozooids number 9–13 per leaf, often bulbous in the basal or central portions, approximately 1.5–2.0 mm in length. Tentacles have up to 12 pinnules per lateral side. Calicular teeth of the autozooids are mostly indistinct, ca. 3–6 in number, approximately 0.2–0.4 mm in length. Some of these are composed of a single vertical needle-like sclerite, whereas others form an inverted "V" of two converging sclerites. Siphonozooids are 4–6 in number, in short rows. Individual siphonozooids are approximately 0.2–0.5 mm in height. These are mostly low and rounded in shape, but some are conical with converging sclerites forming a pointed apex. The siphonozooids form short rows parallel to the width of the polyp leaves, which are located on the rachis adjacent to bases of polyp leaves (under the insertion of the leaves). Polyp leaves are relatively transparent, revealing numerous white ova (each approximately 0.2–0.3 mm in diameter), which are clearly visible in the gastric cavities (Fig. 1C). Sclerites are three-flanged needles scattered in the coenenchyme, polyp leaves, and polyps, 0.12–0.70 mm in length. Color of the wet-preserved holotype is cream-white throughout.

Distribution.— Southwestern part of the South Island of New Zealand, and Campbell Plateau: 30–200 m in depth (Fig. 6).

Etymology.— The specific epithet is derived from the Latin *longus* (long) and *folium* (a leaf), in reference to the relatively elongated polyp leaves of this species.

Remarks.— Morphologically, species of the genus *Acanthoptilum* can be confused with those of the virgulariid genus *Scytalium*, as the two genera are superficially similar. However, the genus *Scytalium* is characterized by having only oval-shaped plates (that are not three-flanged) in the polyp leaves as well as other parts of the colonies, whereas *Acanthoptilum* has sclerites that are three-flanged spindles, sometimes with small ovals or rods as well (Williams 1995:123–124).

Kükenthal (1915:63–65) reports that the six previously described species of *Acanthoptilum* have 4–9 polyps per leaf. In contrast, *Acanthoptilum longifolium* sp. nov. has 9–13 polyps per leaf (Fig. 1B–C, 2B). Of the six previously described species, four are known from California (*Acan-*

