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First occurrence of *Gracilaria chilensis,* and distribution of *Gracilariopsis lemaneiformis (Gracilariaceae, Gracilariales)* in Peru on the basis of *rbc*L sequence analysis

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The terete taxa *Gracilariopsis* (hereafter Gp.) *lemaneiformis* (Bory) Dawson, Acleto & Foldvik and *Gracilaria* (hereafter G.) *chilensis* Bird, McLachlan & Oliveira resemble each other in branching pattern. This study aims to analyze samples attributed to *G. chilensis* from a southern locality in Peru using molecular tools, in order to differentiate it from *Gp. lemaneiformis* samples collected along the Peruvian coast. Species identification of the Gracilariaceae, especially of the terete forms, is notoriously difficult due to morphological plasticity and convergence of their thalli, and the correct taxonomic identification of non-reproductive, cylindrical specimens remains a difficult task (Gurgel & Fredericq 2004). Utilizing traditional morphometric techniques, Edding *et al*. (2006) concluded that *G. chilensis*, comprising a single morphotype, is the main species of *Gracilaria* present along the Chilean coast, in which natural populations are distributed between 30°S and 45°S, from Coquimbo to Southern Chiloe (Bird *et al.* 1986), with farms extending further north to Antofagasta (24°S) (Santelices & Ugarte 1990). Hoffmann & Santelices (1997) found the establishment of *G. chilensis* on the coast of Coihaique (45°S) mainly due to aquaculture introduction. This species also occurs in the western Pacific Ocean, ranging from southeastern Australia to New Zealand (Nelson 1987). *Gracilariopsis* Dawson was long merged into *Gracilaria* until Fredericq & Hommersand (1989) resurrected *Gracilariopsis* on the basis of lack of nutritive cells in the cystocarp, and with chorda-type surface spermatangia. *Gp. lemaneiformis* has a geographical range from Paita, Peru to Antofagasta in northern Chile (Ramírez & Tapia 1991). DNA sequence analysis has been the most reliable and widely used molecular technique to infer phylogenic relationships at the species level within the Gracilariaceae (Gurgel & Fredericq 2004), and recognition of *Gracilariopsis* as a genus distinct from *Gracilaria* received strong support from the molecular studies of Bird *et al.* (1994), and Gurgel *et al*. (2003), among others. According to Gurgel *et al*. (2003), *Gp. lemaneiformis* is shown not to have a worldwide distribution but to be restricted to the vicinity of Peru, whereas the species going under the name *Gp.* "*lemaneiformis*" from North and South Carolina is now referred to as *Gp*. *carolinensis* Liao et Hommersand, and *Gp.* "*lemaneiformis*" from China and Japan constitutes an undescribed species that is related to *Gp*. *heteroclada* Zhang et Xia.

TABLE 1. Silica gel samples for molecular analyses.

Taxon	Locality	Collection Date, Collector	GenBank Accession Numbers
G. chilensis	Morro Sama, Sama, Tacna	13.v.2014, Coll. L. Mina & V. Chili	KP857578
Gp. lemaneiformis	Eten, Lambayeque	Dec. 2014, Coll. P. Ramírez	KP857574
Gp. lemaneiformis	San Andres, Pisco, Ica	21.x.2014, Coll. N. Arakaki	KP857575
Gp. lemaneiformis	Ancon, Lima	30.xii.2014, Coll. N. Arakaki & M. Arakaki	KP857576
Gp. lemaneiformis	Chorrillos, Lima	30.xii.2014, Coll. N. Arakaki & M. Arakaki	KP857577
Gp. lemaneiformis	Yacila, Paita, Piura	03.iii.1994, Coll. C. Acleto & R. Zúñiga	AY049415

DNA extraction was performed and specific gene regions were amplified by PCR and prepared for sequencing following the protocols described in Gurgel *et al*. (2003). The *rbc*L primers used for amplification and sequencing reactions were as follows: F15 (5'-GTAATHCCNTAHGCNAAAATGGG-3')-R916 (5'-CCWGCCATDCKCATCCA-

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