

Redescription of *Schizotricha anderssoni* Jäderholm, 1904 (Cnidaria: Hydrozoa) with the description of a new species. Notes on antarctic hydroids, IV

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The type series of *Schizotricha anderssoni* Jäderholm, 1904, collected by the Swedish Antarctic Expedition 1901-1903 and deposited in the collections of the Swedish National Museum, Stockholm, is redescribed. The type series is composed of two species, the species figured by Jäderholm (1905) is designated the lectotype of *Schizotricha anderssoni*. The second species, differing from the other species of the genus, is described as *Schizotricha jaederholmi* spec. nov.

Resumen: Se ha revisado y redescrito el material tipo de *Schizotricha anderssoni* Jäderholm, 1904, recogido durante la Swedish Antarctic Expedition 1901-1903 y depositado en el Swedish Museum of Natural History de Stockholm. Dentro del material se han podido reconocer dos especies. Se ha elegido como lectotipo de *Schizotricha anderssoni* la colonia dibujada por Jäderholm (1905). La otra especie, que difiere de las demás especies del género, es descrita como *Schizotricha jaederholmi* spec. nov.

Introduction

During a survey of antarctic hydroids presently being carried out, we had the opportunity to examine the type series of *Schizotricha anderssoni* Jäderholm, 1904. This type series consists of material preserved in two vials and in a tube. The material present in the tube was unidentifiable, while that in the vials was composed of two well preserved, but fragmental, colonies. Surprisingly, we found each colony to belong to a different species. In the present paper both colonies are described; the colony figured by Jäderholm (1905, pl. 14 fig. 3) is designated as the lectotype of *Schizotricha anderssoni* Jäderholm, 1904. The other species is clearly different from *S. anderssoni* and the remaining species of the genus and it is described below as *Schizotricha jaederholmi* spec. nov. The differences with the other species of the genus are also discussed.

Description of the species

Schizotricha anderssoni Jäderholm, 1904
(fig. 1)

Schizotricha anderssoni Jäderholm, 1904: 11; 1905: 34-35, pl. 14 figs 3-5; Naumov & Stepan'yants, 1962: 101, fig. 20.

Schizotricha unifurcata unifurcata Stepan'yants, 1979: 115 (in part).

Schizotricha sp. 1 Peña Cantero, 1991: 196-199, pls 36, 49, 69 fig. a; Peña Cantero & García Carrascosa, 1994: 126, fig. 9e-i.

Not *Schizotricha anderssoni*; Blanco, 1984: 46-48, pl. 42 figs 98-99, pl. 43 fig. 100.

Material examined.— Swedish Southpolar Expedition 1901-1903, Stn n° 22, Cumberland Bay (South Georgia), 75 m depth, 14.v.1902 (Swedish Museum of Natural History, Coel no. 433), one colony c. 100 mm high, with one gonotheca (lectotype). Fragment of colony (= schizolectotype) as RMNH Coel. no. 27680, two slides n° 3380.

Description.— The colony is branched, almost black and extremely fragmented, but it could have reached a height of c. 100 mm. The drawing by Jäderholm and the study of this material make it possible to describe the colony. There is a main stem, strongly polysiphonic over almost all its length, though at least the distal 11 mm are monosiphonic. This main stem is now fragmented. The largest fragment, 50 mm high, corresponds with the basal part of the stem and carries the filiform hydrorhiza reaching a length of c. 30 mm; the hydrorhizal stolons do not spring from the basal-most part of the stem, which is devoid of stolons. There are numerous nematothecae on the hydrorhizal stolons.

The main stem gives rise to two polysiphonic secondary stems on the same side, one c. 35 mm from the base and other c. 20 mm from the first secondary stem. From each hydrocaulus of the second order originates one almost completely monosiphonic tertiary stem.

The stems are composed of an axial tube, divided into internodes carrying hydro- and nematothecae, and a few unsegmented, secondary tubes growing upwards around the main tube and carrying only nematothecae. The polysiphony is due to those secondary tubes which almost reach the tip of the colony.

The cauline internodes carry one apophysis at the distal third forming an angle of c. 45° with the internode and bearing a nematotheca (fig. 1b); they are alternately arranged in two planes meeting at an obtuse angle. In the axil between apophysis and internode there is a small hydrotheca; in addition there are two nematothecae flanking the hydrothecal aperture, one on each side (fig. 1b). Furthermore, there are three or four, but occasionally two or five, nematothecae below the hydrotheca arranged at different levels and, sometimes, an additional nematotheca above the hydrotheca inserting near the distal node (fig. 1b).

