Plocamium moei, sp. nov. and *P. varichemicum, sp. nov. (Plocamiaceae, Florideophyceae)* from the Western Antarctic Peninsula

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Worldwide, there are numerous cryptic species within the genus *Plocamium* that, albeit almost indistinguishable morphologically, have been shown to be genetically divergent (e.g. Yano & al. 2004, 2006, Saunders & Lehmkuhl 2005, Cooper 2017, Reddy & al. 2023). Lineages that have been called *P. cartilagineum* (Linnaeus) P.S.Dixon are widely distributed in both hemispheres and most represent misapplications of this name (Saunders & Lehmkuhl 2005, Guiry & Guiry 2026). For example, Saunders & Lehmkuhl (2005) and Cremades & al. (2011) showed that *Plocamium* collected from five different areas in northern Europe previously identified as *P. cartilagineum* based on morphology actually represent five distinct cryptic species.

Antarctic *Plocamium* species have a circumpolar distribution and, as we report here, also display patterns of crypsis*. *Plocamium* species are among the most common understory red macroalgae in almost all published qualitative, semi-quantitative, or quantitative reports from along the Western Antarctic Peninsula (WAP; e.g. Neushul 1965, DeLaca & Lipps 1976, Chung & al. 1994, Amsler & al. 1995, 2024, Klöser & al. 1996, Quartino & Boraso de Zaixso 2008). They are very often one of the dominant understory algae (sometimes the single dominant understory alga) at many locations, particularly below depths of 8 m (CDA, SH, MOA pers. obs.; see also Hommersand & al. 2009, Amsler & al. 2024). Previously, three species along the WAP have been identified based on their morphological similarities to known species despite minor variations, with species names misapplied from other regions of the world (reviewed in Heiser & al. 2020). Recently, all of the species of *Plocamium* in Antarctica, *P. cartilagineum*, *P. hookeri* Harvey, and *P. secundatum* (Kützing) Kützing, were considered likely to be a single species, *P. cartilagineum* (Hommersand & al. 2009). The latter paper suggested that the morphological differences between Antarctic reports of the three previously described species were likely minor variations of the same species, with *P. cartilagineum* having nomenclatural priority. Dubrasquet & al. (2018) sequenced (*cox*1, *rbc*L) WAP specimens of *Plocamium* with morphologies matching all three species and reported that they were identical, also referring them all to *P. cartilagineum*. However, molecular evidence does not support all Antarctic *Plocamium* specimens being *P. cartilagineum*, nor any other named or unnamed *Plocamium* species known from other regions (Hommersand & al. 2009, Dubrasquet & al. 2018). Until recently, we had been referring to the Antarctic *Plocamium* as "*P.* sp." because these previous molecular studies suggested it was a single species (including some of our own that showed two closely related genetic groups; Young & al. 2013, Shilling & al. 2021). However, our recent population genetic studies have revealed that there are in fact at least two cryptic *Plocamium* spp. in Antarctica (Heiser & al. 2025). Therefore, we propose the following new taxa here:

* *Crypsis* is the ability of an organism to avoid observation or detection through blending into its environment or hiding its presence.

Plocamium moei Amsler, S.Heiser & Krueger-Hadfield *sp. nov.* (Figs 1-5)

Description: Thalli dark red to light red (rarely dark pink), slender, and much branched, (5–) 10–25 (–30) cm long. Thalli attached to the substratum by a holdfast of rhizoidal branches, often with secondary rhizoidal attachments from lower branches. Erect axes compressed at base, becoming flattened above, without midrib, 1–2.5 mm broad in lower and middle portions tapering to 0.3–0.7 mm broad near branch tips. Ramuli normally in irregularly alternate series of 3–4, occasionally in pairs, occasionally with two levels of branching; normally all ramuli except the lowest are branched; lowest ramulus in upper portions of the thalli commonly linear to slightly adaxially curving, sometimes slightly recurving, entire, usually 0.7–2.2 mm long and 0.2–0.5 mm broad at center. Axial construction with medulla of hyaline, large cells 50–240 µm diam. and cortex of 1–3 layers of highly pigmented cells elongated in cross-section, 7–17 µm diam. Gametophytic thalli presumably dioicous. Cystocarps sessile, globular, smooth, 0.5–1.6 (–2.0) mm in diameter, borne singly or several adjacent along ramuli. Spermatangia not seen. Tetrasporangia zonately divided within stichidia, 60–100 µm diameter. Stichidia borne in the axils of ramuli or grouped on the upper margin of ramuli and along the axes; stichidia morphology usually triple or irregular with some bifurcated; simple stichidia are rare; individual (non-simple) stichidia 350–1000 µm long and 400–1400 µm in diameter, with a short pedicel.

