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Shedding new light on old algae: Matching names and sequences in the brown algal genus *Lobophora* (Dictyotales, Phaeophyceae)

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Table S1. Primers used for the amplification of short DNA-fragments.

				Initial denaturing step		Denaturation		Annealing		Elongation		Final elongation step	
Primer name	Direction	Sequence(5′→3′)	Reference	T°C	Time (min)	T°C	Time (min)	T°C	Time (min)	T°C	Time (min)	T°C	Time (min)
cox3_44F	F	CATCGCCACCCATTTCAT	Silberfeld & al. 2010	94	3	94	1	46	1	72	2	72	10
cox3_739R	R	CATCGACAAAATGCCAATACCA	Silberfeld & al. 2010	94	3	94	1	46	1	72	2	72	10
cox3_LPF1	F	TCGTGAAGCAGCATTTGAAG	This study	94	3	94	1	55.3	1	72	2	72	10
cox3_LPR1	R	AATACCAACAGGAGGCCAaA	This study	94	3	94	1	55.3	1	72	2	72	10
cox3_LPF2	F	TGTTATGGCTACGTGGTGGA	This study	94	3	94	1	57.3	1	72	2	72	10
cox3_LPR2	R	GGCCAGACACCCCCTATATT	This study	94	3	94	1	59.4	1	72	2	72	10
rbcL_68F	F	TGCCWAAATGGGRWAYTGGGATGC	Draisma & al. 2001	94	3	94	0:45	52	0:45	0:45	1	72	6
rbcL_708R	R	TTAAGNTAWGAACCYTTAACTTC	Bittner & al. 2008	94	3	94	0:45	52	0:45	0:45	1	72	6
rbcL_543F	F	CCWAAATTAGGTCTTTCWGGWAAAAA	Bittner & al. 2008	94	3	94	0:45	52	0:45	0:45	1	72	6
rbcL_1391R	R	TCNAANGTAATATCTTTCCATA	Bittner & al. 2008	94	3	94	0:45	52	0:45	0:45	1	72	6
rbcL_LPF1	F	AAGGTGTAAACCGTGCTGCT	This study	94	3	94	0:45	57.3	0:45	0:45	1	72	6
rbcL_LPR1	R	GAGCCCAAATTGCCATAGTT	This study	94	3	94	0:45	55.3	0:45	0:45	1	72	6
rbcL_LPF2	F	TTCCAAGGTCCAGCTACAGG	This study	94	3	94	0:45	59.4	0:45	0:45	1	72	6
rbcL_LPR2	R	ACGCATGAAAGGCTGTGAAT	This study	94	3	94	0:45	55.3	0:45	0:45	1	72	6
rbcL_LPF3	F	GGCCAAATGCATCAACTTTT	This study	94	3	94	0:45	53.2	0:45	0:45	1	72	6
rbcL_LPR3	R	TAGCAGCCGCAGTACGTAAA	This study	94	3	94	0:45	57.3	0:45	0:45	1	72	6
rbcL_F4	F	GCGTTGGAAAGAACGTTACC	This study	94	3	94	0:45	59	0:45	0:45	1	72	6
rbcL_R4	R	CCATCGTTTGGATTGCACTA	This study	94	3	94	0:45	59	0:45	0:45	1	72	6
psbA_F	F	ATGACTGCTACTTTAGAAAGACG	Yoon & al. 2002	94	3	94	1	46	1	72	2	72	10
psbA_R	R	GCTAAATCTARWGGGAAGTTGTG	Yoon & al. 2002	94	3	94	1	46	1	72	2	72	10
psbA_LPF1	F	TTGTAGCGTTTTCTGCTCCA	This study	94	3	94	1	55.3	1	72	2	72	10
psbA_LPR1	R	CACCAAATACACCAGCCACA	This study	94	3	94	1	57.3	1	72	2	72	10
psbA_LPF2	F	TCGTAGCATTCTCTGCTCCA	This study	94	3	94	1	57.3	1	72	2	72	10
psbA_LPR2	R	ATGAACCACCAAACACACCA	This study	94	3	94	1	55.3	1	72	2	72	10

The *cox*3 and *psb*A genes were amplified as a single PCR product using the primer pairs, *cox*3-44F/*cox*3-739R and *psb*A-F/*psb*A-R respectively. The *rbc*L gene was amplified and sequenced as two overlapping fragments with the following primer pairs: *rbc*L-68F/*rbc*L-708R and *rbc*L-543F/*rbc*L-1391R.

Table S2. Blast-search results for the short DNA fragments from *Lobophora* type specimens.

