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## Bijzondere vondsten van sialgalen in een terrasvijver in Lier (België, provincie Antwerpen)

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### Abstract

#### Remarkable finds of desmids in a terrace pond in Lier (Belgium, province of Antwerpen)

Investigating the presence of desmids in garden ponds seems somewhat unusual. However, it can yield remarkable discoveries. Often, these ponds are left untouched for extended periods, which promotes the undisturbed development of a varied micro flora. Desmids can accidentally hitch-hike on aquatic plants brought in from nature or pond centres. In the village of Lier (Belgium), the author examined a small garden pond that is supplied with water in a somewhat unusual way: partly groundwater, partly excess rainwater from a green roof that splashes down into the pond. The microscopic examination revealed some striking desmid species. Some of them need further taxonomic investigation.

Onderzoek aan sialgalen vindt meest plaats in de geijkte milieus als heidevennen, petgaten, bergmeertjes, etc. Onderzoek naar de aanwezigheid van sialgalen in tuinvijvers lijkt wat ongewoon en ongebruikelijk. Het kan echter opmerkelijke vondsten opleveren. Dikwijls worden die vijvertjes lang ongemoeid gelaten, wat een ongestoorde ontwikkeling van de microflora ten goede komt. Sialgalen kunnen toevallig meeliften met aangevoerde waterplanten uit de natuur of vijvercentra.

Aan de zuidkant van mijn huis, grenzend aan het buiten terras, ligt een voorgevormde rechthoekige vijver met een inhoud van ongeveer 1000 liter. Wanden en bodem zijn van kunststof (HDPE: High Density Polyethylene). De aanvoer van water is ongewoon: deels grondwater dat bij lage waterstand van 8,5 m diepte wordt opgepompt en in de vijver gespreoid, deels overtollig regenwater dat bij zware regenval van een goede 5 meter hoogte in de vijver plonst vanaf het met vetplanten ingezaaide groendak. In de vijver gedijen inheemse waterplanten (Fonteinkruid soorten, Grof hoornblad, Kikkerbeet, Loos blaasjeskruid, Watermunt, Watertorkruid, Waterranonkel) en één exoot: Paarse trompetbekerplant (*Sarracenia purpurea*), een vlees-etende bekerplant uit Noord-Amerika. In het voorjaar van 2024 werd de vijver volledig leeggemaakt en herstart na het verwijderen van *Chara vulgaris*. Dit kranswier verspreidt een sterke geur, en een stof die de groei van alle omringende waterplanten, ook die van (sier)algen, kan beperken (zie bijvoorbeeld Van Donk & Van de Bunt, 2002). Een overzicht van de vijver en details van de begroeiing zijn gegeven in foto 1 en 2.

Op 28 oktober 2025 werd een knijpmonster genomen. Op dat moment bedroeg de pH 7.54, en de elektrische geleidbaarheid (EGV) 410  $\mu\text{S}/\text{cm}$ . Het monster bevatte maar weinig soorten sialgalen, maar daaronder



Foto 1. De terrasvijver. Foto © Leo Vaes.



Foto 2. Details van de terrasvijver. Foto's © Leo Vaes.

bevonden zich wel enkele opvallende vormen die hieronder worden besproken.

#### *Cosmarium subbioculatum* (foto 3)

De vorm die aanvankelijk mijn grootste aandacht trok was een *Cosmarium* met gladde celwand, ongeveer even lang als breed, met tussen de celhelften een smalle, iets open, evenwijdig lopende sinus. De chloroplast had aan beide kanten van de centrale pyrenoid naar de celwand wijzende uitsteeksels, soms lijkend op een hand met vingers. Gemiddeld vond ik drie exemplaren per onderzochte druppel. Met eerdere aanbevelingen van Marien



Foto 3. *Cosmarium subbioculatum*. Foto © Leo Vaes.

van Westen in gedachten, nam ik foto's van meerdere cellen, teneinde incidenteel afwijkende vormen uit te sluiten. Zowel lengte en breedte van tien gemeten cellen bedroegen tussen 24 en 26 µm, met voor beide maximaal 2 µm verschil. De istmus was 10 of 11 µm breed. Een opvallende gelijkens vond ik in de in 2024 verschenen atlas "Sieralgen in Drenthe", op blz. 323, bij *Cosmarium bioculatum* morpha b, in het bijzonder met foto's 5 en 6, waar die vingerachtige uitlopers duidelijk te zien zijn. Van Westen vermoedt dat het om een nog onbeschreven soort gaat die wat groter is dan *C. bioculatum*. Met de "European flora of the desmid genus *Cosmarium*", van Frans Kouwets (2025) belandde ik bij *C. subbioculatum* F.A.C. Kouwets 2025. De cellen bezitten een opvallende slijmmantel rondom de cel welke het meest opvalt in een preparaat wanneer aanwezig materiaal erdoor wordt weggeduwd. Voor alle zekerheid stuurde ik meerdere foto's voor verder advies naar Frans Kouwets, tezamen met enkele andere opmerkelijke soorten uit het vijvertje. Hij bevestigde mijn determinatie en stelt in genoemde flora dat *C. bioculatum* morpha b uit Drenthe eveneens hetzelfde taxon betreft. Nazicht van mijn eerdere bemonsteringen leverde bovendien nog twee vindplaatsen van *C. subbioculatum* op: de educatieve vijver van het Provinciaal instituut voor Milieu educatie (PIME) te Lier (20 september 2022) en een poel in de Netevallei nabij Westmeerbeek (8 juni 2022). Dit sluit aan bij Kouwets' vermoeden dat "It probably is widely distributed but frequently misidentified."

#### *Cosmarium tetraophthalmum* var. *tetraophthalmum* (foto 4)

Deze forse soort was met meerdere exemplaren aanwezig. De cellen meten 113–117 lang en 77–84 breed, met een istmus van 24 µm. Een opvallend verschijnsel is echter de celwand, met in het centrum fijne poriën en veelhoekige tekeningen van dunne lijntjes die voor een groot deel de poriën verbinden. Meer naar de celrand toe lijken de poriën groter (als gevolg van optische vertekening?) en lijken de lijntjes cirkelvormige patronen te vormen. Dit is het best te zien in foto 5. In de drie recente determinatiewerken (Coesel & Meesters, 2023; Van Westen, 2024; Kouwets, 2025) wordt hiervan

geen melding gemaakt, en ook niet in Ralfs (1848). Wellicht is verder onderzoek nodig naar ontstaan en betekenis van deze structuren.



Foto 4. *Cosmarium tetraophthalmum* var. *tetraophthalmum*. Foto © Leo Vaes.

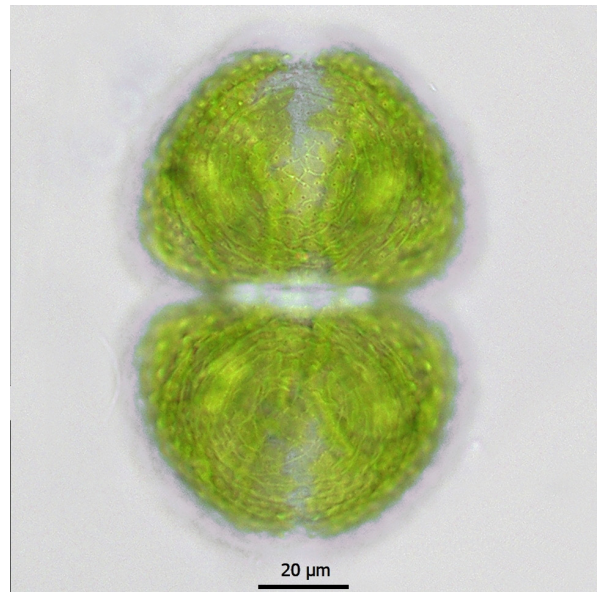


Foto 5. *Cosmarium tetraophthalmum* var. *tetraophthalmum* met cirkelvormige patronen op de celwand. Foto © Leo Vaes.

#### *Cosmarium achondrum* (foto 6)

De determinatie van deze soort werd bevestigd door Frans Kouwets, hetgeen mogelijke verwarring uitsluit met *C. depressum* (beschouwd als "species dubia et inquirenda": een twijfelachtige soort die verder onderzocht moet worden) en *C. scenedesmus* (vaak als synoniem beschouwd van *C. depressum*). Ik vond *C. achondrum* met meerdere exemplaren in elke druppel. Van de gemeten cellen was de lengte 40–46 µm, en de breedte 39–46 µm, met een istmus van 10–11 µm. Het is opmerkelijk dat deze laatste afmetingen iets kleiner zijn dan aangegeven in de flora van Kouwets (2025),

maar wel binnen de range vallen die Van Westen (2024) aangeeft (onder *C. scenedesmus*).

