

DET KGL. DANSKE VIDENSKABERNES SELSKAB
BIOLOGISKE MEDDELELSER, BIND XVIII, NR. 8

VAUGHANIELLA
A NEW GENUS OF THE *DICTYOTACEAE*

BY

F. BØRGESEN



KØBENHAVN
I KOMMISSION HOS EJNAR MUNKSGAARD
1950

Det Kgl. Danske Videnskabernes Selskabs publikationer i 8^{vo}:

Oversigt over selskabets virksomhed,
Historisk-filologiske Meddelelser,
Arkæologisk-kunsthistoriske Meddelelser,
Filosofiske Meddelelser,
Matematisk-fysiske Meddelelser,
Biologiske Meddelelser.

Selskabet udgiver desuden efter behov i 4^{to} »Skrifter« med samme underinddeling som i »Meddelelser«.

Selskabets sekretariat og postadresse: Ny vestergade 23, København V.

Selskabets kommissionær: *Ejnar Munksgaard*, Nørregade 6, København K.

DET KGL. DANSKE VIDENSKABERNES SELSKAB
BIOLOGISKE MEDDELELSER, BIND XVIII, NR. 8

VAUGHANIELLA

A NEW GENUS OF THE *DICTYOTACEAE*

BY

F. BØRGESEN



KØBENHAVN

I KOMMISSION HOS EJNAR MUNKSGAARD

1950

**Printed in Denmark
Bianco Lunos Bogtrykkeri**

In a collection of marine algae recently sent to me for determination by Dr. R. E. VAUGHAN, Director of *Mauritius Institute and Public Museum*, Port-Louis, a small brown alga is included which after examination has proved to be the representative of a new genus of the Fam. *Dictyotaceae*.

In September 1938 Dr. VAUGHAN asked me to assist him in determining a collection of marine algae from Mauritius and since then Dr. VAUGHAN with indefatigable eagerness has undertaken collections of marine algae along the shores of the island and sent them to me for determination.

It is therefore a great pleasure for me to name this little interesting alga in honour of Dr. VAUGHAN.

Vaughaniella rupicola Børgs. nov. gen. et nov. spec.

The prostrate, creeping, flattened thallus (Fig. 1—3) of this little *Dictyotacea* is fastened by rhizoids to the substratum. The



Fig. 1. *Vaughaniella rupicola* Børgs. Some fragments prepared out from tufts. Natural size.

thallus has monopodial growth performed by a large lens formed apical cell in the main filaments about $75\ \mu$ broad and $35\ \mu$ high, from which segments gradually are cut off below (compare