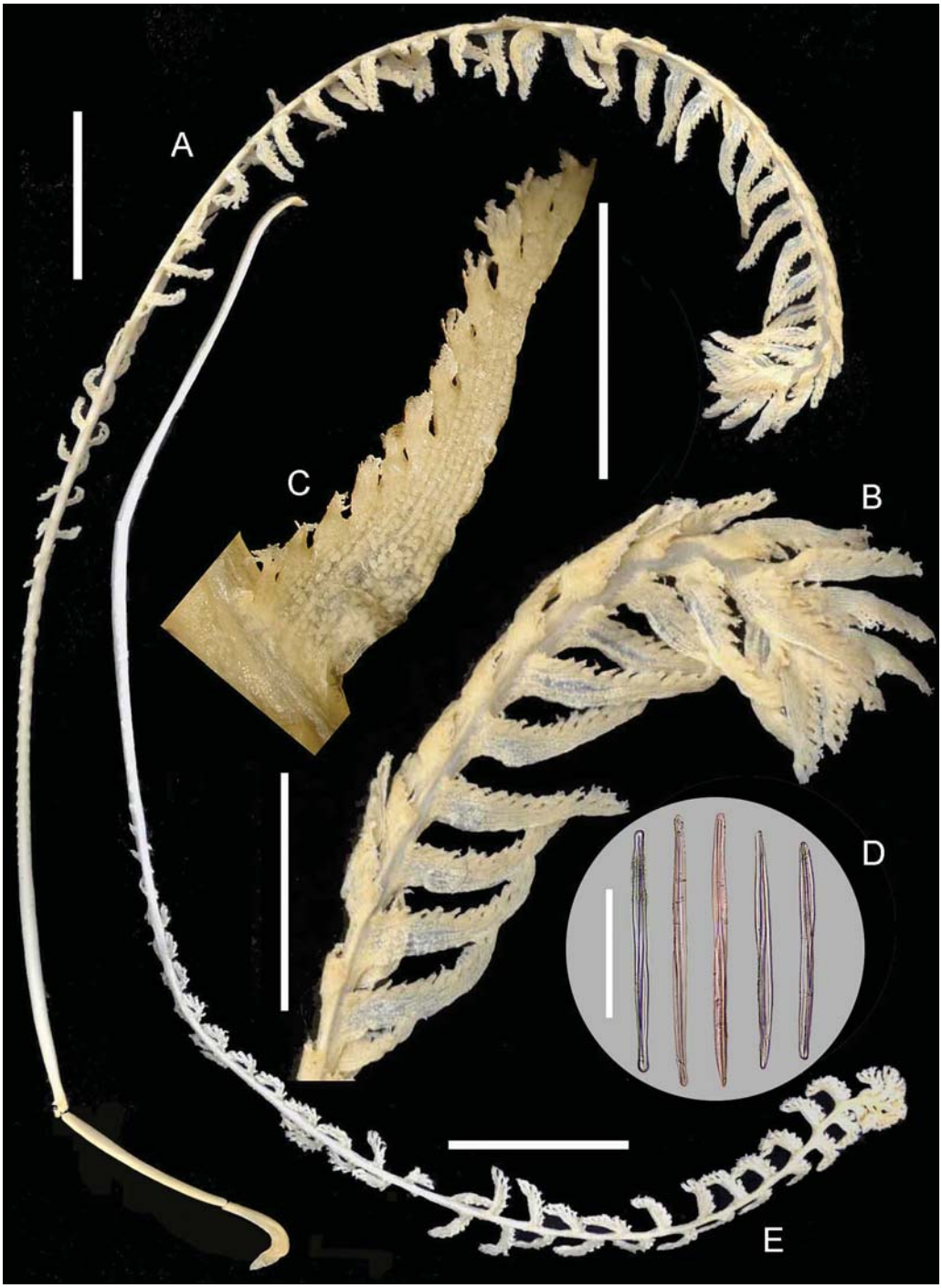

FIGURE 1. *Acanthoptilum longifolium* sp. nov. A-D. Holotype. A. Entire colony; scale bar = 30 mm. B. Distal end of rachis; scale bar = 20 mm. C. A single polyp leaf; scale bar = 8.0 mm. D. Five sclerites from a polyp leaf; scale bar = 0.3 mm. E. Paratype; scale bar = 30 mm.

