

Supplementary material for:

Deep-living and diverse Antarctic seaweeds as potentially significant contributors to global carbon fixation

^{*1,2} Leigh W. Tait, ³Caroline Chin, ^{4,5}Wendy Nelson, ¹Steve George, ³Peter Marriott, ³Richard L. O'Driscoll, ⁶Miles Lamare, ³Victoria S. Mills, ³Vonda J. Cummings

*Corresponding author (leigh.tait@niwa.co.nz)

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Supplementary Material

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Supplementary Figure 1. Selection of herbarium press specimens on A3 paper collected across Northern Victoria Land sites in the Ross Sea, Antarctica. A) branching red alga collected from Possession Islands, B) various fragments of red algae collected from Possession Islands, C) red bladed algae collected from Possession Islands, D) branching brown alga (*Desmarestia* sp) collected from Possession Islands, E) *Himantothallus grandifolius* collected from Possession Islands, F) excised blade of *Himantothallus grandifolius* collected from Cape Adare, G) thin bladed red algae and green alga collected from Possession Islands, H) green lobed alga collected from Cape Adare, I) fleshy 'green' alga collected from Cape Adare, and J) branching brown alga (*Desmarestia* sp) and red alga collected from Cape Adare.

Supplementary tables.

Supplementary Table 1. Macroalgal sample records and herbarium specimens collected from Robertson Bay.

ANT #	Unique sample no.	Station no.	Species	Sheet no.	DNA subsample	Preservation	Comments
ANT175	RB_Algae_1	212	kelp	1	1	Sheet	<i>Himantothallus</i> fragment on sheet 1 -
ANT176	RB_Algae_2	212	red	1	1	Sheet	<i>Phycodrys</i>
ANT177	RB_Algae_3	212	kelp brown	2	1	Sheet	<i>Himantothallus</i>
ANT178	RB_Algae_4	212	branching	3	1	Sheet	<i>Desmarestia</i>

Supplementary Table 2. Macroalgal sample records and herbarium specimens collected from Cape Adare.

ANT#	Unique sample no.	Station no.	Species	Sheet no.	DNA subsample	Preservation	Comments
ANT132A	CA_Algae_1a	275	kelp	1		Sheet	<i>Himantothallus</i> - blade cut in half
ANT132B	CA_Algae_1b	275	kelp brown	2	1	Sheet	<i>Himantothallus</i> - blade cut in half
ANT133	CA_Algae_2	275	branching	3	1	Sheet	<i>Desmarestia</i>
ANT134	CA_Algae_3	275	red blade fleshy	3	1	Sheet	red fragment
ANT135	CA_Algae_4	275	greens fleshy	4	1	Sheet 4	fleshy blade 4
ANT136	CA_Algae_5	275	greens	4		Sheet 4	fleshy blade 5

ANT137	CA_Algae_6	275	fleshy greens	4		Sheet 4	fleshy blade 6
ANT138	CA_Algae_7	275	fleshy greens	4		Sheet 4	fleshy blade 7
ANT139	CA_Algae_8	275	fleshy greens	4	1	Sheet 4	fleshy blade 8
ANT140	CA_Algae_9	275	fleshy greens	4	1	Sheet 4	fleshy blade 9
ANT141	CA_Algae_10	275	green fingers	5		Sheet 5	numbered as fleshy green finger 1

Supplementary Table 3. Macroalgal sample records and herbarium specimens collected from Possession Islands.

ANT#	Unique sample no.	Station no.	Species	Sheet no.	DNA subsample	Preservation	Comments
ANT157	PI_Algae_1	73	red	1	1	Sheet 1	<i>Phycodrys</i>
ANT158	PI_Algae_2	73	red	1	1	Sheet 1	<i>Phycodrys</i>
ANT159	PI_Algae_3	73	red	1	1	Sheet 1	<i>Phycodrys</i>
ANT160	PI_Algae_4	73	red	1	1	Sheet 1	<i>Phycodrys</i>
ANT161	PI_Algae_5	73	red	1	1	Sheet 1	<i>Phycodrys</i>
	PI_Algae_6	73	red blades	2		Sheet 2	reds for id - fragments
ANT162	PI_Algae_7	73	red blades	2	1	Sheet 2	reds for id - fragments
	PI_Algae_8	73	red blades	2		Sheet 2	reds for id - fragments
	PI_Algae_9	73	red blades	2		Sheet 2	reds for id - fragments
	PI_Algae_10	73	red blades	2		Sheet 2	reds for id - fragments
	PI_Algae_11	73	red blades	2		Sheet 2	reds for id - fragments
	PI_Algae_12	73	red blades	2		Sheet 2	reds for id - fragments
ANT163	PI_Algae_13	73	red fleshy	2	1	Sheet 2	reds for id - fragments
	PI_Algae_14	73	red	2		Sheet 2	reds for id - fragments
ANT164	PI_Algae_15	73	red bilobed	2	1	Sheet 2	DNA small scrape
	PI_Algae_16	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_17	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_18	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_19	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_20	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_21	73	red	2		Sheet 2	reds for id - fragments

