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Taxonomic Notes on the Lichen Family Verrucariaceae in Japan (VII). *Verrucaria marinomuralis* Harada sp. nov.

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Abstract *Verrucaria marinomuralis* Harada sp. nov. is described as new in the lichen family Verrucariaceae. It was found growing on non-calcareous seaside rocks in the splash zone and above in Chiba-ken, central Japan.

Key words: Lichenes, taxonomy, Verrucariaceae, *Verrucaria marinomuralis*, Japan, maritime.

During my floristic survey on maritime lichens at Chôshi in Chiba-ken, central Japan, a crustose lichen species resembling *Verrucaria muralis* Ach. was collected on seaside rocks. My recent studies have revealed that it differs from *V. muralis* and belongs to an undescribed species of *Verrucaria*. In this paper, it is newly described as *Verrucaria marinomuralis* Harada sp. nov.

The species *Verrucaria marinomuralis* Harada sp. nov.

(Figs. 1–2)

Lichenes ad saxa maritima non-calcarea; thallus epilithicus, rimulosus, cinerascens; perithecia nigra ad basi immersa; involucrellum nigricans, aliquantum lateraliter expansum, 350–520 μm latus; periphyses bene evolutae, 30–50 μm longae; sporae 15–25×8–11 μm.

Typus. Japan. Honshu, Chiba-ken, Chôshi-shi, Kurobae, 1 m alt., on rocks in splash zone, Harada & Kärnefelt 13609 (CBM–holotypus).

External morphology. Thallus partly superficial, spreading, following the surface of substratum, rimulose, pale grayish green to brownish, or almost white, dull, epruinose, with indistinct margin, lacking prominent hypothallus. Perithecia abundant, solitary, usually 2/3–1/3 immersed and dome-shaped, sometimes almost sessile and hemispherical, 0.3–0.5 mm in diam., very dark brown to almost black, but dark brown in shade, a little glossy, smooth, but usually more or less rough due to fragments of substratal rocks in involucrellum, with or without thin thalline cover at the base, round or slightly projected at the ostiole (usually recognizable as very tiny whitish dot). Pycnidia not seen.

Anatomy. Thallus composed of two layers; the upper layer more or less looking subparaplectenchymatous in lower magnifications (×200 or ×400) under microscope, 40–90 μm thick, hyaline, with scattered phycobiont (spherical) cells (or in clusters), usually with ca. 5 μm thick epinecral layer, cells of hyphae more or less vertically elongated, but usually short and slightly inflated, 3–8 μm long×1–2 μm wide, with thin (ca. 0.5 μm) walls; the lower layer composed of more or less variously orientated linear hyphae, lacking phycobiont, usually 50–75 μm (sometimes thicker). Perithecia (excl. involucrellum) almost spherical, or somewhat flattened, 190–300 μm high×180–280 μm wide. Involucrellum very dark brown to almost black, more or less spreading laterally and separated from the exciple in younger stages, later thickened and frequently contiguous with the exciple, extending nearly to the base-level of the exciple, frequently with fragments of substratal rocks, 350–520 μm in diam. Exciple in the upper part dark brown to almost black, thickened, merging with the involucrellum, with a hyaline or very pale brown innermost layer (incl. periphyses), 15–25 μm thick around the ostiole, in the lateral part