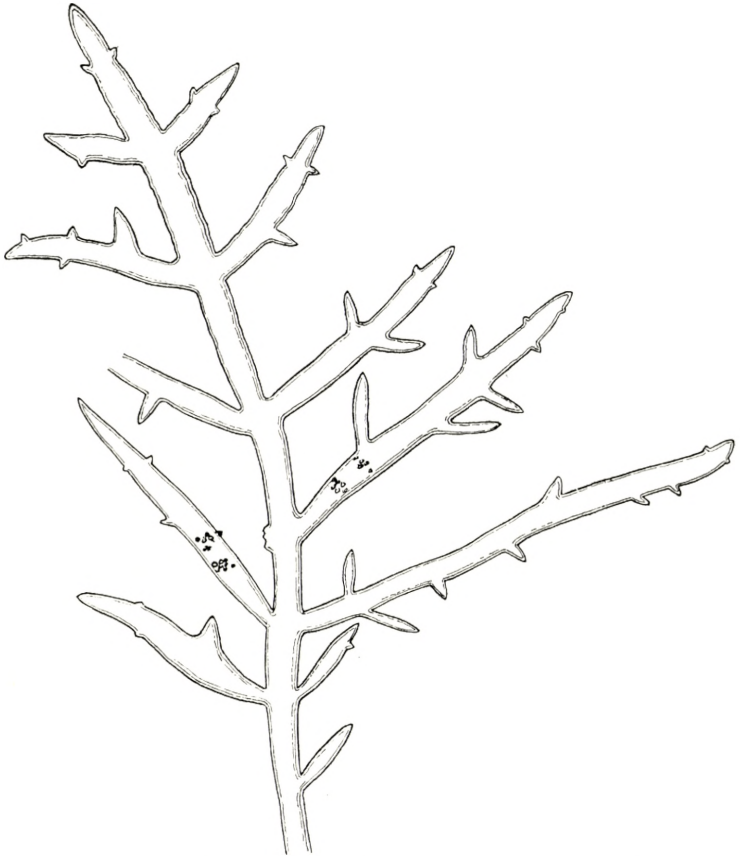


Fig. 2. *Vaughaniella rupicola* Borgs. Part of a specimen with tetrasporangia. ($\times 6$).

Fig. 5 c) in conformity to the apical growth of *Dictyota* (cf. REINKE,¹ 1878).

But while in *Dictyota* the ramification is carried out by longitudinal division of the apical cell, the ramification in *Vaughaniella* takes place by adventitious branches. These originate from an epidermal cell at the edge of the thallus at some distance from

¹ REINKE, G., Entwicklungsgeschichtliche Untersuchungen über die Dictyotaceen des Golfs von Neapel. Nova Acta Leopold.-Carol. Acad. 40, No. 1, 1878.

the apex of the thallus (Fig. 5 a). The cell in question gets filled with protoplasm and chromatophores, assuming a darker colour than the surrounding cells, and swells up above these cells; it is then divided by an oblique transverse wall into two cells, the uppermost and larger one being the future apical cell of the new branch; after some divisions it assumes the ordinary aspect

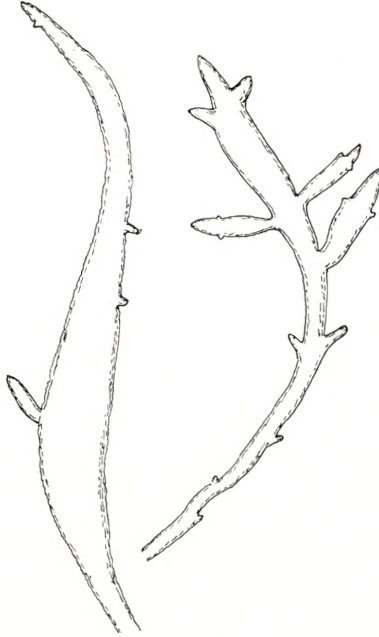


Fig. 3. *Vaughaniella rupicola* Borgs. Two fragments of plant with more irregular growth. ($\times 10$).

of the apical cell (Fig. 5 c). Shortly afterwards on the opposite side of the thallus, but not exactly at the same height, a similar development of a marginal cell takes place and becomes the origin of a branch.

In this way of branching the thallus becomes suboppositely or more irregularly ramified, because it happens that only one of the branches in a pair develops. The branches are again provided with branchlets; these are mostly short, often thornlike only; compare Fig. 2. Now and then a side-branch may grow into a main-branch with continuous growth. The thallus is rather distinctly transversely striated due to the arrangement of

the chromatophores in the medullary layer. The distance between the rows of the chromatophores is about $50\text{--}70\ \mu$ (Fig. 4 *b*).

The surface of the thallus as well as that of the margins is now nearly even, now slightly undulate (Fig. 4 *b*).

