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STUDIES ON THE MELOBESIOIDEAE OF JAPAN. III

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4. *Dermatolithon dispar* (FOSLIE) FOSLIE

Pl. I, Fig. 1, Pl. II, Figs. 1-3, Pls. III & IV

Foslie, 1909, p. 58; De Toni, 1924, p. 667; Mason, 1953, p. 343; Dawson, 1955, p. 276; Scagel, 1957, p. 152; Dawson, Neushul & Wildman, 1960, p. 56, pl. 21, fig. 1.

Syn. *Lithophyllum tumidulum* FOSLIE f. *dispar* FOSLIE, 1907, p. 29; Nichols, 1909, p. 357. *Lithophyllum (Dermatolithon) dispar* FOSLIE, 1909, p. 50. *Lithophyllum dispar* (FOSLIE) FOSLIE, 1919, p. 33, pl. 72, fig. 14. *Fosliella dispar* (FOSLIE) G. M. SMITH, 1944, p. 225; Doty, 1947, p. 170.

Japanese name. Norimaki-modoki (n. n.).

Habit and distribution, in literature. - Epiphytic on *Gelidium arborescens*, *G. nudifrons* (?)*, *Bossiella* sp., *Corallina* sp., *Prionitis Lyallii*, *Ahnfeltia gigartinoides*, *A. plicata*, *Gymnogongrus linearis*, and *Gigartina volans*. Pacific coast of North America, from Northern Washington to California.

Specimens collected. - Nanaehama, near Hakodate, on *Grateloupia filicina* and *Rhodoglossum pulchrum*, June and October 1959, Masaki.

Thallus epiphytic on various red algae, firmly adherent to and partly encircling the host, at first orbicular, later becoming confluent with each other and irregular in shape, reddish purple in color. ca. 1 cm in maximum diameter, to 200-500 μ thick, surface smooth, polystromatic but marginal portion here and there narrowly monostromatic, cells of marginal portion arranged radially in surface view. 42-84 μ long by 11 μ diam.; hypothallium consisting of cells obliquely elongated, 15-84 μ long by 8-11 μ diam., sometimes showing abrupt change in length of cells; perithallium polystromatic, consisting of 7-9 layers of cells in the neighborhood of conceptacles, cells 13-70 μ long by 7-11 μ diam.; cells of epithallium triangular in the marginal portion of thallus but rectangular in the inner, 3-5 μ high, 5-10 μ diam.; secondary pits present but coalescence of cells absent; sporangial conceptacles immersed, sometimes slightly convex, 210-273 μ diam., (110-) 126-170(-184) μ high, tetrasporangia 64-112 μ long, 25-63 μ diam., 6-9 sporangia standing on the periphery of floor in each conceptacle, central part of conceptacle floor slightly upheaved and surmounted by a number of elongated cells which connect the floor and the gelatinous plug that closes the conceptacle pore; procarpic conceptacles immersed, up to ca. 105 μ diam. by 63 μ high, cystocarpic conceptacles sometimes slightly convex, 210-252 μ diam., 126-168 μ high, orifice with well developed papillae; spermatangial conceptacles immersed deeply or immediately below the thallus surface, sometimes slightly

*Cf. Dawson *et al.*, 1960, pl. 21, fig. 1.

convex, 85-115 μ diam., 46-84 (-105) μ high, orifice sometimes provided with a spout, spermatangia 5-7 μ long by 2 μ diam., not at the end of sterigmata.

The writers' sporangial and male specimens agree well in general with the descriptions of the present species given by the authors cited above, except in having somewhat smaller sporangial conceptacles and sporangia and somewhat higher spermatangial conceptacles. Female plants of this species have been previously unknown, but the writers have fortunately discovered procarpic and cystocarpic specimens among their materials as described above.

5. *Dermatolithon canescens* (FOSLIE) FOSLIE

Pl. I, Figs. 2 & 3, Pl. II, Figs. 4-7, Pl. V

Foslie 1909, p. 58; De Toni, 1924, p. 666.

Syn. Melobesia (Heteroderma) canescens FOSLIE, 1900, p. 6; Yendo, 1902, p. 186; De Toni, 1905, p. 1769. *Lithophyllum (Dermatolithon) canescens* FOSLIE, 1905, p. 8; 1909, p. 48. *Lithophyllum canescens* FOSLIE, 1919, p. 32, pl. 72, fig. 3; Yendo, 1916, *in* Okamura, 1916, p. 128; 1936, *in* Okamura, 1936, p. 511.

Japanese name. Sôhan (Yendo).

Habit and distribution, in literature. - Epiphytic on *Padina arborescens*. Pacific coast of middle Honshû, Japan.

Specimens examined. - Epiphytic on the hapteres of *Alaria crassifolia*: Shirikishinai, near Hakodate, November 1958, Yakushi. On *Padina arborescens*: Enoshima, Kanagawa Pref., April 1898, Okamura (Alg. Jap. Exsic. No. 39); Misaki, Kanagawa Pref., April 1900, Yendo (Herb. Fac. Agr., Hokkaido Univ.); Kominato, Chiba Pref., 28 August 1959, Iwamoto.