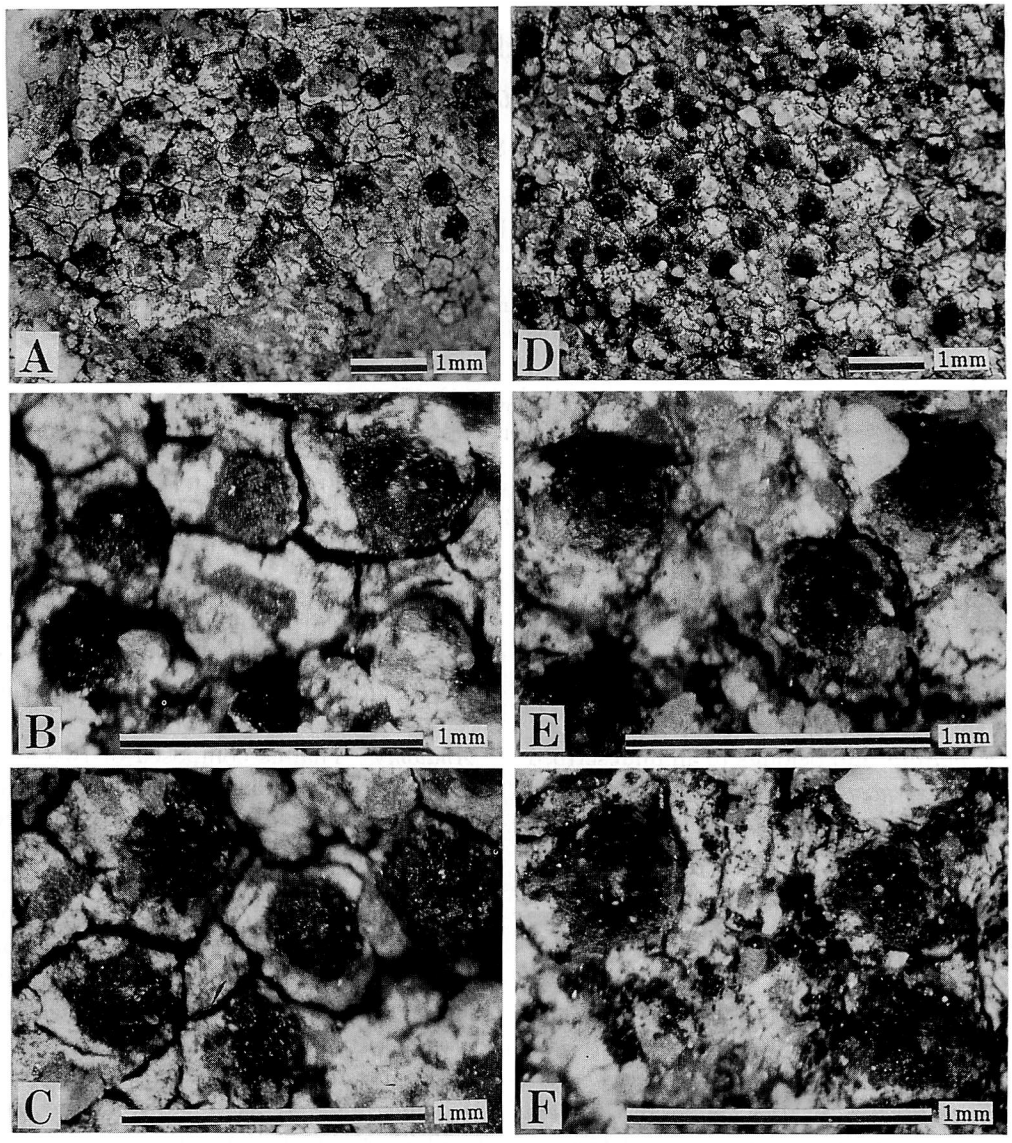

Fig. 1. Habit of *Verrucaria marinomuralis*. (A–F, air-dried material. A–C, holotype; D–F, Harada 11603).

hyaline or brown, 10–30 μm thick, in base hyaline or browned in the outer parts, 20–30 μm thick. Periphyses prominent, more or less sparsely branched and anastomosing near the base to form a loose network, 30–50 μm long. Subhymenium concave above, 15–50 μm thick at the base. Asci clavate, 60–75×20–25 μm. Spores 8 in each ascus, hyaline, simple, ellipsoidal, 15–25×8–11 μm.

Habitat. On non-calcareous seaside rocks in splash zone or above.

Distribution. Known only from the type locality and its vicinity in central Japan.

Additional specimens examined. Japan. Honshu. Chiba-ken, Chôshi-shi, 10 m alt., Harada 11603 (CBM).

Remarks. Verrucaria marinomuralis Harada resembles *V. muralis* Ach. in having partly superficial, thin and cracked grayish thallus, black perithecia partly immersed in the thallus, rather long, more or less branched and anastomosing periphyses which form a loose network in the basal part, and medium-sized spores. However, it can be distinguished from

