
Lectotypification of some formae of *Alaria esculenta* (Linnaeus) Greville (Phaeophyceae, Alariaceae) described in Postels and Ruprecht's *Illustrationes algarum*

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In the early 19th century, *Alaria* specimens were collected from Avacha Bay on the south-eastern coast of the Kamchatka Peninsula, Russia during the round-the-world expedition organised in 1826–1829 by F.P. Litke and M.N. Stanyukovich. Two ships, *Senyavin* and *Moller*, took part in this expedition, and three naturalists, including the botanist K.H. Mertens, the geologist A. Postels, and the ornithologist F.K. Kittlitz were on board the *Senyavin* captained by F.P. Litke. The only naturalist on board the *Moller*, captained by M.N. Stanyukovich, was G. Kastalsky (Shirina 1991, Wynne 2009). During this expedition, considerable phycological material was collected from the northern part of the Pacific Ocean, mainly from Baranof (Baranov) and Unalaska Islands in Alaska and Avacha Bay (Postels & Ruprecht 1840). Each ship visited this general area three times during 1827–1828 (Litke 1835).

Currently, algal specimens collected during this expedition are preserved in the V.L. Komarov Botanical Institute (LE “Herb. Acad. Sc. Petrop.,” as specified by Postels & Ruprecht) and Uppsala University (UPS). In light of the fact that algal specimens collected earlier by Georg W. Steller from Kamchatka and reported by Gmelin (1768) are thought to be no longer extant (Dixon 1960, Abbott 1979), the herbarium specimens of *Alaria* from this expedition are likely to be the oldest surviving materials from Kamchatka. After processing the materials collected during this expedition, Postels & Ruprecht (1840) published a remarkable colour illustrated atlas of the marine plants from the North Pacific Ocean. In this “magnificent elephant folio volume” (Wynne 2009), they recorded three species of the genus *Alaria sensu lato*: *A. fistulosa* Postels & Ruprecht [currently *Eualaria fistulosa* (Postels & Ruprecht) M.J.Wynne], *A. esculenta* (Linnaeus) Greville, and *A. marginata* Postels & Ruprecht. Additionally, Postels & Ruprecht (1840) reported three infraspecific taxa of *A. esculenta* in the Pacific region: “ α *angustifolia*”, “ β *latifolia*” and “ γ *pinnatifida*.” Whilst such taxa designated with Greek letters are generally treated as varieties (*varietas*) their infraspecific status must be considered in the context of author’s text. In this instance, Postels & Ruprecht (1840) specifically noted “*Formae sequentes ... saepe distingui possunt*” [Often the following forms can be distinguished], and thus their infraspecific taxa are to be considered as formae.

Alaria esculenta f. *angustifolia* (as ‘*Alaria esculenta* α *angustifolia*’) Postels & Ruprecht *Illustrationes algarum* 1840: 11.

Type locality: Avacha Bay, eastern Kamchatka [Kamtschatka *ad portum St. Petri et Pauli*] (Postels & Ruprecht 1840).

Lectotype (here designated): unnumbered sheet deposited at LE (Fig. 1).

The lectotype was chosen among *Alaria* specimens marked by F.I. Ruprecht as “*Alaria esculenta* (*angustifolia*) *Ill. Algarum*” (Klimova *et al.* 2018) stored at LE. This specimen was collected by G. Kastalsky from Avacha Bay in 1827–1828.

We recently used a specimen KAV AvB01, collected on October 29, 2014 from Mayachny Cape (Avacha Bay) by A.V. Klimova, for DNA extraction. Our sequences were registered in the GenBank (MG993131 (COI), MG993133 (Rubisco), MG993136 (rDNA)).

Alaria esculenta f. *latifolia* Postels & Ruprecht (as '*Alaria esculenta* β *latifolia*'), *Illustrationes algarum* 1840: 11.

Type locality: Avacha Bay, eastern Kamchatka [Kamtschatka *ad portum St. Petri et Pauli*] (Postels & Ruprecht 1840).

Lectotype (here designated): Postels & Ruprecht *Illustrationes algarum* 1840 pl. XVII as *A. esculenta* [f.] *latifolia*

DNA sequences: We recently used a specimen (KAV_AvB02) collected on October 29, 2014 from Zavojko inlet (Avacha Bay) by A.V. Klimova, for DNA sequencing, now registered in GenBank [MG993132 (COI), MG993134 (Rubisco), MG993137 (rDNA)].

Note: Postel & Ruprecht (1840: 11) in describing their new infraspecific taxa stated that they were observed "*saepe in speciminibus rossicis*" [often in Russian specimens]. This strongly suggests that the authors probably used additional specimens in preparing the account of their new taxa. Thus, in accordance with ICN Art. 9.1. Note 1 (Turland *et al.* 2018): "If the author used only one specimen or illustration, either cited or uncited, when preparing the account of the new taxon, it must be accepted as the holotype, but the possibility that the author used additional, uncited specimens or illustrations (which may have been lost or destroyed) must always be considered", thus the figure in pl. XVII is here designated as lectotype (see Art. 9.1 Note 1 Ex. 2.).

Alaria esculenta f. *pinnatifida* Postels & Ruprecht ('*Alaria esculenta* γ *pinnatifida*') *Illustrationes algarum* 1840: 11.

Lectotype (here designated): unnumbered sheet deposited at LE (Fig. 2).

Type locality: Avacha Bay, eastern Kamchatka [Kamtschatka *ad portum St. Petri et Pauli*] (Postels & Ruprecht 1840).

Note: based upon our examination of herbarium specimens of *Alaria* collected from Kamchatka in the past two centuries and our freshly-collected materials, we consider that the unique character used to establish *A. esculenta* f. *pinnatifida* (viz, the blade bearing horizontal splits on its whole length) merely reflects age variability. These splits usually appear at the end of vegetative period in both forms of *A. esculenta* described above, especially in those habitats exposed to wave action. Thus, in our opinion, no reason exists to consider f. *pinnatifida* as an infraspecific forma of *A. esculenta*. We thus propose that it be considered as a heterotypic synonym of *A. esculenta* f. *esculenta*.

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Fig. 1. *Alaria esculenta* f. *angustifolia* Postels & Ruprecht. Lectotype (here designated) deposited in the Herbarium of the V.L. Komarov's Botanical Institute, Saint Petersburg (LE). Scale = 10 cm.



Fig. 2. *Alaria esculenta* f. *pinnatifida* Postels & Ruprecht. Lectotype (here designated) deposited in the Herbarium of the V.L. Komarov's Botanical Institute, Saint Petersburg (LE). Scale = 10 cm.