Holotype: *M.O. Amsler (MOA)* **UC** 2126531 [tetrasporophyte], 31 March 2016, Shallow C, cove on SE side of Hermit Island, Antarctica, 64.798233°S, 64.005750°W, depth 6 m, chemogroup L GenBank KF158991

Isotypes: *MOA* [♀ gametophyte], Deep B, *loc. cit.*, depth 14 m, chemogroup L [**UC**]; *MOA* [tetrasporophyte], Deep A, *loc. cit.*, depth 14 m, chemogroup L [**NCU**]; *MOA* [tetrasporophyte], Deep C, *loc. cit.*, depth 14 m, chemogroup L [**NY**].

Paratypes deposited in **UC**, **NCU**, **NY**, Herbarium C.D. Amsler, or Herbarium C.W. Schneider: *C.D. Amsler (CDA)* [tetrasporophyte], 17 March 2026 #1, islet off Omega Island in the Melchior Islands, Antarctica, 64.340291°S, 62.949952°W, depth 6–27 m; *S. Heiser* [♀ gametophyte], 17 May 2018 T1-76E, Wauwermans Islands, USAP island #514, Antarctica, 64.916683°S, 64.034917°W, depth 23 m; *MOA,* 2 April 2016 Shallow A [tetrasporophyte], B [tetrasporophyte], and C, Laggard Island, N side, Antarctica, 64.806433°S, 64.018600°W, depth 11 m; *MOA,* 2 April 2016 Deep A, B. and C, Laggard Island, N side, Antarctica, 64.806433°S, 64.018600°W, depth 17 m; *CDA* [tetrasporophyte], 23 January 2023 #26, NE side of Hermit Island, 64.796683°S, 64.006700°W, depth 9–14 m

Registration: http://phycobank.org/107676

Diagnosis: In our chemical ecology studies around Anvers Island, *P. moei* is usually represented by chemogroup L but also includes two rare chemogroups, I and N (Shilling & al. 2021, Heiser & al. 2023b).

Eponymy: The specific epithet honors Dr. Richard L. Moe (1946–) of the University of California at Berkeley whose studies of Antarctic macroalgae have made major contributions to our understanding of them, and who has been generous in providing advice concerning them to CDA over many years.

Distribution: WAP between Kay, islote (64.12507˚S, 60.92997˚W) and Pléneau Island (65.10425˚S, 64.04705˚W) (Shilling & al. 2021, Heiser & al. 2023b, authors' unpub. data).

Plocamium varichemicum Amsler, S.Heiser & Krueger-Hadfield *sp. nov.* (Figs 6-10)

Description: Thalli dark red to light red (rarely dark pink), slender, and much branched, (5–) 10–25 (–30) cm long. Thalli attached to the substratum by a holdfast of rhizoidal branches, often with secondary rhizoidal attachments from lower branches. Erect axes subterete at base, compressed to flattened above, without midrib, 1–2 mm broad in lower and middle portions tapering to 0.3–0.7 mm broad near branch tips. Ramuli normally in irregularly alternate series of 3–4, occasionally in pairs, occasionally with two levels of branching; normally all ramuli except the

lowest are branched; lowest ramulus in upper portions of the thalli commonly linear to slightly recurving (rarely moderately recurving), sometimes slightly adaxially curving, entire, usually 0.8–2.4 mm long and 0.2–0.5 mm broad at center. Axial construction with medulla of hyaline, large cells, 30–200 µm diam., and cortex of 1–3 layers of highly pigmented cells elongated in cross-section, 7–22 µm diam. Gametophytic thalli presumably dioicous. Cystocarps sessile, globular, smooth, 0.5–1.7 mm in diameter, borne singly or several adjacent along ramuli. Spermatangia not seen. Tetrasporangia zonately divided within stichidia, 60–100 µm diameter. Stichidia borne in the axils of ramuli or grouped on the upper margin of ramuli and along the axes; stichidia morphology usually simple or bifurcated; triple and irregular stichidia are usually less common but can be predominant; individual simple stichidia (250–) 400–1000 µm long and (140–) 200–300 µm in diameter, with a short pedicel; more complex stichidia 500–900 µm long and 200–1100 µm in diameter, with a short pedicel.

Holotype: *MOA* **UC** 2126532 [tetrasporophyte], 3 April 2016, Shallow C, Stepping Stones off Anvers Island, Antarctica, 64.784317°S, 63.991817°W, depth 11 m, chemogroup C, GenBank KF158990

Isotypes: *MOA* [tetrasporophyte], Shallow A, *loc. cit.*, depth 11 m, chemogroup C **[UC]**