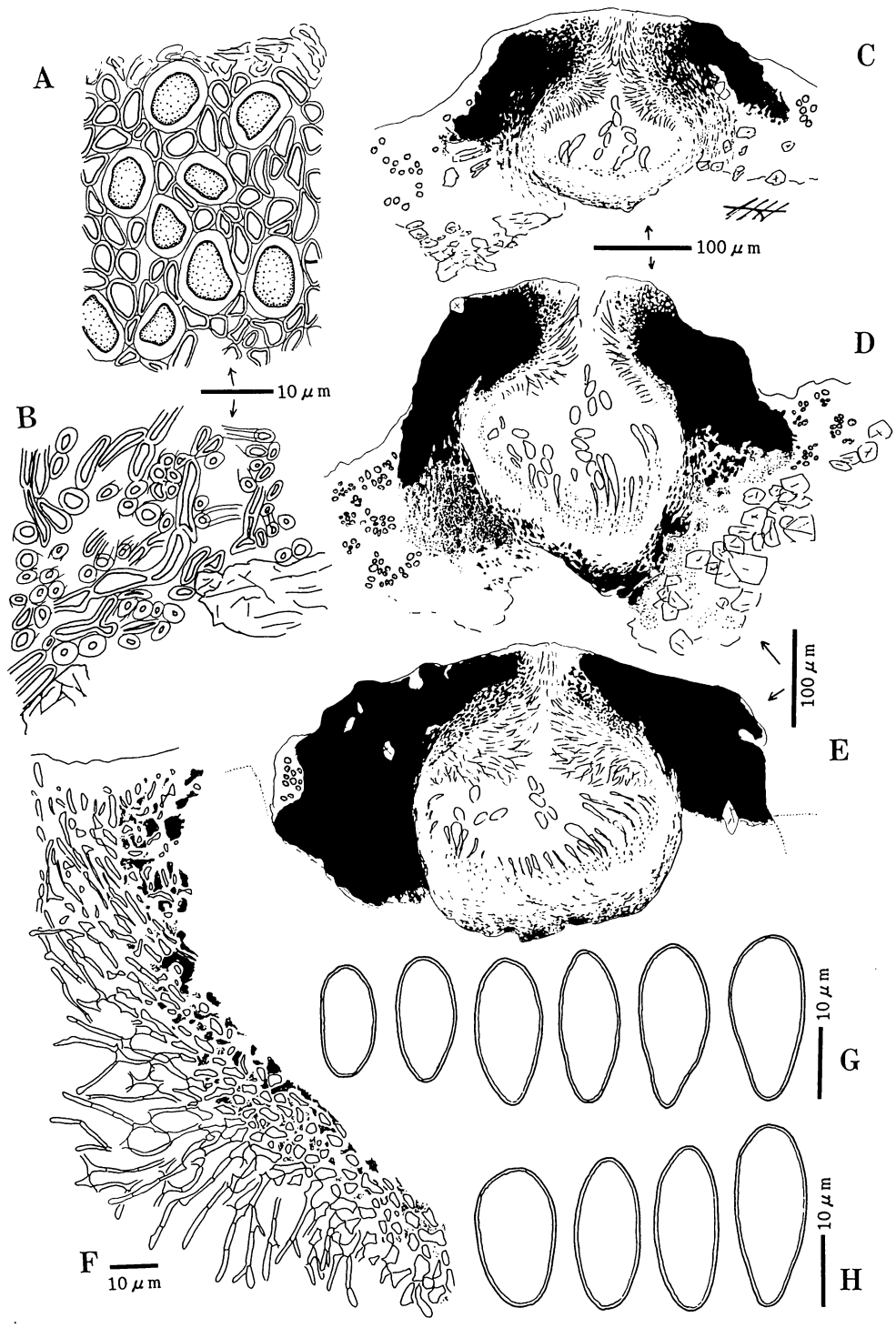

Fig. 2. Anatomy of *Verrucaria marinomuralis* from Japan. A, upper part of thallus in vertical section. B, lower part of thallus in vertical section. C–E, vertical sections of perithecia. F, part of perithecium in vertical section. G–H, spores. (A, B, F–H, LPCB preparations; C–E, GAW preparations. A–D, F–G, holotype; E, H, Harada 11603).

the latter in morphology and ecology. *V. marinomuralis* has 0.3–0.5 mm wide perithecia in superficial view which are slightly larger than 0.2–0.3 mm wide in the type specimen of *V. muralis* (H-ACH 691, p. major p., that is, left, upper center, and lower center pieces of wall fragments, excluding the right one which can be considered as the type of *V. muralis* var. *concentrica* Ach.). The involucrellum of *V. marinomuralis* at relatively young stages of perithecia is more or less separated from the exciple and spreads laterally. At later stages, most of the axillary part between the involucrellum and the exciple becomes dark brown to almost black and thus a part of the involucrellum. It results in the thickened involucrellum. In *V. muralis*, on the other hand, the involucrellum is usually thin and contiguous with the exciple or slightly separated from the exciple in lateral part. Ecologically, these two species are significantly different. *V. marinomuralis* was found on non-calcareous seaside rocks in the splash zone. On the other hand, *V. muralis* is known from calcareous rocks or walls (Purvis *et al.*, 1992; Santesson, 1993; Clauzade and Roux, 1985).

The perithecia tend to be less smooth on the surface in one of the specimens (Harada no. 11603, Fig. 1F) than in the holotype (Fig. 1B & C). That specimen shows a characteristic form of the perithecial walls in vertical section of perithecia, that is, abnormally thin near the ostiole (Fig. 1E). The rough surface seems to be caused by high erosive activities due to sand grains carried by wind or run-off at that site.

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日本産アナイボゴケ科地衣類分類ノート (VII). *Verrucaria marinomuralis* Harada sp. nov.

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千葉県銚子産の標本に基づき *Verrucaria marinomuralis* Harada (地衣類, アナイボゴケ科) を新種として記載した. 本種は *V. muralis* Ach. に以下の点で似る. 地衣体が基物の表面に薄く現れ, 灰色を帯び, 割れる. 周糸が比較的長く, 基部では分枝癒合し緩い編目状を呈する. 胞子が中くらいの大きさ (*V. marinomuralis* では 15–25×8–11 μm, Purvis *et al.*, 1993 によると *V. muralis* では 15–25×8–15 μm). しかし, 本新種では involucrellum が水平に広がり果殻より離れ, あるいは厚くなる傾向が強いことで明らかに異なる. そこで子器を表面からみると 0.3–0.5 mm で, *V. muralis* の 0.2–0.3 mm より幾らか大きい. また生態的にも極めて差異が大きく, *V. muralis* が石灰岩など石灰質の基物に生育するのに対し, *V. marinomuralis* は海岸の非石灰質の岩上 (飛沫帯) に生育する.