Thallus epiphytic on brown algae, firmly adherent to the host, forming suborbicular patches, which later become confluent with each other, 2-10 cm in diam., color of the crust purplish red when fresh, whitish rose on drying, monostromatic at margins, polystromatic in the inner portion, usually up to 120 μ thick, sometimes up to 200-300 μ ; hypothallium monostromatic, cells obliquely elongated, 12-55 μ long, (7-) 9-16 μ diam., showing marked differences in length in one and the same individual; perithallium consisting of 2-5 layers of cells of various length, cells 10-42 μ long, 7-13 μ diam.; secondary pits present between each vertical cell row, but coalescence of cells absent; cells of epithallium triangular, 5-9 μ diam. by 3-5 μ high; sporangial conceptacles immersed, 252-268 μ in inside diameter, 63-105 μ high, tetrasporangia 42-84 μ long, 25-42 μ diam., 5-7 sporangia standing on the periphery of floor in each conceptacle, central part of conceptacle floor slightly upheaved and surmounted by a number of hairy cells surrounded by mucilaginous substance, orifice without papillae; female conceptacles immersed, nearly flat on surface, mature but unfertilized conceptacles 105-126 μ diam., 63-84 μ high, cystocarpic conceptacles

nearly flat on surface, 55-210 μ diam., 84-126 μ high, orifice with well developed papillae; spermatangial conceptacles slightly elevated on surface, (55-)84-126 μ diam., 42-63 μ high, opening by a narrow pore sometimes extended into a spout, sometimes embedded deeply in the tissue without an opening, spermatangia narrowly cylindrical in shape, ca. 3 μ diam. by 9 μ long.

In the present species, tetrasporangial conceptacles have been described by Foslie (1900, 1909) and Yendo (1916, 1936), but cystocarpic and spermatangial ones have not been reported by anyone. The writers fortunately could observe not only sporangial conceptacles but also female and male ones in their specimens epiphytic on *Alaria* collected near Hakodate. These specimens were confirmed to agree well with the above listed specimens of Yendo and Iwamoto. Yendo's specimen was collected at Misaki, the type locality of the present species, and was identified as *Melobesia canescens* FOSL. by Yendo himself. The writers' hearty thanks are due to Professor D. Murayama of the Faculty of Agriculture, Hokkaido University, for the loan of Yendo's specimen, and to Mr. K. Iwamoto of Tokyo Fisheries University for his kindness in collecting and sending the specimens from Kominato in compliance with the writers' request.

6. *Melobesia farinosa* LAMOUROUX

Pl. I, Figs. 4 & 5, Pl. II, Figs. 8-12, Pls. VI & VII

Lamouroux, 1816, p. 515; Kützting, 1849, p. 696; Rosanoff, 1866, p. 69; Solms-Laubach, 1881, p. 11; Ardissonne, 1883, p. 445; Hauck, 1885, p. 263; Foslie, 1900, p. 20; 1905, p. 96; Yendo, 1902, p. 186, 1916, *in* Okamura, 1916, p. 125, 1936, *in* Okamura, 1936, p. 506; De Toni, 1905, p. 1764, 1924, p. 645; Balakrishnan, 1947, p. 305, 36 text-figs., pl. 1; Rayss, 1959, p. 20.

Syn. Fosliella farinosa (LAMOUROUX) HOWE, 1920, p. 587; Taylor, 1937, p. 270, 1939, p. 10, 1957, p. 252.

Japanese name. Ibo-mokasa (n.n.).

Habit and distribution, in literature. - Epiphytic on *Caulerpa Freycinetii*, *Caulerpa* sp., *Valonia ventricosa*, *Padina pavonia*, *Spathoglossum* sp., *Ecklonia radiata*, *Fucus linifolius*, *F. serratus*, *Cystoseira a-ticulata*, *C. granulata*, *C. myrica*, *Hormophysa* sp., *Sargassum crispum*, *S. herbaceum*, *S. Horschuchii*, *S. linifolium*, *S. Turneri*, *Sargassum* sp., *Turbinaria* sp., *Chondrus crispus*, *Phyllophora nervosa*, *Rhodymenia palmata*, *R. phyllophora*, *Bryothamnion triangulare*, *Laurencia obtusa*, *L. papillosa*, *Laurencia* sp., *Cymodocea manatorum*, *C. serrulata*, *Potamogeton* sp., *Zostera marina*, *Zostera* sp. Middle Honshû, Japan (?)*, Ryûkyû (?)*, Formosa (?)*, China Sea; Celebes Sea; Malay Archipelago; Indian Ocean; Pacific coast of N. America; South Pacific Ocean; Australia; Caribbean Sea; West Indies; Atlantic coasts of N.

*Cf. Yendo, 1916. p. 125, 1936, p.507.

America, Europe and Africa; Canaries; Mediterranean Sea; Adriatic Sea; Red Sea.

Specimens collected. - Epiphytic on the leaves of *Sargassum confusum*: Nanaehama, near Hakodate, December 1958, Masaki; Oshoro, 24 November 1959, Yamazaki. On *Ecklonia Kurome*: Nou, Niigata Pref., 29 November 1959, Saito. On *Padina arborescens*: Misaki, Kanagawa Pref., 8 April 1960, Tokida. On *Dictyopteris undulata* and *Sargassum* sp., Shirahama, Wakayama Pref., 30 March 1960, Tokida.