Pocockiella papenfussii W.R.Taylor (Herbarium number: MICH WRT46-232) BLAST results for *cox3*

#	Seq name	Score (bits)	E value	Identities	Identities (%)
1	*Lobophora densa* IRD7885 KM487799	250	1E-68	172/175	98
2	*Lobophora densa* IRD4882 KM487801	248	1E-67	171/175	98
3	*Lobophora densa* IRD4605 KM487800	248	1E-67	171/175	98
4	*Lobophora densa* IRD4677 KU353188	248	1E-67	171/175	98
5	*Lobophora* sp23 GLO180 KU353185	248	1E-67	171/175	98
6	*Lobophora densa* JN040 KU353187	243	2E-66	170/175	97
7	*Lobophora* sp23 GLO308 KU353186	243	2E-66	170/175	97
8	*Lobophora gibbera* CV3257 KM487798	228	6E-62	166/175	95
9	*Lobophora gibbera* CV3253 KM487797	228	6E-62	166/175	95
10	*Lobophora gibbera* EUR262 KU353164	228	6E-62	165/175	94

Dictyota variegata J.V.Lamour. (Herbarium number: CN C7F100) BLAST results for *psbA*

#	Seq name	Score (bits)	E value	Identities	Identities (%)
1	*Lobophora* sp75 LAF6914 KU364270	216	1E-58	144/144	100
2	*Lobophora* sp75 LAF06912 KU364269	216	1E-58	144/144	100
3	*Lobophora* sp75 MW11793 KU352856	216	1E-58	144/144	100
4	*Lobophora* sp75 MW11719 KU352855	216	1E-58	144/144	100
5	*Lobophora* sp59 IRD11157 IRD11157	204	5E-55	141/144	98
6	*Lobophora* sp56 HEC16632 KX581363	204	5E-55	141/144	98
7	*Lobophora* sp17 IRD11050 KU352874	201	4E-54	141/144	98
8	*Lobophora* sp17 IRD11051 KU352873	201	4E-54	141/144	98
9	*Lobophora* sp5 PHV241 KM488085	200	1E-53	139/144	98
10	*Lobophora asiatica* CV3068 KM488073	201	4E-54	140/144	97

Zonaria obscura Dickie (Herbarium number: BM 563329) BLAST results for *rbcL*

#	Seq name	Score (bits)	E value	Identities	Identities (%)
1	*Lobophora crassa*8 IRD8919 KU353017	360	2E-101	243/244	100
2	*Lobophora crassa*8 IRD7992 KU353016	360	2E-101	243/244	100
3	*Lobophora crassa*5 CV3092 KM488144	360	2E-101	243/244	100
4	*Lobophora crassa*5 CV3089 KM488143	360	2E-101	243/244	100
5	*Lobophora crassa*5 IRD10188 KM488142	360	2E-101	243/244	100
6	*Lobophora crassa*8 IRD8921 KU353020	357	1E-100	242/244	99
7	*Lobophora crassa*7 NVT093 KU353019	357	1E-100	242/244	99
8	*Lobophora crassa*5 SAP109518 AB665262	357	1E-100	242/244	99
9	*Lobophora crassa*8 IRD8157 KU353018	357	1E-100	242/244	99
10	*Lobophora crassa*3 IRD10237 KU353008	357	1E-100	242/244	99

Zonaria isselii Picc. & Grunow (Herbarium number: W 19388) BLAST results for *rbcL*

#	Seq name	Score (bits)	E value	Identities	Identities (%)
1	*Lobophora abscondita* PAP513 KU353031	525	6E-151	369/380	97
2	*Lobophora abscondita* PAP509 KU353030	525	6E-151	369/380	97
3	*Lobophora abscondita* IRD10198 KM488130	522	5E-150	368/380	97
4	*Lobophora abscondita* CV3096 KM488131	522	5E-150	368/380	97
5	*Lobophora abscondita* IRD10198 KM488130	522	5E-150	368/380	97
6	*Lobophora abscondita* IRD7919 KM488129	522	5E-150	368/380	97

Table S2. Continued.

L. isselii (*continued*)					
7	*Lobophora abscondita* CV3097 KM488132	522	5E-150	368/380	97
8	*Lobophora* sp83 GLO051 KU353029	522	5E-150	368/380	97
9	*Lobophora* sp52 d1733 AB665263	515	9E-148	366/380	96
10	*Lobophora* sp22 LAF06623 KU364173	500	3E-143	362/380	95

Lobophora nigrescens J.Agardh (Herbarium number: LD 48307) BLAST results for *psbA*

#	Seq name	Score (bits)	E value	Identities	Identities (%)
1	*Lobophora australis* SAL36 DQ866944	166	2E-43	110/110	100
2	*Lobophora australis* HV2431 KU352864	166	2E-43	110/110	100
3	*Lobophora australis* HV2476 KU352863	166	2E-43	110/110	100
4	*Lobophora crassa*8 IRD8918 KU352954	154	6E-40	107/110	97
5	*Lobophora crassa*8 IRD8921 KU352953	154	6E-40	107/110	97
6	*Lobophora crassa*7 NVT093 KU352951	154	6E-40	107/110	97
7	*Lobophora crassa*3 IRD10237 KU352950	154	6E-40	107/110	97
8	*Lobophora crassa*3 IRD10233 KU352949	154	6E-40	107/110	97
9	*Lobophora crassa*3 PAP662 KU352948	154	6E-40	107/110	97
10	*Lobophora crassa*3 PAP185 KU352947	154	6E-40	107/110	97

