

Some Early *Vaucheria* Descriptions

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ABSTRACT

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The names *Vaucheria bursata* (O. F. MÜLL.) C. AG., *V. dillwynii* (WEB. & MOHR) C. AG., *V. velutina* C. AG. and *V. subsimplex* CROUAN FRAT. are shown to be earlier legitimate names of the plants mostly referred to as *V. sessilis* (VAUCH.) DC., *V. pachyderma* WALZ, *V. thuretii* WOR. and *V. sphaerospora* NORDST.

Vaucheria bursata (O. F. MÜLL.)

C. AG. 1812

Conferva bursata O. F. MÜLL. 1788, cf. 1779

?*Conferva vesicata* O. F. MÜLL. 1788

Ectosperma sessilis VAUCH. 1803

Vaucheria sessilis (VAUCH.) DC. in LAM. & DC. 1805

This species is based on a plant collected in August 1777 at Bad Meinberg 74 km southwest of Hannover in Germany. MÜLLER visited this spa and the neighbouring Bad Pyrmont for his arthritis, and during his stay also studied the algal flora of the places. Two of his finds were siphonous threads, one later named *Conferva bursata* by him, the other *C. vesicata*. Back in Copenhagen, he refound the latter, or a close ally of it, and set up an article on "invisible water-mosses", expanding in his peculiar manner on the supposed rarity of his finds. The article was published both in German (1779) and in French (1784). It gives a description and a small-scale illustration of each of the siphonous algae but only names them in German, resp. French. In addition he wrote a different paper with nearly the same title in Latin, here giving Latin names and formal diagnoses for these

plants as well as others found during his stay in Germany. This paper was submitted to the Academy of Sciences of St. Petersburg in 1779, and was published by that society in 1788. The illustrations of *Conferva bursata* and the German *C. vesicata*, more carefully made than those in the German and French journals, are rendered as Fig. 1 A, resp. B and C of the present account.

MÜLLER's figure of *C. bursata* is seen to fit with the alga currently called *Vaucheria sessilis* (VAUCH.) DC., cf. Fig. 1 F—G. The characteristics of the oogonia are rendered quite well except that the various deviations from a spherical shape are much exaggerated so as to make the oogonia look emaciated, probably due to the poor quality of MÜLLER's optical equipment. The antheridium is not shown. This is common in early *Vaucheria* illustrations, VAUCHER failed to see the antheridium in one of the groups of sexual organs illustrated by him, antheridia are also missing in DILLWYN's illustrations of the same species, cf. Fig. 1 D and E, and the two following species dealt with in the present paper were pictured without antheridia by DILLWYN and C. A. AGARDH, respectively.

The species is abundant at Bad Meinberg today, growing in the brook, die Werre, that runs into the pond of the Kurpark, and in the effluent of this pond down in the town. The culture material shown in Fig. 1 F—G was reared from a sample taken on 1 Aug. 1971 in die Werre in the park extension called Silvaticum.

MÜLLER's *Conferva vesicata* as illustrated by Fig. 1 B and C was found in the same place as *C. bursata* according to the German and French papers; in the Latin text, the station is said to be Bad Pymont. Obviously this is a *Vaucheria* grown from a zoospore or an aplanospore (though one filament has been drawn with two swellings), most probably the same species as his *C. bursata*, as this forms such germlings much more frequently than any other species.

DILLWYN (1806) found filaments very similar to *Conferva bursata* mingled with filaments that were obviously *C. vesicata*, and with a little doubt united the two under the name of *C. vesicata*. SMITH & SOWERBY (1807) united DILLWYN's plant with *Vaucheria sessilis* (VAUCH.) DC. under the name of the latter, and DILLWYN (1809) agreed in this synonymy, being inclined to go even further in lumping together. C. A. AGARDH (1812), reporting MÜLLER's *Conferva bursata* from Sweden, combined this epithet with the generic name *Vaucheria*. Later he appears to have changed his mind repeatedly. After (1817) reporting *V. sessilis* as a species separate from *V. bursata* and introducing his *V. ornithocephala* as a new name for what he thinks is *Conferva vesicata* sensu DILLWYN, he then (1822) doubts whether the two last-mentioned species are identical, and finally (1824) lists the following three as independent species: (2) *V. bursata* with *C. vesicata* MÜLLER as a synonym, (11) *V. sessilis*, and (12) *V. ornithocephala* with *C. bursata* MÜLLER as a synonym. Later authors avoided this confusion by simply neglecting MÜLLER's species. WALZ in his monograph (1866) declared it most probable that MÜLLER's *C. bursata* was

identical with *V. sessilis*, but said there were other possibilities too, giving *V. sericea* LYNGB. as an example. Today no other possibility is to be seen. *V. sericea* must be rejected because the oogonia of that species as conceived by WALZ (= *V. fortinialis* (L.) T. CHRISTENSEN) point largely in the same direction and do not form symmetrical pairs. So the specific name given by MÜLLER must be taken up again.