The cauline apophyses give rise to the hydrocladia. Most of the hydrocladia are composed of a primary hydrocladium bearing a secondary hydrocladium at its first hydrothecate internode. There is no ahydrothecate internode after the cauline apophyses and its presence must be considered as an anomaly (it has been observed three times along the whole length of the colony). However, it is quite frequent after the apophysis which gives rise to the secondary hydrocladium; for instance, in one of the secondary stems, there were 11 such ahydrothecate internodes at the base of the secondary hydrocladium in twenty cauline internodes. The ahydrothecate internode is provided with two nematothecae.

The hydrocladia are divided into internodes, carrying a hydrotheca situated on the distal half and, typically, five nematothecae: two flanking the hydrothecal aperture, one on each side, and three underneath the hydrotheca and arranged at differ-

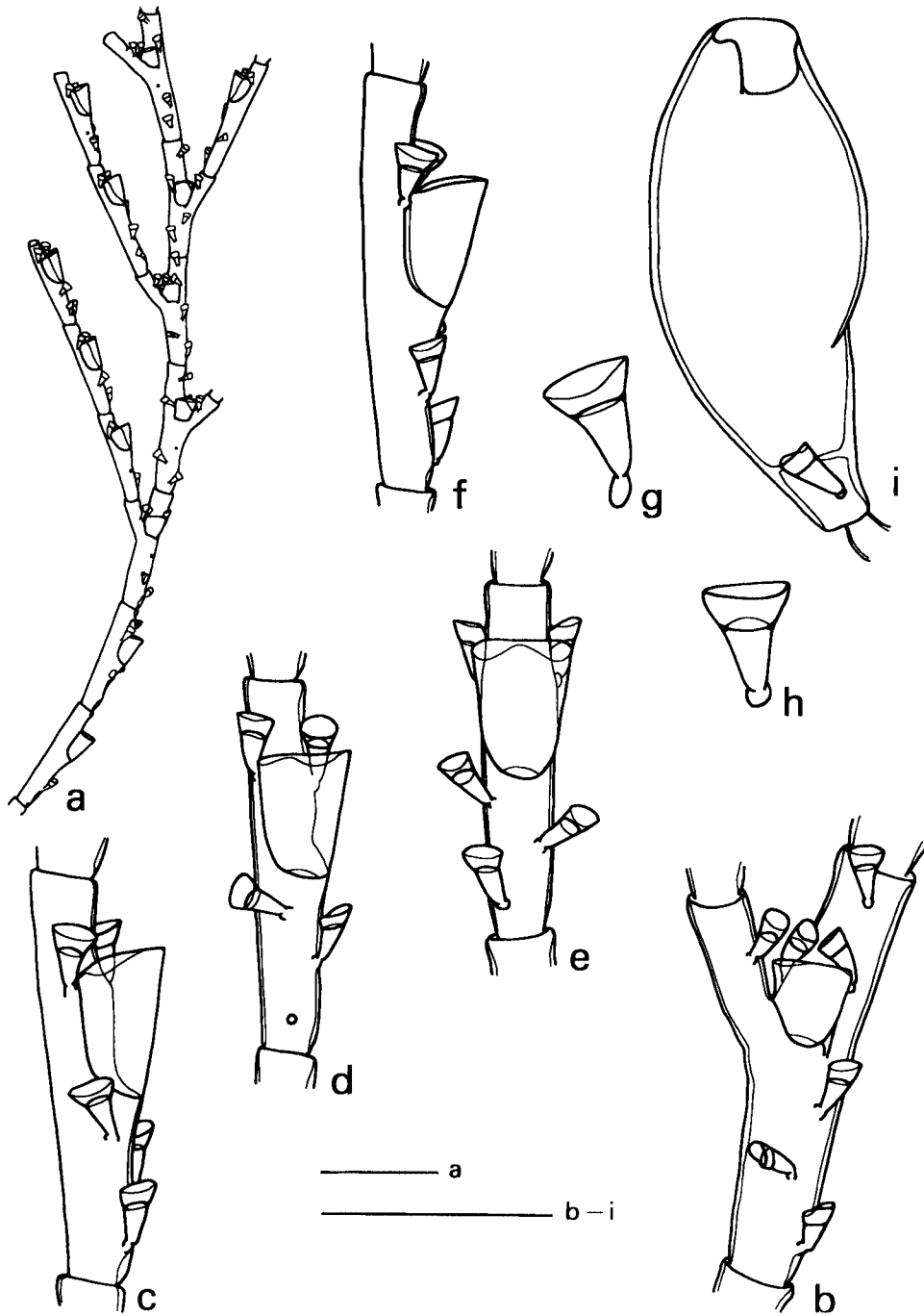


Fig. 1. *Schizotricha anderssoni* Jäderholm, 1904. a, hydrocladium becoming a secondary stem; b, cauline internode showing apophysis, hydrotheca and nematotheca; c-f, hydrocladial internodes with hydrotheca and nematotheca; g-h, nematotheca; i, gonotheca. Scale bars: a = 1 mm; b-f, i = 500 µm; g-h = 250 µm. (All drawings from lectotype).

ent levels (fig. 1c-f); occasionally, there may be an additional nematotheca under and/or above the hydrotheca. The deep hydrotheca is adnate over its whole length. The length of the hydrotheca strongly increases along the hydrocladia; for example, the length of the abcauline wall may be 247 μm in the first internode and 325 μm in the eighth. The abcauline wall is straight and directed outwards (fig. 1c, f). The hydrothecal aperture is slightly tilted towards the adcauline side. The forked internodes bear three or four nematothecae below the hydrotheca.

Though most of the hydrocladia consist of a hydrocladium of the first order giving rise to a secondary hydrocladium, there are also either hydrocladia composed of a single primary hydrocladium or hydrocladia becoming stems of lower order, the hydrothecate internodes forming apophyses which give rise to new hydrocladia (fig. 1a). In some cases, the primary hydrocladium gives rise to alternately arranged secondary hydrocladia. It is also possible to find, after the first secondary hydrocladium, several hydrothecate internodes without apophyses before the next hydrothecate internodes bearing hydrocladia (fig. 1a). Typically, it is the primary hydrocladium which develops and carries the secondaries, but a