Lobophora nigrescens J.Agardh (Herbarium number: LD 48307) BLAST results for *cox3*

#	Seq name	Score (bits)	E value	Identities	Identities (%)
1	*Lobophora australis* HV03610 KU353374	187	2E-49	129/132	98
2	*Lobophora australis* SAP109517 AB665369	169	4E-44	124/132	94
3	*Lobophora australis* LT0286 KU353378	169	4E-44	124/132	94
4	*Lobophora australis* HV2431 KU353377	169	4E-44	124/132	94
5	*Lobophora australis* HV2476 KU353376	164	8E-43	123/132	93
6	*Lobophora australis* HV2438 KU353375	164	8E-43	123/132	93
7	*Lobophora nigrescens* JFC0286 KU353370	161	6E-42	122/132	92
8	*Lobophora nigrescens* LT0348 KU353367	161	6E-42	122/132	92
9	*Lobophora nigrescens* LT0326 KU353366	161	6E-42	122/132	92
10	*Lobophora nigrescens* JFC0214 KU353369	161	6E-42	122/132	92

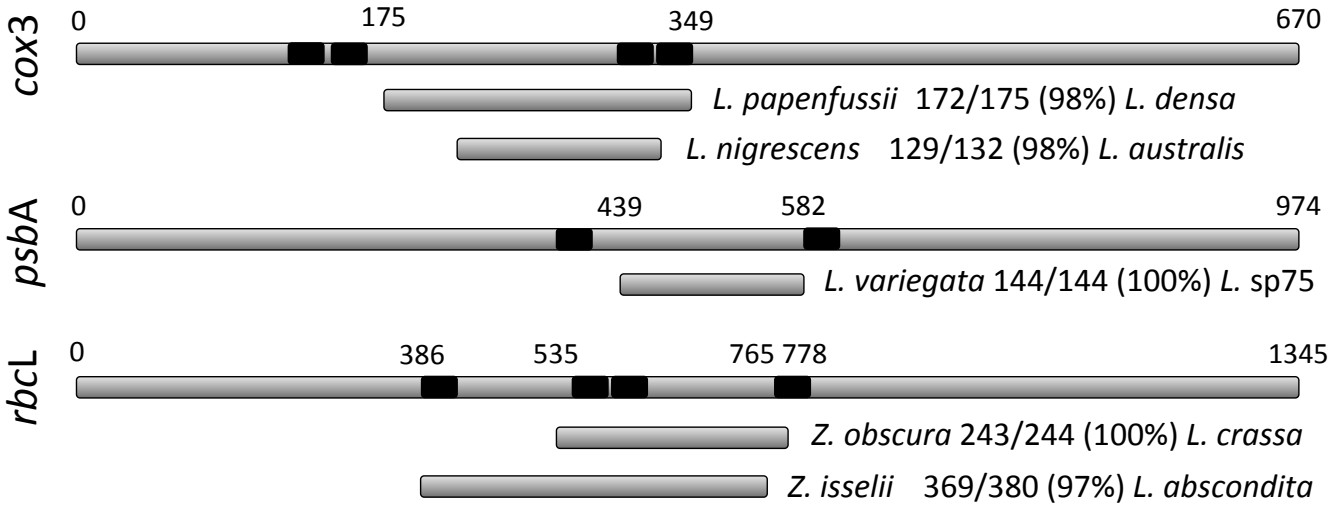

Fig. S1. Schematic representation of the short fragments amplified from the types using different primer pairs (black bands) on three different genes (*rbcL*, *psbA*, *cox3*). The number of common pair base (-/-) and the highest hit similarity (%) obtained from the BLAST analyses are given next to the type name.

Table S3. Short DNA fragment sequences from *Lobophora* types.