***Vaucheria dillwynii* (WEB. & MOHR)**

C. AG. 1812

Conferva dillwynii WEB. & MOHR 1803

Conferva frigida sensu DILLWYN 1802, non *Conferva frigida* ROTH 1797

Vaucheria pachyderma WALZ 1866

This species was first described and illustrated by DILLWYN (1802), who identified it with *Conferva frigida* ROTH. WEBER & MOHR (1803) pointed out that this was a misidentification, and introduced the epithet *dillwynii* for DILLWYN's plant. DILLWYN's illustration, rendered here as Fig. 1 H, is rather poor and shows no antheridium, but apart from some brackish-water species there is no alga known today that fits with it except for that later called *Vaucheria pachyderma* by WALZ (1866), and this species is found "on the ground in moist shady places" in the colder seasons, just like DILLWYN's plant is said to be. WALZ says DILLWYN's plant may be a *Vaucheria* with aplanospores, but aplanospores are never sessile in a lateral position.

Typification of *V. dillwynii* by herbarium material is difficult. The terrestrial specimen in the DILLWYN herbarium in Cardiff (cf. DIXON 1966) has been used up except for a few sterile filaments. These filaments agree with *V. pachyderma* WALZ in thickness; the soil contains a good deal of *Microcoleus vaginatus*. A badly preserved aquatic specimen entered underneath appears to have been taken in brackish water to judge from the diatoms on it, and must be regarded as a later addition, then assumed to be the same