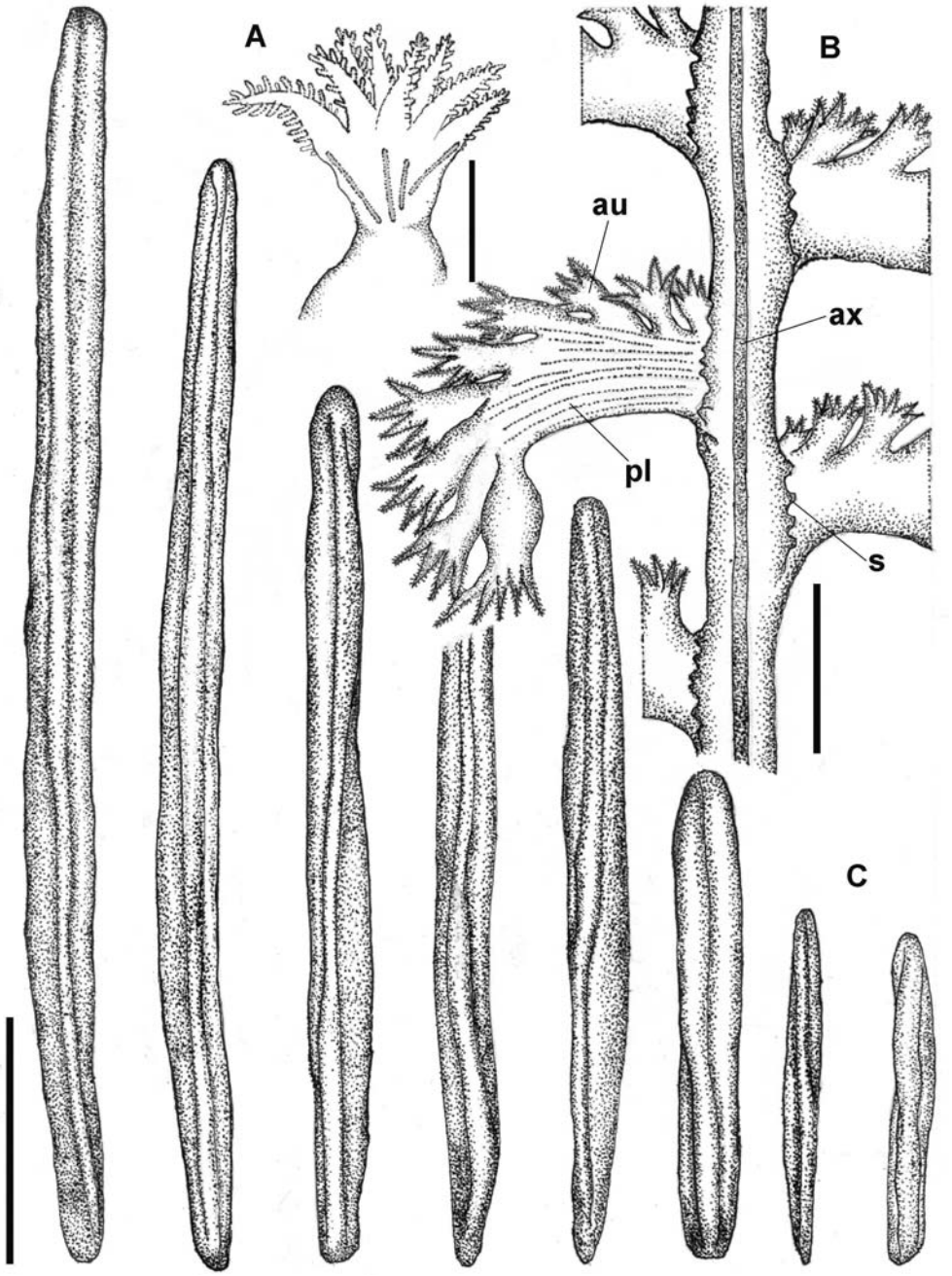

FIGURE 2. *Acanthoptilum longifolium* sp. nov. Polyp leaves and sclerites. A. Individual polyp showing placement of sclerites. B. Portion of rachis showing polyp leaves. C. Polyp leaf sclerites. Abbreviations: au – autozooid; ax – axis; pl - polyp leaf; s – siphonozooid. Scale bars: A = 0.4 mm, B = 2.0 mm, C = 0.1 mm.