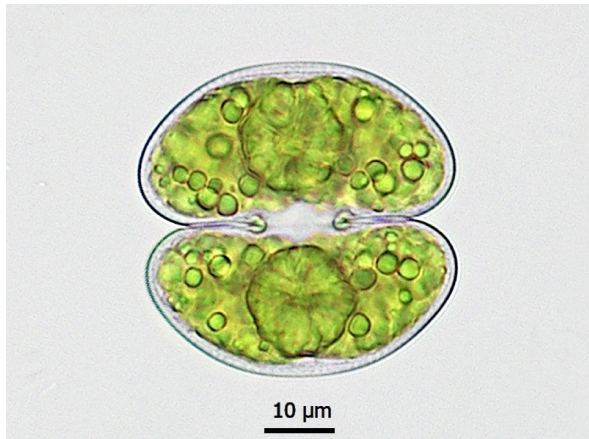


Foto 6. *Cosmarium achondrum*. Foto © Leo Vaes.

***Cosmarium moniliforme* var. *panduriforme* (foto 7)**

Deze variëteit is duidelijk kleiner dan de nominaatvorm en heeft ook een minder diepe insnoering bij de isthmus. De afmetingen van de cellen, en de relatieve breedte van de isthmus wijzen op de door Kouwets (2025) onder var. *panduriforme* aff. beschreven intermediaire vorm. De cellen waren overvloedig aanwezig in de onderzochte druppels, meestal met twee aan elkaar, soms zelfs met drie of vier.



Foto 7. *Cosmarium moniliforme* var. *panduriforme*. Foto © Leo Vaes.

***Closterium ehrenbergii* cf. var. *atumidum* (foto 8)**

Moeilijk op naam te brengen was een grote *Closterium* met afgeronde apex. De pyrenoïden liggen verspreid in de chloroplast en de ventrale zijde is niet “buikig”. De cel meet 536 bij 57 µm, L/B = 9.4. De lengte is duidelijk

te groot voor *C. submoniliferum*. Enkel *Closterium ehrenbergii* komt dan in aanmerking, maar die is ventraal in het midden gezwollen. Frans Kouwets wees me op een in 1935 door Grönblad in Krieger beschreven Finse vorm van *Closterium ehrenbergii* met vergelijkbare afmetingen en zonder ventrale verdikking: var. *atumidum*. In de publicatie is echter geen originele afbeelding van de nieuwe variëteit opgenomen. De eerste afbeelding van een vorm toegeschreven aan deze variëteit is die in Bourrelly & Manguin (1952, p. 213, Pl. 28: 484–485). In materiaal van Guadeloupe (Carïben) vonden deze auteurs maar één, vrij kleine cel en de determinatie is dus twijfelachtig. Verder is var. *atumidum* gemeld uit Noord-Amerika (Prescott et al., 1975), noordelijk Servië (Stamenković & Cvijan, 2008) en Moravië in Tsjechië (Mazalová et al., 2013). Beschrijvingen en afbeeldingen (voor zover verstrekt) wijzen echter steeds op twijfelachtige determinaties. Deze variëteit van *C. ehrenbergii* is dus heel slecht bekend en nog nooit in de Lage Landen waargenomen. Nader onderzoek is wenselijk.

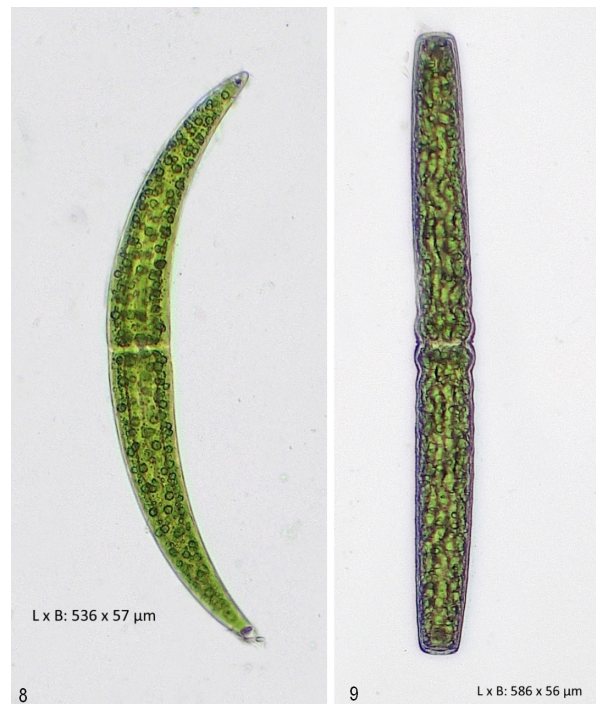


Foto 8. *Closterium ehrenbergii* var. *atumidum*.

Foto 9. *Pleurotaenium maximum*. Foto's © Leo Vaes.

***Pleurotaenium maximum* (foto 9)**

Een forse *Pleurotaenium* cel van 586 x 56 µm (L/B = 10.5) met een duidelijke opzwellung boven de isthmus, bijna parallele zijden en een apex zonder korrelkrans duidt op *Pleurotaenium maximum*. De gevonden vorm lijkt sterk op de afbeelding van dit taxon in Desmids of the Lowlands (Coesel & Meesters, 2023). In Sieralgen in Drenthe (Van Westen, 2024) maakt de auteur de opmerking dat natuurlijke variatie binnen het genus *Pleurotaenium* niet goed bekend is. Ook stelt hij dat de korrelkrans aan de apex heel onopvallend kan zijn. Aldus komt *Pleurotaenium nodulosum* eveneens in beeld voor

de identificatie van onze vorm. Tenslotte moet de huidige *Pleurotaenium* worden vergeleken met *P. archeri*. Die soort lijkt sterk op *P. maximum*, maar bezit een – vaak niet of slecht ontwikkelde – apicale krans van korreltjes. Bovendien zijn de cellen slanker. In het verleden zijn deze twee soorten echter wel als synoniemen beschouwd (vergelijk Růžička, 1977; zie ook Bando, 1988). Beide soorten zijn uit Nederland bekend; *P. maximum* was tot op heden niet met zekerheid uit België bekend. Op <https://waarneming.nl/> staat *Pl. maximum* met 119 waarnemingen. Op <https://waarnemingen.be/> : geen enkele.

Het knijpmonster leverde tenslotte nog twee fraaie soorten op: *Staurastrum cristatum* var. *cristatum* (foto 10) en *Staurastrum furcigerum* (foto 11).

Het onderzoek naar de sialgalen in mijn tuinvijver leverde een onverwacht aantal bijzondere soorten op die slecht bekend zijn of pas recent waren beschreven. Verder onderzoek zal wellicht meer duidelijkheid scheppen over de taxonomisch moeilijkere soorten.

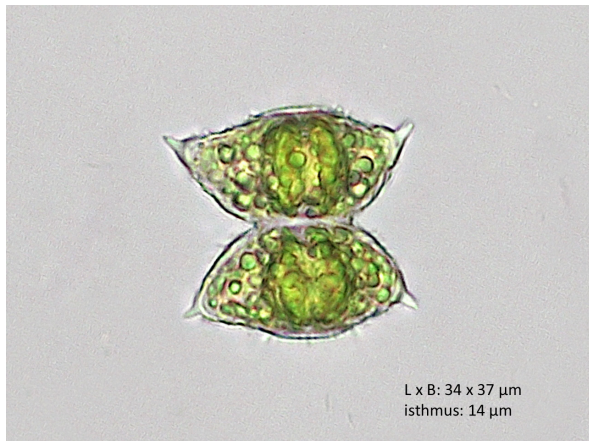


Foto 10. *Staurastrum cristatum* var. *cristatum*. Foto © Leo Vaes.

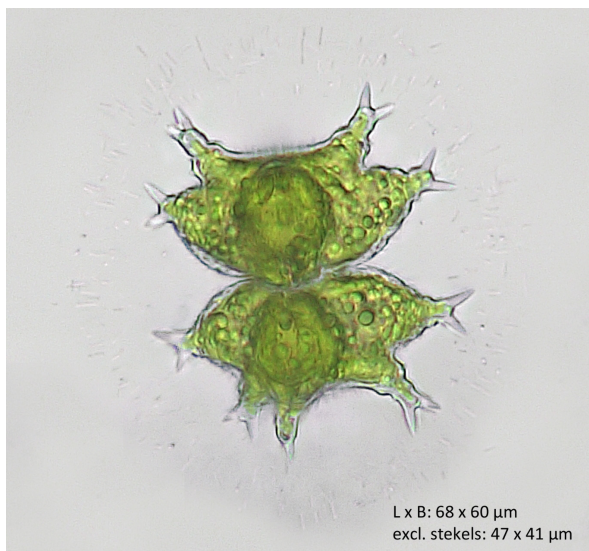


Foto 11. *Staurastrum furcigerum*. Foto © Leo Vaes.