Specimen	Voucher number	Marker	Sequence
Dictyota variegata J.V.Lamour.	CN C7F100	*psbA*	CCCTATTGGTCAAGGTAGCTTCTCTGATGGTATGCCATTAGGAATCTCAG-GTACTTTCAACTTCATGATCGTTTTCCAAGCTGAGCACAACATCTTAATG-CACCCATTCCATATGGCTGGTGTAGCTGGTGTGTTTGGTGGTTC
Lobophora nigrescens J.Agardh	LD48307	*psbA*	AGTTTTTCTGATGGTATGCCATTAGGAATCTCTGGTACTTTCAACTTCAT-GATAGTTTTCCAAGCTGAGCATAATATTTTAATGCACCCATTCCATATGGCTG-GTGT
Lobophora nigrescens J.Agardh	LD48307	*cox3*	TCTGTTGTGCAAGAAGGTTTACGTTTAGGTATGATTCTCTTTATTGTATC-CGAAGTTATGTTTTTCTTTGCCTTCTTTTGGGCATTTTTTACTTCTTCATTA-ACCCCCGTTTTTAATATAGGTGGGGTTTGG
Pocockiella papenfussii W.R.Taylor	MICH WRT46-232	*cox3*	TCGTGAAGCAGCATTTGAAGGTCAACATACTTCTGTTGTGCAAGAAGGTC-TACGTTTAGGTATGATTCTTTTTATCGTTTCAGAAGTTATGTTTTTTTTT-GCTTTTTTCTGGGCATTTTTTACATCTTCCTTAACTCCAGTATTCAATAT-TGGAGGAGTTTGGCCTCCTGTTGGT
Zonaria obscura Dickie	BM563329	*rbcL*	GATGAAAACATTAATTCACAGCCTTTTATGCGCTGGAAAGAACGT-TACCTATACTGTATGGAAGGTGTAAACCGTGCTGCTGCAGCAA-CAGGGGAAGTTAAAGGTTCATATCTAAACGTAACTTCTGCGACAATGGAA-CAAATGTATGAACGTGCAGATTATGCATATTCTTTAGGTACAGTAATTGTTAT-GATTGATTTAGTAATTGGTTATAGTGCAATTCAAACTATGGCAATTTGGGCTCA
Zonaria isselii Picc. & Grunow	W19388	*rbcL*	CAGGTGTGATCGTAGAAAGAGAAAGATTAGATAAATTTGGTCGTCCAT-TATTAGGTGCAACAGTAAAACCTAAATTAGGTCTTTCAGGAAAAAAT-TATGGACGTGTGGTATATGAAGGTTTAAGAGGCGGTCTTGACTTTTTA-AAGGATGATGAAAATATCAATTCACAGCCTTTTATGCGTTGGAAAGAACGT-TACCTATACTGTATGGAAGGTGTAAACCGTGCTGCTGCTGCAACAGGAGA-AGTTAAAGGTTCATATCTAAACGTAACTTGTGCGACAATGGAGCAAATGTAT-GAACGTGCAGATTATGCATATTCATTAGGAACAGTAATTGTTATGATTGATT-TAGTAATCGGTTATAGTGCAATCCAAACTATG
Lobophora variegata (= *L.* sp75)	LAF06947	*psbA*	GTAGCAGCAGCATCAGCAGTATTCTTAGTATACCCTATTGGTCAAGG-TAGCTTCTCTGATGGTATGCCATTAGGAATCTCAGGTACTTTCAACTTCAT-GATCGTTTTCCAAGCTGAGCACAACATCTTAATGCACCCATTCCATATG-GCTGG
Lobophora variegata (= *L.* sp75)	LAF07029	*psbA*	GTAGCAGCAGCATCAGCAGTATTCTTAGTATACCCTATTGGTCAAGG-TAGCTTCTCTGATGGTATGCCATTAGGAATCTCAGGTACTTTCAACTTCAT-GATCGTTTTCCAAGCTGAGCACAACATCTTAATGCACCCATTCCATATG-GCTGG

■ APPENDIX S1. TAXONOMIC TREATMENT

***Dictyota variegata* J.V.Lamour. 1809**

Collected by the French botanist L.C.M. Richard in the Antilles, West Indies, the species was described as *Dictyota variegata* (Lamouroux, 1809). The type collection of *D. variegata* consists of two specimens filed as C7F100 housed in the J.V.F. Lamouroux herbarium (CN).

Although the exact type locality is unknown, considering that the collector was French, it is very plausible that *D. variegata* was collected in a French territory in the Lesser Antilles. Moreover, considering the geopolitical situation in 1809, *D. variegata* was most possibly collected in Guadeloupe, the only territory in the Antilles islands under French sovereignty during the Napoleonic wars. The taxonomic history of *D. variegata* was described in detail by Sun & al. (2012). The species was validly transferred to *Lobophora* by Oliveira Filho (1977). Type material (CN C7F100) of *D. variegata* is characterized by dark orange to dark brown thalli organized in dense, erect blades, with fronds composed of several lobes, and a rudimentary stipe (not as evident as in *Z. nigrescens* Sond.; Fig. 3). The short *psbA* sequence enabled us to link the Caribbean specimens (Bahamas, Florida Keys, Grand Cayman, St. Kitts and Nevis, Jamaica, Guadeloupe) to the type of *D. variegata*. These Caribbean specimens share a number of morphological features with the type of *D. variegata* (Fig. 4A, B): namely a single medullary layer and two to three upper- and lower-cortical cell layers (Fig. 4C–F). It should be noted, however, that morphological features may not be sufficient for a confident taxonomic identification of this species. The specimen from the Florida Keys (LAF6914; Fig. 3D) most closely resembles the *D. variegata* types (Fig. 3A, B). Among the newly collected specimens from the Caribbean, the only ones with a rudimentary stipe (specimens from Guadeloupe) belong to this MOTU. The presence of a stipe was more or less evident among the different specimens in *D. variegata* (Fig. 3C–F). For the reasons discussed earlier, the presence of this MOTU in Guadeloupe supports the idea of this MOTU being identical to *D. variegata*. Finally, the morphology (external and internal) and geography support molecular results, and we are confident of having identified the genuine *L. variegata*, which appears to be restricted to the Caribbean.

