

# Supplementary Material

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**Supplementary Table S1.** GenBank accession numbers of *rbcl* sequences used in the phylogenetic analysis

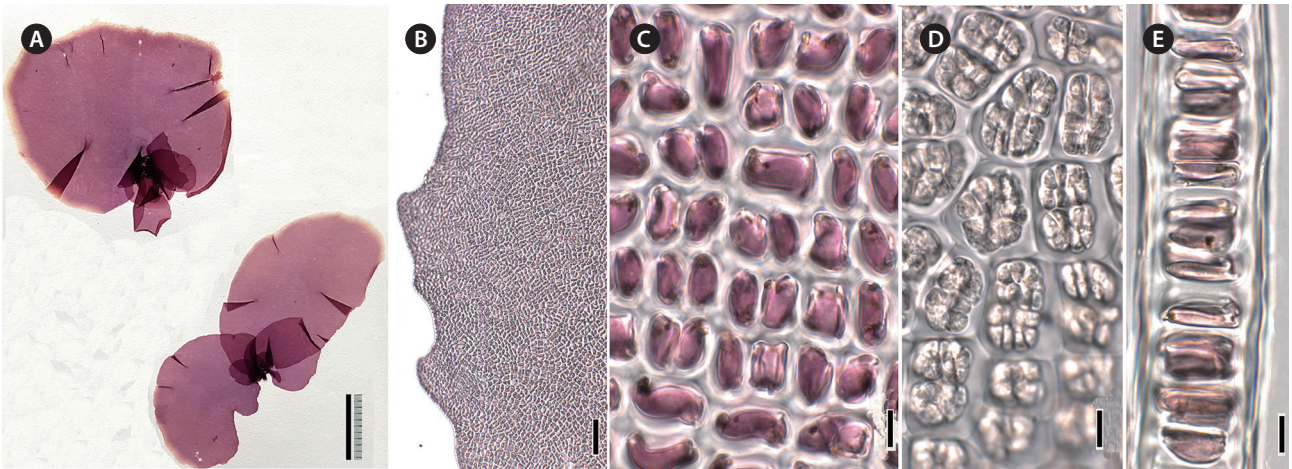
Taxon	Collections information (short sequences)	Accession No.
Out group		
<i>Bangia gloiopeltidicola</i>	Shinori, Hakodate, Hokkaido, Japan	HQ687503
<i>Boreophyllum aestivale</i>	Japonski Island, Alaska, USA	EU223035
<i>Wildemanina amplissima</i>	Nosappu, Nemuro, Hokkaido, Japan	HQ687560
Currently registered <i>Pyropia</i> species in AlgaeBase		
1. <i>Pyropia abbottiae</i>	Victoria, British Columbia, Canada	EU223024
2. <i>P. acanthophora</i>	Philippines	KU234769
3. <i>P. aeodis</i>	Paternoster, South Africa	GU165843
4. <i>P. bajacaliforniensis</i>	Moss Landing, California, USA	KP904065
5. <i>P. brumalis</i>	Vancouver, British Columbia, Canada	AF452426
6. <i>P. collinisii</i> (= <i>P. parva</i> ) <sup>a</sup>	Buzzard Bay, Massachusetts, USA	DQ813598
7. <i>P. cinnamomea</i>	Bruce's Rock, Otago, South Island, New Zealand	EU521637
8. <i>P. columbiensis</i>	Cape Mendocino, California, USA	KP903984
9. <i>P. columbina</i>	Antipodes Island, New Zealand	GU046442
10. <i>P. conwayae</i>	Lincoln City, Oregon, USA	AF452427
11. <i>P. crassa</i> ( <i>P. cf. crassa</i> )	Nosappu, Nemuro, Hokkaido	HQ687518
12. <i>P. dentata</i>	Uka, Shimonoseki, Yamaguchi, Japan	AB287928
13. <i>P. denticulata</i>	Mooloolaba, Queensland, Australia	HQ687521
14. <i>P. drachii</i>	-	-
15. <i>P. elongata</i>	Bohuslan, Koster, Sweden	FJ817088
16. <i>P. endiviifolia</i>	Antarctica (?)	KT716756
17. <i>P. fallax</i>	Calvert Island, British Columbia, Canada	KP903956