Paratypes: deposited in **UC**, **NCU**, **NY**, Herbarium C.D. Amsler, or Herbarium C.W. Schneider: *MOA* [♀ gametophyte], 3 April 2016 Deep B, Stepping Stones off Anvers Island, Antarctica, 64.784317°S, 63.991817°W, depth 17 m; *MOA*, 3 April 2016 Shallow B, Stepping Stones off Anvers Island, Antarctica, 64.784317°S, 63.991817°W, depth 11 m; *MOA*, 3 April 2016 Deep A, Stepping Stones off Anvers Island, Antarctica, 64.784317°S, 63.991817°W, depth 17 m; *MOA*, Deep C, Stepping Stones off Anvers Island, Antarctica, 64.784317°S, 63.991817°W, depth 17 m; *CDA* [♀ gametophyte], 19 March 2026, #11, Kay, islote, Antarctica, 64.125070°S, 60.929971°W, depth 6–30 m; *CDA* [tetrasporophyte], 9 March 2026 #7, Thiébault Island, Antarctica, 65.180425 °S, 64.156861°W, depth 6–37 m; *CDA* [tetrasporophyte], 9 March 2026 #2, Thiébault Island, Antarctica, 65.180425 °S, 64.156861°W, depth 6–37 m; *CDA* [tetrasporophyte], 9 March 2026 #3, Thiébault Island, Antarctica, 65.180425°S, 64.156861°W, depth 6–37 m; *MOA,* 26 March 2016, Shallow A, B, and C, East Arthur Harbor, Anvers Island, Antarctica, 64.772667°S, 64.050050°W, depth 8 m; *MOA,* 26 March 2016 [tetrasporophytes], East Arthur Harbor, Anvers Island, Antarctica, 64.772667°S, 64.050050°W, depth 14 m; *CDA*, 20 January 2023 #16 and #18, Stepping Stones off Anvers Island, Antarctica, 64.786783°S, 63.990783°W, depth 7–14 m; *CDA* [tetrasporophyte], 23 January 2023 #25, NE side of Hermit Island, 64.796683°S, 64.006700°W, depth 9–14 m.

Registration: http://phycobank.org/107677

Diagnosis: In our chemical ecology studies around Anvers Island, *P. varichemicum* is chemically diverse, being represented by the relatively common chemogroups A, C, D, E, F, H, and M and by the relatively uncommon chemogroups B, G, J, K, and O (Shilling & al. 2021, Heiser & al. 2023a,b).

Etymology: From *varius, -a, -um* (New Latin, adjective), varying, and *chemicus, -a, -um* (New Latin, adjective), chemical, meaning with varying chemicals. The epithet recognises the rich abundance of halogenated monoterpenes found in 12 distinct chemogroups of *Plocamium* (Shilling & al. 2021) and is in recognition of the chemical ecology studies (cf. Amsler & al. 2005, 2014, 2020, Heiser & al. 2022) that led to our discovery of this pattern of crypsis.

Distribution: Known from sequencing data on the WAP between King George Island (62.18˚S, 58.92˚W) and Horseshoe Island (67.83˚S, 67.28˚W) (Dubrasquet & al. 2018, Shilling & al. 2021, authors' unpub. data). Since its distribution on the WAP is so much broader than that of *P. moei* at present we presume, but do not know, that other records of *Plocamium* from around the continent of Antarctica (Wiencke & al. 2014, Heiser & al. 2020) represent *P. varichemicum*.

As previously noted, Dubrasquet & al. (2018) reported that specimens from the WAP matching the morphology of *Plocamium hookeri, P. secundatum,* and *P. cartilagineum* had identical *cox*1 and *rbc*L sequences. These sequences place the specimens in *P. varichemicum*. *Plocamium hookeri* and *P. secundatum* are both currently accepted species taxonomically in Southern Hemisphere regions north of Antarctica with type localities in Kerguelen and Tierra del Fuego, respectively (Guiry & Guiry 2026). Unfortunately, no genetic sequence data are available for either morphospecies aside from the WAP data provided by Dubrasquet & al. (2018). We have published chemical and genetic analyses of over 1400 *Plocamium* thalli from the WAP (Young & al. 2013, Shilling & al. 2021, Heiser & al. 2023a, 2025) and have examined many hundreds more, and none of our collections match the morphology of either *P. hookeri* or *P. secundatum*. *Plocamium hookeri* has large, very broad, leaf-like lower branches (Hooker & Harvey 1845, Harvey 1849, Ricker 1987) that Hooker & Harvey (1845: 257) noted distinguish it from other congeneric species. The upper parts of *P. secundatum* axes have series of up to six pectinate ramuli usually without lower, unbranched ramuli, and have compound tetrasporangial stichidia (Kützing 1866, Ricker 1987: 207) unlike any we have observed in Antarctica. While we cannot rule out that *P. hookeri* or *P. secundatum* or both occur somewhere in Antarctica, we can be confident that our material does not represent either of these morphospecies.