#### Dank

Ik wil Frans Kouwets bedanken voor zijn hulp bij het determineren en de aanmoediging dit artikel te schrijven.

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## *Netrium interruptulum*, a new status and new name for *Netrium interruptum* forma *minus* Borge

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### Abstract

*Netrium interruptulum* Coesel is proposed as a new species name for *Netrium interruptum* forma *minus* Borge 1909. From the European lowlands, the taxon in question was not recorded before.

Keywords: desmid, *Netrium*, nomenclature.

### Introduction

In September 2025, the Flemish citizen scientist André Vanhoof discovered a remarkably small form of *Netrium interruptum* (Ralfs) Lütkemüller (figs 1–2). The find in question (GPS 51.21355, 5.16162) was done in a wet cart track making part of the Flemish nature reserve 'Buitengoor' situated near the border with the Netherlands. Considering the well-known Rabenhorst flora by Krieger (1933), the cells encountered could be identified as *Netrium interruptum* var. *minus* (Borge) Willi Krieger, a taxon up to then not known from the European lowlands area.



Figure 1. A cell of *Netrium interruptulum* Coesel as encountered in nature reserve 'Buitengoor'. Photo © André Vanhoof.

### Taxonomy

The taxon under discussion was originally described by Borge (1909: 2, fig. 1) from Florida (USA) as *Penium interruptum* forma *minus* ("minor") (our fig. 3). Krieger



Figure 2. Another cell of *Netrium interruptulum* Coesel as encountered in nature reserve 'Buitengoor'. Photo © André Vanhoof.

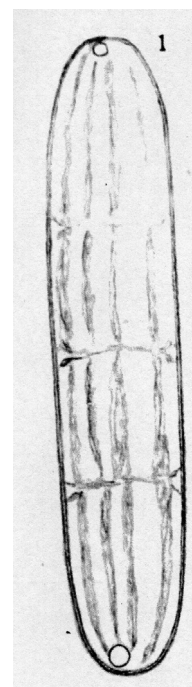


Figure 3. *Netrium interruptulum* Coesel copied from Borge 1909, fig. 1 [as *Penium interruptum* forma *minus* ("minor")].

(1933: 223, pl. 8: 10) nomenclaturally recombined it to *Netrium interruptum* var. *minus* ("minor"). As an earlier published synonym he mentions the smaller form *Penium digitus* b. *interruptum*  $\alpha$  described by Klebs (1879: 25, pl. 3: 3a, b). Although Klebs described his taxon from Eastern Germany, the illustration referred to — more detailed than that in Borge — makes likely that we have to do with the same taxon indeed (our fig. 4). As its name indicates, Krieger's newly distinguished variety of *Netrium interruptum* differs from the nominate variety by distinctly smaller cell dimensions [length 82–109  $\mu\text{m}$  versus (150) 180–300 (400)  $\mu\text{m}$  in the nominate variety]. Next to that, however, there is a remarkable difference in the morphology of the cell ends: abruptly conically attenuating in var. *interruptum*, rather gradually narrowing to a broadly rounding apex in var. *minus*. In particular that latter feature renders cells of var. *minus* quite an own appearance and in my opinion justifies distinction on species level:

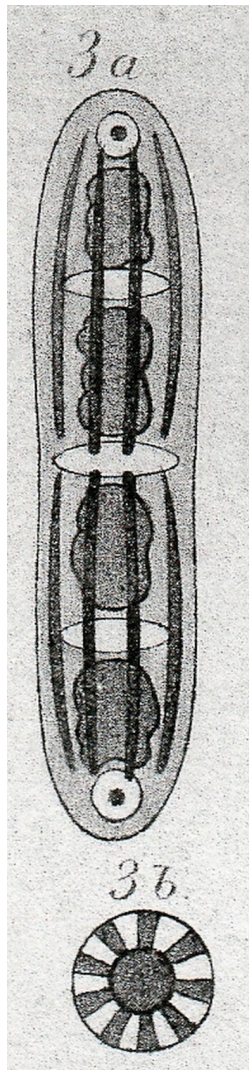


Figure 4. *Netrium interruptulum* Coesel copied from Klebs 1879, pl. 3: 3 (as *Penium digitus* b. *interruptum*  $\alpha$ ).

***Netrium interruptulum*** Coesel stat. et nom. nov.

Homotypic synonym: *Penium interruptum* forma *minus* "minor" Borge 1909: 2, fig. 1.

The above newly named taxon could also be accommodated to the genus *Planotaenium*, see Palamar-Mordvintseva & Petlovany 2009: 103, but in view of better fitting in the current edition of the flora 'Desmids of the Lowlands' (Coesel & Meesters, 2023), as yet I prefer to stick to the genus *Netrium*.

#### Distribution

According to Guiry (2024), *Netrium interruptulum* (as *Netrium interruptum* var. *minus*) is known from both North and South America, Asia and Europe.

Within Europe it has been reported from Great Britain, Austria, the Czech Republic, Serbia, France and Spain. Obviously it has a wide geographical distribution. Yet, the number of records is very limited, so presumably it is a rather rare taxon which may explain why in the European lowlands it has not been encountered before.

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## A reappraisal of *Staurastrum vestitum* J. Ralfs 1848 and its varieties

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### Abstract

When researching *Staurastrum vestitum* for a separate project, it became clear that it was a taxonomically confused species complex. This manuscript is an attempt to provide the nominate species and the numerous associated infraspecific taxa with a more tightly defined structure.

### Keywords

Desmids, *Staurastrum vestitum*, *Staurastrum vestitiforme*, *Staurastrum parvestitiforme*, *Staurastrum pseudovestitum*, *Staurastrum gymnovestitum*, *Staurastrum croasdaleae*, *Staurastrum landwasserense*

### Introduction

In February 2026 I made a brief trip to the Isle of Lewis, the most northerly inhabited island in the Outer Hebridean archipelago. It is contiguous to the Isle of Harris without an identifiable border. Hence, they are usually spoken of as one: Harris and Lewis (fig. 1). The islands are composed of granite, predominantly Lewisian gneiss. I had enough time to sample two of the deep moorland lochs, which are noted for some scarce Atlantic *Staurastrum* taxa. I used a plankton net close to the loch-edge. There was some submerged vegetation, but it was unidentifiable so early in the year. The catch was small, but it included *Staurastrum vestitum* and *Staurastrum anatinum* var. *subanatinum*. Researching these taxa prompted this manuscript.

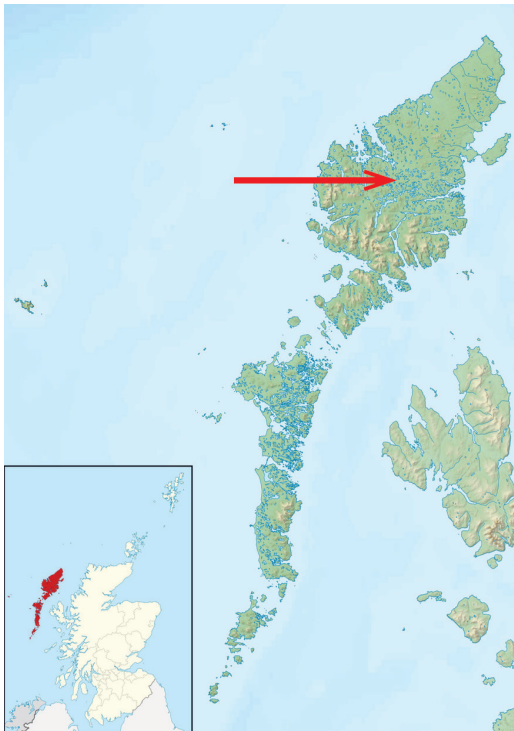


Figure 1. Map showing the geographical position of the Outer Hebrides (inset) and the linked northern islands of Harris and Lewis. Ordnance Survey data © Crown copyright.

### Results and discussion

#### *Staurastrum vestitum* J. Ralfs 1848

var. *vestitum* f. *vestitum*

Heterotypic synonyms:

*Staurastrum vestitum* f. *minus* Schmidle 1898: 63, no fig. (as 'minor').

*Staurastrum vestitum* var. *splendidum* Grönblad 1920: 81, pl. 3: 100–102.

*Staurastrum vestitum* var. *tortum* West & G.S. West 1898: 317, pl. 18: 16

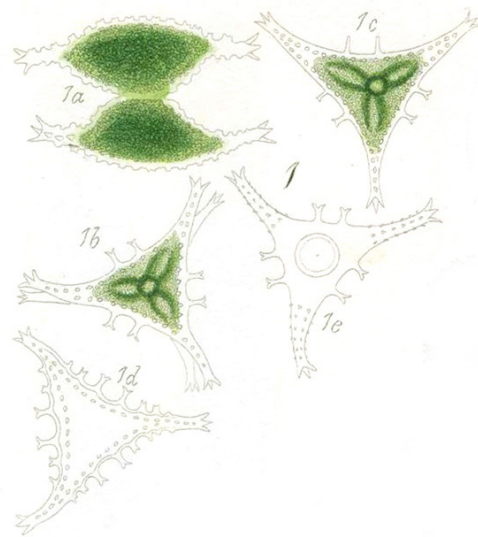
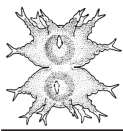


Figure 2. From Ralfs (1848) as *Staurastrum vestitum*.