Thallus epiphytic on various larger brown algae, firmly adherent to the host, at first suborbicular and 2-4 mm diam., later becoming confluent and overlapping, purplish red in color when fresh, monostromatic in vegetative part, cells in marginal portion 12-20 μ long by 5-9 μ diam. in surface view, 5-13 μ high by 7-13 μ diam. in section, cell-fusion frequent, each cell except those along the thallus margins and trichocyst initials obliquely cut off a cover cell, cover cells rectangular to roundish in surface view and triangular in section, trichocyst initials elongate, 22-25 μ long by 7-10 μ diam.; tetrasporangial conceptacles hemispherical, 63-126 μ high, (84-)126-168(-189) μ diam., tetrasporangia 40-80 μ long, (20-)25-50(-63) μ diam., 3-7 sporangia standing on the periphery of floor of each conceptacle, always tetrasporic in the writers' material, central part of conceptacle floor occupied by a columella, roof of conceptacle thin, composed of one to two layers of cells; female conceptacles hemispherical, 45-55 μ high, 45-60 μ diam. when young, (25-)42-63(-91) μ high, (29-)105-126 μ diam. when carpospores are formed, provided with papillae on the inner wall of pore, carpospores arising from periphery of floor; spermatangial conceptacles convex, (29-)33-46(-55) μ high, (42-)55-84 μ diam., spermatangia narrowly cylindrical in shape, 3-7 μ long by 2 μ diam., while attached to their mother cells, but ellipsoidal to globular with no appendage when detached and set free in the conceptacle cavity.

The above description is based chiefly on the specimens growing on the leaves of *Sargassum confusum* from Nanaehama. It agrees well in general with the descriptions of the present species given by the authors cited above, except in somewhat smaller dimensions of both tetrasporangial and cystocarpic conceptacles. (Cf. Foslie, 1905, p. 98; Taylor, 1957, p. 252).

Melobesia farinosa LAMX. has already been listed in the marine flora of Japan (Yendo, 1902, 1916, and 1936). However, Yendo commented under the present species in his treatment on the Corallinaceae published in 1916 to the following effect. "On examining the specimens preserved in the Berlin Botanical Museum, it was revealed that: Marten's specimens from Yokohama and Warburg's from Ryūkyū and Formosa, both reported to be identical with this species, were epiphytic on the leaves of *Zostera marina* and they seemed to be referable to '*Heteroderma zostericola* FOSL.'; Marten's specimens reported from Yokohama under the name of *Melobesia granulata* MENEH. were attaching to the stipe of *Gracilaria Textorii* and they seemed to be identical with '*Melobesia canescens*

FOSL.' or other related species. As far as I have investigated to date, it is doubtful whether *Melobesia farinosa* LAMX. is distributed in Japan or not."

In view of the above opinion, the occurrence of *Melobesia farinosa* in Japan is believed to be firmly established for the first time in the present report.

Summary

1. *Dermatolithon dispar* (FOSL.) FOSL. which has previously been known from the Pacific coast of North America is reported herein to be new to Japan on the basis of specimens collected in Hokkaido. The species in Hokkaido is represented not only by the previously known sporangial and male plants but also by the female plant.

2. *Dermatolithon canescens* (FOSL.) FOSL., a species previously known only from the Pacific coast of middle Honshû, Japan, and reported to be epiphytic on *Padina arborescens*, is described herein to be found also in Hokkaido growing on the hapteres of *Alaria crassifolia*. Besides the previously known tetrasporic plant, both the male and female plants were also observed and described.

3. *Melobesia farinosa* LAMX., a cosmopolitan species, which has long been listed in the marine flora of Japan but not without a doubt (cf. Yendo, 1916), is reported herein to have been collected on both coasts of middle Honshû, and also in Hokkaido.

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EXPLANATION OF PLATES

PLATE I

Dermatolithon dispar (FOSLIE) FOSLIE

Fig. 1. Habit of plant growing on *Grateloupia filicina* from Nanaehama, Hakodate ×3