Our previous studies have concentrated on the common chemogroup L in *Plocamium moei* and common chemogroups A, D, F, H, and M in *P. varichemicum*, most at sites within 4 km and all within 17 km of the United States research base Palmer Station on southwestern Anvers Island. Based on *cox*1 sequencing, *P. moei* (represented by haplotype 1 in Shilling & al. 2021), was ~2% distinct from *P. varichemicum* which alone was not strong enough evidence for the presence of two species. Divergence within the haplotypes of *P. varichemicum* (represented by haplotypes 2–6 in Shilling & al. 2021), was 0.2–0.5% (Shilling & al. 2021), roughly equivalent to intraspecific diversity in other *Plocamium* spp. (Cremades & al. 2011, Montecinos & al. 2021). However, our analyses of microsatellite genotypes uncovered extraordinarily high genetic differentiation between the co-occurring chemogroup L in *P. moei* and all other chemogroups found in *P. varichemicum* (Heiser & al. 2025). Chemogroup L was anywhere from 78–81% genetically distinct from the other five chemogroups (as measured by F_{ST}). By contrast, divergence between sites when controlling for chemogroup was much lower: roughly 3% between sites with chemogroup L thalli and 0.8–14.4% between sites with chemogroups A, D, F, H, and M. Limited gene flow based on both *cox*1 sequencing and microsatellite genotyping strongly suggests incipient speciation between at least two cryptic *Plocamium* spp. (Heiser & al. 2025). Rates of divergence used to delimit other macroalgal species are comparable to our observations on these *Plocamium* spp. (cf. Saunders 2005, see also McCoy & al. 2020).

When most of our field sampling was conducted in our 2017 and 2018 field seasons in the southern Anvers Island area (Heiser & al. 2023a,b), most *Plocamium* specimens were vegetative at the time of sampling (primarily April through June), rendering it impossible to distinguish morphologically gametophytes from tetrasporophytes. However, due to differences in ploidy, we used our microsatellite genotypes to assign haploid (gametophyte) or diploid (tetrasporophyte) to >850 thalli and found that the populations were dominated by tetrasporophytes (Heiser & al. 2023a). In our 2017 and 2018 samples, over half of the chemogroup L tetrasporophytes were reproductive at the time of sampling compared to less than 5% of those in the *P. varichemicum* chemogroups (Heiser & al. 2023a). Subsequent observations by CDA in January 2023 while at Palmer Station found that almost all specimens from multiple sites, which should have included all the common chemogroups, were reproductive tetrasporophytes. This suggests that our earlier sampling was simply too late in the season to observe reproduction in most chemogroups, but importantly, that the reproductive period of *P. moei* is partially offset from *P. varichemicum*.

Although the two Antarctic Peninsula *Plocamium* species can be distinguished genetically and chemically (if they are in one of the known chemogroups; we cannot know if additional chemogroups are present in other parts of the WAP), unfortunately there are no unique morphological features that can be used to definitively identify the two species. The morphology of tetrasporangial stichidia is a characteristic that has sometimes enabled differentiation between otherwise indistinguishable *Plocamium* spp. (Saunders & Lehmkuhl 2005, Cremades & al. 2011). There are statistically significant differences between the distributions of stichidial morphologies found in *P. moei* and *P. varichemicum*, but their ranges overlap (Heiser & al. 2025). Simple stichidia (Figs 5, 9) are frequently much more common in *P. varichemicum* than more complex (particularly triple, or irregular; Figs 5, 10) stichidia. If an individual thallus has a predominance of simple stichidia, it is likely *P. varichemicum* since simple stichidia are relatively rare in *P. moei* (Heiser & al. 2025). However, some *P. varichemicum* can also have a predominance of more complex stichidia, particularly in some chemogroups (Heiser & al. 2025), thus a lack of simple stichidia is not necessarily diagnostic of *P. moei* (Heiser & al. 2025, unpub. obs.). In our relatively few collections of *P. varichemicum* outside the southern Anvers Island area, complex stichidia can be more common than they are in southern Anvers Island area collections (unpubl. obs.), which may indicate that different chemogroups predominate. Vegetatively, curvature of the unbranched, lowest ramulus in branch series of upper portions of thalli has been used previously to help distinguish otherwise morphologically similar *Plocamium* spp. (Yano & al. 2006). In both *P. moei* and *P. varichemicum* these ramuli are commonly linear but range from slightly recurving to slightly adaxially curving (Figs 3, 7). Slightly recurving ramuli appear to be somewhat more common in *P. varichemicum* while slightly adaxially curving ramuli appear to be somewhat more common in *P. moei* but the full range of morphologies can be found in both species.

The two species do differ in geographic range along the WAP, and thalli collected from much to the north or south of the southern Anvers Island area (64.78˚S–64.90˚S) are more likely to be *Plocamium varichemicum.* In the vicinity of southern Anvers Island, *P. moei* is common at many sites but rare or absent at others (Heiser & al. 2023b). At the two sites from which we have collected *Plocamium* thalli further north on the peninsula, one of four individual thalli in the Melchior Islands (64.34˚S) and only one of 11 individual thalli at Kay, islote (64.13˚S) were *P. moei* (unpubl. obs.). At sites we have sampled to the south of the Anvers Island area, four of 26 individual *Plocamium* thalli were *P. moei* at Pléneau Island (65.10˚S) but *P. moei* was not among eight thalli sampled just north of there in the Lemaire Channel (65.08˚S–65.10˚S), or among any of 51 sampled at eight sites not far to the south of there between Duseberg Buttress (65.17˚S) and the Argentine Islands (65.26˚S; unpubl. obs.). We also found only *P. varichemicum* in the Berthelot Islands (65.33˚S), in the Lahille Island/Lippmann Island area (65.51˚S), in the Markham Island area (65.94˚S), and in the Southern Saffery Islands (66.09˚S; unpubl. obs.). Dubrasquet & al. (2018) found only *P. variachemum* at all of their sampling sites that ranged from 62.18˚S–67.83˚S including one site (Paradise Bay) that is northeast of our collection sites near southern Anvers Island but south of where we have collected two representatives of *P. moei*. None of their other collection sites were in the range where we have collected either *Plocamium* species.