A medium-sized cell with an open sinus, predominantly 3-radiate, occasionally 4-radiate. Semicells subfusiform to bowl-shaped, apex convex with about six emarginate teeth. On the ventral side there are two or three emarginate teeth extending down from the processes. There are two spines positioned near the centre of the semicell, which can be simple or bifurcate. The processes are relatively short and parallel to slightly convergent with three or four spines at the tips. Ralfs (1848: 143) describes them as 'minute', but they vary considerably between populations and can be quite large. In apical view the processes occasionally display some curvature. Also, in apical view the two central spines are prominent, they are quite variable and can be present as simple or bifurcate, the length is also variable but on well ornamented cells they are the most prominent. On either side of these spine are additional teeth which vary from vestigial to quite large and emarginate. Chloroplast axile with a single pyrenoid per semicell. West, West &



Carter (1923: 158) give overall dimensions of LxB: 28–43 x 46–90 µm (I believe the extreme breadth noted here came from a population in the west of Ireland), whereas Ralfs' (l.c.) dimensions (calculated from inches) are LxB: 40 x 60 µm (figs. 2–3).

Overall cell dimensions from the literature: L: 28–53 µm; B: 40–61(-90) µm; Is: (9-)11.6–17 µm, L/B: 0.66–0.70.

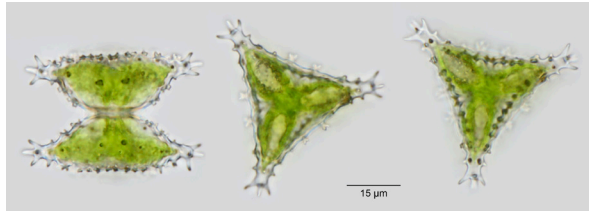


Figure 3. *Staurastrum vestitum*. Photo © Chris Johnson.

### Occurrence

A widespread species in Europe and North America but not common. Found in slightly acidic habitats such as in the plankton of lochs and lakes, especially at altitude.

### Notes

Much has been written and debated regarding this extremely variable species and its relationship with *St. aculeatum* Ralfs 1848, but there is little to be gained by reciting these texts except where it is pertinent to the varieties under discussion.

From northern Sweden Schmidle (1898: 63, no fig.) described a small taxon as *Staurastrum vestitum* f. *minus*, (as 'minor'). His dimensions (L: 32; B: 40–46 µm) fit the lower range of the nominate variety. It has been synonymised here.

From Finland Grönblad (1920: 81, pl. 3: 100–102) described a 4-radiate cell which he named as *St. vestitum* var. *splendidum*. For cell dimensions he gives L: 53 µm; B: 68 µm; Is: 17 µm. Single measurements suggest just a single specimen was recorded. The rather broad isthmus might be a feature of the 4-radiate cells. I see nothing here that is outside *St. vestitum*'s natural variability, hence, it has been synonymised here (fig. 4).

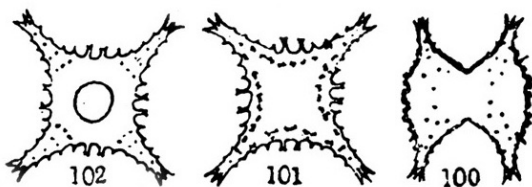


Figure 4. From Grönblad (1920) as *Staurastrum vestitum* var. *splendidum*.

Coesel & Meesters (2013, pl. 82: 6–9) include other cells as var. *splendidum*. In their figure 9 after Kouwets (1987, erroneously dated 1989) the face and apical views are linked, which is not the case in Kouwets' original drawing (l.c., pl. 19: 15–16). I see Kouwets' (l.c., figs. 13, 15–16) drawings all conforming to *St. vestitum*. On the

same plate (l.c., fig. 14), with its divergent processes, this would be better described as *St. pseudovestitum* (see its description below) (fig. 5).

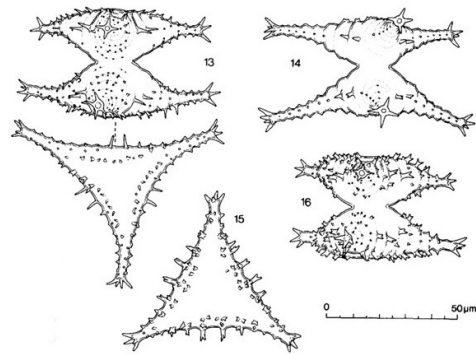


Figure 5. From Kouwets (1987) captioned as *Staurastrum vestitum* (as *S. vestitum* Ralfs, morphae in the text (l.c.: 255)).

Coesel & Meesters (l.c., fig. 7) after Lenzenweger (1989a: 41, fig. 123), illustrate a 4-radiate cell with concave sides in apical view giving the impression that the ornamentation is of a similar length. A closer look shows that the two central bifurcate spines on three of the four sides are longer, suggesting that this is just a well ornamented cell and should be described as *St. vestitum* (fig. 6). Interestingly, the isthmus, calculated

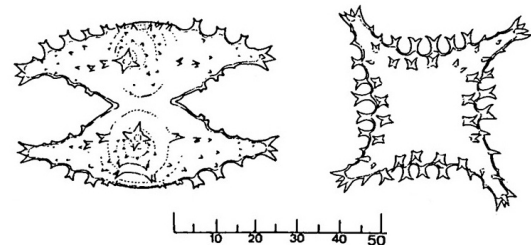
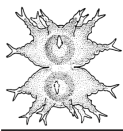


Figure 6. From Lenzenweger (1989a) as *Staurastrum vestitum* var. *splendidum*.

from the scale bar is 17 µm, identical to Grönblad's (l.c.) 4-radiate cell. The final image in Coesel & Meesters (l.c., fig. 8) after Lenzenweger (1989b: 531, fig. 54) was originally described as *St. vestitum*. In apical view it has the characteristic two central spines as simple or bifurcate, rather camouflaged by the abundant subapical bifurcate spines. It has little in common with the doubtful and



Figure 7. From Lenzenweger (1989b) as *Staurastrum vestitum*.



now synonymised *St. vestitum* var. *splendidum*. The spiny termini to the processes have a little in common with *St. aculeatum* but it is better left as originally designated (fig. 7).

From North America we get *St. vestitum* var. *tortum* West & West (1898, pl. 18: 16) and later from Canada by Irénée-Marie (1939, pl. 56: 4–5). It is named for a curvature in the processes and an insignificant axial twist when viewed apically. Neither of these works illustrates the cell in face-view (fig. 8). Ralfs (l.c., pl. 23: 1d – see our fig. 2) shows some cells having a propensity to display a curvature of the processes. Ralfs does not specifically mention this in the text but having illustrated it, it is not unreasonable to suggest it is an occasional feature. Var. *tortum* has been synonymised here.

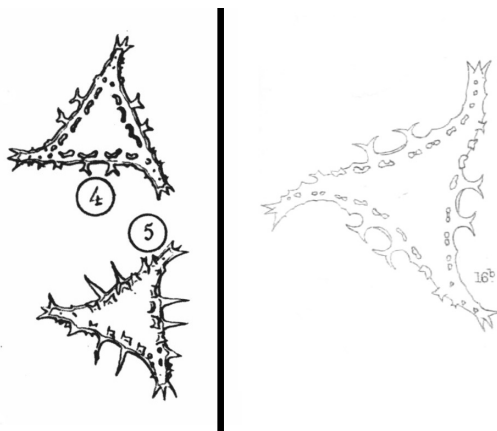


Figure 8. From West & West (1898) (right) Irénée-Marie (1939) (left) as *Staurastrum vestitum* var. *tortum*.

Below are several varieties associated with *St. vestitum*, which are treated separately.

***Staurastrum vestitumiforme* C.D.N. Johnson 2026  
nom. & stat. nov.**

Homotypic synonyms:

*Staurastrum vestitum* var. *subanatinum* W. & G.S. West 1902: 54, pl. 1: 28 (replaced synonym).

*Staurastrum anatinum* var. *subanatinum* (W. & G.S. West) P.F.M. Coesel & J.K. Meesters 2013: 63, pl. 85: 1–3.

A medium to large cell, predominantly (entirely?) 3-radiate, deeply constricted with an open acute sinus. Semicells cup- or bowl-shaped with the apex roughly truncate embellished with up to six emarginate or simple teeth. The lengthy processes are divergent to varying degrees ornamented with a concentric series of denticulations, which, towards the cell-body, can be emarginate. The processes are tipped with usually three spines of varying length. In face-view there are two bifurcate spines close to the median line of the semicell. On either side there is often a series of smaller or larger dentitions, some occasionally bifurcate. In apical view these two bifurcate spines show prominently.