Dermatolithon canescens (FOSLIE) FOSLIE

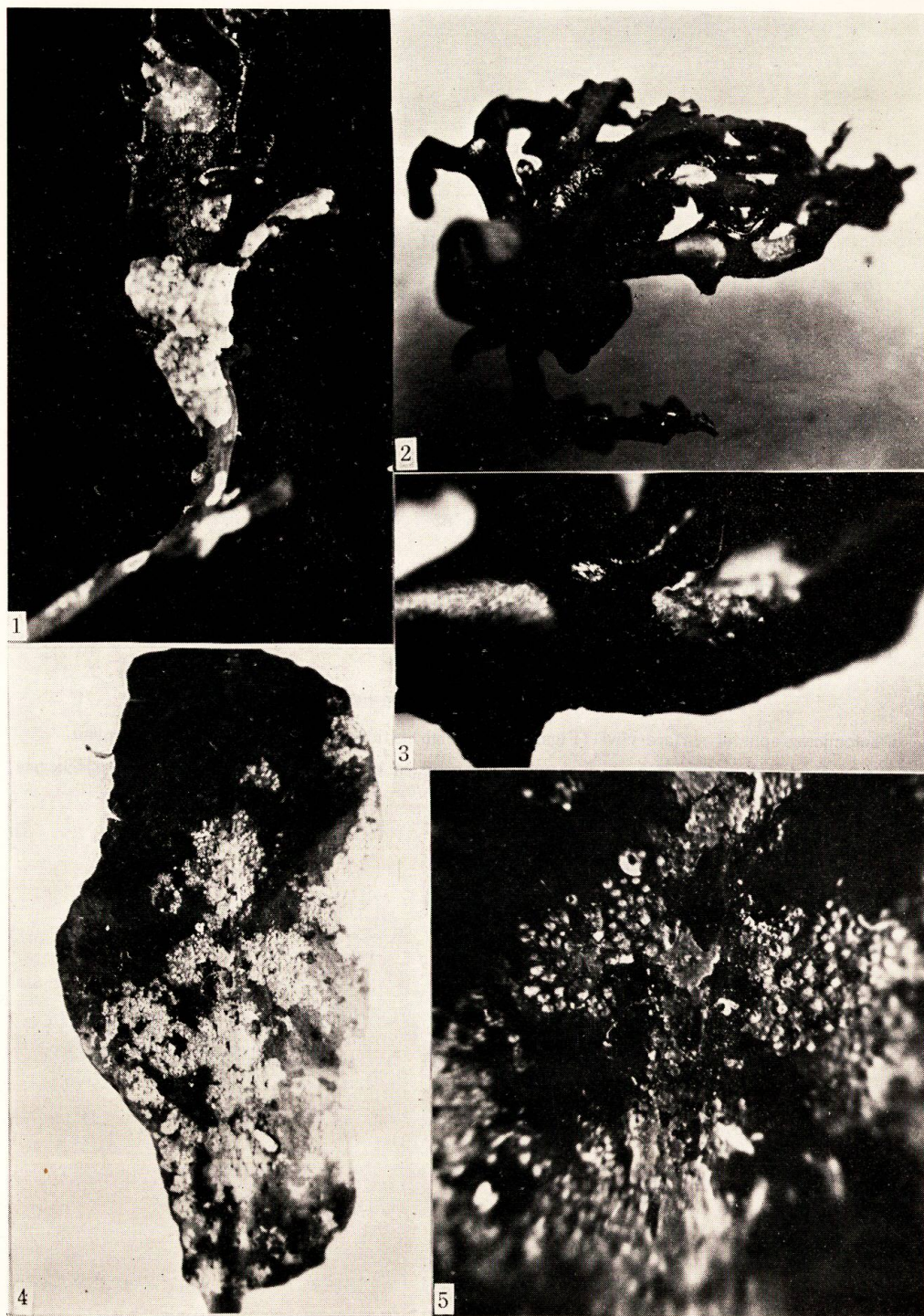
Fig. 2. Habit of plant attached on the hapteres of *Alaria crassifolia* from Shirikishinai ×1

Fig. 3. Enlargement of a portion of the specimen shown in Fig. 2

Melobesia farinosa LAMOUROUX

Fig. 4. Habit of plant growing on a leaf of *Sargassum confusum* from Nanaehama, Hakodate
×2

Fig. 5. Enlargement of a portion of the specimen shown in Fig. 4 ×6



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PLATE II

Dermatolithon dispar (FOSLIE) FOSLIE

Photomicrographs of vertical sections of plant $\times 62$

- Fig. 1. Tetrasporangial crust
- Fig. 2. Procarpic and cystocarpic crust
- Fig. 3. Spermatangial crust