secondary hydrocladium giving rise to tertiary hydrocladia also occurs. In one case, for example, after the first hydrothecate internode which give rise to a secondary hydrocladium, there are six hydrothecate internodes without apophyses followed by six internodes bearing secondary hydrocladia; moreover, the first secondary hydrocladia carry three tertiary hydrocladia. Sometimes, in the hydrothecate internodes closer to the internodes carrying hydrocladia, a nematotheca is observed above the hydrotheca (fig. 1a), which happens quite often in the cauline internodes. All the nematothecae are bithalamic (fig. 1g-h).

Jäderholm (1904) mentioned that the gonothecae were few in number. We have found a single gonotheca inserting on a small apophysis under the hydrotheca in the first hydrothecate internode of a primary hydrocladium. The gonotheca is pear-shaped, having a small chamber proximally with one nematotheca (fig. 1i); Jäderholm (1905) described two nematothecae. The gonothecal aperture, placed at the distal end, is subterminal (fig. 1i).

Measurements (in μm)

Hydrothecae	
length abcauline wall (lateral view)	227.5-325
diameter at rim (frontal view)	175.5-227.5
Hydrocladial internodes	
length	787.2-918.4
diameter under hydrotheca	149.5-188.5
Cauline internodes	
length	902-1115.2
diameter under apophysis	213.2-229.6
Apophyses	
length	246-344.4
diameter	114.8
Nematothecae flanking hydrothecal rim	
length	113.8-120.3
maximum diameter	94.3-97.5
diameter at diaphragm	48.8-52

Remarks.— Jäderholm (1904) described the new species *Schizotricha anderssoni* from two colonies. The examination of the type series of Jäderholm's species surprisingly proved it to be composite, each colony belonging to a different species. We have selected as the lectotype of *Schizotricha anderssoni* the colony figured by Jäderholm (1905), while the other colony will be described below as *Schizotricha jaderholmi* spec. nov. The differences between both species will be discussed along with the remarks on this second species.

Schizotricha anderssoni is clearly distinguishable from other antarctic species of the genus. It shares with *S. unifurcata* Allman, 1883, the presence of a branched stem, but the two species differ because of the constant presence, in *S. unifurcata*, of an ahydrothecate internode following the cauline and hydrocladial apophyses. The hydrocladia of *S. unifurcata* branch up to five times [according to Totton (1930) who reviewed the type material] and there is a single nematotheca under the hydrotheca in the unforked hydrothecate internodes of the hydrocladia.