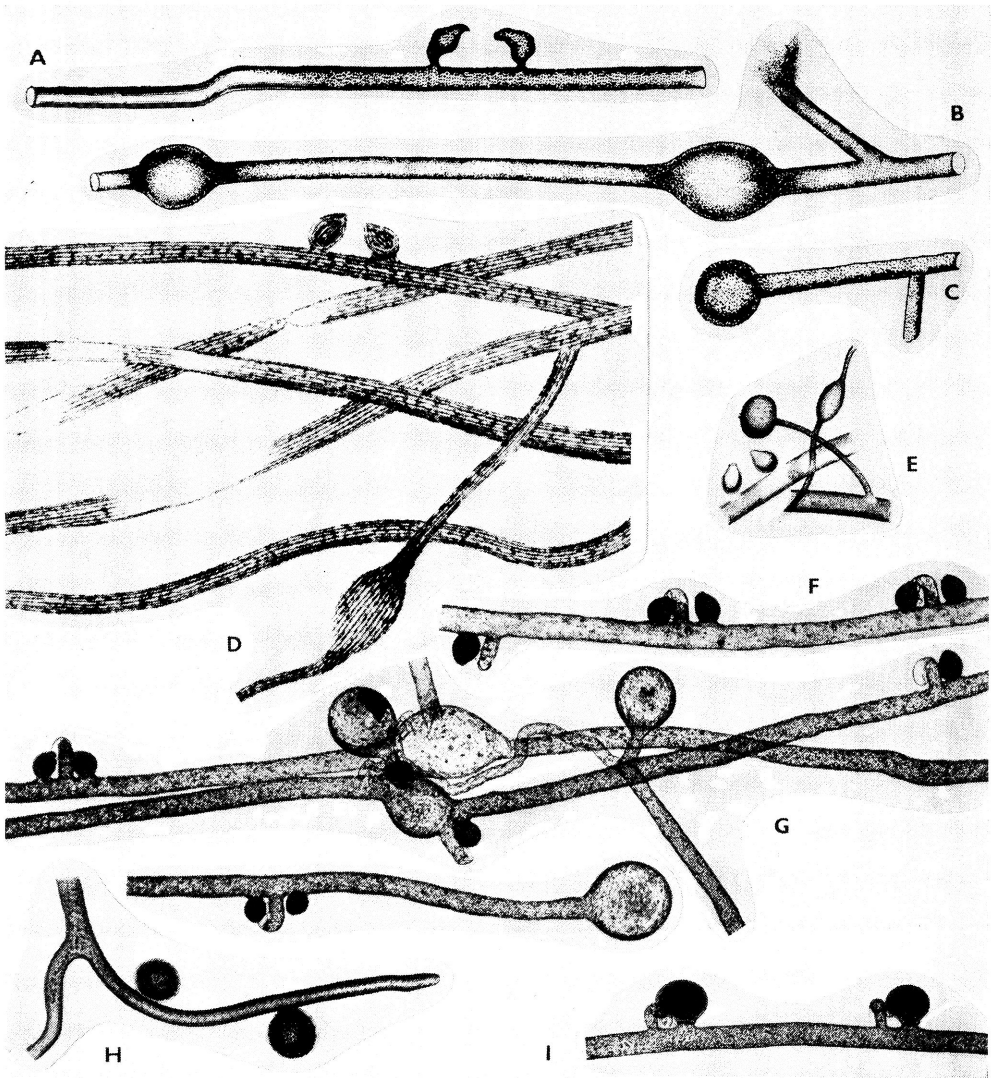


Fig. 1. A—G: *Vaucheria bursata*. — A: Type illustration, material from Meinberg, Germany. From MÜLLER 1788. — B—C: *Vaucheria vesicata* from the same region, probably the same species. From MÜLLER 1788. — D—E: Illustrations from DILLWYN 1806. — F—G: Photomicrographs, unialgal culture reared from sample from Meinberg, Germany. — H—I: *Vaucheria dillwynii*. — H: Type illustration, material from England. — I: Photomicrograph, crude culture reared from a sample from the Geneva region, Switzerland. — Photomicrographs $\times 50$. Scale of older illustrations adapted to fit with the micrographs in size.

species. HEERING (1907 pp. 151 and 191) mentions "das Original exemplar von MOHR" kept in Kiel. This is probably one of the samples collected by WEBER &

MOHR near Göttingen, as they say "an einem Orte ganz demjenigen ähnlich, wo Hr. TURNER und Hr. DILLWYN dieselbe bemerkten". Unfortunately, the specimen

seems to have been in the type herbarium destroyed during World War II, so probably it will never be known with certainty whether it was collected by DILLWYN or by MOHR. In any case, HEERING confirms its identity with *V. pachyderma*, and says its filaments were 60 μm thick. As DILLWYN's specimens have been scattered among a great number of herbaria, authentic DILLWYN material may still turn up somewhere. Even without type material, however, the epithet *dillwynii* must be retained. As to the plant studied by DILLWYN no species fits with it except that which by unbroken tradition is called *V. dillwynii* in England, and also partly called so elsewhere, e.g., in the monograph by DANGEARD (1939). As to MOHR's plant its identity has been witnessed by a specialist of this century. So the name given by WEBER & MOHR holds, regardless of whether it might be typified by "material cited" or their "material at hand".

***Vaucheria velutina* C. AG. 1824**

Vaucheria thuretii WOR. 1869

This species was established by C. A. AGARDH (1824 p. 312), and the type material is kept as no. 14700 in the AGARDH herbarium in Lund. Most of the material, collected "in lacunis exsiccatis ad Graen Aug Sept 1824", is mounted on a sheet of paper. A pencil note on the paper says there is mica material belonging with it and this, too, is still present. On the paper with the dried alga there is also a rough pencil sketch. Fig. 2 A shows a part of this sketch and Fig. 2 B—F a number of fruiting organs from the dried sample. Obviously the plant is the same as that later described by WORONIN (1869) as *V. thuretii*, cf. Fig. 2 G and H. Such identity has previously been indicated by NORDSTEDT (1878), but NORDSTEDT's observation, though recorded by HEERING (1907), has been generally disregarded as to its nomenclatural consequences.

***Vaucheria subsimplex* CROUAN FRAT. 1867**

Vaucheria sphaerospora NORDST. 1878

When NORDSTEDT (1878) introduced *Vaucheria sphaerospora* as a new species he said its closest ally was *V. piloboloides* THUR. Immediately after publishing this he realized that P. L. & H. M. CROUAN (1867) had described a plant under the name *V. subsimplex* which agreed with his own except for details that were probably unimportant. He made a footnote about this in his next paper (1879) saying, in English translation: "It seems very probable to me that *V. subsimplex* CROUAN (Florul. du Finistère, Paris 1867) is identical with *V. sphaerospora*, but since the former species is shown (l.c. tab. 10, Fig. 76) with obovate oospores and without any empty cell under the very antheridial cell, it might possibly be a species separate from the latter."