Dermatolithon canescens (FOSLIE) FOSLIE

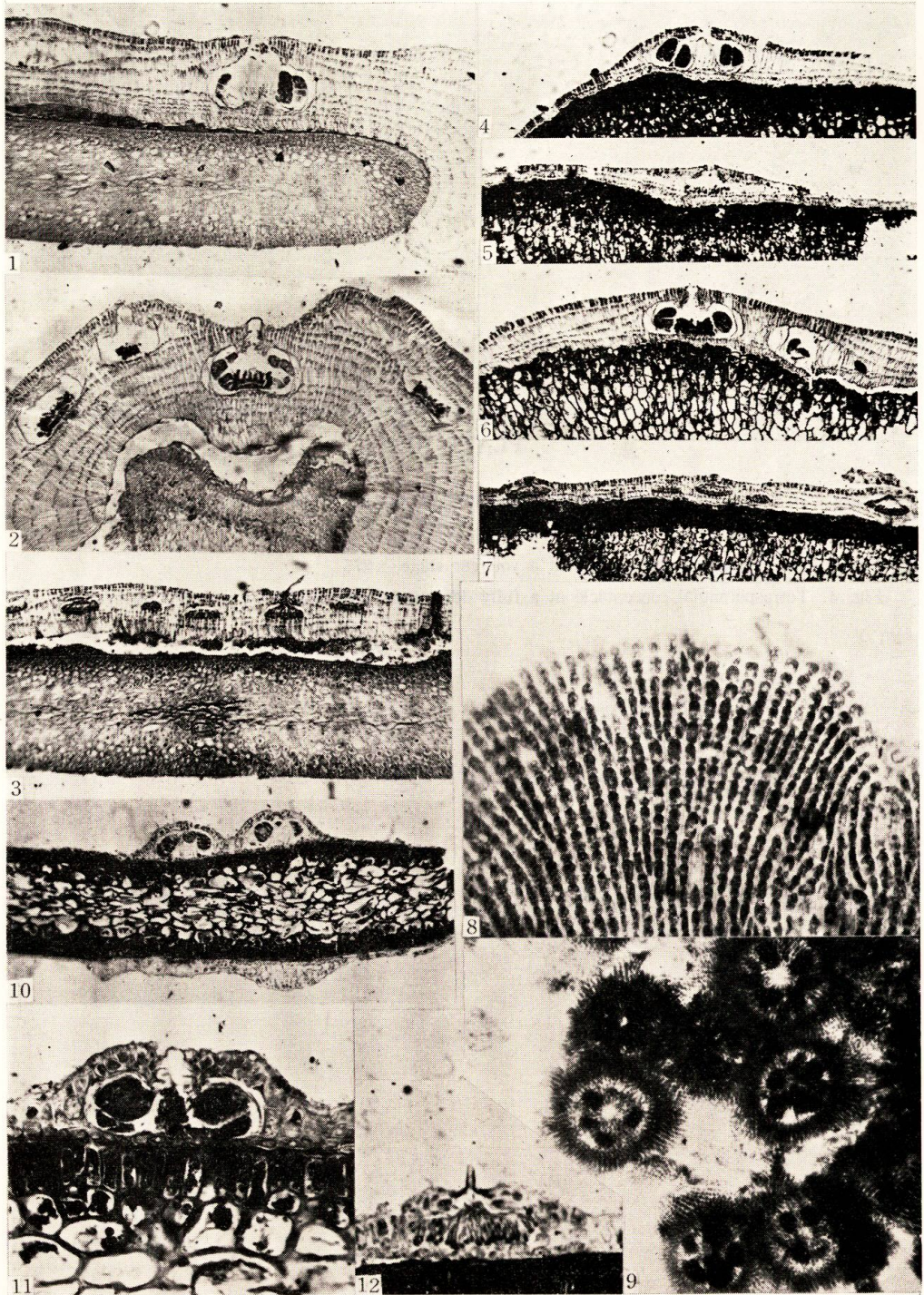
Photomicrographs of vertical sections of plant $\times 62$

- Fig. 4. Tetrasporangial crust
- Fig. 5. Procarpic crust
- Fig. 6. Cystocarpic crust
- Fig. 7. Spermatangial crust

Melobesia farinosa LAMOUROUX

Photomicrographs of surface views (Figs. 8 & 9) and vertical sections (Figs. 10-12) of plant

- Fig. 8. Marginal portion of a crust showing arrangement of the cells and scattered pale trichocysts $\times 227.5$
- Fig. 9. Sporangial crust $\times 62$
- Fig. 10. Sporangial conceptacles $\times 62$
- Fig. 11. Cystocarpic conceptacle $\times 227.5$
- Fig. 12. Spermatangial conceptacle $\times 227.5$



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PLATE III

Dermatolithon dispar (FOSLIE) FOSLIE

- Fig. 1 & 2. Vertical section through marginal portion of a crust $\times 400$
Fig. 3. Tetrasporangial conceptacle at a younger stage $\times 275$
Fig. 4. Tetrasporangial conceptacle at a fully developed stage $\times 275$