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Amsler, C.D., Rowley, R.J., Laur, D.R., Quetin, L.B. & Ross, R.M. (1995). Vertical distribution of Antarctic Peninsular macroalgae: cover, biomass, and species composition. *Phycologia* 34: 424–430.

Amsler, C.D., Iken, K., McClintock, J.B., Amsler, M.O., Peters, K.J., Hubbard, J.M., Furrow, F.B. & Baker, B.J. (2005). Comprehensive evaluation of the palatability and chemical defenses of subtidal macroalgae from the Antarctic Peninsula. *Marine Ecology Progress Series* 294: 141–159.

Amsler, C.D., McClintock, J.B. & Baker, B.J. (2014). Chemical mediation of mutualistic interactions between macroalgae and mesograzers structure unique coastal communities along the western Antarctic Peninsula. *Journal of Phycology* 50: 1–10.

Amsler, C.D., McClintock, J.B. & Baker, B.J. (2020). Chemical mediation of Antarctic macroalga-grazer interactions. In: *Antarctic Seaweeds: Diversity, Adaptation and Ecosystem Services.* Gómez, I. & Huovinen, P. (Eds.). Cham Switzerland, Springer International Publishing. pp. 339–363.

Amsler, C.D., Amsler, M.O., Heiser, S., McClintock, J.B., Iken, K., Galloway, A.W.E. & Klein, A.G. (2024). Vertical distribution of brown and red macroalgae along the central Western Antarctic Peninsula. *Botanica Marina* 67: 1–10.

Chung, H., Oh, Y.S., Lee, I.K. & Kim, D.-Y. (1994). Macroalgal vegetation of Maxwell Bay in King George Island, Antarctica. *Korean Journal of Phycology* 9: 47–58.

Cooper, M.W. (2017) *A Taxonomic Investigation into the Red Alga Plocamium within New Zealand.* M.S. Thesis, Victoria University of Wellington. pp. 78.

Cremades, J., Barreiro, R., Maneiro, I. & Saunders, G.W. (2011). A new taxonomic interpretation of the type of *Plocamium cartilagineum* (Plocamiales, Florideophyceae) and its consequences. *European Journal of Phycology* 46: 125–142.

DeLaca, T.E. & Lipps, J.H. (1976). Shallow water marine associations, Antarctic Peninsula. *Antarctic Journal of the United States* 11: 12–20.

Dubrasquet, H., Reyes, J., Sanchez, R.P., Valdivia, N. & Guillemin, M.-L. (2018). Molecular-assisted revision of red macroalgal diversity and distribution along the Western Antarctic Peninsula and South Shetland Islands. *Cryptogamie, Algologie* 39: 409–429.

Guiry, M.D. & Guiry, G.M. (2026). *AlgaeBase. World-wide electronic publication*. National University of Ireland, Galway. http://www.algaebase.org; searched on 12 August 2026.

Harvey, W.H. (1849). *Nereis Australis, or Algae of the Southern Ocean: being figures and descriptions of marine plants, collected on the shores of the Cape of Good Hope, the extra-tropical Australian colonies, Tasmania, New Zealand, and the Antarctic regions; deposited in the Herbarium of the Dublin University*. pp. 345. London, Reeve Brothers.

Heiser, S., Amsler, C.D., McClintock, J.B., Shilling, A.J. & Baker, B.J. (2020). Every rule has an exception: a cheater in the community-wide mutualism in Antarctic seaweed forests. *Integrative and Comparative Biology* 60: 1358–1368.

Heiser, S., Amsler, C.D., Brothers, C.J., Amsler, M.O., Shilling, A.J., Bozarth, L., Davis, C.B., McClintock, J.B. & Baker, B.J. (2022). Who cares more about chemical defenses - the macroalgal producer or its main grazer? *Journal of Chemical Ecology* 48: 416–430.

Heiser, S., Amsler, C.D., Stoeckel, S., McClintock, J.B., Baker, B.J. & Krueger-Hadfield, S.A. (2023a). Tetrasporophytic bias coupled with heterozygote deficiency in Antarctic *Plocamium* sp. *Journal of Phycology* 59: 681–697.