The thallus reaches a breadth of up to 1 mm., it is about $275\ \mu$ thick in transverse section, which is broadly oval—lan-

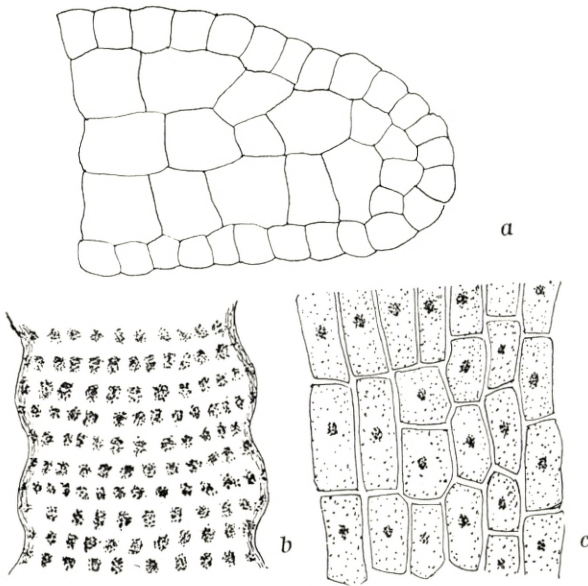


Fig. 4. *Vaughaniella rupicola* Borgs. *a*, part of transverse section of the thallus. *b*, fragment showing the striped thallus. *c*, surface cells of the thallus. (*a*, $\times 65$, *b*, $\times 20$, *c*, $\times 150$).

ceolate in shape (Fig. 4 *a*). The length of the thallus varies much, reaching up to about 3 cm. or more. The branches are shorter and somewhat slender. From the more or less narrowed base they become as a rule a little broader upwards towards the middle, whence they taper to the subacute apex terminated by the large vaulted apical cell. The main filaments together with the branches and branchlets are all in about the same plane.

The thallus forms low cushions on rocks, the branches and branchlets being felted together with those of the neighbouring plants (Fig. 1). It is fastened to the substratum by means of numerous longer or shorter rhizoids (Fig. 6), issuing from the

epidermal cells of the under side either solitarily but mostly sociably in smaller or larger groups; the rhizoids consist of a single row of cells, the length of which is about $150\ \mu$ or more; the rhizoids often end in irregularly lobed, coralliformed discs.

The peripheral cells of the thallus (Fig. 4 c) when observed

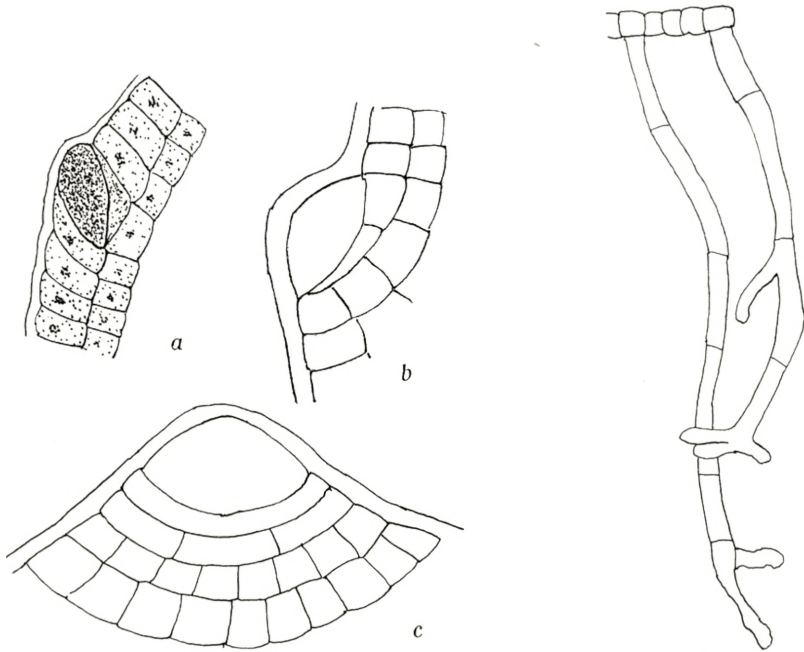


Fig. 5.

Fig. 6.