18. <i>P. francisii</i>	Three Kings Islands, New Zealand	HQ687537
19. <i>P. fucicola</i>	Makah Bay, Olympic Peninsula, Washington, USA	KJ776837
20. <i>P. gardneri</i>	Caminitos, Baja California, Mexico	HQ687522
21. <i>P. haitanensis</i>	Yuge Ehime, Japan	AB118585
22. <i>P. hiberna</i>	Pacific Grove, Monterey County, California, USA	GU319866
23. <i>P. hollenbergii</i>	Agua Verde, Baja California, Mexico	HQ687523
24. <i>P. ishigecola</i>	Yoshio, Katsuura, Chiba, Japan	HQ687524
25. <i>P. kanakaensis</i>	Kanaka Bay, San Juan Island, Washington, USA	KJ776836
26. <i>P. katadae</i>	Pohang, Gyeongbuk, Korea	HQ728199
	Ise, Mie, Japan	HQ687525
27. <i>P. kinositae</i>	Otaru, Shukutsu, Hokkaido, Japan	AB366139
	Gyoam, Goseong, Gangwon-do, Korea (IK158)	MG926656
	Punghwa, Tongyeong, Gyeongnam, Korea (KU366)	MG926661
	Oori, Goseong, Gangwon-do, Korea	HQ728198
	Sachon, Namhae, Gyeongnam, Korea	HQ728200
	Juneau, Alaska, USA	AF452432
	Shirahama, Chiba, Japan	HQ687527
	Bodega Marine Lab., California, USA	KP904029
	Sidmouth, UK	HQ687528
	Fort Bragg, California, USA	KP903964
	Otaru, Hokkaido, Japan	EU521645
	Hwajinpo, Goseong, Gangwon-do, Korea (KU408)	MG926663
	Sitka, Alaska, USA	AF452435
	Monterey, California, USA	KP876025
	Hruteyri, Slettustrond, Reydarfjordur, Iceland	JN847266
	New Meadows River, Brunswick, Maine, USA	DQ813607
	Mori, Hokkaido, Japan	HQ687529
	Hwajinpo, Goseong, Gangwon-do, Korea (KU407)	MG926664
	Maitencillo, Chile (876 bp)	KF479481
	Narragansett, Rhode Island, USA	JN029005
	Peggys Cove, Halifax Co., Nova Scotia, Canada	JN028991
41. <i>P. orbicularis</i>		
42. <i>P. parva</i> ( <i>P. sp.</i> HK-2011d) <sup>a</sup>		
43. <i>P. peggicovensis</i>		