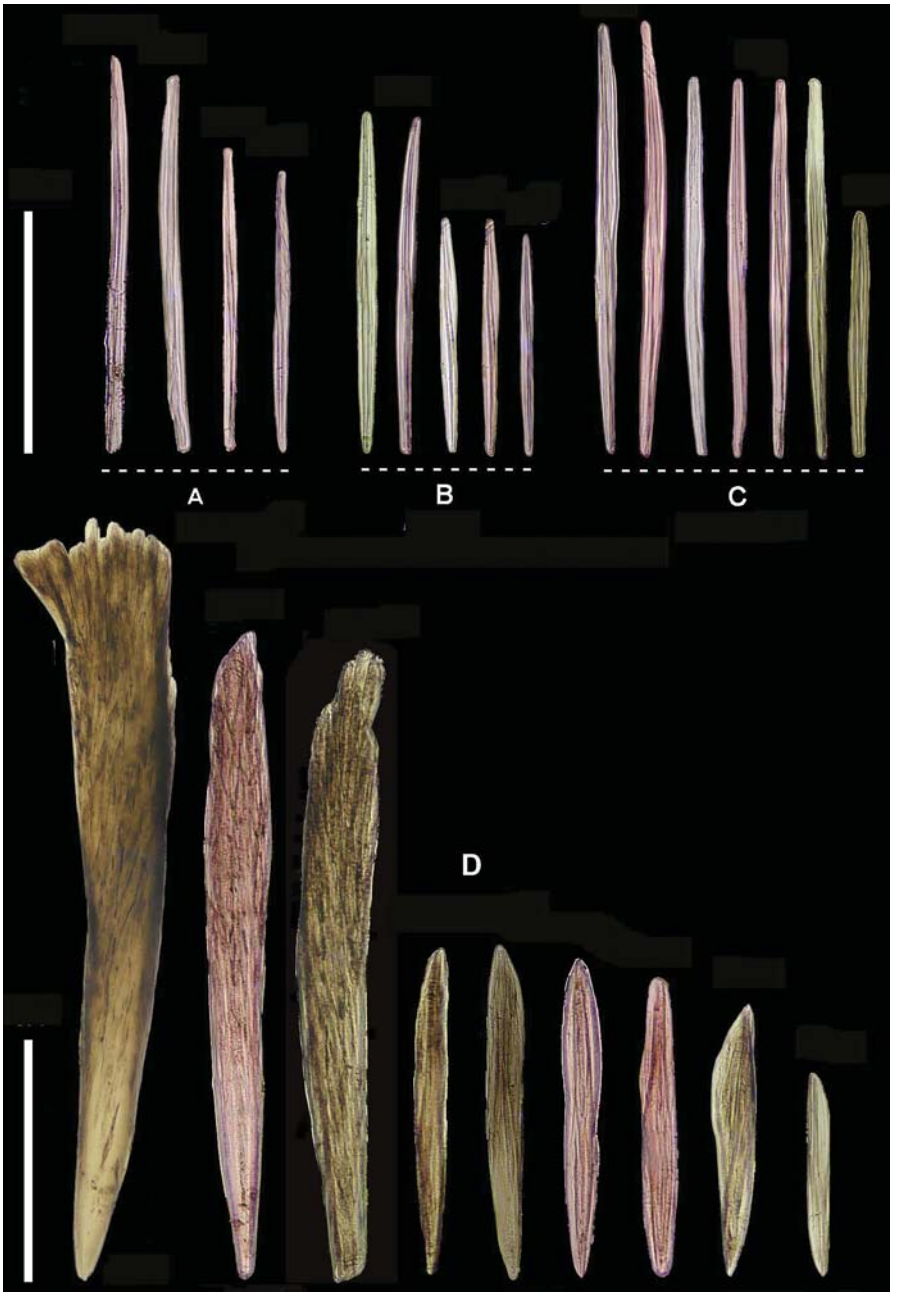

FIGURE 3. Micrographs of sclerites. A-C. *Acanthoptilum longifolium* sp. nov. A. Polyp leaf sclerites. B. Rachis sclerites. C. Peduncle sclerites. D. *Stylatula austropacifica* sp. nov., polyp leaf sclerites. Scale bars = 0.4 mm.

thoptilum album, *A. annulatum*, *A. scalpellifolium*, and *A. gracile*), whereas two are reported from the Gulf of Mexico (*A. agassizii* and *A.pourtalesii*). The new species, *Acanthoptilum longifolium* sp. nov., is known only from New Zealand.

Genus *Stylatula* Verrill, 1864

Stylatula Verrill, 1864:30. Kölliker, 1870: 556. Jungersen, 1904:37. Balss, 1910:42. Kükenthal and Broch, 1911:315. Kükenthal, 1915:67. Bayer, 1961: 307. Williams, 1995:122.

Distribution.— Eastern Pacific Ocean, Atlantic Ocean, New Zealand (Fig. 7).

Stylatula austropacifica sp. nov.

Figures 3D, 4, 5, 7.

Material examined.— Holotype: CAS 173209, Sta. No. NIWA (NZOI) C306, 36°41.00′S 173°58.00′E, 190 m depth, 24 October 1959, one partial colony. Paratype: CAS 173210, Sta. No. NIWA (NZOI) C306, 36°41.00′S 173°58.00′E, 190 m depth, 24 October 1959, one partial colony. Other material: CAS 173211, Sta. No. NIWA (NZOI) B674, 36°40.00′S 173°53.00′E, 196 m depth, 26 October 1962, three partial colonies. CAS 173212, Sta. No. NIWA (NZOI) C306, 36°41.00′S 173°58.00′E, 190 m depth, 24 October 1959, ten partial colonies.

Description of the holotype.— The specimen is comprised of a portion of rachis 120 mm in length, with 37 pairs of polyp leaves. The axis is present throughout the length of the specimen, cylindrical in cross section, ca. 0.8 mm in diameter. Polyp leaves are in pairs, oppositely-arranged, each polyp leaf contains 4–6 autozooids. Tentacles of polyps tightly contracted, wet-preserved polyps tubular/cylindrical, <1.0–1.8 mm long. The polyp leaf fans (basal armatures) are usually composed of 7–8 large sclerites, mostly 1.0–1.3 mm in length. These sclerites are spindles that are not three-flanged, with one end somewhat pointed, whereas the other end is often wider and relatively blunt. The blunt end may be weakly serrated (Figs. 3D, 5B). Longitudinal grooves and ridges are evident on the surface of these sclerites. Four to seven smaller sclerites (0.3–0.5 mm in length) may compose a second fan at the base of the main fan. Polyp leaves are separated by bare areas of rachis, 1.0–1.2 mm in length. Siphonozooids are minute and inconspicuous, longitudinally placed on lateral sides of the rachis below the bases of a particular polyp leaf pair. Retracted polyps light tan in color, rachis white.