Fig. 5. *Vaughaniella rupicola* Borgs. The formation of the adventitious branches. *a*, a marginal cell becomes divided by an oblique wall. *b*, a somewhat more advanced stage. *c*, the fully developed apical cell ($\times 150$).

Fig. 6. *Vaughaniella rupicola* Borgs. Rhizoids. ($\times 75$).

from above are subquadrangular or somewhat lengthened and arranged rather clearly in longitudinal rows; in transverse section about quadrangular, about $40\text{--}50\ \mu$ broad. The cells in the interior of the thallus (Fig. 4 *a*) are in transverse section irregularly quadrangular or polygonal about $60\ \mu$ long and $40\text{--}50\ \mu$ broad. No midrib is found.

The sporangia (Fig. 7) are cruciately, sometimes also tetrahedrally divided. They occur singly or in small groups scattered

on the upper surface of the thallus (Fig. 2), sometimes also issuing from the margin. They develop from a surface cell which is divided by a transverse wall into two cells, the uppermost of

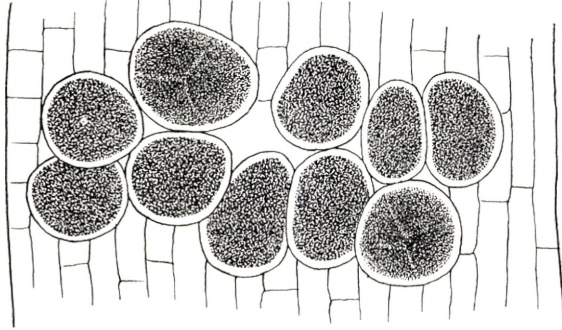


Fig. 7. *Vaughaniella rupicola* Borgs. ($\times 250$). Sporangia two of which are divided.

which is the sporangium; this is projecting freely above the surface of the thallus, it is semiglobular in shape and has a diameter of about 75μ ; when several are crowded together more or less polygonal by the mutual pressure.

This is what I am able to say about the asexual reproductive

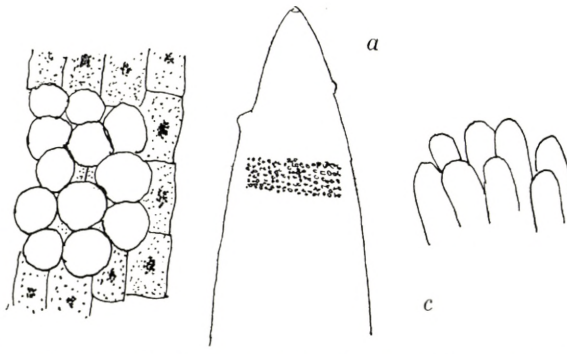


Fig. 8. *Vaughaniella rupicola* Borgs. *a*, apex of frond with a small group of hairs; *b*, a part of this group more magnified. *c*, more developed hairs. (*a*, $\times 30$; *b*, *c*, $\times 300$).

organs; as to the sexual organs the scarce material has brought forward no certain information.

In two of the specimens examined I have in the young parts of the thallus, not far below the apex on the upper side of the

thallus, observed some small groups of densely placed roundish cells issuing from the epidermal ones. Fig. 8 *a* shows such a group: it is oblong in shape, about 200 μ long and 70 μ broad and the cells of which it is composed had a diameter of about 12 μ . The contents in these cells were rather homogeneous and of a lighter colour than that in the epidermal cells since chromatophores were not visible. At first I took these small groups of cells to be young antheridia but later I have given up this idea, when discovering in an other specimen that the small cells become elongated and curved like sausages (Fig. 8 *c*). It seems more likely that they are young hairs, but peculiarly enough I have searched in vain for hairs elsewhere in the specimens.

As to the female organs I have not made any certain observation neither, but the possibility does not seem to be excluded that they occur in a similar way as the sporangia, and when the latter are still undivided, the oogonia might be very like the sporangia.