**Supplementary Table S1.** Continued

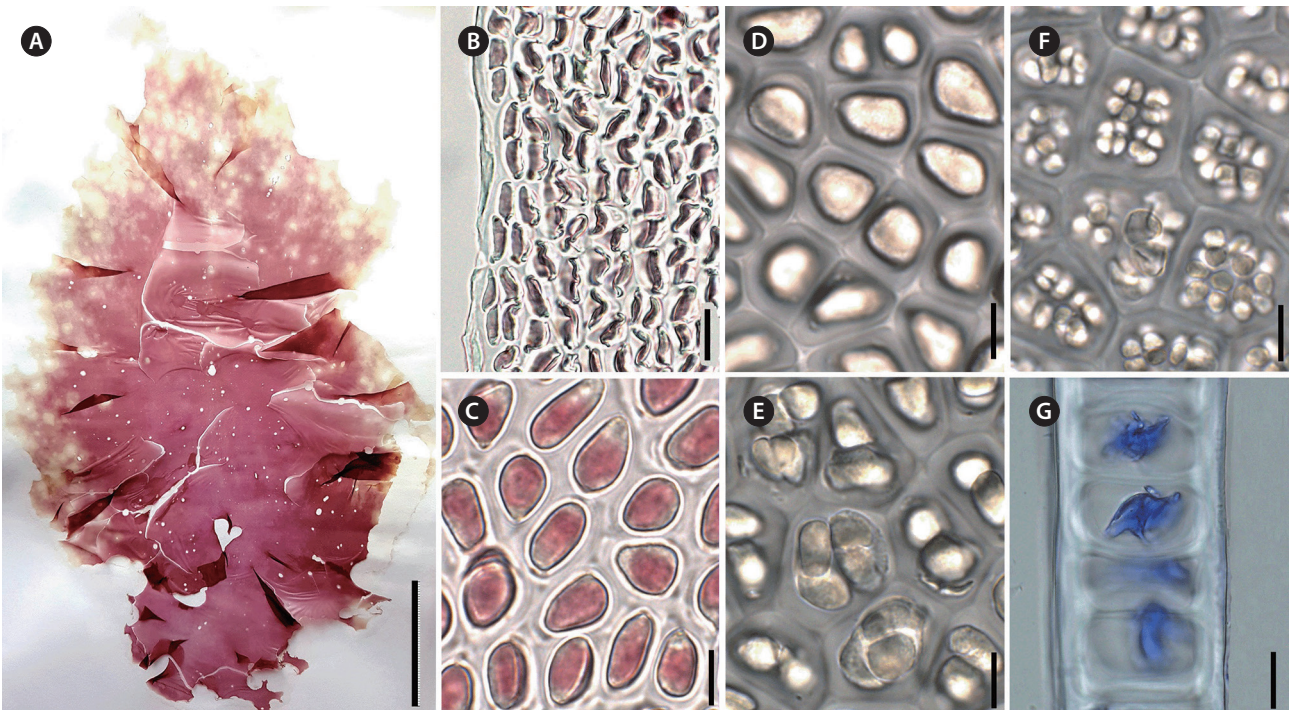
Taxon	Collections information (short sequences)	Accession No.
Currently registered <i>Pyropia</i> species in AlgaeBase		
44. <i>P. pendula</i>	Isla Partida, Baja California, Mexico (880 bp)	JQ900553
45. <i>P. perforata</i>	Sitka, Alaska, USA	AF452438
46. <i>P. plicata</i>	Ocean View, Kaikoura, New Zealand	GU046410
47. <i>P. protolanceolata</i>	Spanish Bay, Monterey, California, USA	KP904005
48. <i>P. pseudolanceolata</i>	Sunset Beach, Oregon, USA	KP904052
49. <i>P. pseudolinearis</i>	Dokdo, Gyeongbuk, Korea	HQ728196
50. <i>P. pulchella</i> <sup>b</sup>	Waihou Bay East, North Island, New Zealand	HQ687532
51. <i>P. pulchra</i> ( <i>P. smithii</i> )	Barkley Sound, British Columbia, Canada	EU223224
52. <i>P. rakiura</i>	Kaikoura, South Island, New Zealand	EU521646
53. <i>P. raulaguilarii</i>	Michoacán, Carrizalillo, Mexico (893 bp)	JQ684701
54. <i>P. retorta</i> sp. nov. (this study)	Oosu, Ogatsu, Miyagi, Japan ( <i>Porphyra</i> sp. P7)	AB366143
	Jumunjin, Gangneung, Gangwon-do, Korea (SM018)	MG926666
	Jumunjin, Gangneung, Gangwon-do, Korea (KU758)	MG926674
55. <i>P. saldanhae</i>	Kommetjie, South Africa	GU165838
56. <i>P. seriata</i>	Hondo, Kumamoto, Japan	HQ687533
57. <i>P. spatulata</i>	Powder Pt., Duxbury, Maine, USA	DQ813633
58. <i>P. spiralis</i>	Vila Velha, Espírito Santo, Brazil	HQ605696
59. <i>P. stamfordensis</i> <sup>b</sup>	Falmouth, Maine, USA	DQ813636
60. <i>P. suborbiculata</i>	Kawatana, Yamaguchi, Japan	AB118580
61. <i>P. taeniata</i>	Alaid Island, Alaska, USA	KT936185
62. <i>P. tanegashimensis</i>	Norikaku, Tanegashima, Kagoshima, Japan	AB671541
63. <i>P. tenera</i>	Kumamoto, Kawaura, Japan	HQ687543
64. <i>P. tenuipedalis</i>	Yamaguchi, Yamaguchi, Futajima, Japan	AB287951
65. <i>P. thulaea</i>	Nuuk, Greenland	JN847268
66. <i>P. thuretii</i>	Tahsis, British Columbia, Canada	JN029007
67. <i>P. torta</i>	Sitka, Alaska, USA	AF452445
68. <i>P. unabbottiae</i>	Malcolm Island, British Columbia, Canada	KU248447
69. <i>P. vietnamensis</i>	Thangeseri (Kerala), India	HQ687544
70. <i>P. viridentata</i>	Lyall Bay, Wellington, North Island, New Zealand	EU521650
