1871
ИнБЮМ – IBSS

Морской биологический журнал
Marine Biological Journal
2023, vol. 8, no. 1, pp. 109–112
https://marine-biology.ru

NOTES

UDC [582.273:581.9](265.2/.5)

ON THE DISTRIBUTION OF MARINE ALGA *LUKINIA DISSECTA* PERESTENKO (RHODYMENIACEAE, RHODYMENIALES) IN THE NORTHERN PACIFIC

© 2023 **O. N. Selivanova and G. G. Zhigadlova**

Kamchatka Branch of the Pacific Geographical Institute, Far Eastern Branch
of the Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Russian Federation
E-mail: *oselivanova@mail.ru*

Received by the Editor 05.04.2022; after reviewing 08.06.2022;
accepted for publication 20.10.2022; published online 14.03.2023.

The red alga *Lukinia dissecta*, previously found in a laboratory marine aquarium containing water and substrate (bottom stones and broken shells) from the Avacha Bay (the Southeastern Kamchatka), was first discovered in natural conditions in the Eastern Kamchatka waters. This significantly broadens the concept of the range of the species, which was previously considered disjunctive and exclusively insular. Based on new findings, the species range is reported as extended and, apparently, continuous. The availability of *L. dissecta* samples from Alaska (USA) in the authors' possession made it possible to consider the species as a boreal interzonal pan-Pacific one.

Keywords: *Lukinia*, Kamchatka, range, pan-Pacific species

The species *Lukinia dissecta* Perestenko, 1996 (Rhodophyta), described by L. Perestenko [1994] and assigned by her to the order Gigartinales, long remained a taxon with an unclear systematic position at the family level. However, recently, the researchers from the Far East [Shibneva et al., 2022] carried out a radical review of *L. dissecta* status and came to an unambiguous conclusion that the species belongs to the family Rhodymeniaceae within the order Rhodymeniales.

During our studies in a laboratory marine aquarium containing substrate and water from the Avacha Bay (the Southeastern Kamchatka), algae new to this region were found, including *L. dissecta* [Selivanova, Zhigadlova, 2022]. We suggested that the presence of unusual algae in the aquarium may indicate their occurrence in the Avacha Bay water, and it was justified in terms of *L. dissecta*: the species was soon discovered in the Kamchatka water area. The data on the findings are shown in Figs 1 and 2 (water areas 2 and 3).

The aim of this work was to clarify the range of *L. dissecta* taking into account all currently known data on the distribution of this algae.

MATERIAL AND METHODS

Aquarium and natural algae sampled near the Southeastern Kamchatka were identified under an Olympus CX31 light microscope. When identifying the material, a comparison was made with the original taxon description and data from other publications on this species [Klochkova et al., 2009; Lopatina, Klochkova, 2016; Perestenko, 1994; Shibneva et al., 2022]. The samples were photographed with an Olympus SZ-20 digital camera. The studied material is stored in the laboratory of hydrobiology of the Kamchatka Branch of the Pacific Geographical Institute.

RESULTS AND DISCUSSION

The study of our *L. dissecta* samples showed their close morphological similarity with representatives of the genera *Palmaria* Stackhouse, 1802 and *Sparlingia* G. W. Saunders, I. W. Strachan et Kraft, 1999. *L. dissecta* also has a narrow wedge-shaped base and a lamellar part widened upwards with varying degree of the apex dissection (the apex from almost non-dissected to deeply dissected). The polymorphic appearance of plants is shown in Fig. 1. However, *L. dissecta* differs from representatives of closely related genera in the structure of subcortical and medulla cells, as well as in the structure of the cystocarp [Lopatina, Klochkova, 2016; Shibneva et al., 2022]. This allows to reliably distinguish its specimens from closely related ones.