Because of its apical growth performed by a single large top-cell this new genus is most closely related to the group *Dictyoteae* of the *Dictyotaceae* but it differs fundamentally from this group and others referred to this family because of its dorsiventral creeping thallus, its monopodial growth and its ramification performed by adventitious branches, being in this way the representative of a new group of the *Dictyotaceae*.

Finally a short diagnosis in Latin.

Vaughaniella Børgs. gen. nov.

Frons subplana et sublinearis, ecostata, prostrata et repens, dorsiventralis, rhizoideis ad saxa adfixa, e cellula singula, apicali, per magna creata, polystromatica a cellulis corticalibus minoribus et cellulis interioribus majoribus formata, superficie thalli plus minus sinuosa, transverse evidenter striata, ramosa.

Rami suboppositi aut magis irregulariter praesentes, adventitii, e cellulis marginalibus orti.

Tetrasporangia sparsa, singula aut plura aggregata, e transformatione cellularum corticalium orta, subsphaerica, cruciatim aut triangule divisa.

Vaughaniella rupicola Børgs. nov. spec.

Frons parva ca. 1—3 cm longa et ca. 1 mm lata et ca. 275 μ crassa, rami tenuiores.

Mauritius: Pointe aux Sables, "growing on rocks exposed at low tide"; March 24, 1945; G. MORIN no. 778.

I wish to thank Miss INGEBORG FREDERIKSEN the paintress for her valuable help in producing two of the figures.

DET KGL. DANSKE VIDENSKABERNES SELSKAB

BIOLOGISKE MEDDELELSER

BIND XVIII (under pressen):

	kr. ø.
2. LARSEN, POUL: The Aspects of Polyploidy in the Genus <i>Solanum</i> . II. Production of dry Matter, Rate of Photosynthesis and Respiration, and Development of Leaf Area in some Diploid, Autotetraploid and Amphidiploid <i>Solanums</i> . 1943	4.50
3. WESTERGAARD, M.: The Aspects of Polyploidy in the Genus <i>Solanum</i> . III. Seed Production in Autopolyploid and Allopolyploid <i>Solanums</i> . 1948	2.00
4. HAGERUP, O.: <i>Thrips</i> Pollination in <i>Calluna</i> . 1950	1.50
5. HAGERUP, O.: Rain-Pollination. 1950	1.50
7. JENSEN, P. BOYSEN: Investigations on the Growth and Differentiation of Tobacco Tissue Cultures in Vitro. 1950	1.50
8. BØRGESEN, F.: <i>Vaughaniella</i> . A New Genus of the <i>Dictyotaceae</i> . 1950	1.00

BIND XIX (KR. 44.50):

1. BØRGESEN, F.: Some Marine Algae from Mauritius. III. Rhodophyceae. Part 2. <i>Gelidiales</i> , <i>Cryptonemiales</i> , <i>Gigartinales</i> . 1943	7.00
2. NIELSEN, ANKER: Postembryonale Entwicklung und Biologie der rheophilen Köcherfliege <i>Oligoplectrum maculatum</i> Fourcroy. 1943	6.00
3. LARSEN, ELLINOR BRO: Problems of Heat Death and Heat Injury. Experiments on some Species of <i>Diptera</i> . 1943	4.00
4. THOMSEN, MATHIAS: Effect of Corpus Cardiacum and other Insect Organs on the Colour-Change of the Shrimp, <i>Leander adpersus</i> . 1943	4.50
5. HARTMANN, JUL.: Contributions to the Discussion of the Agglutination-Inhibition Method. 1944	3.50
6. BØRGESEN, F.: Some Marine Algae from Mauritius. III. Rhodophyceae. Part 3. <i>Rhodymeniales</i> . 1944	3.00
7. JØRGENSEN, C. BARKER: On the Spicule-Formation of <i>Spongilla lacustris</i> (L.). 1. The Dependence of the Spicule-Formation on the Content of Dissolved and Solid Silicic Acid of the Milieu. 1944	3.00
8. JENSEN, AD. S.: On Specific Constancy and Segregation into Races in Sea-Fishes. 1944	1.50
9. STRUNGE, TAGE: Histotopographie des glandes pyloro-duodénales. 1945	2.50
10. BØRGESEN, F.: Some Marine Algae from Mauritius. III. Rhodophyceae. Part 4. <i>Ceramiales</i> . 1945	5.00
11. HAGERUP, O.: Facultative Parthenogenesis and Haploidy in <i>Epipactis latifolia</i> . 1945	1.50
12. ANDREASEN, ERIK, and GOTTLIEB, OLE: The Hemolymph Nodes of the Rat. 1946	3.00