Schizotricha multifurcata Allman, 1883, also has a branched stem, but it differs from *S. anderssoni* by the constant presence of an ahydrothecate internode after the cauline and hydrocladial apophyses, by the much branched hydrocladia (up to the seventh order of hydrocladia) and by the presence of two nematothecae below the hydrotheca in the unforked hydrocladial internodes.

Schizotricha turqueti Billard, 1906, shares with *S. anderssoni* the characteristic presence of a single branching in the hydrocladia and the presence of an ahydrothecate internode after the apophyses which bear the secondary hydrocladia, though this feature is not constant in Jäderholm's species. However, *S. turqueti* also differs from *S. anderssoni* by the unbranched stem and the number of infrathecal nematothecae, since there is only one nematotheca under the hydrotheca.

Schizotricha anderssoni shares with *S. glacialis* (Hickson & Gravelly, 1907) the presence of once branched hydrocladia, but differs from *S. glacialis* because in that species there is only one nematotheca underneath the hydrotheca and the stem is unbranched.

Naumov & Stepan'yants (1962) assigned to *Schizotricha anderssoni* a form characterized by a higher number of nematothecae in the hydrocladial internodes: four nematothecae, occasionally six, under the hydrothecae and two, occasionally four, above the hydrothecae. Later on Stepan'yants (1979), regarded that form conspecific with *Schizotricha unifurcata* Allman, 1883, considering the number of nematothecae irrelevant to separate both species. Peña Cantero (1991) rediscovered the species described by Naumov & Stepan'yants. He described it as *Schizotricha* sp. 1, because he considered the number of nematothecae important enough to separate this species from *S. unifurcata* and because at that time he had no possibility to examine Jäderholm's species before determining whether they were conspecific or not. Now, after re-examining *S. anderssoni*, we believe there are insufficient differences between Jäderholm's species and the material described by Naumov & Stepan'yants (1962) and Peña Cantero (1991), because in the lectotype it is possible to find up to four nematothecae under the hydrotheca (even five in some cauline internodes) and an additional nematotheca above the hydrotheca. They agree in all the other features: branched stem, normal presence of a single secondary hydrocladium, occasional presence of hydrothecate internodes without apophyses between the internodes

bearing the apophysis in hydrocladia which become stems of lower order and occasional presence of ahydrothecate internodes at the base of the secondary hydrocladia. Therefore, we consider all that material being conspecific and believe the small differences in number of nematothecae to be due to a certain degree of intraspecific variability.

Blanco (1984) assigned to *Schizotricha anderssoni* a small fragment composed of hydrocladia differing from Jäderholm's species by the size of the hydrothecae, these being much shallower (150-270 μm deep). This material probably belongs to another species, though the scarcity of the material prevents us from giving a complete description.

Schizotricha jaederholmi spec. nov.
(fig. 2)

Material examined.— Swedish Southpolar Expedition 1901-1903, Stn n° 34, 54°11'S-36°18'W, off South Georgia, 252-310 m depth, 5.vi.1902 (Swedish Museum of Natural History, Coel no. 432), one colony c. 130 mm high, without gonothecae (holotype). Fragment of colony (= schizoholotype) as RMNH Coel. no. 27681, two slides n° 3381.

Description.— The colony is composed of an unbranched, dark brown stem c. 130 mm high; it is broken in three fragments of 55, 40 and 35 mm length. The longest fragment corresponds to the basal part of the colony and carries a filiform hydro-rhiza of c. 10 mm length. The colony is polysiphonic over almost its whole length; the last 16 mm being monosiphonic. The stem is composed of an axial tube divided into thecate internodes and a few unsegmented, secondary tubes growing upwards around the main tube and provided only with nematothecae.

Each cauline internode has a long apophysis at the distal fourth which makes an angle of c. 45° with the internode, carries two nematothecae and gives rise to the hydrocladium (fig. 2b). There is one apophysis per internode, and they are alternately arranged in almost the same plane. In the axil between apophysis and internode there is a hydrotheca; two nematothecae flank the hydrothecal aperture, one on each side. Moreover, there are four, occasionally three, nematothecae under each hydrotheca at different levels (fig. 2b). The last two cauline internodes bear only two nematothecae under the hydrotheca, but they may be considered as anomalies, since they are the first hydrothecate internodes after a rupture of the stem which is first followed by a short ahydrothecate internode with two nematothecae. Also, the first of those hydrothecate internodes carries another nematotheca above the hydrotheca.