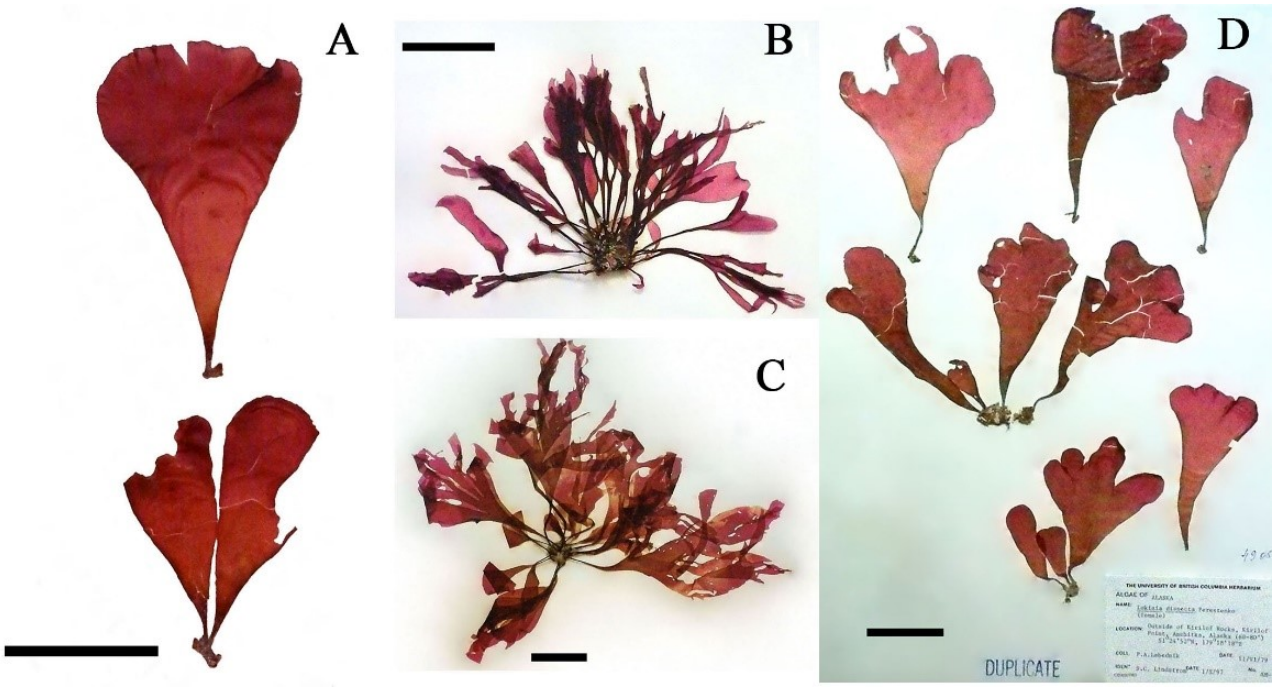

Fig. 1. *Lukinia dissecta* from different habitats: sampled at the Commander Islands (A), at Cape Baraniy (B), in Vestnik Bay (C), and at Amchitka Island (D). Scale: A, D, 4.5 cm; B, C, 3 cm

Our information on *L. dissecta* distribution differs from the data obtained earlier. Specifically, it was considered that *L. dissecta* occurs in Russian waters of the Far East alone and, in addition to the Commander Islands (its typical habitat), is distributed near Sakhalin and the Kuril Islands [Klochkova et al., 2009; Lopatina, Klochkova, 2016; Perestenko, 1994]. However, *L. dissecta* findings first in the laboratory

marine aquarium containing bottom sediments and water from the Avacha Bay [the Southeastern Kamchatka] [Selivanova, Zhigadlova, 2022] and then in the Eastern Kamchatka water area [Cape Baraniy (the Avacha Bay) and Vestnik Bay (the Southeastern Kamchatka) (Fig. 2, water areas 2 and 3, respectively)] significantly expanded the understanding of its range. It is quite natural that *Lukinia* described from the Commander Islands and then found much further south, on Sakhalin and Kuriles, could only get there through the Kamchatka water area. Moreover, our herbarium specimens of this alga, kindly sent by Dr. Sandra C. Lindstrom (University of British Columbia, Canada), sampled in Alaska (USA) (Fig. 2, water area 6), allowed us to assume an even more extended and continuous range of *L. dissecta* in the northern Pacific Ocean [Selivanova, Zhigadlova, 2022]. This is shown in Fig. 2.