Chloroplast axile with a single pyrenoid per semicell (figs. 9–10).

Overall cell dimensions from the literature: L: 34–44 µm; B: 70–102 µm; ls: 11.6–13.5 µm; L/B: 0.49–0.60.

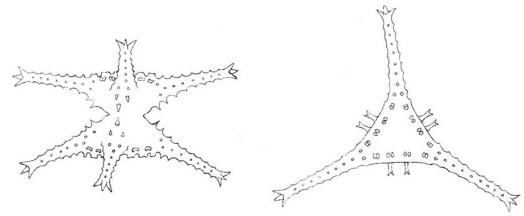


Figure 9. From West & West (1902) as *Staurastrum vestitum* var. *subanatinum*.

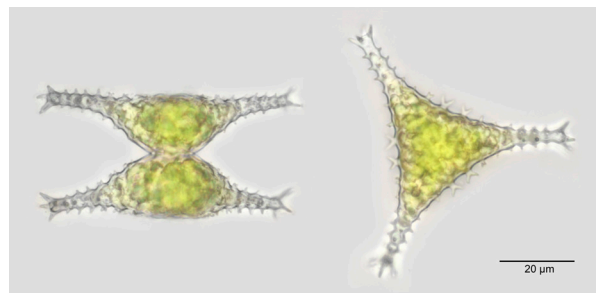


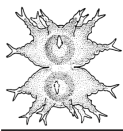
Figure 10. *Staurastrum vestitum* var. *subanatinum*. Photo © Chris Johnson.

**Occurrence**

Found in slightly acidic habitats mainly in the plankton of deeper lochs and lakes, especially at altitude and less frequently in moorland pools with *Sphagnum*. The Wests (l.c.) record it in abundance in County Galway and from Donegal in Ireland. It is infrequently recorded in the Outer Hebrides. Because of earlier taxonomic confusion, its general distribution is unclear. It probably has an Atlantic-subarctic range.

**Notes**

West & West (1902: 54) made this a variety of *St. vestitum* based on the characteristic bifurcate spines, as seen best in apical view, but acknowledged the striking resemblance to *St. anatinum* Cooke & Wills 1881. Coesel & Meesters (2013: 63) considered there was a greater affinity to *St. anatinum* and made it a variety of that species, but this is not a view shared here. The Wests (l.c.) considered the two bifurcate central spines as the fundamental diagnostic feature. A quote from Smith (1924: 93) reinforces this view: “This variety is very happily named since it bears a striking resemblance to some of the pelagic varieties of *S. anatinum* Cooke & Wills. The presence of the characteristic verrucae on the side of the semicells shows, however, that the variety belongs with *S. vestitum*.” This taxon clearly straddles two species in its morphological features but doesn’t fit comfortably with either. It is here raised to species level with a charitable nod to *St. vestitum*.



***Staurastrum parvestitumiforme* C.D.N. Johnson 2026  
nom. & stat. nov.**

Homotypic synonym:

*Staurastrum vestitum* var. *parvum* Nygaard 1949: 113–114, fig. 59 (replaced synonym).

A small cell, 3-radiate, deeply constricted with an open acute sinus. Semicells triangular with the apex about truncate embellished with two emarginate teeth. The relatively long processes are divergent and ornamented with four concentric series of denticulations, tipped with small spines. In face-view there are two bifurcate spines close to the median line of the semicells. In apical view the sides are slightly concave with two prominent bifurcate spines (fig. 11).

Cell dimensions after Nygaard: Length without processes 15 µm, with processes 22 µm; B: 31–33 µm; Is: 5.5 µm.

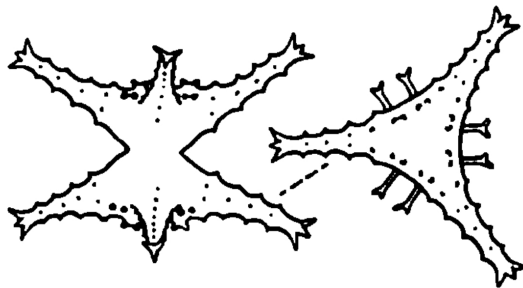


Figure 11. From Nygaard (1950) as *Staurastrum vestitum* var. *parvum*.

**Occurrence**

Found in Holmso, north of Esbjerg, West Jutland, Denmark, ‘free-swimming’ with plankton dominated by *Peridinium willei*. It was found in oligotrophic, acidic waters with a pH 4.6. The taxon was found in very small quantities.

**Notes**

Nygaard (l.c.) notes it bears most resemblance to *St. vestitum* var. *subanatinum* West & G.S. West 1902 but less than half its size. Apart from the size difference, it seems to prefer a markedly acidic environment. This seemingly unique taxon justifies a species name and a link to the newly proposed *St. vestitumiforme* Johnson 2026 is desirable.

***Staurastrum pseudovestitum* C.D.N. Johnson 2026  
nom. & stat. nov.**

Homotypic synonym:

*Staurastrum vestitum* var. *abundans* Korschikov 1941: 66, 74, pl. 6: 7 (replaced synonym).

A robust medium-sized cell a little broader than long, 3-radiate, deeply constricted with an open acute sinus. Semicells fusiform with parallel processes ending in five

or six short spines. The apices are convex and support 6 or 7 emarginate teeth, the central ones being doubly furcate, becoming simple towards the processes. On the ventral side of the semicells from the centre to the tips are two emarginate teeth, and at the base is an encircling row of small spines. In face-view are two bifurcate spines near the median line of the semicells, seen protruding from the sides in apical view, diagnostic of *St. vestitum* (fig. 12).

Cell dimensions after Korschikov: L: 50 µm; B: c.60 µm; Is: 14.5–15 µm.

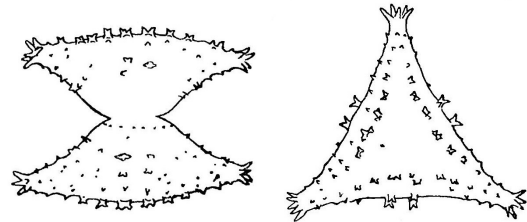


Figure 12. From Korschikov (1941) as *Staurastrum vestitum* var. *abundans*.

**Occurrence**

Only known from plankton in the Niva River in Murmansk Oblast, Russia, which flows into the Kandalaksha Gulf of the White Sea. Presumably from a backwater where the flow was almost still.

**Notes**

It has the characteristic median bifurcate spines diagnostic of *St. vestitum* but differs in several details. It is more robust and closer to the upper length measurements; the numerous spines at the tip of the processes and the encircling small teeth at the semicell base. Moreover, it has a riverine habitat, located just inside the Arctic Circle. The varietal name given: *abundans* is thought to relate to the abundance of spines. Korschikov (l.c.: 71) in the English summary states that “The general quantity of the planktic population was very small.” This would explain the consistent cell dimensions. It differs sufficiently to warrant species rank but with a name that maintains its link with *St. vestitum*.

***Staurastrum gymnovestitum* C.D.N. Johnson 2026  
nom. & stat. nov.**

Homotypic synonym:

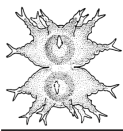
*Staurastrum vestitum* var. *denudatum* Nordstedt 1870: 230, pl. 4: 40 (replaced synonym).

Heterotypic synonym:

*Staurastrum vestitum* var. *gymnocephalum* Scott & Prescott 1961: 118, pl. 58: 9.

None of the authors give much in the way of a description noting they are smaller than the nominate variety and completely lacking in apical verrucae. In all other respects they reflect the nominate variety.

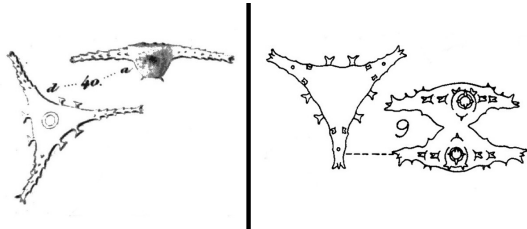
Cell dimensions: L 19–23 µm; B: 32–43 µm; Is: ca.7 µm.



**Notes**

Both synonyms noted above display the features of *St. vestitum* but are a lot shorter in length and lack apical ornamentation. Both varietal names refer to this lack of ornamentation. Therefore, ‘gymno’ meaning unadorned, has been introduced into the epithet (fig. 13).

**Occurrence**



**Figure 13.** From Nordstedt (1870) as *Staurastrum vestitum* var. *denudatum* (left); Scott & Prescott (1961) as *Staurastrum vestitum* var. *gymnocephalum* (right).