Schultz & al. (2015) proposed, based on anatomical criteria only, to assign *L. variegata* to one of the species (*L.* sp39, Fig. 2) identified from Bermuda and St. Croix. Present molecular and morphological evidence support the assignment to a different species than the one proposed by Schultz & al. (2015), and consequently supersedes the epitypification by Schultz & al. (2015).

Distribution. – Caribbean: Bahamas, Florida Keys, St. Kitts and Nevis, Grand Cayman, Jamaica and Guadeloupe.

Description. – A more detailed description than the original diagnosis is provided. Thallus fan-shaped, erect, more or less stipitate, up to 8 cm wide and 6 cm tall, forming clusters of ruffled dark brown to dark green blades. Blades 123–197 µm thick, composed of 5–7 cell layers, a single medullary layer and cortex of two to three cell layers on the dorsal and ventral sides. *Lobophora variegata* occurs in shallow waters (down to 7 m), on blocks of hard substratum or coral rubble mixed among numerous other algae including *Dictyota* J.V.Lamour., *Sargassum* C.Agardh, *Jania* J.V.Lamour. and *Caulerpa* J.V.Lamour. In the Florida Keys, *L. variegata* LAF6914, reported as *Lobophora* sp. by Camacho & al. (2015), was also found growing on the holdfast and basal branches of *Sargassum pteropleuron* Grunow and some gorgonian corals, and on leaves of *Thalassia testudinum* Banks ex K.D.Koenig.

***Pocockiella papenfussii* W.R.Taylor 1950**

Pocockiella papenfussii was described from Bikini Atoll, Marshall Islands. Farghaly (1980) transferred *P. papenfussii* to the genus *Lobophora*, following the suggestion by Womersley (1967). Molecular analyses disclosed that *P. papenfussii* is a distinct species closely related to *L. densa*. Although *L. papenfussii* resembles *Ralfsia ceylanica* Harv. ex E.S.Barton in morphology (Fig. 3G, H, Q, R; Table 2), sections of the isotype do not show the numerous superficial cell layers diagnostic for *L. densa* (Fig. 4G, H, Q–T).

Description. – *Lobophora papenfussii* has a crustose thallus, 308–640 µm thick, composed of 14–17 cell layers, a single layered medulla, a 7- to 8-layered cortex on the dorsal side and a 6- to 8-layered cortex on the ventral side.

Note. – Based on relative geographical proximity, Bittner & al. (2008) identified a specimen (*IRD1382* = *L.* sp15; Fig. 1) collected from the Solomon Islands as *L. papenfussii*. However, its sequence did not match the *L. papenfussii* type, and the morphology of that specimen is clearly distinct from the *L. papenfussii* types.

***Zonaria isselii* Picc. & Grunow 1884**

Zonaria isselii was described from Massawa, Eritrea. *Zonaria isselii* was commonly observed growing procumbently, attached by ventral numerous ventral rhizoids, on shells of bivalve molluscs (e.g., *Meleagrina*, *Mytilus*, *Pinna*, *Tridacna*). The original description and drawings of Piccone and Grunow (in Piccone, 1884) clearly correspond to those of a *Lobophora*. It was reduced to a taxonomic synonym of *L. variegata* by Papenfuss (1943). Molecular and morphological results confirm that *Z. isselii* is a *Lobophora* (Figs. 3I, 4I, J) and molecular analyses concluded that it is a distinct species. Therefore, we propose the reinstatement of *Z. isselii* Picc. & Grunow, and the following new combination: *Lobophora isselii* (Picc. & Grunow) C.W.Vieira, De Clerck & Payri, comb. nov.

Description. – Thalli 115–150 µm thick, composed of 6–7 cell layers, a single layer of medulla, a dorsal cortex of three cell layers and ventral cortex of two cell layers.