71. <i>P. yezoensis</i>	Tongyeong, Gyeongnam, Korea	HQ728197
Unidentified or misapplied names of <i>Pyropia</i> sequences in GenBank		
1. <i>Porphyra</i> sp. "AKL170"	Campbell Island, New Zealand	GU046403
2. <i>Porphyra</i> sp. "DE001"	Enoshima, Fujisawa, Kanagawa, Japan	AB287973
3. <i>Porphyra</i> sp. "DN002"	Hokuto, Nanaehama, Hokkaido, Japan	AB287967
4. <i>Porphyra</i> sp. "FIA"	Macquarie Island, Australia	GU046428
5. <i>Porphyra</i> sp. "FIC"	Falkland Islands, UK	GU046422
6. <i>Porphyra</i> sp. "FID"	East Loafers, Sea Lion Island, Falkland Island, UK	GU046406
7. <i>Porphyra</i> sp. "FIE"	Top Island, Port Stanley, East Falklands, UK	GU046408
8. <i>Porphyra</i> sp. "P10"	Shichigahama, Miyagi, Japan	AB366146
9. <i>Porphyra</i> "pseudolinearis"	Juneau, Alaska, USA	AF452441
10. <i>Porphyra</i> sp. "PTW1017"	New Zealand	GU046426
11. <i>Porphyra</i> sp. "RIB167"	Campbell Island, New Zealand	GU046413
12. <i>Porphyra</i> sp. "ROS1211"	Tasmania, Australia	GU214020
13. <i>Porphyra</i> sp. "6POR"	South Jetty, Port Arkansas, Texas, USA	JN029003
14. <i>Porphyra</i> sp. "SCL-2008-2"	South cove, Bridget Cove, Lynn Canal, Alaska, USA	EU223172
15. <i>Porphyra</i> sp. "SSR053"	Ocean View, Kaikoura, New Zealand	GU046411
16. <i>Porphyra</i> sp. "SSR091"	Brighton, Otago, New Zealand	GU046421
17. <i>Porphyra</i> sp. "SuSa 001"	Shimonoseki, Yamaguchi, Japan	AB118586
18. <i>Porphyra</i> sp. "TCH243"	Stewart Island, New Zealand	GU046413
19. <i>Porphyra</i> sp. "TDC1732"	Tristan Da Cunha, UK	GU046429
20. <i>Porphyra</i> sp. "ZLI1045"	Paternoster, South Africa	GU165839
21. <i>Pyropia</i> "kurogii"	Utoro, Hokkaido, Japan	HQ687526
22. <i>Pyropia</i> sp. "ROS125"	Henderson Point, North Island, New Zealand	HQ687538
23. <i>Pyropia</i> sp. "SMR"	Curio Bay, Southland, South Island, New Zealand	HQ687539
24. <i>Pyropia</i> sp. P974Hakai	Calvert Island, British Columbia, Canada	KY579367
25. <i>Pyropia</i> cf. <i>thuretii</i>	Olas Altas, Mazatlan, Sinaloa, Mexico	HQ687519
26. <i>Pyropia</i> sp. "WRO"	Punakaiki, Westland, South Island, New Zealand	HQ687541
27. <i>Pyropia</i> sp. 3 RVD-2017	Basco, Batan Island, Batanes, Philippines	KY272476
28. <i>Pyropia</i> sp. 4 RVD-2017	Savidug, Sabtang Island, Batanes, Philippines	KY272439