ANT165	PI_Algae_22	73	red	2	1	Sheet 2	reds for id - fragments
	PI_Algae_23	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_24	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_25	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_26	73	red	2		Sheet 2	reds for id - fragments
ANT166	PI_Algae_27	73	red	2	1	Sheet 2	reds for id - fragments
	PI_Algae_28	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_29	73	red	2		Sheet 2	reds for id - fragments
	PI_Algae_30	73	red	2		Sheet 2	reds for id - fragments
ANT167	PI_Algae_31	73	red branching	3	1	Sheet 3	<i>Plocamium</i>
ANT168	PI_Algae_32	73	brown thin branched	4	1	Sheet 4	<i>Desmarestia</i> <i>Himantothallus</i> - on
ANT169	PI_Algae_33	73	kelp	5	1	Sheet 5	sheet with 34
ANT170	PI_Algae_34	73	kelp	5	1	Sheet 5	<i>Himantothallus</i>
ANT171	PI_Algae_35	73	red thin strappy	6	1	Sheet 6	for id - on sheet 6
ANT172	PI_Algae_36	73	red red twin	6	1	Sheet 6	for id - on sheet 6
ANT173	PI_Algae_37	73	tips	6	1	Sheet 6	for id - on sheet 6
ANT174	PI_Algae_38	73	green	6	1	Sheet 6	for id - on sheet 6
	PI_Algae_39	73	coralline algae			Silica gel	5 kg - rocks with CCA but also some fine reds and possible crusts

Supplementary Table 4. Voucher specimens deposited in the Herbarium of the Museum of New Zealand Te Papa Tongarewa (WELT – Thiers 2023).

Registered sample number(s)	Genus/ species	Credit	Locations identified	Comments
WELT A035683	<i>Monostroma hariotii</i>	Gain	Possession Island	
WELT A035670/A;	<i>Himantothallus grandifolius</i>	(A.Gepp & E.S.Gepp)	Cape Adare	
A035670/B;		Zinova	Robertson Bay	
A035673; A035667;			Possession Island	
A035675				
WELT A035676;	<i>Desmarestia menziesii</i>	J.Agardh	Cape Adare	
A035668;			Robertson Bay	
A035666			Possession Island	
WEKT A035679;	<i>Ballia</i> sp.		Possession Island	
A035663; A035664				
WELT A035671;	<i>Iridaea</i> sp.		Cape Adare	
A035672			Possession Island	
WELT A035677;	<i>Palmaria</i> sp.		Cape Adare	
A035684; A035680			Possession Island	
WELT A035674;	<i>Phycodrys antarctica</i>	(Skottsb.) Skottsb.	Cape Adare	
A035678			Robertson Bay	
			Possession Island	
WELT A035669;	<i>Plocamium</i> sp.		Possession Island	
A035665				
WELT A035682	<i>Rhodymenia</i> ?		Possession Island	
WELT A035681	unknown red 1		Possession Island	‘unknown’ are either too fragmentary or not able to be identified without sequence data
Pending	crustose coralline algae		Possession Island	‘unknown’ are either too fragmentary or not able to be identified without sequence data

Pending	Unknown red 2	Possession Island	'unknown' are either too fragmentary or not able to be identified without sequence data
Pending	Unknown red 3	Possession Island	'unknown' are either too fragmentary or not able to be identified without sequence data
Pending	Unknown red 4	Possession Island	'unknown' are either too fragmentary or not able to be identified without sequence data
Pending	Unknown red 5	Possession Island	'unknown' are either too fragmentary or not able to be identified without sequence data