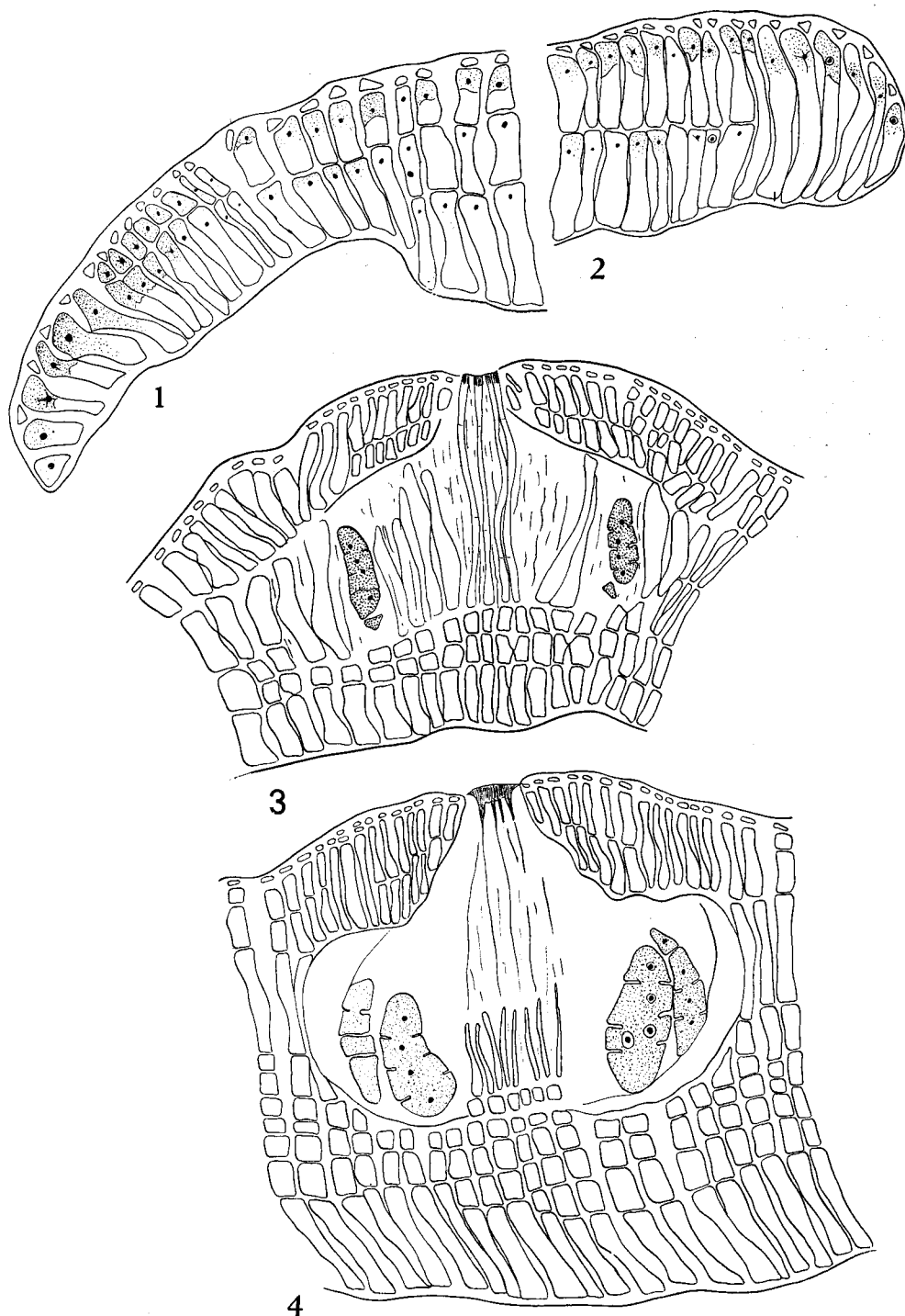


PLATE IV

Dermatolithon dispar (FOSLIE) FOSLIE

Vertical sections of conceptacles

Fig. 1. Tetrasporangial conceptacle

Fig. 2. Spermatangial conceptacle

Fig. 3. Procarpic conceptacle

Fig. 4. Cystocarpic conceptacle, showing well developed papillae

Fig. 5. Cystocarpic conceptacle, showing a lid-like cover on the pore

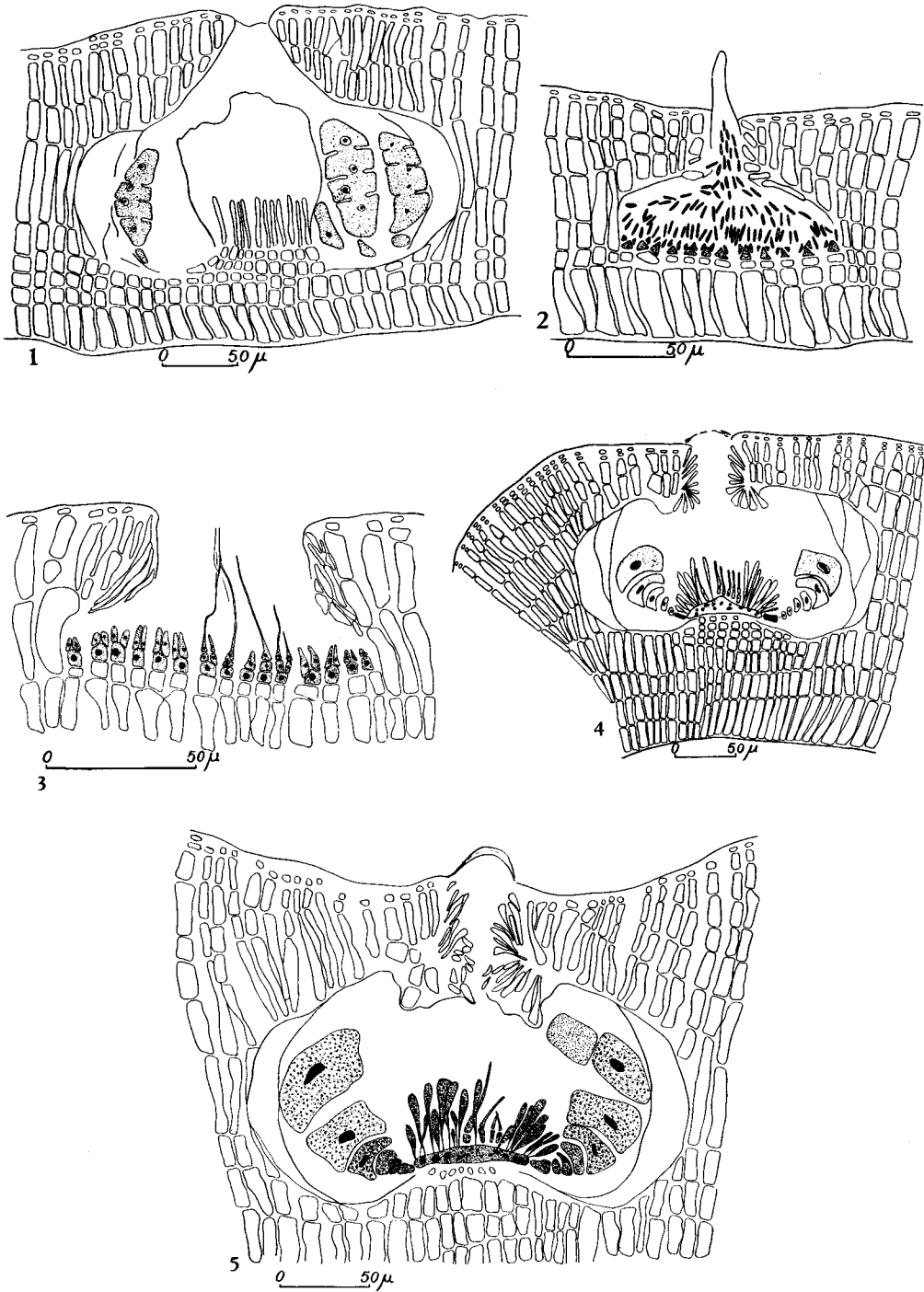


PLATE V

Dermatolithon canescens (FOSLIE) FOSLIE

- Fig. 1 & 2. Vertical section of the marginal mono- and distromatic portions of a crust $\times 650$
Fig. 3. Tetrasporangial conceptacle
Fig. 4. Spermatangial conceptacle
Fig. 5. Procarpic conceptacle
Fig. 6. Cystocarpic conceptacle

