

**On the identity of *Lophosiphonia bermudensis* Collins and Hervey
and *Dipterosiphonia rigens* (Schousboe) Falkenberg**

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After careful study the authors conclude that Collins and Hervey based the description of *Lophosiphonia bermudensis* on a mixture of three different species: *Polysiphonia scopulorum*, *P. setacea*, and *Dipterosiphonia rigens*. Later, Howe placed this taxon as a synonym under *Dipterosiphonia rigens*, probably basing his decision on a partial examination of the Collins and Hervey material. Although these three species resemble each other very much when *D. rigens* does not assume its typical habit, the two species of *Polysiphonia* can be separated from *D. rigens* because the pericentral cell number is always four in the *Polysiphonia* species and 5 to 7 in *D. rigens*.

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During our work with Brazilian marine algae, we came across some plants resembling very closely *Lophosiphonia bermudensis* described by Collins and Hervey in 1917 from Bermuda. A search in the literature revealed that this *Lophosiphonia* species had been placed as a synonym under *Dipterosiphonia rigens* by Howe (1918, p. 521). Later phycologists followed Howe's interpretation (see Taylor, 1960, p. 601). As our plant could not be a *Dipterosiphonia*, we suspected that we were dealing with a new species of *Lophosiphonia*.

In their publication, following the description of *L. bermudensis*, Collins and Hervey (1917, p. 126) cited two collections, one by Hervey and the other by Collins, as follows: "Type in Collins herbarium. Gravelly Bay, Feb., Hervey, Fairyland, Cave at Agar's Island, Aug., and dredged in 6 m. Collins. A rather delicate plant, usually on *Sargassum* or *Zonaria*, but also on limpet shells."

The Collins Herbarium is deposited at the New York Botanical Garden. We borrowed all the available material under *Lophosiphonia bermudensis* that was in the Collins Herbarium. None of the labels had the exact combination of month and place cited, hence it was impossible to know if we really had the syntypes. However, this is the only Collins material under this species name that exists.

In almost all the material in Collin's Herbarium, consisting of bottled plants, microscopic

slides, and dried specimens, we suspected that we were dealing with a mixture of two or three different species. It is certain that part of the material examined has the characteristic branching pattern of *Dipterosiphonia* (Falkenberg, 1901, p. 319); but we noticed sometimes that, as already recorded by Falkenberg (1901, p. 327), the typical branching pattern of *Dipterosiphonia* can be recognized only at a growing apex of a prostrate axis. We also noted that in some instances branch suppression occurs (*i.e.* non-development of one lateral branch of each pair) and that when this takes place it changes the habit of the adult thallus considerably. This "unusual" habit makes it difficult to separate rapidly *Dipterosiphonia* plants from the other species we found among the material.

Study of abundant fresh material found in Brazil convinced us that *L. bermudensis*, as described by Collins and Hervey, is a species distinct from *D. rigens*, and made it easier to isolate plants of both species in the original material. It was also possible to distinguish our freshly-collected plants not only by the branching habit of each species and the endogenous or exogenous origin of the branches, but also by the pericentral cell number, which was always four in *Lophosiphonia*-like plants and 5 to 7 in *Dipterosiphonia rigens*.

Using this newly recognized difference, we found exactly the same situation in the original material from Bermuda (*i.e.* a mixture of plants

with four pericentral cells and others with 5 to 7).

These observations led us to suppose that Collins and Hervey described *L. bermudensis* from a typical four-siphoned plant, but since they were not aware of the mixture of species it is possible to understand the following explanation given by these two distinguished phycologists: "The variation in number of the pericentral cells is something exceptional in a plant of normally four" (Collins and Hervey, 1917, p. 127). Later, when Howe studied the Collins Herbarium material he must have seen among the mixture a typical axis of *Dipterosiphonia*. Unfortunately, he did not mention which collections he examined when reducing *L. bermudensis* to synonymy.

Corroborating our opinion that *L. bermudensis* consistently has four pericentral cells, is the following remark of Børgesen (1924, p. 34): "Collins & Hervey found in their plant variation of the number of pericentral cells being occasional 5-6. This I have not found in the specimens I have examined."

On examining the original material, our first impression was that in addition to *D. rigens* we were dealing with two species of *Lophosiphonia*, one of them being *L. bermudensis*, and the other *L. scopulorum* or *L. villum*.

Recently Hollenberg (1968, p. 57) has reinterpreted *Lophosiphonia*, restricting the circumscription of this genus to include only species having dorsiventral development of the apex with unilateral origin of lateral branches or trichoblasts. In keeping with this characterization of the genus *Lophosiphonia*, both *Lophosiphonia*-like entities present in the original Collins and Hervey material would be placed in the genus *Polysiphonia*. The first collection in the Collins Herbarium (Collins 7626: 7/25/1913) is a coarse plant, always found mixed with *D. rigens*. The prostrate branch measures 71 to 114 μ in diameter with segments 1 to 1.5 times longer than wide; the erect branches, mostly unbranched, reach 1.2 cm high, are about 71 to 88 μ in diameter, and mostly about 1 to 1.5 times longer than wide; the trichoblasts are reduced, spirally disposed, and quickly deciduous; the rhizoids are cut off from the pericentral cells by a transverse wall, have multicellular apices, and arise at the distal end of the pericentral cells. We suppose that this species is *P. setacea* Hollenberg.

The second collection (Collins 7779, 8/18/

1913), consists of delicate plants, with the prostrate branch measuring about 44 to 45 μ in diameter and with segments mostly about the same length as diameter. The erect branches are mostly unbranched, reaching 0.5 to 2.0 mm high, and measuring about 28 to 38 μ in diameter with segments 1.5 to 2.0 times as long as wide; the scar-cells are infrequent and seem spirally disposed; the rhizoids remain in open connection with their pericentral cell and arise from the central part of it. These plants agree very well with the descriptions of *Polysiphonia scopulorum* Harvey, with measurements varying from var. *villum* (J. Ag.) Hollenberg to var. *minima* Hollenberg. The relationship of this species to the more traditional concepts of *Lophosiphonia* may be seen in Hollenberg (1942, p. 535; see *L. villum*) and in Womersley (1950, p. 188; see *L. scopulorum*).

As a result, we conclude that one must not omit Collins' collection numbers when reducing *L. bermudensis* to synonymy because: 7626 was a mixture of *Polysiphonia setacea* and *Dipterosiphonia rigens*; 7779 is *Polysiphonia scopulorum*; and 7392 appears to be an entirely different member of the Rhodomelaceae. In addition, there is another collection marked "*Lophosiphonia bermudensis* Same", which is entirely *Dipterosiphonia rigens*.

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