The cauline apophyses give rise to the hydrocladia, which are much branched (fig. 2a). The hydrocladium of the first order gives rise to a secondary hydrocladium at its first hydrothecate internode. This internode forms an apophysis, lateral of the base of the hydrotheca, which carries the secondary hydrocladium. This gives rise, in its first hydrothecate internode and in the same way, to a tertiary hydrocladium. Up to four branchings have been noticed and, therefore, up to the fifth order of hydrocladia have been observed (fig. 2a). Sometimes, following the hydrocladial apophyses, there is an ahydrothecate internode provided with two nematothecae placed at different levels (fig. 2a). That intermediate internode has been found only twice after the first branching and it has never been found following the cauline apophyses.

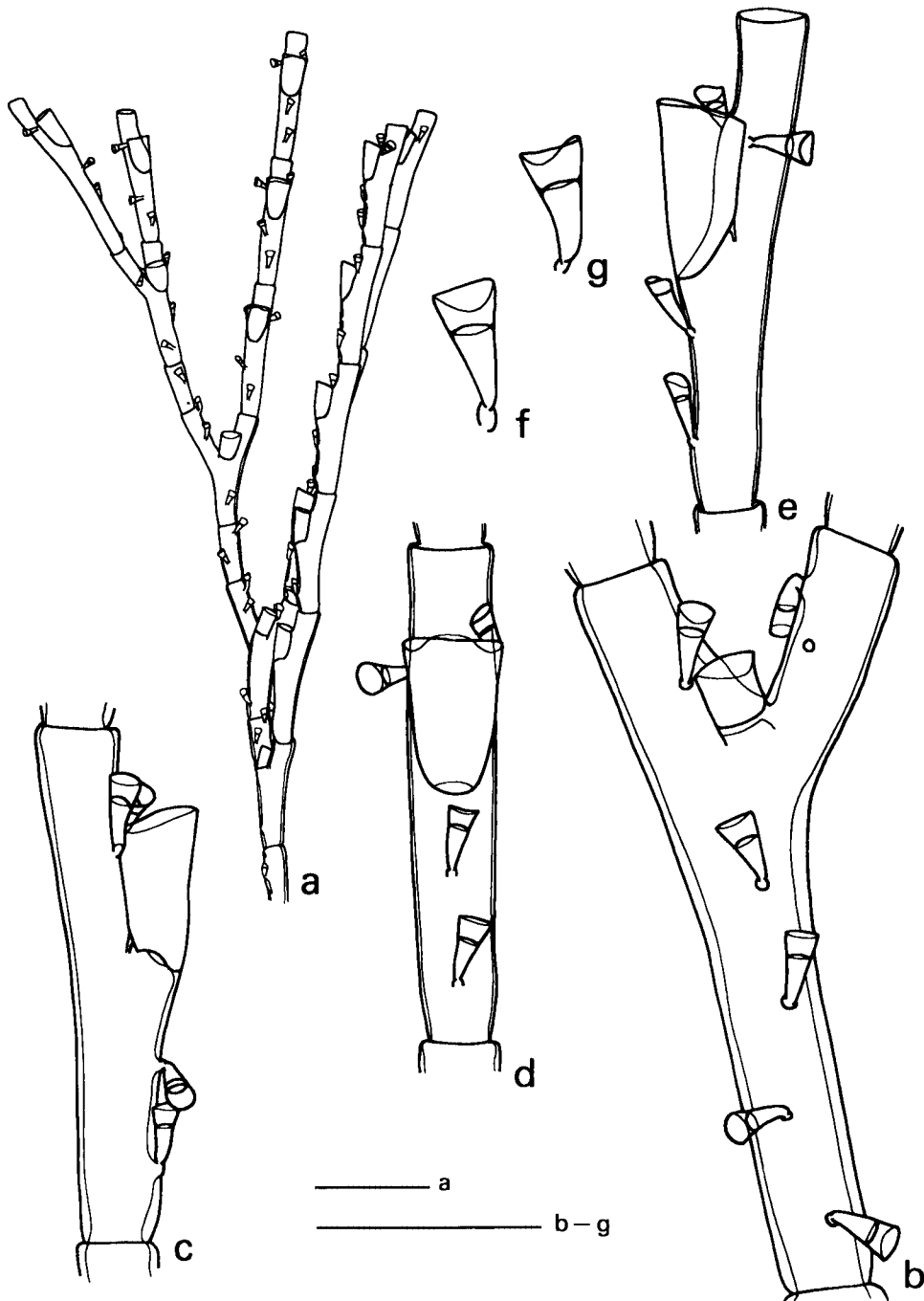


Fig. 2. *Schizotricha jaederholmi* spec. nov. a, branch showing hydrocladial ramification and hydrothecal disposition; b, cauline internode showing apophysis, hydrotheca and nematothecae; c-e, hydrocladial internodes with hydrotheca and nematothecae; f-g, nematothecae. Scale bars: a = 1 mm; b-e = 500 μ m; f-g = 250 μ m. (All drawings from holotype).