Heiser, S., Shilling, A.J., Amsler, C.D., McClintock, J.B. & Baker, B.J. (2023b). To change or not to change: drivers of defensive secondary metabolite distribution in the red macroalga *Plocamium* sp. *Marine Biology* 170: 31.

Heiser, S., Amsler, C.D., Shilling, A.J., Higginbotham, H.M., Amsler, M.O., Stoeckel, S., McClintock, J.B., Baker, B.J. & Krueger-Hadfield, S.A. (2025). Linking phenotypic variation to patterns of genetic isolation along a speciation continuum. *Journal of Phycology* 61: 3–19.

Hommersand, M.H., Moe, R.L., Amsler, C.D. & Fredericq, S. (2009). Notes on the systematics and biogeographical relationships of Antarctic and Sub-Antarctic Rhodophyta with descriptions of four new genera and five new species. *Botanica Marina* 52: 509–534.

Hooker, J.D. & Harvey, W.H. (1845). Algae antarcticae, being characters and descriptions of the hitherto unpublished species of algae, discovered in Lord Auckland's Group, Campbell's Island, Kerguelen's Land, Falkland Islands, Cape Horn and other southern circumpolar regions, during the voyage of H.M. discovery ships "Erebus" and "Terror". *London Journal of Botany* 4: 249−276, 293−298.

Klöser, H., Quartino, M.L. & Wiencke, C. (1996). Distribution of macroalgae and macroalgal communities in gradients of physical conditions in Potter Cove, King George Island, Antarctica. *Hydrobiologia* 333: 1–17.

Kützing, F.T. (1866). *Tabulae phycologicae; oder, Abbildungen der Tange*. Vol. XVI pp. i−iii, 1−35, 100 pls. Nordhausen, Gedruckt auf kosten des Verfassers (in commission bei W. Köhne).

McCoy, S.J., Krueger-Hadfield, S.A. & Mieszkowska, N. (2020). Evolutionary phycology: Toward a macroalgal species conceptual framework. *Journal of Phycology* 56: 1404–1413.

Montecinos, A.E., Huanel, O.R., Ramírez, M.E. & Guillemin, M.-L. (2021). Molecular data reveal the presence of three *Plocamium* Lamouroux species with complex patterns of distribution in southern Chile. *Cryptogamie, Algologie* 42: 1–19.

Neushul, M. (1965). Diving observation of sub-tidal Antarctic marine vegetation. *Botanica Marina* 8: 234–243.

Quartino, M.L. & Boraso de Zaixso, A.L. (2008). Summer macroalgal biomass in Potter Cove, South Shetland Islands, Antarctica: its production and flux to the ecosystem. *Polar Biology* 31: 281–294.

Reddy, M.M., du Plessis, J., Roodt-Wilding, R., Anderson, R.J. & Bolton, J.J. (2023). The reinstatement of *Plocamium robertiae* (Rhodophyta, Plocamiales) and an updated species inventory of the genus in South Africa. *Phycologia* 62: 194–202.

Ricker, R.W. (1987). *Taxonomy and Biogeography of Macquarie Island Seaweeds*. pp. 344. London, British Muesum (Natural History).

Saunders, G.W. (2005). Applying DNA barcoding to red macroalgae: a preliminary appraisal holds promise for future applications. *Philosophical Transactions of the Royal Society B: Biological Sciences* 360: 1879–1888.

Saunders, G.W. & Lehmkuhl, K.V. (2005). Molecular divergence and morphological diversity among four cryptic species of *Plocamium* (Plocamiales, Florideophyceae) in northern Europe. *European Journal of Phycology* 40: 293–312.

