

LITHOPHYLLUM TORTUOSUM
REDISCOVERED IN THE KVARNER GULF
(NORTHERN ADRIATIC)

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The calcareous alga *Lithophyllum tortuosum* (Esp.) Fosl. — syn. *Tenarea tortuosa* (Esp.) Lemoine (fam. *Corallinaceae*), was not found in the Kvarner Gulf since Lorenz (1863:180) and therefore its existence in the Northern Adriatic Sea was questionable. The presence of this alga in the Kvarner has been mentioned recently in a preliminary communication (Lovrić 1970).

Now it is known for certain to exist in the Quarneric isles of Krk, Sv. Grgur, and Plavnik. The first and the most abundant localities of Kvarner are the emergent pavements in abrasion caves of the stormy straits of Senjska Buka (cape of Škuljica, — SE end of the island of Krk, near Baška), exposed directly to the violent and very frequent bora of Senj (continental east wind), and to periodical shore icing in winter (fig. 2).

This exclave of Kvarner is characterised by the new subspecies *ercegovicii*, which differs from the Mediterranean type by its external aspect, internal structure, and ecology. It is a psychrophilous ecotype developed in the abrasion cliffs of the eastern shores exposed to gusts of bora, and sometimes forming calcareous pavements up to 1/2 m wide in a mediolittoral zone of 10—30 cm.

This alga is the principal characteristic species of the association *Lithothamnio* — *Lithophylletum adriaticum* (Lorenz) comb. nov. — syn. *Hieroglyphico* — *Lithophylletum* Lorenz 1863:180 (Alliance *Neogoniolitho* — *Nemodermion* Molinier 1959:157), making a separate boreal facies with this subspecies in Kvarner. Other characteristic algae are *Lithophyllum incrustans* Phil., *Lithothamnium lenormandii* (Aresch.) Fosl., *Valonia utricularis* (Roth.) C. Ag. var. *crustacea* Kuck., *Nemalion helminthoides* (Velley) Batt., and the significant fauna are *Middendorfia caprearum* (Poli), *Physcosoma granulatatum* (Leuck.), and *Patella aspera* Lamk. (Lovrić 1971a, 1971b).

The thermophilous subspecies *tortuosum* (incl. f. div.) has a regional variable ecology: In the East Adriatic it is developed principally in the rocky crevices and caves of the south shores exposed to the open sea winds (Ercegović 1963). There is widened from Dubrovnik (Šerman 1962) to the south shore of Istrian Peninsula (Špan 1969, Giaccone — communication in Lovrić 1970), and in the West Adriatic this alga is found northwards to the Monte Gargano Peninsula and Tremiti Archipelago (Huvé and Picard 1963, Pignatti and coll. 1967) — for detailed localities of Adriatic cf. Lovrić (1971b). In the West Mediterranean this one occurs on the well exposed open shores forming emergent pavements with *Neogoniolithon notarisii* Setch. et Mason. (Molinier 1959, Pérès 1967), and in the East Mediterranean it grows on the submerged pavements at the foot of low-water line, in the *Tenarea undulosa* Bory — *Lithophyllum byssoides* Fosl. — community (Giaccone 1968).

Diagnosis

Lithophyllum tortuosum (Esp.) Foslie subsp. *ercegovicii*, subspec. nova — syn. *L. hieroglyphicum* Lorenz (1863: 180, non Zanard.). *Etymol.*: Prof. Dr Ante Ercegović (1895—1969, cf. Pavletić 1970, Alfirević 1970), *Florae Adriaticae exploratoris egregii in memoriam*. *Diff.* a subsp. *tortuosum* s. s. (typus cf. f. *cristata* Foslie 1900 in Preda 1908: 25, f. *genuina* Hauck 1885: 270): *Thallus* compactus haud porosus, superficies subintegra vix sculpta subtile papillosa et imbricato-squamata, squamulae parvae 1—3 mm Ø conceptaculis convexis granulatae. *Alga psychrophila*, *Typus*: speluncae emergentes »Škuljica« freti Senjska Buka contra pharum Prvić (Adriaticum boreale), 16. VIII 1967 A. Lovrić, no. Bš-62/67, Zagreb. *Icon.*: Lovrić 1970: fig. 3 et 4. *Hab.*: rupes abrasivae mediolitorales procellosae orientales, pavimenta calcaria interdum construens, associationis *Lithothamnion* — *Lithophylletum* adriaticum (Lorenz) comb. nov. proprium. *Area*: insulae quarnericae Krk, Sv. Grgur, Plavnik.