***Zonaria obscura* Dickie 1875**

Zonaria obscura was described from Mangaia, Cook Islands, South Pacific. Dickie (1875) described the species as a procumbent, leathery, suborbicular, wavy and sparsely hairy,

very dark olive-colored thallus with stringy rhizoids on the ventral surface. Molecular analyses disclosed that *Z. obscura* corresponds to *L. crassa* Z.Sun & al. (2012), which was shown to be a complex of at least four MOTUs (Vieira & al., 2014). The original morphological description of *Z. obscura* fits the description of *L. crassa* (Sun & al., 2012; Vieira & al., 2014; Fig. 3AF). Additionally, the presence of *L. crassa* in different places in the Pacific (e.g., Hawaii, New Caledonia) further supports the molecular results and the morphological resemblance (Fig. 3AE). We propose the resurrection of *Z. obscura* Dickie and the following new combination: *Lobophora obscura* (Dickie) C.W.Vieira, De Clerck & Payri, comb. nov.

Aglaozonia canariensis Sauv. 1905

Aglaozonia canariensis was originally described from the Canary Islands. In his original description, Sauvageau (1905) already highlighted the similarity of his new species to *L. variegata* (as *Zonaria variegata*), and also Papenfuss (1943) suggested that *A. canariensis* is a taxonomic synonym of *L. variegata* (as *Pocockiella variegata*) based on clear morphological criteria specific to *Lobophora*. In spite of the taxonomic treatment proposed by Papenfuss (1943), Abbott & Huisman (2003) proposed the combination *Cutleria canariensis* (Sauv.) I.A.Abbott & J.M.Huisman based on the argument that *Aglaozonia* was recognized as the sporophyte phase of *C. canariensis* (Sauv.) Abbott & Huisman. Morphological (external and internal) features of newly collected specimens (Figs. 3J, 4K, L) from Punta del Hidalgo, Tenerife, Canary Islands (Spain), located 30 km northeast of Puerto de la Cruz (type locality), match the original description of *A. canariensis* (Sauvageau, 1905) and the drawings of internal morphology by Børgesen (1926) of a plant collected at the same locality in which Sauvageau originally found it. Molecular results of newly collected specimens confirmed that the correct generic identity of *A. canariensis* is *Lobophora* as advocated by Papenfuss (1943). Sequences of the newly described species *L. payriae* by Schultz & al. (2015) match *L. canariensis*. The former is consequently reduced to synonymy with the latter. *Lobophora canariensis* is neotypified by the material newly collected from the Canary Islands (PC0063044).

Description. – Thalli 80–112 µm thick and composed of 5 cell layers, composed of a single cell-layered medulla, and two cell-layered cortex on the dorsal and ventral sides. It has a crustose thallus firmly attached to the substratum, following the sinuated surface of the rocks. The species is common in intertidal rock pools and subtidal down to about −20 m depth, where it can form crusts up to 20 cm in diameter. The orange-brown color with dark brown spots is distinctive and sets the species apart from sympatric congeners.

Aglaozonia pacifica Setch. 1926

Aglaozonia pacifica was described from Papeete, Tahiti (Setchell, 1926). The species was found closely appressed to a calcareous red crust (*Porolithon*), but the author did not give further details on its morphology. The original description clearly corresponds to a *Lobophora*: "a central layer of larger cells, on each side of which are four layers of flattened cells". Furthermore, the author noted the similarity to *L. variegata* (as *Z. variegata*) and *Z. latissima* (in the current paper shown to be a *Lobophora*). Among the new collections from Tahiti, we identified a specimen from Fa'aa with a shelf-like morphology and with the basal part attached to the substratum (Fig. 3K). The Fa'aa specimen shows internal morphology similar to the description by Setchell (1926; Fig. 3L). Consequently, we propose the reinstatement of *Aglaozonia pacifica* Setch. and the following new combination: *Lobophora pacifica* (Setch.) C.W.Vieira, De Clerck & Payri, comb. nov. Since only a small fragment of the holotype material remains in UC, we selected an epitype (UPF026) collected at the type locality.

Distribution. – So far *L. pacifica* is known only from French Polynesia (Moorea, Tahiti) and New Caledonia.

Description. – Thalli 168–202 µm thick, composed of 7–9 cell layers; a single layered medulla, a three- to four-layered cortex on the dorsal and ventral sides. *L. pacifica* grows on dead corals, hidden under coral assemblages, and is common on barrier reefs near the front reef, in exposed areas subject to wave action, down to −30 m depth.