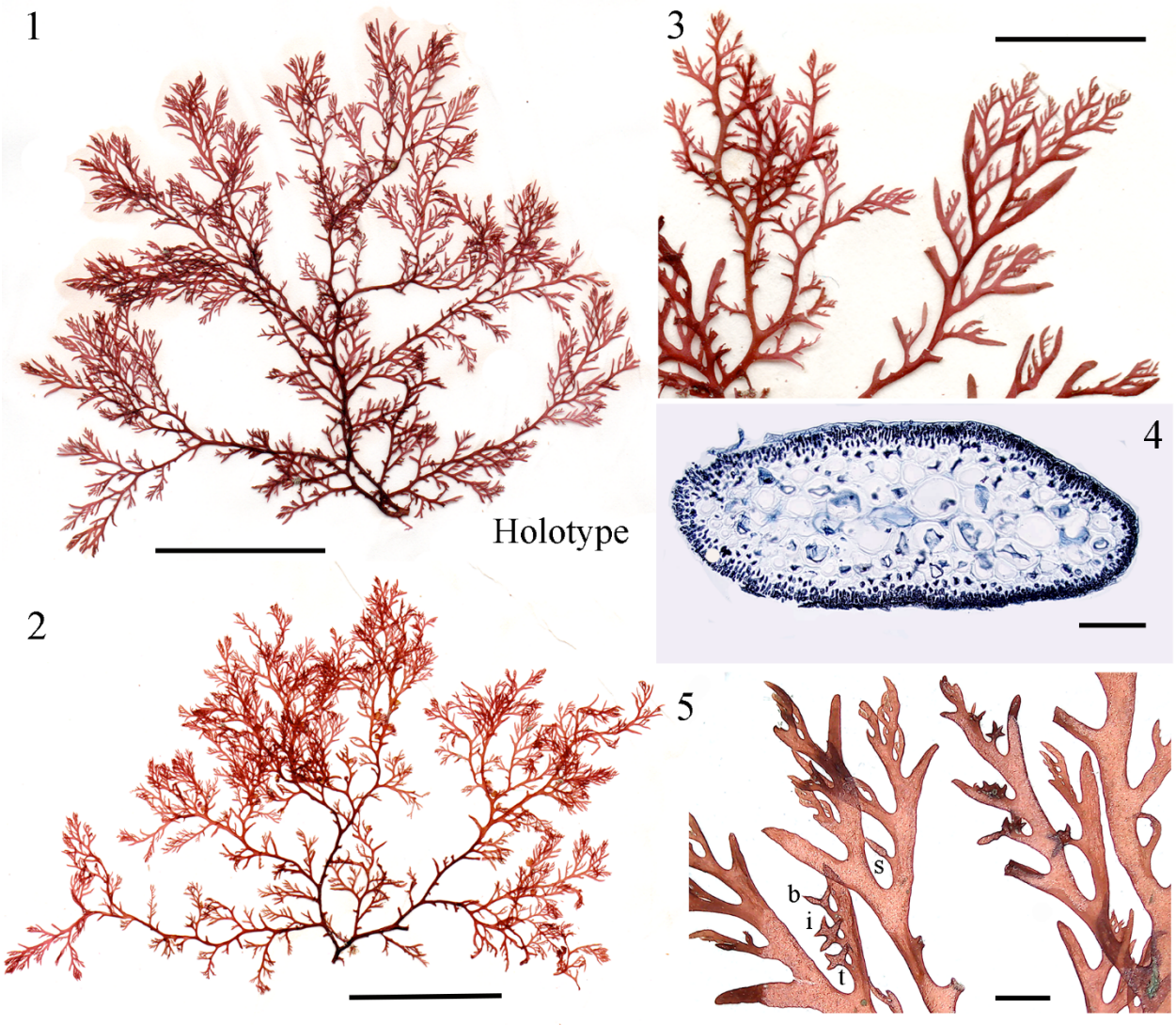
Shilling, A.J., Heiser, S., Amsler, C.D., McClintock, J.B. & Baker, B.J. (2021). Hidden diversity in an Antarctic algal forest: Metabolomic profiling linked to patterns of genetic diversification in the Antarctic red alga *Plocamium* sp. *Marine Drugs* 19: 607.

Wiencke, C., Amsler, C.D. & Clayton, M.N. (2014). Macroalgae. In: *Biogeographic Atlas of the Southern Ocean.* De Broyer, C., Koubbi, P., Griffiths, H. J., Raymond, B., d'Udekem d'Acoz, C., Van de Putte, A. P., Danis, B., David, B., Grant, S., Gutt, J., Held, C., Hosie, G., Huettmann, F., Post, A. & Ropert-Coudert, Y. (Eds.). Cambridge, UK, Scientific Committee on Antarctic Research. pp. 66–73.