<sup>a</sup>The *rbcl* sequence was accessioned as *Porphyra* sp. HK-2011d and *P. collinsii* in GenBank are identical with those of *P. parva* (see Sánchez et al. 2014).

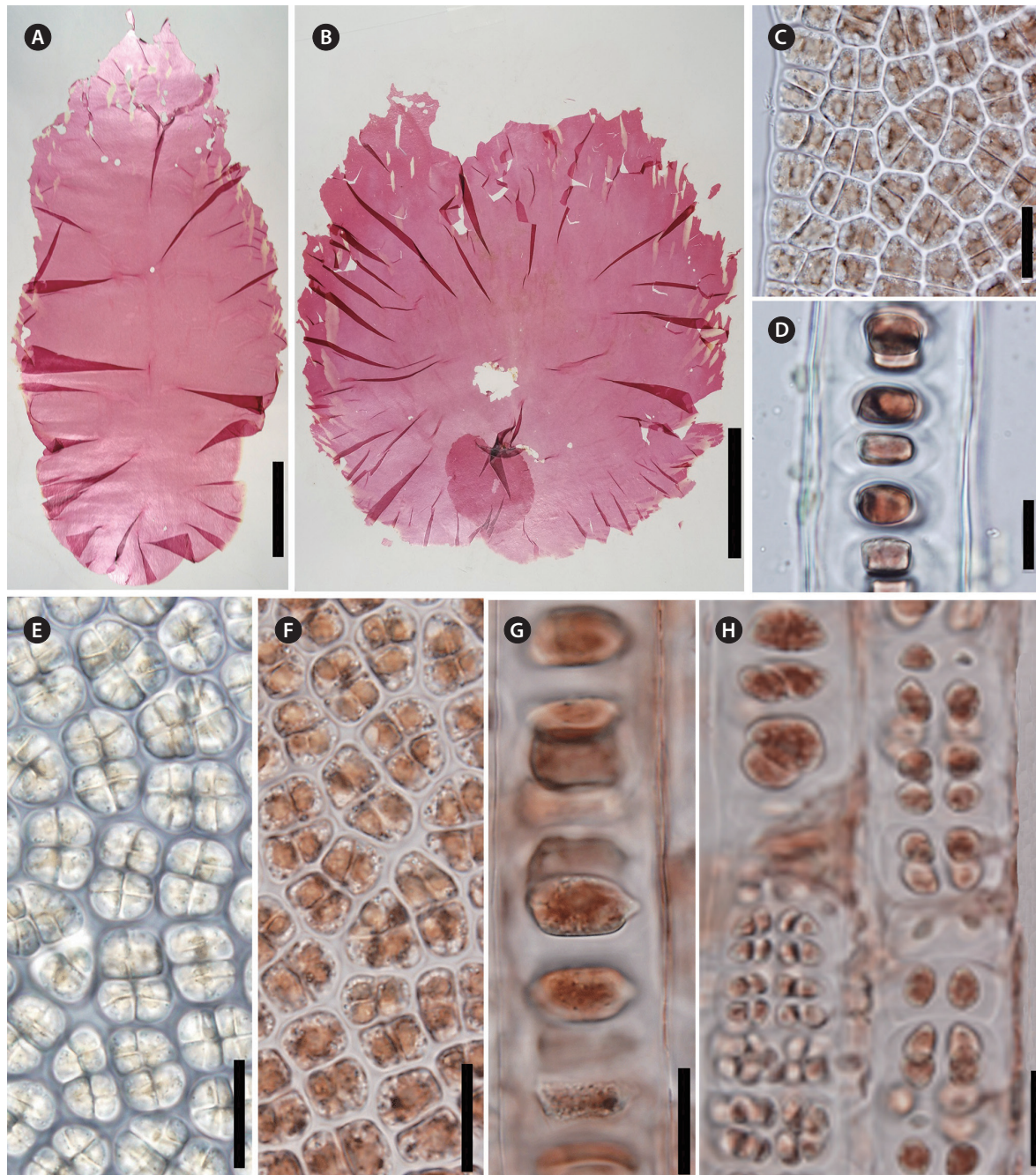
<sup>b</sup>The *rbcl* sequences of *P. pulchella* and *P. stamfordensis* in GenBank are identical with those of Korean *P. kuniedae*.



**Supplementary Fig. S1.** *Pyropia onoi*. (A) A dried herbarium specimens. (B) Marginal part of the lower part of thallus. (C) Vegetative cells in the surface views of the middle portion of the lower part of thallus. (D) Surface view of spermatangial sori. (E) Vegetative cell in the cross-section view of the middle part of thallus. Scale bars represent: A, 1 cm; B, 100  $\mu$ m; C-E, 10  $\mu$ m.



**Supplementary Fig. S2.** *Pyropia moriensis*. (A) A dried herbarium specimens (KU408). (B) Marginal portion of the lower part of thallus. (C & D) Vegetative cells in the surface view of the middle part of thallus. (E) Surface view of zygotosporangial sori. (F) Surface view of spermatangial sori. (G) Vegetative cells in the cross-section of the middle part. Scale bars represent: A, 5 cm; B & G, 20  $\mu$ m; C-F, 10  $\mu$ m.



**Supplementary Fig. S3.** *Pyropia kinositae*. (A & B) Herbarium specimens (IK153, IK327). (C) Vegetative cells and smooth margin in the surface view of the middle part of frond. (D) Vegetative cells in the cross section of the middle part. (E) Surface view of sori of spermatangia. (F) Surface view of sori of zygotosporangia. (G) Carpogonia with slight protruded prototrichogynes in the cross section. (H) Development of zygotosporangia in the cross section. Scale bars represent: A & B, 5 cm; C-H, 20  $\mu$ m.

## REFERENCES

- Sánchez, N., Vergés, A., Peteiro, C., Sutherland, J. E. & Brodie, J. 2014. Diversity of bladed Bangiales (Rhodophyta) in western Mediterranean: recognition of the genus *Themis* and description of *T. ballesterosii* sp. nov., *T. iberica* sp. nov., and *Pyropia parva* sp. nov. *J. Phycol.* 50:908-929.