Pocockiella dichotoma Simons 1966

Pocockiella dichotoma was described from Kosi Bay, Kwazulu-Natal, South Africa (Simons, 1966). Silva in Silva & al. (1996) made the combination *Lobophora dichotoma* (Simons) P.C.Silva by recognizing the nomenclatural priority of *Lobophora* against *Pocockiella*. *Lobophora dichotoma* presents a very characteristic and atypical morphology which differentiates it from any other *Lobophora* species. Although the internal morphology of *P. dichotoma* accurately fits the generic description of *Lobophora*, the external appearance does not. As shown in Fig. 3M–P, *L. dichotoma* has dichotomizing, strap-shaped branches very similar to other Dictyotales genera (e.g. *Dictyota*, *Stoechospermum*, *Zonaria*, etc.), while *Lobophora* species documented to date typically have broad and entire, flabellate thalli (Lamouroux, 1809; Agardh, 1894; Taylor, 1950; Kraft, 2009; Sun & al., 2012; Vieira & al., 2014). Morphological (external and internal) comparisons of newly collected specimens from Ribbon Reef, Sodwana Bay, 70 km south of Kosi Bay (type locality), with *L. dichotoma* holotype material (BOL!) indicated that they are the same species (Figs. 3M–P, 4O, P). Molecular and anatomical data of newly collected specimens confirm that this species belongs in *Lobophora* lineages (Fig. 2). *Lobophora dichotoma* has been reported only from Kwazulu-Natal, South Africa and the southern part of Madagascar. *Lobophora dichotoma* is epitypified by newly collected material from Sodwana Bay (BOL150668), Kwazulu-Natal (South Africa). *Lobophora dichotoma* was found at 19–20 m depth attached to hard substrata (e.g. sandstone) on reefs with scattered sandy patches, and loose pebbles.

***Ralfsia ceylanica* Harv. ex E.S.Barton 1903**

Ralfsia ceylanica was described from Lakshadweep (formerly the Laccadive Islands), India. The original description and drawings by Barton (1903) clearly correspond to those of a *Lobophora*. The synonymy to *L. variegata* was first suggested by Papenfuss (1943). It is a crustose species with a thick and unique anatomy (Figs. 3Q, 4Q, R). Two species of *Lobophora*, *L. densa* (Figs. 3R, 4S, T) and *L. indica*, morphologically resemble *R. ceylanica*. *Lobophora densa* was reported from the Maldives, 330 km south of Minicoy, Lakshadweep, India, and *L. indica* from the southeastern coast of India (Krishnamurthy & Baluswami, 2000). Based on morphological similarities and geographic proximity between these three species, we regard these species as synonymous. We propose the following new combination: *Lobophora ceylanica* (Harv. ex E.S.Barton) C.W.Vieira, De Clerck & Payri, comb. nov. *Lobophora ceylanica* is epitypified by material collected from the Maldives (PC0063012).

Note. – Detailed morphological and ecological descriptions are given in Vieira & al. (2014) under the name *Lobophora densa*.

***Lobophora nigrescens* J.Agardh 1894 and *Zonaria nigrescens* Sond. 1845**

Lobophora nigrescens J.Agardh and *Zonaria nigrescens* Sond. were regarded by Womersley (1967) as taxonomic synonyms of *L. variegata*. Both taxa were described from Australia, the former from "Dromana Bay" (Victoria) and the latter from Western Australia (exact locality unknown). When J. Agardh (1894) established the new genus *Lobophora* to accommodate his new species *L. nigrescens*, he was aware of *Z. nigrescens* (Sonder, 1845) and considered it as a separate species. Jakob Agardh (1894) transferred *Z. nigrescens* to *Gymnosorus* as *G. nigrescens* (Sond.) J.Agardh. Prior to this, *Z. nigrescens* was transferred to *Spatoglossum* by Kützing (1849) and to *Orthosorus* by Trevisan (1849). Later, Papenfuss (1943) transferred *Gymnosorus nigrescens* (Sond.) J.Agardh to *Pocockiella*. Finally, Womersley (1967) considered *Pocockiella nigrescens* (Sond.) Papenfuss as a synonym of *L. variegata*. During this long and complex taxonomic history the combination *Lobophora nigrescens* J.Agardh has been considered only by Womersley (1967) who treated it as a taxonomic synonym of his *L. variegata*. Sun & al. (2012) reinstated *L. nigrescens* J.Agardh based on specimens from Sydney (New South Wales) and Seaford (South Australia). In this process *Zonaria nigrescens* Sond. was not considered. In fact, two distinct species (*L. nigrescens* sensu Sun & al. 2012 and *L. australis*) could have been associated with *L. nigrescens* J.Agardh. Comparison between *L. nigrescens* J.Agardh (Fig. 3Y, Z) and *Z. nigrescens* Sond. (Fig. 3S, T) show that not only are they distinct morphological species but that *L. nigrescens* sensu Sun & al. (Fig. 3U–X; Sun & al., 2012: figs. 4–8) Phaeophyceae matches the description of *Z. nigrescens* Sond. (Fig. 3S, T), and *L. nigrescens* J.Agardh (Fig. 3Y, Z) that of *L. australis* (Sun & al., 2012: figs. 9–13). The morphological similarity between *L. nigrescens* (Agardh, 1894: 23, pl. I: figs. 7–8) and *L. australis* (Sun & al., 2012: figs. 9–13), molecular analyses and the vicinity of their type localities demonstrate their conspecificity. To revise the taxonomic identity of *Z. nigrescens* Sond., we compared the morphology of the type with recently collected specimens from Western Australia. Molecular analyses revealed the presence of at least eight MOTUs in Western Australia. Since among these species only *L. nigrescens* sensu Sun & al. (2012) showed a clear morphological resemblance to *Z. nigrescens*, we propose the reinstatement of *Z. nigrescens*. A new name is proposed for *Zonaria nigrescens* Sond., *Lobophora sonderi* C.W.Vieira, De Clerck & Payri, nom. nov., and we propose the reinstatement of the species *Lobophora nigrescens* as a separate species, *Lobophora nigrescens* J.Agardh.