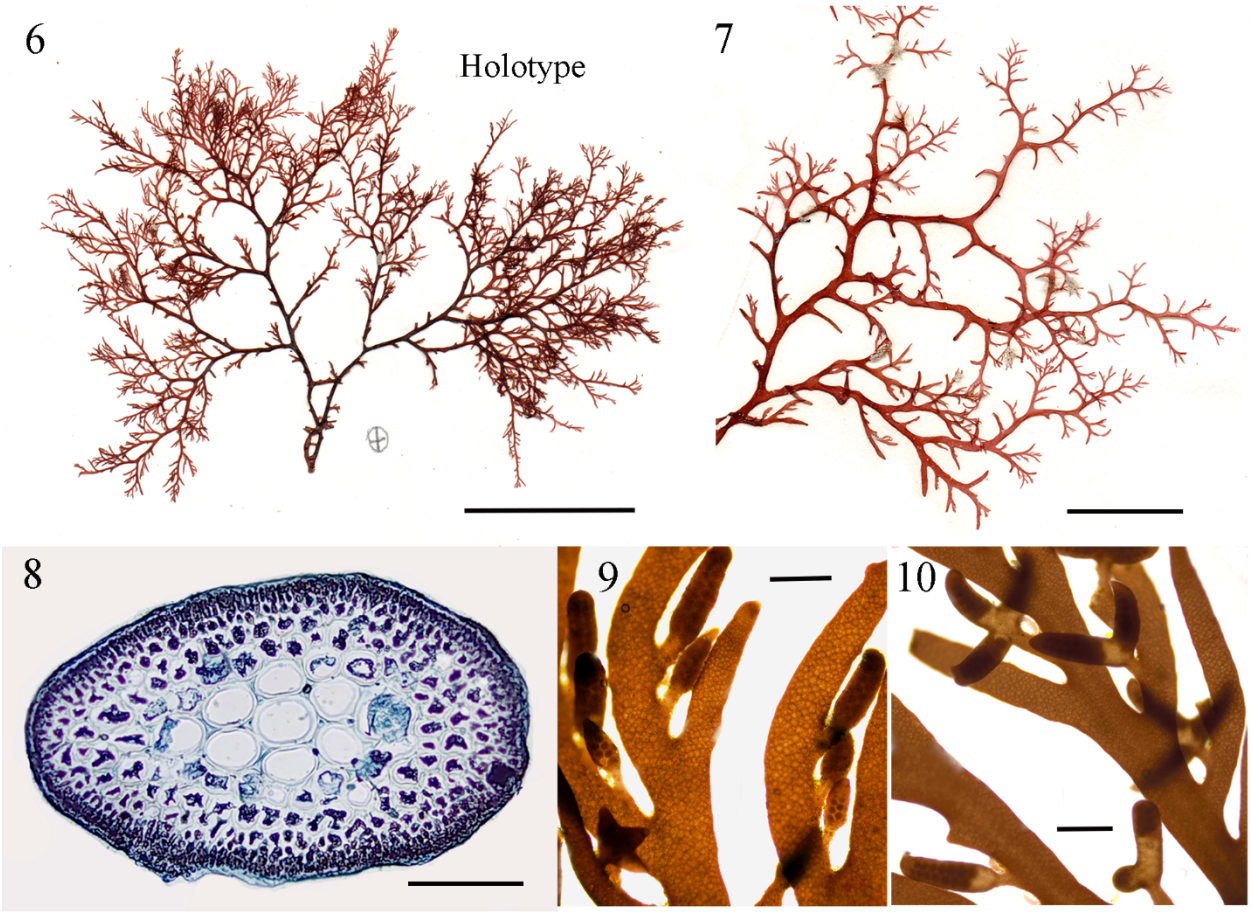
Yano, T., Kamiya, M., Arai, S. & Kawai, H. (2004). Morphological homoplasy in Japanese *Plocamium* species (Plocamiales, Rhodophyta) inferred from the Rubisco spacer sequence and intracellular acidity. *Phycologia* 43: 383–393.

Yano, T., Kamiya, M., Murakami, A., Sasaki, H. & Kawai, H. (2006). Biochemical phenotypes corresponding to molecular phylogeny of the red algae *Plocamium* (Plocamiales, Rhodophyta): Implications of incongruence with the conventional taxonomy. *Journal of Phycology* 42: 155–169.

Young, R.M., von Salm, J.L., Amsler, M.O., Lopez-Bautista, J., Amsler, C.D., McClintock, J.B. & Baker, B.J. (2013). Site-specific variability in the chemical diversity of the Antarctic red alga *Plocamium cartilagineum*. *Marine Drugs* 11: 2126–2139.



Figs 1-5. ***Plocamium moei sp. nov.*** **Fig. 1.** Holotype, ⊕, Hermit Island off Anvers Island, 3 March 2016 Shallow C, [**UC** 2126531]. Scale bar = 3 cm. **Fig. 2.** Isotype, cystocarpic, *loc. cit*., Deep B. Scale bar = 3 cm. **Fig. 3.** Branching detail with linear to slightly adaxially curved unbranched ramuli, Laggard Island off Anvers Island, 2 April 2016 Deep C. Scale bar = 1 cm. **Fig. 4.** Cross section of secondary branch, Hermit Island off Anvers Island, 23 January 2023 #26, Scale bar = 25 µm. **Fig. 5.** Holotype, tetrasporangial stichidia, s = single, b = bifurcated, t = triple, i = irregular, Scale bar = 1 mm.



Figs 6-10. ***Plocamium varichemicum sp. nov.*** **Fig. 6.** Holotype, ⊕, Stepping Stones off Anvers Island, 3 April 2016 Shallow C, [**UC** 2126532]. Scale bar = 3 cm. **Fig. 7.** Branching detail with linear to recurved unbranched ramuli, East Arthur Harbor, Anvers Island, 29 March 2016 Shallow A Scale bar = 1 cm. **Fig 8.** Cross section of secondary branch, Stepping Stones off Anvers Island, 20 January 2023 #18, Scale bar = 25 µm. **Fig. 9.** Tetrasporangial stichidia, simple with one small irregular, Hermit Island off Anvers Island, 23 January 2023 #16, Scale bar = 500 µm. **Fig. 10.** Tetrasporangial stichidia, single, bifurcated, and triple, Stepping Stones off Anvers Island, 20 January 2023 #25, Scale bar = 500 µm.