Each unforked hydrocladial internode has a hydrotheca, situated on the distal half, and four nematothecae: two flanking the hydrothecal aperture, one on each side, and two under the hydrotheca and placed at different levels (fig. 2c-e). The large and deep hydrotheca is adnate over its whole length. The length of the hydrotheca strongly increases along the hydrocladia; for instance, the length of the abcauline wall may be 195 μm in the first internode and 390 μm in the seventh. The abcauline wall is straight and slightly directed outwards (fig. 2c, e). The hydrothecal aperture is slightly tilted towards the adcauline side.

The branched hydrocladial internodes carry a reduced hydrotheca in the axil between apophysis and internode, two nematothecae flanking the hydrothecal aperture on each side, and two or three nematothecae under the hydrotheca, placed at different levels. All the nematothecae are bithalamic (fig. 2f-g).

Measurements (in μm)

Hydrothecae	
length abcauline wall (lateral view)	195-400
diameter at rim (frontal view)	188.5-227.5
Hydrocladial internodes	
length	1066-1230
diameter under hydrotheca	213.2-246
Cauline internodes	
length	1033.2-1640
diameter under apophysis	164-229.6
Apophyses	
length	295.2-574
diameter	147.6-196.8
Nematothecae flanking hydrothecal rim	
length	130-136.5
maximum diameter	70-73.5
diameter at diaphragm	45.5

Remarks.— As can be deduced from the descriptions, *Schizotricha jaederholmi* shows many differences with *S. anderssoni*. In *S. jaederholmi* the stem is unbranched, there are hydrocladia of the fifth order and only two nematothecae occur below the hydrotheca in the unforked hydrocladial internodes. In *S. anderssoni* the stem is repeatedly branched, there are only secondary hydrocladia and, typically, there are three nematothecae beneath the hydrotheca in the unforked hydrocladial internodes. The two species also differ because in *S. jaederholmi* the hydrothecae and the internodes are much larger. Moreover, in *S. anderssoni* the nematothecae are shorter, but with a larger diameter at the rim.

Schizotricha jaederholmi has important differences with the remaining antarctic species of the genus. In *S. unifurcata* Allman, 1883, the stem is repeatedly branched, there is a constant presence of an ahydrothecate internode following the cauline and hydrocladial apophyses and there is only one nematotheca under the hydrotheca in the unforked hydrocladial internodes.

Schizotricha multifurcata Allman, 1883, is allied to *S. jaederholmi* because, typically, it has two nematothecae underneath the hydrotheca in the unforked hydrocladial

internodes. Nevertheless, the two species differ because in *S. multifurcata* the stem is branched, there is constantly an ahydrothecate internode after the cauline and hydrocladial apophyses and there are four nematothecae below the hydrotheca in the forked hydrocladial internodes.

Schizotricha turqueti Billard, 1906, and *S. glacialis* (Hickson & Gravely, 1907) share with *S. jaederholmi* the unbranched stem. However, they differ because in *S. turqueti* and *S. glacialis* the hydrocladia branch only once and there is a single nematotheca underneath the hydrotheca in the unforked hydrocladial internodes.

El Beshbeeshy (1991) described as *Schizotricha binematotheca* a species with branched stem, hydrocladia up to the fourth order, an ahydrothecate internode, provided with one nematotheca, following the cauline and hydrocladial apophyses, two nematothecae under the hydrotheca at different levels in the unforked hydrocladial internodes, and two to four nematothecae under the hydrotheca in the forked hydrocladial internodes. All those characteristics are also present in *S. multifurcata* Allman, 1883, with small differences as for instance the presence of two nematothecae in the ahydrothecate internodes in Allman's species. It seems quite likely that the two are conspecific.

Etymology.— The specific name, *jaederholmi*, is a tribute to Dr E. Jäderholm who originally studied the collections from the Swedish Southpolar Expedition.

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