BIND XX (KR. 56.00):

kr. ø.

1. PETERSEN, JOHS. BOYE: Algae Collected by Eric Hultén on the Swedish Kamtchatka Expedition 1920—22, especially from Hot Springs. 1946	8.00
2. BURSTRÖM, HANS, and KROGH, AUGUST: The Biochemistry of the Development of Buds in Trees and the Bleeding Sap. 1946	2.00
3. JENSEN, AD. S.: Bog og Egern, Bogvikler og Musvitter. With an English Summary. 1946.....	3.00
4. BRØNDSTED, H. V.: The Existence of a Static, Potential and Graded Regeneration Field in Planarians. 1946	3.00
5. HAGERUP, O.: Studies on the <i>Empetraceae</i> . 1946	4.00
6. BØRGESEN, F.: Some Marine Algae from Mauritius. An Additional List of Species to Part I Chlorophyceae. 1946	6.00
7. BRØDERSSEN, ROLF, and KLENOW, HANS: Molecular Weight Determinations of Biological Substances by means of Diffusion Measurements. 1947.....	2.00
8. BÖCHER, TYGE W.: Cytogenetic and Biological Studies in <i>Geranium Robertianum</i> L. 1947	3.00
9. HAGERUP, O.: The Spontaneous Formation of Haploid, Polyploid, and Aneuploid Embryos in some Orchids. 1947.....	2.00
10. JØRGENSEN, C. BARKER: On the Spicule-Formation of <i>Spongilla lacustris</i> (L.) and <i>Ephydatia fluviatilis</i> (L.). 2. The Rate of Growth of the Spicules. 1947	2.50
11. HOLM-JENSEN, IB: Osmotic Regulation in <i>Daphnia magna</i> under Physiological Conditions and in the Presence of Heavy Metals. 1948	5.00
12. BØRGESEN, F.: Some Marine Algae from Mauritius. Additional Lists to the Chlorophyceae and Phaeophyceae. 1948.....	6.00
13. JENSEN, AD. S.: <i>Chermes abietis</i> Galls and Squirrels. 1948	1.50
14. STEENBERG, C. M.: Études sur l'anatomie et la systématique du genre <i>Eremina</i> (Gastéropodes pulmonés). Éditées par G. Mandahl-Barth. 1949	8.00

BIND XXI (under pressen):

1. BÖCHER, TYGE W.: Studies on the Saproelic Flora of the Lake Flyndersø with Special Reference to the Oscillatoriaceae. 1949.....	4.00
2. JENSEN, P. BOYSEN: The Production of Matter in Agricultural Plants and its Limitation. 1949.....	2.00
3. JENSEN, P. BOYSEN: Causal Plant-Geography. 1949.....	2.00
4. LARSEN, ELLINOR BRO: Activity and Migration of <i>Plusia Gamma</i> L. Studies on the Activity of Insects III. 1949.....	3.00
5. BØRGESEN, F.: Some Marine Algae from Mauritius. Additions to the Parts previously published. 1949.....	6.00
6. JENSEN, AD. S., and VOLSOE, HELGE: A Revision of the Genus <i>Icelus</i> (<i>Cottidae</i>). With Remarks on the Structure of its Urogenital Papilla. 1949.....	3.00