Both collections have come from below the equator: Java, Indonesia and Brazil, hence subject to hot climatic conditions. The author is not aware of any similar taxa being found in the northern hemisphere and it may be exclusively a southern hemisphere desmid.

***Staurastrum croasdaleae* C.D.N. Johnson 2026 nom. & stat. nov.**

Homotypic synonym:

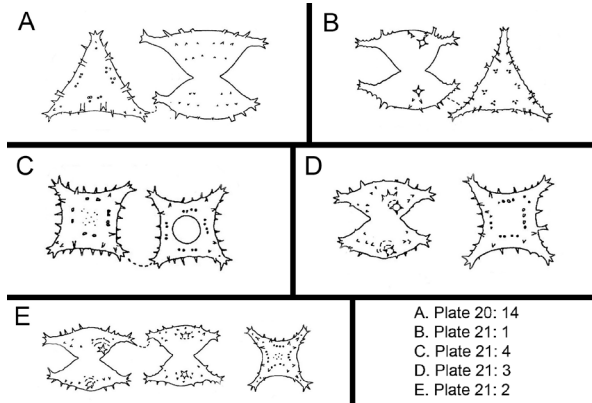
*Staurastrum vestitum* var. *cedercreutzii* Croasdale 1964: 207, pl. 20: 14, pl. 21: 1–4 (replaced synonym).

A small to medium-sized cell, 3–4-radiate, rarely 5-radiate, deeply constricted with an open acute sinus. Semicells fusiform with parallel processes ending in four (rarely five) short spines. The apices are convex and support simple irregular spines on the margin and across the face of the semicell. In apical view the sides of the triradiate cells are straight, in the 4-radiate they are concave. The denticulate ornamentation is mainly simple, short, and quite random in its distribution (fig. 14).

Cell dimensions after Croasdale: L: 20–35 µm; B: 25–49 µm; Is: 8.5–11 µm.

**Occurrence**

The collection was made at their designated Station 6, which is in the south-eastern area of Spotted Island off the Labrador coast. From Croasdale’s text: “The bedrock consists of Precambrian crystalline rocks of mainly acid character. It is overlaid by Wisconsin Age drift. ... The variety was abundant and variable.” No pH was given but it is probably acidic.



**Figure 14.** From Croasdale & Grönblad (1964) as *Staurastrum vestitum* var. *cedercreutzii*.

**Notes**

It is clear from Croasdale’s text that the authors were uncertain where to place this taxon. Croasdale’s initial thought was as a variety of *St. aculeatum*, but Grönblad pointed out that “*S. aculeatum* has much more numerous spines – always.” After more suggestions it was decided to attach it as a variety of *St. vestitum*. There are some random emarginate teeth but not in the characteristic position that defines *St. vestitum*. It is also worth noting that its length is quite a bit smaller than either of those species, with little overlap. It clearly does not fit comfortably with either of those species the authors considered and would be better given an unrelated name.

Named in honour of Dr Hannah Thompson Croasdale, American botanist (1905–1999).

***Staurastrum landwasserense* C.D.N. Johnson 2026 nom. & stat. nov.**

Homotypic synonym:

*Staurastrum vestitum* var. *persplendidum* Messikommer 1942: 171, pl. 18: 8–9 (replaced synonym).

Heterotypic synonym:

*Staurastrum vestitum* var. *montanum* Lenzenweger 1986: 118, pl. 9: 3–6, pl. 11.

A small to medium-sized cell, predominantly 3–5-radiate, deeply constricted with an open acute sinus. Semicells cup- to bell-shaped with stocky, short, parallel processes ending in short spines. Semicells are strongly twisted at the isthmus and are best seen in apical view. In face-view the apices are convex and support usually four emarginate denticulations. Near the semicell centre are two emarginate denticulations, which show clearly in apical view, especially in the 3-radiate cell where the sides are almost straight. They are not quite so obvious in the 4–5-radiate cells where the sides are concave. The remaining dentition, mainly around the processes, is simple. A ring of simple teeth encircles the semicells’ bases (figs. 15–18).

Cell dimensions: L: 33.2–38 µm; B: 40–47 µm; Is: 10.8–15 µm.

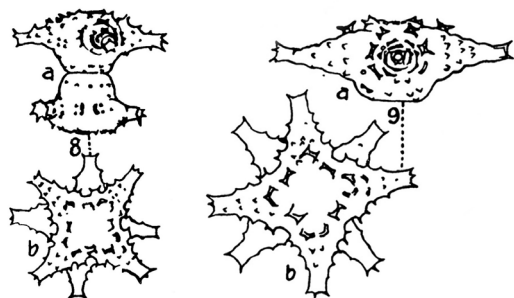


Figure 15. From Messikommer (1942) as *Staurastrum vestitum* var. *persplendidum*.

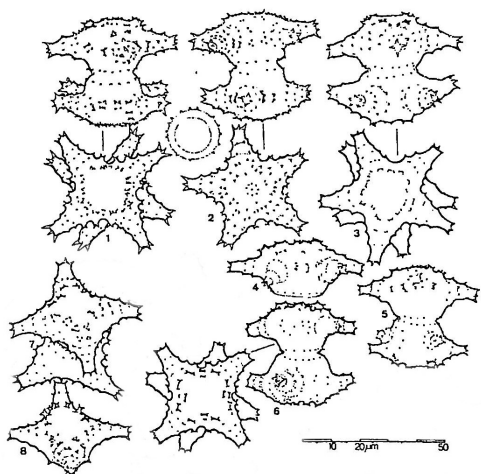


Figure 16. From Lenzenweger (1986) as *Staurastrum vestitum* var. *persplendidum*.

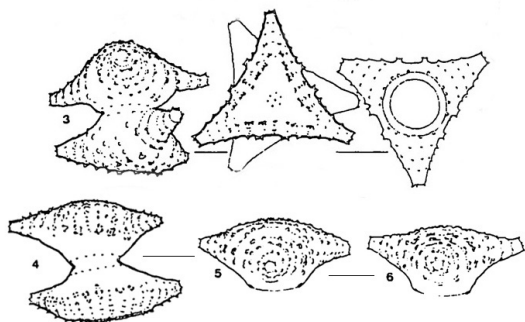


Figure 17. From Lenzenweger (1986) as *Staurastrum vestitum* var. *montanum*.

#### Occurrence

Messikommer (l.c.) found this taxon at an altitude of over 2500 metres on both sides of the Landwasser valley, near Davos, Switzerland. Collections were made from various waterbodies in the summer months of July and August of 1935 at high altitude before the lakes froze over. It was also found by Lenzenweger (1986: 119, pl. 8: 1–8) in drainage zones of small mountain lakes (Karsee, Pichl-Kainisch, Styria and Hirkarseelein, south of Obertraun, Upper Austria) at medium altitudes (500–800 metres). He also found it in the high-altitude

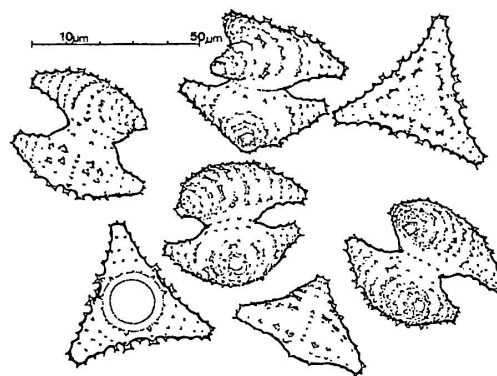


Figure 18. From Lenzenweger (1986) as *Staurastrum vestitum* var. *montanum*.

region around Obertauern. It was found frequently but always in small numbers.

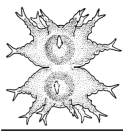
#### Notes

Most interestingly, Lenzenweger (1986) reported both var. *persplendidum* and his new var. *montanum* from the same region, and commented on their similarity, especially in apical view. I initially had these varieties described as separate species, but close examination of the texts and images persuaded me they were the same. One set of collections was predominantly 4–5-radiate, the other predominantly 3-radiate. It is not always easy to make comparisons with different radiations as the cell shape alters slightly.

Features that are the same: semicells cup- to bell-shaped; semicells twisted at the isthmus, processes stocky at their base; a ring of simple teeth encircles the semicells' bases; a pair of emarginate spines protrude prominently at the midpoint of each semicell side. This is not a known characteristic outside of *St. vestitum*, which are diminutive in comparison to that species. As they appear identical in both the above authors' descriptions and images, it is too much of a coincidence, so I concluded they are the same species. They are also from the same geographical area and altitude. Lenzenweger (l.c.) also commented on the resemblance to *St. vestitum* var. *persplendidum*. The only remote link to *St. vestitum* is the two bifurcate spines emanating from the semicells' centre and seen protruding in apical view. They are quite small leading me to conclude that this is coincidental and a new name, distancing this taxon from *St. vestitum*, is desirable. To avoid any future taxonomic confusion a name has been chosen that reflects the collecting area, noted above.