Summary

Lithophyllum tortuosum has been found again in the Kvarner Gulf as the new subspecies *ercegovicii*. This psychrophilous ecotype is developed in the abrasion cliffs exposed to the bora and icing, and it is characteristic of the emergent pavements of Ass. *Lithothamnion* — *Lithophylletum* adriaticum.

Fig. 1. The area of the *Lithophyllum tortuosum* in Adriatic Sea (— — —).
Sl. 1. Areal alge *Lithophyllum tortuosum* u Jadranu (— — —).

Fig. 2. Localities of the new subspecies *ercegovicii* in the Kvarner Gulf (▲), and dynamics (days/year) of the wind of bora (....).

Sl. 2. Nalazišta nove podvrste *ercegovići* u Kvarneru (▲) i dinamika bure u danima/god. (....).

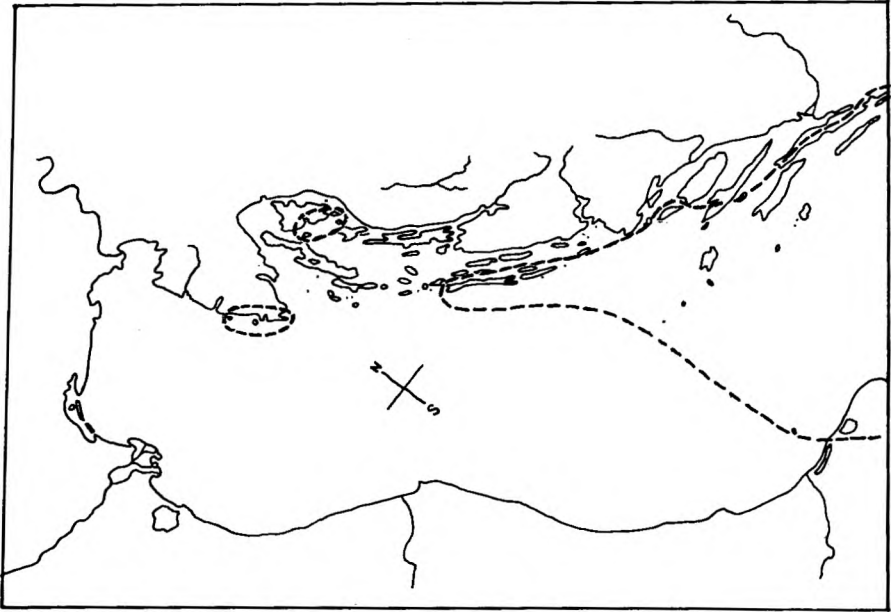


Fig. 1. — Sl. 1.