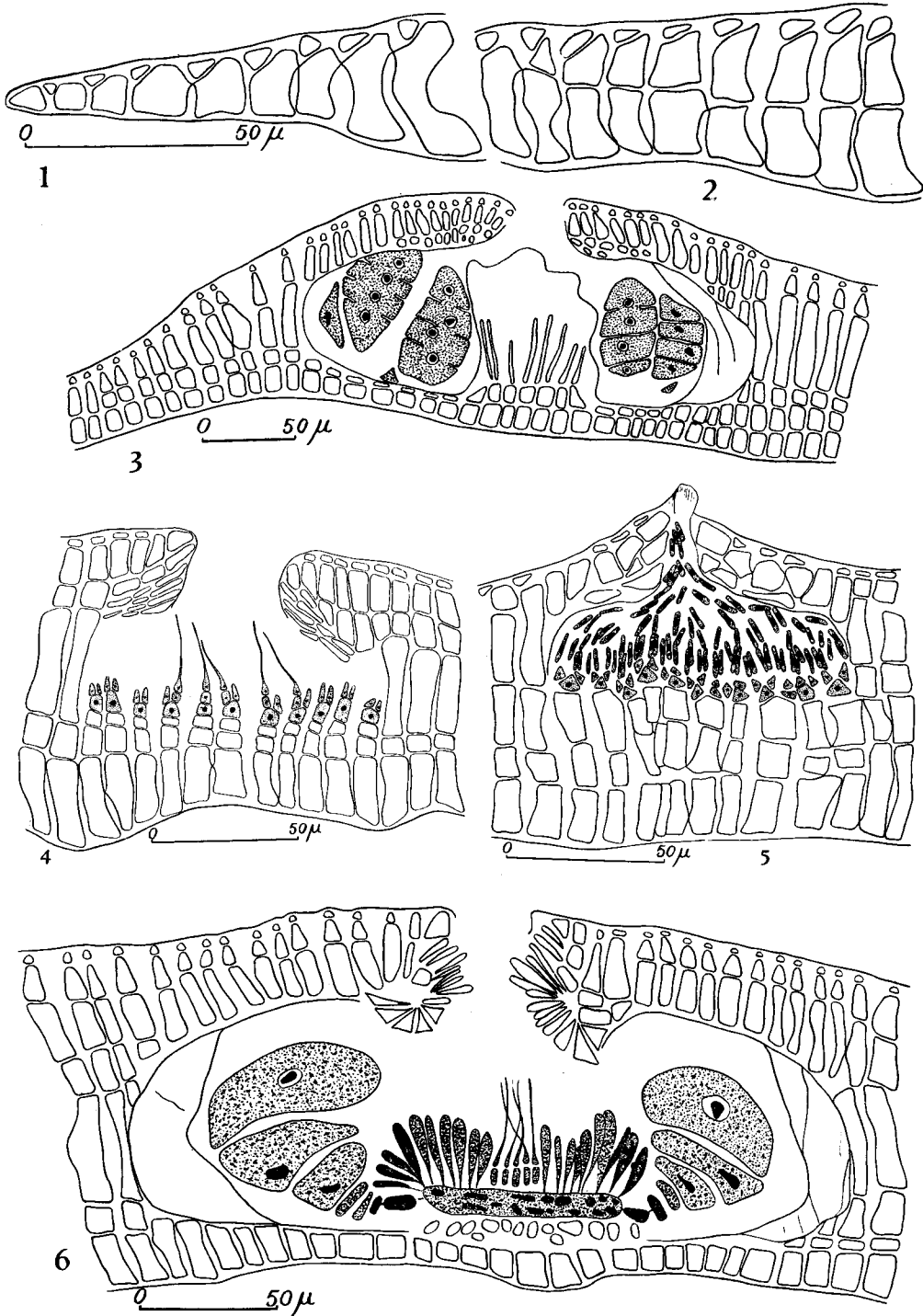


PLATE VI

Melobesia farinosa LAMOUROUX

- Fig. 1. Vertical section of a crust showing a trichocyst $\times 650$
- Fig. 2 & 3. Surface view of marginal portion of a crust showing a trichocyst (Fig. 2) and a pale elongated cell or trichocyst initial (Fig. 3) $\times 650$
- Fig. 4. Vertical section through marginal monostromatic portion of a crust $\times 1000$
- Fig. 5. Vertical section through a crust showing tetrasporangium initials $\times 650$