#### Doubtful or rejected infraspecific taxa:

*Staurastrum vestitum* var. *distortum* Wolle 1883: 21, pl. 27: 5–5a. - Wolle's brief description and lack of cell dimensions leaves this cell difficult to evaluate. It seems to have more in common with *St. controversum*.



*Staurastrum vestitum* f. *minus* F.E. Fritsch & M.F. Rich, nom. illeg. 1937: 214, fig. 27 E. Name already taken: *Staurastrum vestitum* f. *minus* Schmidle, 1898. The authors note: “no good specimens showing the individuals in front-view were obtained, ...” yet they give length and remarkably narrow isthmus dimensions?

*Staurastrum vestitum* var. *koreana* Skvortzov 1932: 154, pl. 5: 66. – The body is cup-shape to cylindrical with a wide-open sinus with a small acute notch at the isthmus. This is more akin to some smaller forms of *Staurastrum manfeldtii* Delponte 1878. It should not be associated with *St. vestitum*.

*Staurastrum vestitum* var. *incurvum* Hegde 1986: 153, fig. 11. – This unusual desmid is poorly described. The six trifurcate spines are apically positioned. The dimensions given bear no relation to the scaled drawing. It should not be associated with *St. vestitum*.

*Staurastrum vestitum* var. *orbelicum* Petkoff. – I am unable to trace a written account or drawing of this taxon. It appears in Stoyneva-Gärtner, et al. (2015: 42) as “DD - Data Deficient”.

### Conclusions

When researching for this manuscript, I initially used Coesel & Meesters' (2013) major work on the genus *Staurastrum*. Under *St. vestitum* (l.c.: 164) they listed several varieties as “taxa excluded” and made some suggestions on species with closer affinities. They also renamed two, one of which the current author has a different opinion on as noted above. Algaebase (Guiry & Guiry, 2026) was also consulted for a more comprehensive list of intraspecific taxa. The references wouldn't be complete without mention of Brook (1959). This was a huge undertaking and the results complex. He produced 18 plates with 156 figures, many with triple, hyphenated epithets. Although the work is largely superseded by later authors it emphasises the huge variability of certain species within this genus. The current author has taken a broader view when describing both *St. vestitum* and several of its varieties. The variability tends to be in the ornamentation rather than the cell shape, although comparing 3-, 4- and 5- radiate cells often involves a slight change in semicell shape.

### Acknowledgements

My thanks to the editors for correcting my nomenclatural and taxonomic errors and for helpful suggestions and corrections to the text. It has enhanced the manuscript and added increased clarity.

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## New insights into morphology and distribution of the asymmetrical genus *Croasdalea* (Desmidiaceae, Streptophyta)

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### Abstract

The genus *Croasdalea* is currently known only from two countries of South America: Brazil and Colombia. In this paper we report a new record, expanding the distribution of this genus to northeastern Brazil, in addition to provide for the first time detailed photos in light microscopy and scanning electron microscopy for this genus. Some observations about ecology and morphology were provided.

### Introduction

The monospecific genus *Croasdalea* was proposed by Bicudo & Mercante (1993) based on *Staurastrum marthae*, a species described by Grönblad (1945) from Pará State, northern Brazil. It is one of the asymmetrical genera of desmids occurring in the tropics together with *Allorgeia* Gauthier-Lievre, *Amscottia* Grönblad, and *Prescotiella* C.E.M.Bicudo, and it is currently considered endemic to South America, with records from Brazil and Colombia.

Before the proposition of this genus, this taxon also was considered a member of the genus *Stauroidesmus* by Teiling (1967) at variety level: *Stauroidesmus calyxoides* var. *marthae* (Grönblad) Teiling. The last records of *Croasdalea* were performed in 1990s in São Paulo State (Bicudo & Mercante, 1993; Marinho & Sophia, 1997) and in 1985 in Colombia (Coesel et al., 1988). Since then, the records of this genus in Brazil were known only to States of Pará and São Paulo, northern and southeastern regions, respectively.

Recently, we have collected samples in Cerrado areas from western Bahia State, northeastern Brazil, and we found rare and interesting desmids, including *Croasdalea marthae*.

Herein we report a new record of this genus showing an updated distribution and new insights about morphology, besides presenting photos in different views in light microscopy and SEM.

### Material & Methods

Five samples were collected during February 2026 in a pond in the municipality of São Desidério, Bahia State, northeastern Brazil (photo 1). Some physico-chemical water parameters were measured *in situ* including Dissolved Oxygen (DO; mg/l), temperature (°C), Electrical Conductivity (EC;  $\mu\text{S}/\text{cm}$ ), Total Dissolved Solids (TDS; mg/l) and pH. Measurements were performed using portable multimeter probes (Hanna HI98130 and Instrutherm MO-910). The samples were fixed with Transeau solution. The Light Microscopy (LM) analysis was carried out with a Leica Microscope, and the Scanning Electron Microscopy (SEM) studies were conducted based on Moura et al. (2021).



Photo 1. Map and sampling site (\*) in municipality of São Desidério, Bahia State, Brazil. Photo © Geraldo Ramos.

### Results and discussion

*Croasdalea marthae* (Grönblad) C.E.M.Bicudo & Mercante 1993, 271 (figs. 2–3).

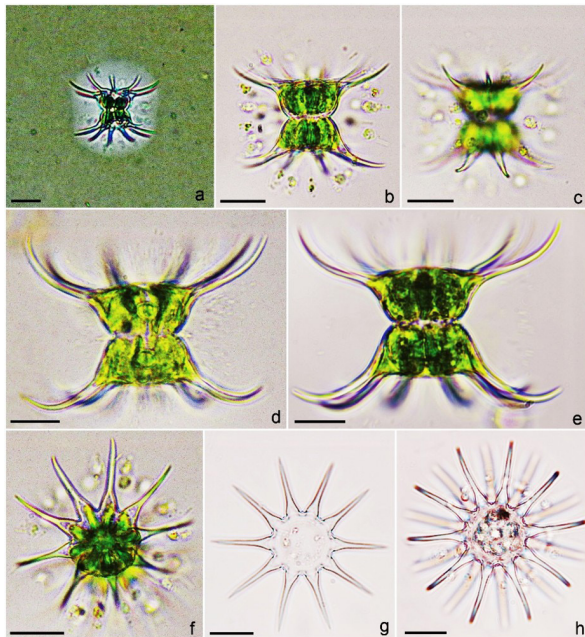
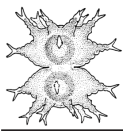
Basionym: *Staurastrum marthae* Grönblad (1945: 27)  
Synonym: *Stauroidesmus calyxoides* var. *marthae* (Grönblad) Teiling (1967: 492).

Cell solitary, as long as wide, deeply constricted, median sinus open, acute-angled; semicells trapeziform, all angles somewhat projected and tipped with a single, solid, long spine; spines of both upwardly curved; chloroplast axial, stelloid, with one pyrenoid per semicell. Zygospores not observed.

Cell dimensions: cell length (without spines) 25–39  $\mu\text{m}$ ; cell width (without spines) 24–38  $\mu\text{m}$ ; width of isthmus 17–25  $\mu\text{m}$ ; spines: 19–29  $\mu\text{m}$ .

Distribution: Brazil: Pará (Grönblad 1945, Scott et al. 1965: as *Staurastrum marthae*, Förster 1969: as *Stauroidesmus calyxoides* var. *marthae*), São Paulo (Bicudo & Mercante, 1993; Marinho & Sophia, 1997; Mercante & Bicudo, 1998; Ramírez & Mercante, 1998; Bicudo et al., 2018); Bahia (present study); Colombia (Coesel et al., 1988: as *Stauroidesmus calyxoides* var. *marthae*).

We have analyzed five samples from western Bahia, collected in areas of Cerrado, the World's most biodiverse Tropical Savannah (Cardoso et al., 2026), covering



**Photo 2.** Cells of *Croasdalea marthae* in LM. a. Detail of the mucilage sheath. b-c. detail of the chytrids parasitizing the cell. d-e. cell in front view, with detail of the chloroplast. f-g. cell in apical view showing the variation in the number of spines. Scale bars: 20  $\mu\text{m}$ .