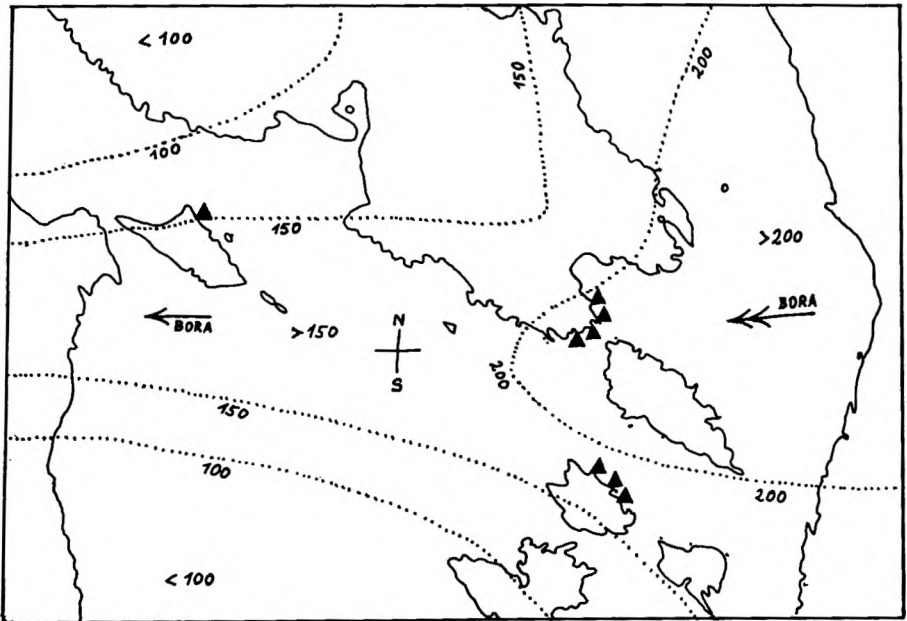


Fig. 2. — Sl. 2.



Fig. 3. — Sl. 3.

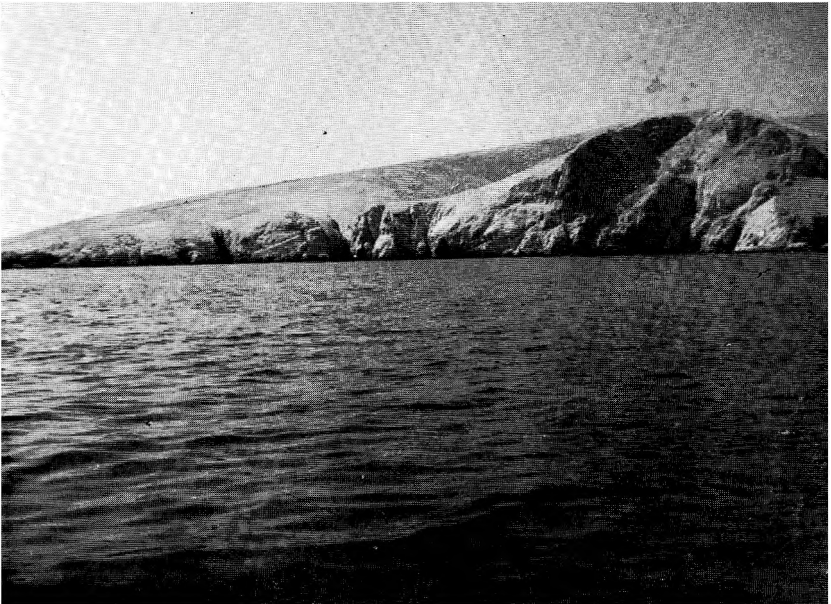


Fig. 4. — Sl. 4.