- Fig. 6. Tetrasporangial conceptacle with a monostromatic floor $\times 400$
- Fig. 7. Tetrasporangial conceptacle with a polystromatic floor $\times 400$

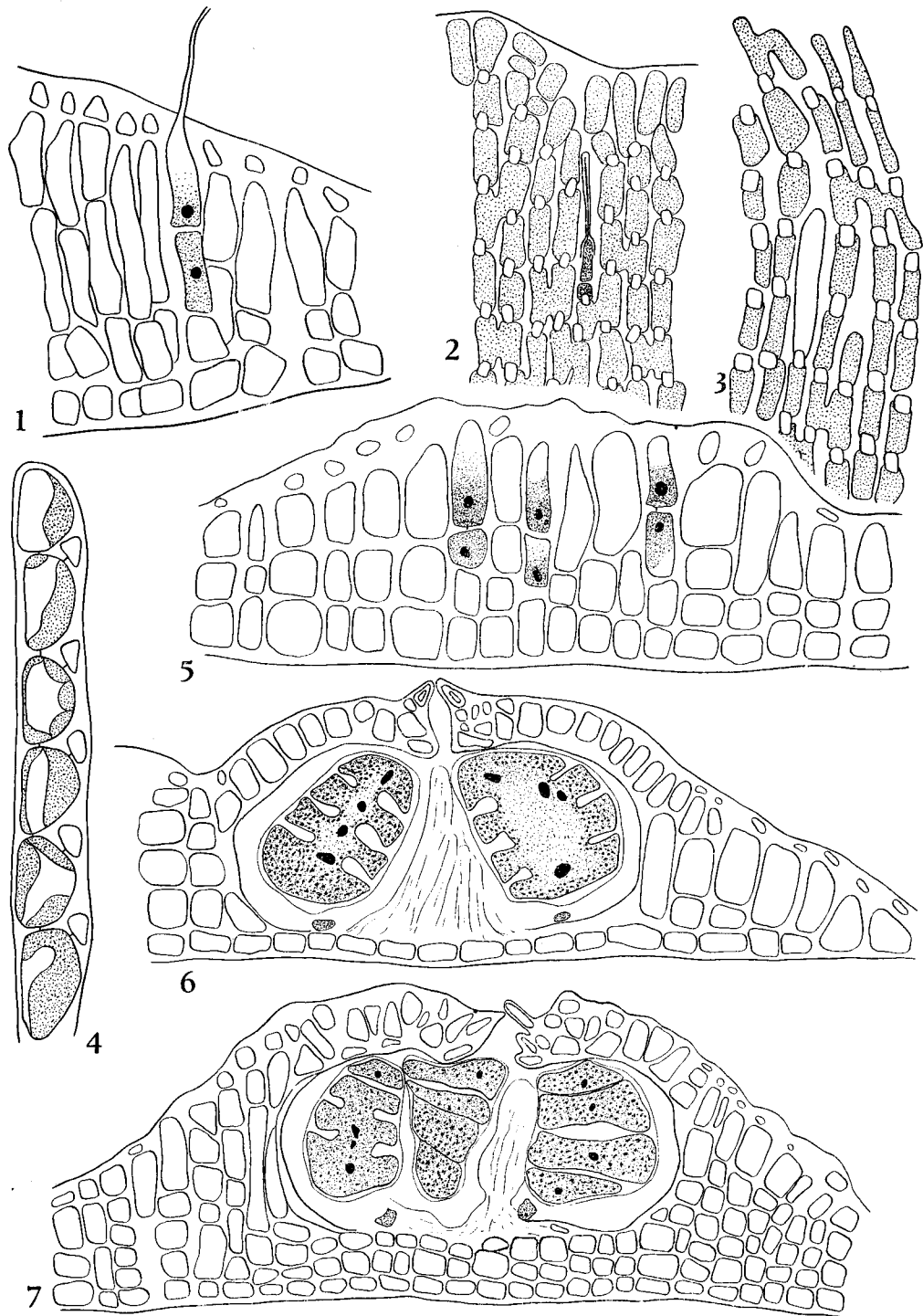


PLATE VII

Melobesia farinosa LAMOURBOUX

Vertical sections of conceptacles $\times 650$

Fig. 1. Young procarpic conceptacle

Fig. 2. Procarpic conceptacle

Fig. 3. Spermatangial conceptacle

Fig. 4. & 5. Cystocarpic conceptacle; in Fig. 4 is shown the structure of the wall of orifice