Distribution.— West coast of the North Island of New Zealand; 190–196 m in depth (Fig. 7).

Etymology.— The specific epithet is derived from the Latin *australis* (southern) and *pacificus* (Pacific Ocean); in reference to the geographic region of the type locality.

Remarks.— The ten previously described species of *Stylatula* include two from the eastern Pacific, six from the Atlantic (tropical western Atlantic, southwestern Atlantic, Namibia, and Europe), and two species with localities not reported. The new species, *Stylatula austropacifica* sp. nov. is known only from New Zealand.

Stylatula elegans, *S. diadema*, and *S. macphersoni* have numerous (usually more than 8), fine, needle-like sclerites composing the basal armature of a particular polyp leaf. On the other hand, *Stylatula australopacifica* sp,. nov. has a fan-like leaf armature of a few (ca. 7–8) larger, robust, spindle-shaped sclerites, and 4–7 relatively smaller spindles (Figs. 4C–D, 5A–B).

Discussion

The virgulariid genus *Stylatula* was formerly known only from the West Coast of North America, and opposite sides of the Atlantic Ocean, whereas the related genus *Acanthoptilum* was known

FIGURE 4. *Stylatula austropacifica* sp. nov. A. Holotype, 121 mm long. B. Paratype, 88 mm long; scale bar for A and B = 25 mm. C. A single polyp leaf from the holotype showing subtending fan-like armature; scale bar = 1.0 mm. D. Five scerites from the fan-like armature subtending a polyp leaf of the holotype; scale bar = 0.4 mm.

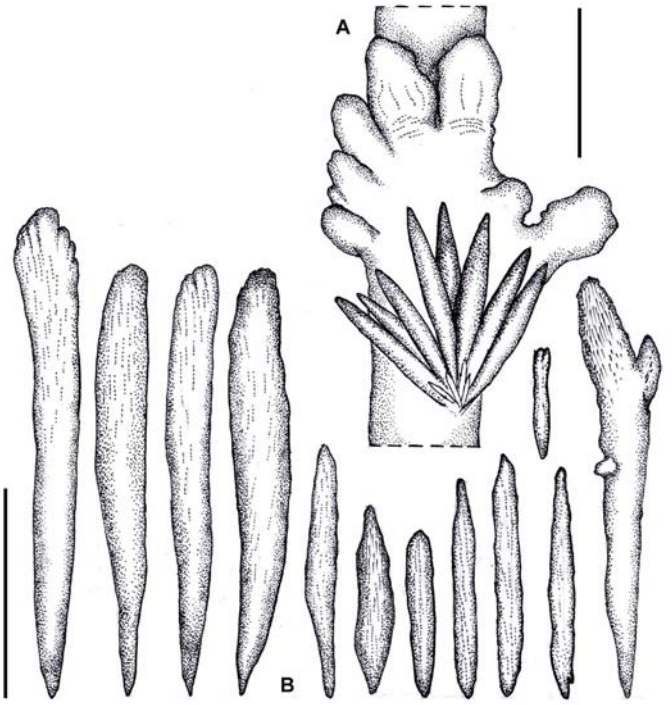

FIGURE 5. *Stylatula austropacifica* sp. nov. A. Portion of rachis showing a single polyp leaf with subtending fan of sclerites; scale bar = 1.0 mm. B. Sclerites from a subtending fan of a polyp leaf; scale bar = 0.5 mm.

only from the west coast of North America and both sides of the Atlantic Ocean. The present paper establishes the presence of these two taxa in the region of New Zealand in the southwestern Pacific Ocean, and provides the descriptions of two new species.