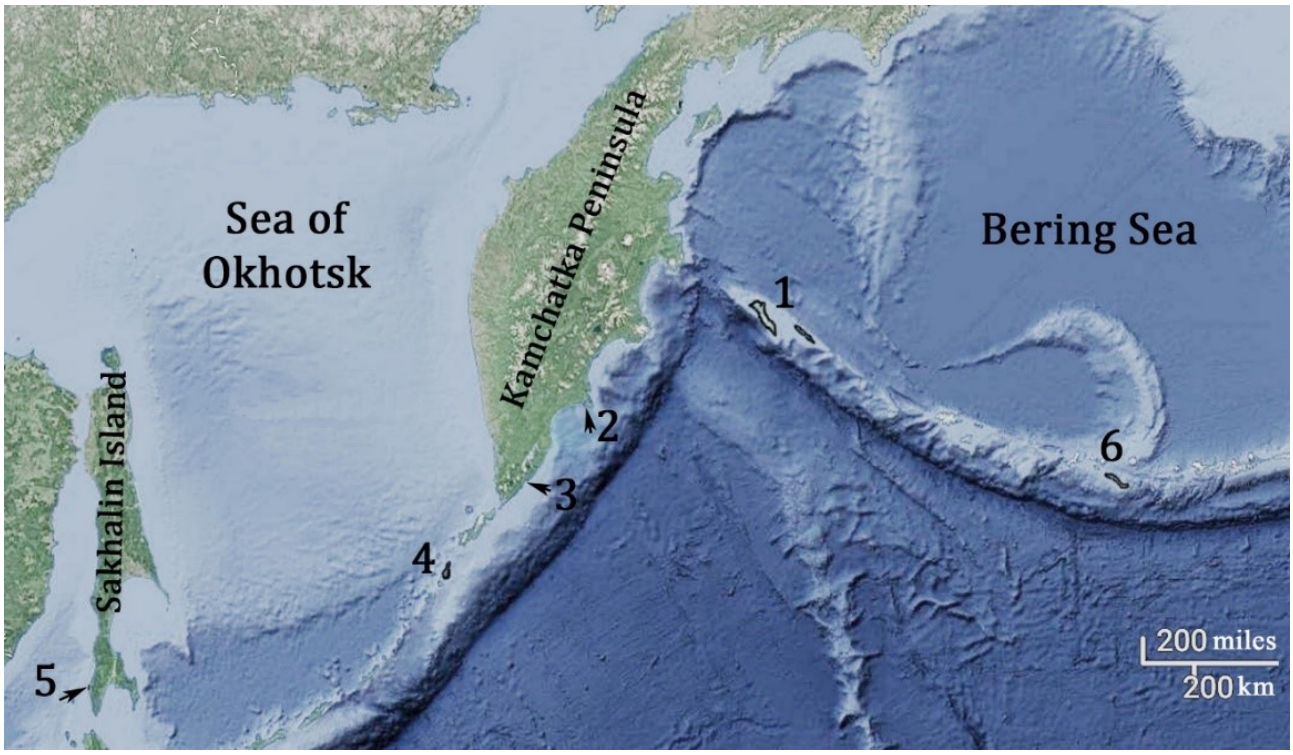

Fig. 2. Location map of *Lukinia dissecta* in the Northern Pacific. Russian water area: the Commander Islands (1); Cape Baraniy (the Avacha Bay) (2); Vestnik Bay (the Southeastern Kamchatka) (3); the Onekotan Island (the Northern Kuriles) (4); Cape Lopatin (the Sakhalin Island) (5). American sector: Amchitka Island (the Aleutian Islands, Alaska, USA) (6)

Conclusion. The study of *Lukinia dissecta* from the Avacha Bay showed that this species has an extended range in the Northern Pacific (from the Commander Islands to Sakhalin and the Kuriles through the Eastern Kamchatka), though it was previously considered disjunctive and exclusively insular. The occurrence of *L. dissecta* in Alaska led to the conclusion that this species is even more widespread in the Pacific Ocean and should be considered as a boreal interzonal pan-Pacific (also found in the American sector).

Acknowledgement. We thank our colleagues for their participation in the algae sampling and Sandra C. Lindstrom (Canada) for providing alga herbarium specimens.

REFERENCES

1. Klochkova N. G., Koroleva T. N., Kusidi A. E. *Marine Algae of Kamchatka and Surrounding Areas.* Vol. 2. *Red Seaweeds.* Petropavlovsk-Kamchatsky : KamchatNIRO Publishing, 2009, 303 p. (in Russ.)
2. Lopatina N. A., Klochkova N. G. The genus *Lukinia* (Rhodophyta: Gigartinales) in the Far-Eastern seas of Russia. *Vestnik Kamchatskogo gosudarstvennogo tekhnicheskogo universiteta*, 2016, no. 36, pp. 74–78. (in Russ.). https://doi.org/10.17217/2079-0333-2016-36-74-78
3. Perestenko L. P. *Red Algae of the Far-Eastern Seas of Russia.* Saint Petersburg : Olga, 1994, 331 p. (in Russ.)
4. Selivanova O. N., Zhigadlova G. G. On the finding of algae new to Southeastern Kamchatka in a laboratory marine aquarium. *Biologya morya*, 2022, vol. 48, no. 2, pp. 129–134. (in Russ.). https://doi.org/10.1134/S1063074022020092
5. Shibneva S. Yu., Skriptsova A. V., Semenchenko A. A. Molecularly assisted taxonomic studies of marine red algae from the north-western Pacific: Establishing the ordinal and family positions of the genus *Lukinia* and the monospecific status of the genus *Sparlingia* (Rhodymeniales). *Phycologia*, 2022, vol. 61, iss. 1, pp. 37–44. https://doi.org/10.1080/00318884.2021.1988488

О РАСПРОСТРАНЕНИИ МОРСКОЙ ВОДОРОСЛИ *LUKINIA DISSECTA* PERESTENKO (RHODYMENIACEAE, RHODYMENIALES) В СЕВЕРНОЙ ПАЦИФИКЕ

О. Н. Селиванова, Г. Г. Жигадлова

Камчатский филиал Тихоокеанского института географии ДВО РАН,
Петропавловск-Камчатский, Российская Федерация
E-mail: *oselivanova@mail.ru*

Красная водоросль *Lukinia dissecta*, которую ранее нашли в лабораторном морском аквариуме, содержащем грунт и воду из Авачинского залива (Юго-Восточная Камчатка), впервые обнаружена в природных условиях в акватории Восточной Камчатки. Это значительно расширяет представления об ареале вида, который ранее считали дизъюнктивным и исключительно островным. На основании новых находок ареал вида признан протяжённым и, по-видимому, непрерывным, а наличие у авторов образцов *L. dissecta* с Аляски (США) позволило рассматривать вид как бореальный интерзональный панпацифический.

Ключевые слова: *Lukinia*, Камчатка, ареал, панпацифический вид