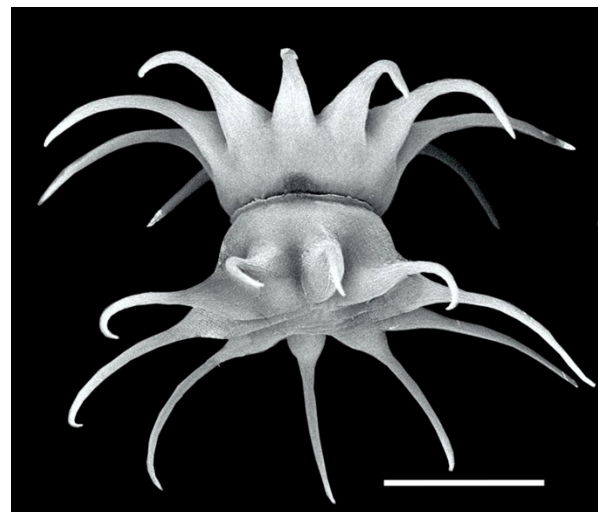
the most part of Central Brazil. This biome is known for high endemism and rare species of desmids (Ramos et al., 2024). Despite of little is known about the distribution of *Croasdalea*; the ecology of the genus is well known from studies performed mainly in São Paulo State. As highlighted by Mercante & Bicudo (1998) *Croasdalea marthae* is surely a species morphologically well adapted for flotation, due to its perfectly smooth cell wall and long, strong spines, which occur at regular intervals on the angular projections of the semicells. According to these authors, the concentration of the cells of this species in a pond from São Paulo State is approximately three times more in the surface than in at the bottom. This pattern together with the mucilage sheath (photo 2a) contributes to planktonic life of this species. In our samples we found *Croasdalea* cells from different communities (phytoplankton, periphyton, and metaphyton). Ramirez & Mercante (1998) referred this species mainly as “pseudo-periphyton”. During our analysis we also realized most individuals were parasitized by chytrids photos 2a-b).

Apparently, this species is well adapted to wide variation of pH. Bicudo & Mercante (1993) reported specimens occurring between pH 5.44–8.90 in a pond. However, in Bahia, we found *Croasdalea* cells only under acidic conditions (pH 5.4). Other parameters measured were water temperature (28.9 °C), EC 1  $\mu\text{S}/\text{cm}$ , dissolved oxygen (DO) 4.5 mg/L and TDS 0 ppm.

Regarding bipolar asymmetry of the cell, we did not observe symmetrical forms, so the asymmetrical pattern of the genus was strongly constant in all the specimens examined. On other hand, the number of spines was variable, as reported in the literature. The most

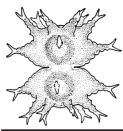
common pattern is cells with 9 spines, but specimens 7 or 8 radiate also could occur (Bicudo & Mercante, 1993). In our samples from Bahia, we observe two populations: one with minor cells (approximately 30  $\mu\text{m}$  in length) bearing up to 9 spines (photos 2b-c, f-g), and another with larger cells (approximately 40  $\mu\text{m}$  in length) with 10 spines (photos 2d-e,h). Some cells with 8 spines were also observed, especially in individuals measuring around 30  $\mu\text{m}$ . Overall, we observed that larger cells tend to have a greater number of spines. According to Bicudo & Mercante (1993), the spines of the upper semicell are all upwardly curved, whereas those of the lower one are less curved than and somewhat parallel to those of the upper semicell. Scott et al. (1965) reported different specimens (as *Staurastrum marthae*) with spines more erect. However, in the specimens which we analyzed from Bahia, both semicells have spines upwardly curved. We also noticed that in apical view the spines of the upper semicell are generally alternate with those of the lower semicell (photo 2h), which probably contributes to a better stability in the flotation.

Although bipolar asymmetry is commonly used to separate desmid genera, this criterion is not unanimity beyond the desmidiologists. Coesel & van Geest (2014), for example, do not recognize the genus *Prescottella*, and consider it a member of *Micrasterias*. The same to *Croasdalea*, which is still referred to as *Staurastrum marthae*. The exception for these authors is the genus *Allorgeia*. All the asymmetrical desmid genera still lack molecular studies to a better taxonomic understanding and placement within Desmidiaceae.



**Photo 3.** Cell of *Croasdalea marthae* in SEM. Front view. Scale bar: 20  $\mu\text{m}$ .

The SEM analysis revealed that the cell wall is characterized by tiny pores concentrated in the midregion and apices of semicells (photo 5), whereas the spines exhibit a striated pattern with few pores. In addition, the extremities of some spines were strongly curved forming hooks (photo 3, 4), which were not clearly observed in LM analysis. This latter pattern probably



contributes to cell fixing in some substrates, especially aquatic macrophytes.

Finally, further studies are yet necessary to the genus *Croasdalea*, especially regarding its phylogenetic position and the reproductive aspects, as its zygospore still is unknown.

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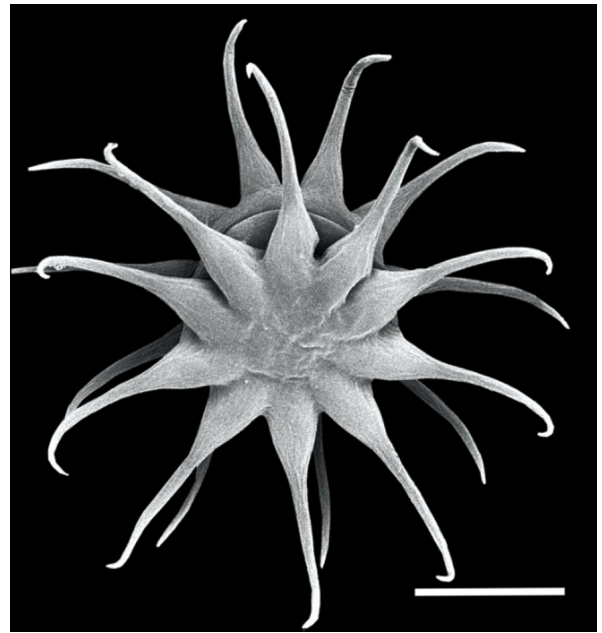


Photo 4. Cell of *Croasdalea marthae* in SEM. Apical view. Scale bar: 20  $\mu$ m.



Photo 5. Cell of *Croasdalea marthae* in SEM. Details of the semicell. Scale bar: 20  $\mu$ m.

## Recensie: Praktische gids voor de sieralgen van Vlaanderen – Determinatiesleutels

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Gysels, J., L. Vaes & W. Veraghtert, 2026. Praktische gids voor de sieralgen van Vlaanderen – Determinatiesleutels. Gratis te downloaden van: <https://www.natuurpunt.be/werkgroepen/sieralgen-en-kranswierenwerkgroep-micrasterias>

### Abstract

The publication of the second edition of the 'Desmids of the lowlands' flora (Coesel & Meesters, 2023) and the 'European flora of Cosmarium' (Kouwets, 2025), induced the Flemish desmid working group to publish a new determination guide containing all species found in Flanders with their new names.



De Vlaamse sieralgen- en kranswierenwerkgroep Micrasterias publiceerde in 2015 de eerste Sieralgengids van Vlaanderen, gevolgd door een herziening in 2021. Deze gidsen werden in druk uitgegeven.

In 2023 verscheen een nieuwe editie van 'Desmids of the lowlands' (Coesel & Meesters, 2023). Hierin zijn de soorten opgenomen die sinds de uitgave van de eerste versie in Nederland en Vlaanderen nieuw gevonden en nieuw beschreven zijn. Tevens is een aantal taxonomische correcties uitgevoerd. In 2025 verscheen de 'European flora of Cosmarium' (Kouwets, 2025). In deze flora worden alle uit Europa beschreven soorten kritisch bekeken en is een groot aantal correcties betreffende de naamgeving doorgevoerd.

De auteurs van de eerdere versies van de Sieralgengids van Vlaanderen hebben daarom een herziene versie uitgebracht waarin de nieuwe namen gebruikt zijn. De nieuwe uitgave bevat alle 583 taxa die tot 15 februari

2026 in Vlaanderen werden gevonden, met volledige index tot op taxon niveau.

Deze praktische gids is een determinatiesleutel en bevat dus geen beschrijving van de soorten. Er is voor gekozen om geen dichotome sleutel te maken, maar een die op groepen is gebaseerd. Hierin worden de sieralgen eerst ingedeeld in hoofdgroepen, gebaseerd op de genera. Vervolgens worden in de grotere genera een aantal subgroepen onderscheiden (in Closterium bijvoorbeeld 13 subgroepen met hooguit 10 soorten). Van deze soorten worden de belangrijkste morfologische kenmerken weergegeven (ecologie, celwand structuur, lengte, breedte en L/B verhouding). Op deze manier kunnen soorten snel op naam gebracht worden. Verificatie met behulp van een flora en bij twijfelgevallen meerdere exemplaren bekijken blijft nodig.

Persoonlijk spreekt deze manier van werken mij wel aan. Als je bij een dichotome sleutel een verkeerde afslag kiest, loop je hopeloos vast, en moet je weer opnieuw beginnen. Op elkaar lijkende soorten worden op één pagina afgebeeld, wat vergelijken makkelijker maakt. Deze gids is een aanrader voor iedereen die in sieralgen is geïnteresseerd. Ook gevorderden die nog moeten wennen aan de nieuwe namen kunnen deze gids goed gebruiken.

### Referenties

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