References — Literatura

- Alfirević S. 1970: Dr Ante Ercegović — sa vie et son oeuvre. *Acta Adriat.* **13**, 8, 11—23.
- Ercegović A. 1963: Vegetacija Jadranskog mora i problemi njezina istraživanja. *Pomorski zbornik* **1**, 667—691.
- Giaccone G. 1968: Contributo allo studio fitosociologico dei popolamenti algali del Mediterraneo orientale. *Giorn. Bot. Ital.* **102**, 6, 485—506.
- Hauck F. 1885: Die Meeresalgen Deutschlands und Östererichs, in Rabenhorst's Kryptogamenflora Bd. II, Leipzig.
- Huvé H. et P., Picard J. 1963: Aperçu préliminaire sur le benthos littoral de la côte rocheuse adriatique italienne. *Rapp. C.I.E.S.M.* **17**, 2, 95—102.
- Lorenz J. R. 1863: Physikalische Verhältnisse und Verteilung der Organismen im Quarnerischen Golfe. Wien.
- Lovrić A. Ž. 1970: Signification de l'isolation géographique etc. *Arch. Ocean. Limnol.* **18** — V. Eur. Symp. Marine Biol. Venezia.
- Lovrić A. Ž. 1971a: Études écologiques et biocoenotiques du litoral du Kvarner (Adriatique du nord-est). *Acta Adriat.* **14** (in press).
- Lovrić A. Ž. 1971b: Biocenoze Senjskog arhipelaga s posebnim obzirom na utjecaj bure. D. Sc. Thesis (mscr. ined.), Prir.-mat. fak. Zagreb.
- Molinier R. 1959: Étude des biocénoses marines du Cap Corse I. *Vegetatio* **9**, 1/2, 121—192.
- Pavletić Z. 1970: Dr Ante Ercegović — In memoriam. *Acta Bot. Croat.* **29**, 9—16.
- Pérès J. M. 1967: Les biocoenoses benthiques dans le Système Phytal. *Rec. Trav. St. Mar. Endoume* **42**, 58, 3—113.
- Pignatti S. et coll. 1967: Le associazioni algali della Grotta delle Viole nell'isola di S. Domino. *Giorn. Bot. Ital.* **101**, 2, 117—126.
- Preda A. 1908: *Florideae*, in *Flora Ital. Cryptogama* II/1, 2.
- Serman D. 1962: Prilog poznavanju bentoske vegetacije infralitorala otoka Lokruma. Graduate work (mscr.), Prir.-mat. fak. Zagreb.
- Span A. 1969: Istraživanja trotoara vapnenačkih alga u Jadranu. 3. Kongres Biol. Jugosl. Ljubljana, 261—262.

Fig. 3. A fragment of calcareous pavement of *Lithophyllum tortuosum* subsp. *ercegovičii* from the straits of Senjska Buka, with *Patella aspera*, and *Brachyodontes minimus* (2/3).

Sl. 3. Komad vapnenačke police alge *Lithophyllum tortuosum* subsp. *ercegovičii* iz tjesnaca Senjska Buka, s vrstama *Patella aspera* i *Brachyodontes minimus*.

Fig. 4. Abrasion cliffs and caves of the cape of Škuljica in the straits of Senjska Buka, a locality of pavements of Ass. *Lithothamnio — Lithophylletum adriaticum*.

Sl. 4. Abrazivne klisure i pećine rta Škuljica u tjesnacu Senjska Buka, nalazište police zajednice *Lithothamnio — Lithophylletum adriaticum*.

SADRŽAJ

PONOVNI NALAZ ALGE *LITHOPHYLLUM TORTUOSUM* U KVARNERU

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Vapnenačka alga *Lithophyllum tortuosum* (Esp.) Fosl. (*Corallinaceae*) nakon Lorenza (1863: 180) nije više nađena u Kvarneru pa je bila dvojbena za ovo područje. Sada je sigurno utvrđena za Krk, Sv. Grgur i Plavnik, a najbogatije je nalazište u abrazivnim pećinama rta Škuljica u tjesnacu Senjska Buka (jugoistočni Krk). Za ovu kvarnersku eksklavu je značajna nova podvrsta *ercegovičii* koja se razlikuje od mediteranskog tipa morfološki (gušća unutarnja građa, te skoro cjelovita, sitno bradavičasto-ljuskasta površina) i ekološki (psihorofilni ekotip). Nalazi se po abrazivnim klisurama na istočnim obalama otoka izloženih najžešćoj orkanskoj buri i povremenom zimskom zaleđivanju obale. Ova alga je glavna svojstvena vrsta zajednice *Lithothamnio — Lithophyllum adriaticum* (Lorenz 1863) comb. nov., u kojoj opisana podvrsta čini posebni sjevernojadranski facijes. Mjestimice izgrađuje u kvarnerskom mediolitoralu (npr. na rtu Škuljica) organogene vapnenačke police širine do 1/2 m.

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