Note. – Detailed morphological and ecological descriptions of *L. sonderi* are given in Sun & al. (2012) and Vieira & al. (2014) under the name *L. nigrescens*.

***Lobophora rickeri* Kraft 2009**

Lobophora rickeri was described from the southern Great Barrier Reef, Queensland (Australia) and was also reported from Lord Howe Island, New South Wales (Australia). Type material has been kept in formaldehyde since 1982, including specimens pressed on the herbarium sheet, and consequently cannot be sequenced. New specimens were collected from different places on Lord Howe Island by G.W. Saunders for the Barcode of Life Data Systems database. According to Kraft (2009), only two species of *Lobophora* are present on Lord Howe Island: *L. rickeri* and *L. variegata*. *Lobophora variegata*, described by Kraft (2009) from Australia and Lord Howe Island, most likely corresponds to *Z. nigrescens* based on morphological similarity (erect stipitate species). Because all specimens from Lord Howe Island matched a single species, distinct from *Z. nigrescens*, we conveniently assigned these new collections to *L. rickeri*. *Lobophora rickeri* came out as the sister species of *L. undulata* (Fig. 2). *Lobophora rickeri* is epitypified by material newly collected on Lord Howe Island (GWS022754, UNB).

Remaining types

Zonaria collaris C.Agardh, *Stypopodium fissum* Kütz. , *Stypopodium laciniatum* Kütz., *Zonaria latissima* Sond. ex Kütz. have not been included for further taxonomic treatment because at present we do not have sufficient data, lacking DNA and type locality material. Anatomical analyses clearly demonstrated that these species, which have been recognized as taxonomic synonyms of *L. variegata* (Papenfuss, 1943), belong to *Lobophora*. While *Z. collaris* described from Jamaica could possibly be *L. variegata*, it is very unlikely the case for three other taxa, all collected from Eritrea. In order to reassess the identity of these remaining types, sampling near type localities and morphological comparisons with type material will be needed.

***Zonaria collaris* C.Agardh 1820. —** This species was originally described from the West Indies (India Occidentali) as

a *Zonaria*. The original description does not refer to any type material nor provides any drawings. In 1894, J. Agardh transferred *Z. collaris* to his genus *Gymnosorus* along with *G. nigrescens*. It was finally considered a taxonomic synonym of *L. variegata* (*Pocockiella variegata*) by Papenfuss (1943). The Curator from LD found an unmounted specimen (No. 48006) in the Agardh herbarium placed in an old envelope labeled "*Z. collaris* mihi" by C.Agardh and annotated "sp. origin in Hb. C.Ag." by J. Agardh. Although we have no certainty, we naturally presume that it might be an original type specimen of *Z. collaris* from C.Agardh. This specimen distinctively resembles a *Lobophora* (Fig. 3AC). Given the fragmentary situation of the type specimen, we were not allowed to perform destructive sampling for molecular and anatomical analyses.

***Stypopodium fissum* Kütz. 1859. —** *Stypopodium fissum* was described from Equatorial Guinea. This species was considered a taxonomic synonym of *L. variegata* (*G. variegatus*) by J. Agardh (1894). Kützing's drawings (Kützing, 1859: 26, pl. 64 fig. 1) and our morphological analyses (Figs. 3AA, 4U, V) clearly show the features of a *Lobophora*.

***Stypopodium laciniatum* Kütz. 1859. —** *Stypopodium laciniatum* was described from the Canary Islands. This species was considered a taxonomic synonym of *L. variegata* (*G. variegatus*) by J.Agardh (1894). Kützing's drawings (Kützing, 1859: 26, pl. 64 fig. 2) and our morphological analyses (Fig. 4AB, 4W, X) clearly show the features of a *Lobophora*.

***Zonaria lattisima* Sond. ex Kütz. 1859. —** *Zonaria latissima* was described from the coast of Eritrea (littora Abyssiniae). It was considered a taxonomic synonym of *L. variegata* (*Pocockiella variegata*) by Papenfuss (1943). Kützing's drawings (Kützing, 1859: 30, pl. 75 fig. 1) and our morphological analyses (Figs. 3AD, 4Y, Z) clearly show the features of a *Lobophora*.

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