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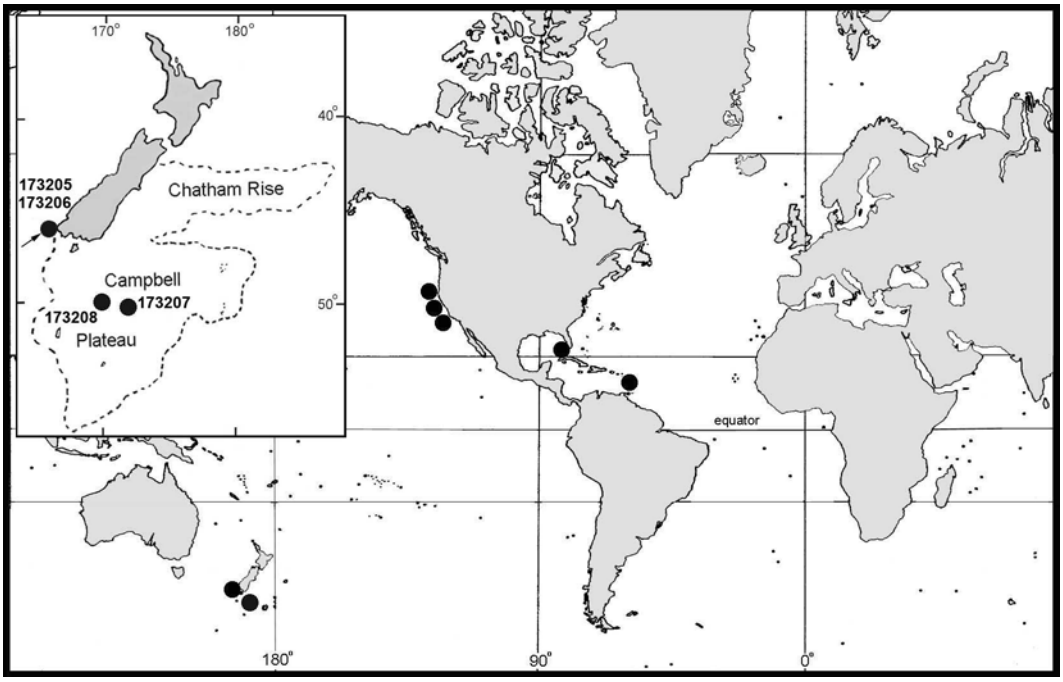

FIGURE 6. World map showing collecting stations (●) for the genus *Acanthoptilum*. Inset: map of New Zealand region showing distribution and type locality (arrow) of *Acanthoptilum longifolium* sp. nov. Six digit numbers refer to CAS catalog numbers.

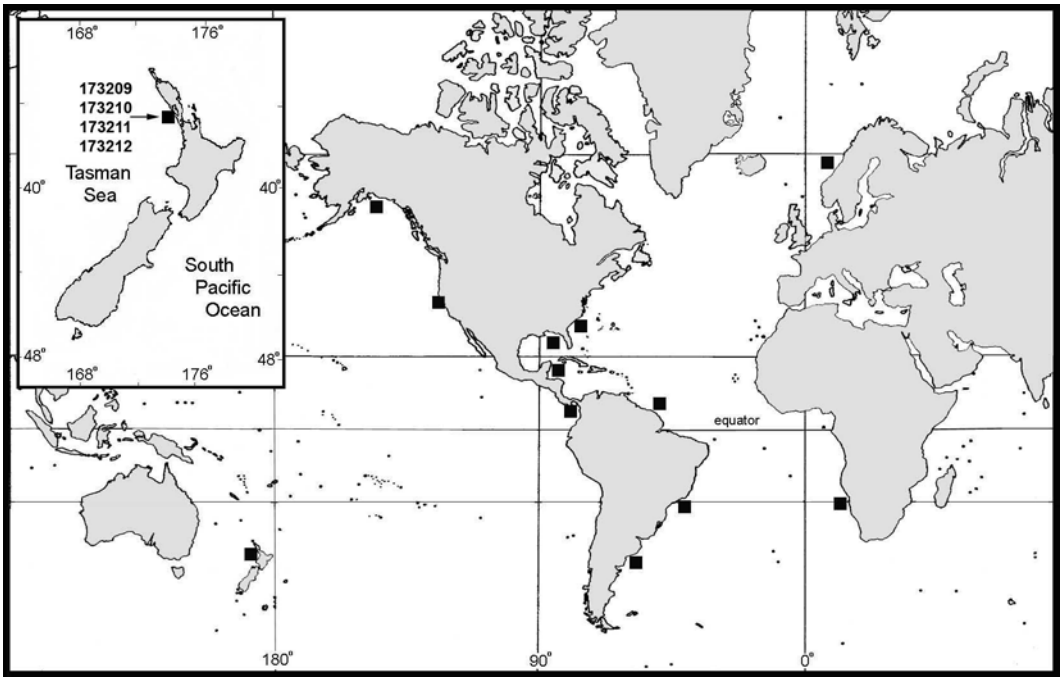

FIGURE 7. World map showing collecting stations (■) for the genus *Stylatula*. Inset: map of New Zealand showing distribution and type locality (arrow) of *Stylatula austropacifica* sp. nov. Six digit numbers refer to CAS catalog numbers.

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