Fig. 3 of the CROUAN brothers, rendered as Fig. 2 J in the present account, shows a plant with its sexual organs turned obliquely forwards. The outline of the dark body seen would be abnormal for an oospore of NORDSTEDT's species if it is true, but it may well represent an unfertilized oogonium. The drawing shows only a single wall under the antheridium, but the double septation may be difficult to see when the antheridium is directed towards the observer. In addition the entire oogonial part of the tube is evenly dotted instead of showing an isolated mass of cytoplasm (presumably with surplus nuclei) in the middle, but clumping of the cytoplasm may have been taken for an artifact, or perhaps only the outlines were drawn at once and the schematic indication of cytoplasm added after inking. As long as the *Vaucheria* flora of the European west coast was badly known one might perhaps allow for the possible existence of two slightly different species, one covered by the CROUAN, one by the NORDSTEDT description. Today plants of this general type have been found on many localities, and all agree with NORD-

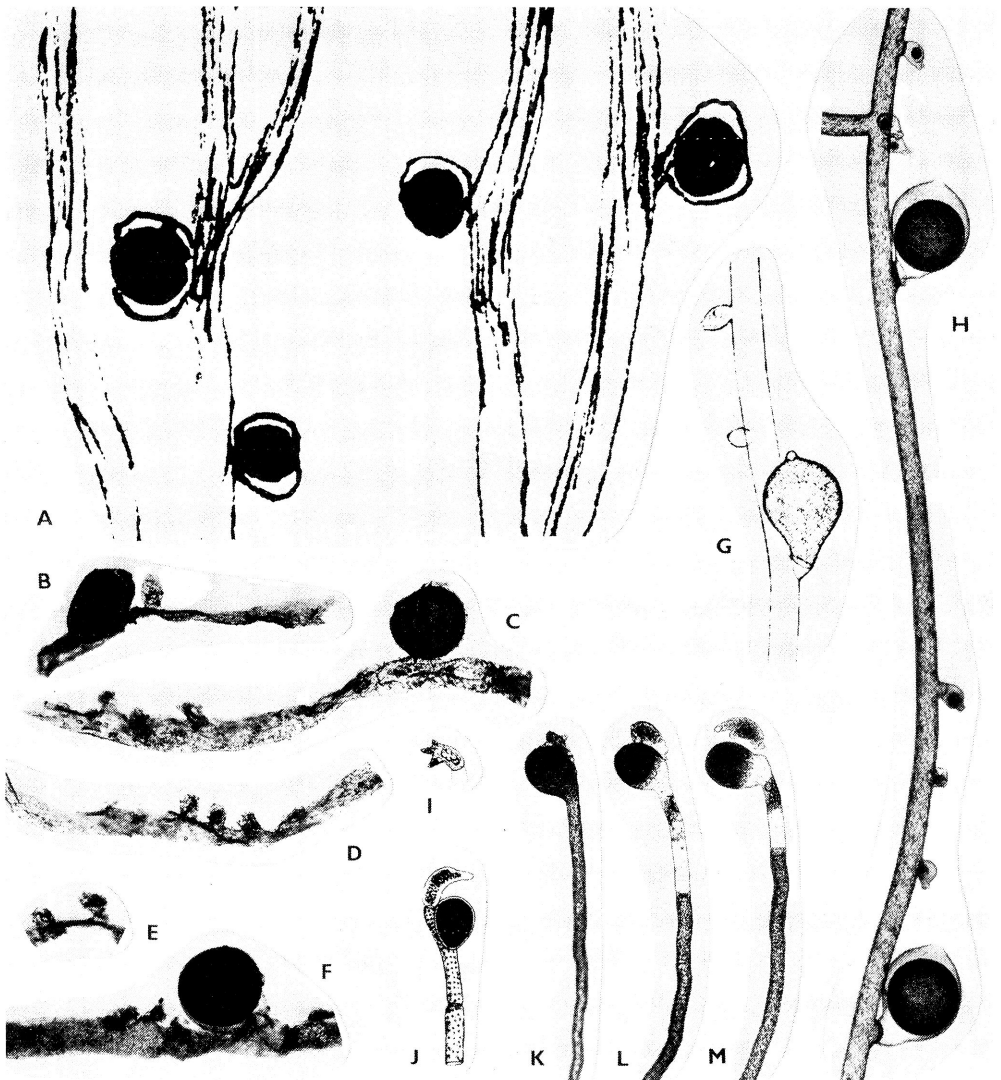


Fig. 2. A—H: *Vaucheria velutina*. — A: Part of sketch by AGARDH on paper with type material. — B—F: Photomicrographs, type material, from Gråen at Landskrona, Sweden. Stained with ruthenium red. — G: Sketch by THURET kept in Paris with his find from the Cherbourg region mentioned by WORONIN when describing *V. thuretii*. — H: Photomicrograph, unialgal culture reared from a sample from the Stornoway region, Scotland. (Most oogonia strongly bent like in THURET's drawing, some little bent as in the illustration published by WORONIN.) — I—M: *Vaucheria subsimplex*. — I—J: Type illustrations, material from the Brest region, France. — K—M: Photomicrographs, crude cultures reared from samples from the Stornoway region, Scotland (K and L) and the Holbæk region, Denmark (M). — Photomicrographs $\times 50$. Scale of older illustrations adapted to fit with the micrographs in size.

STEDT's description. So the slight differences are undoubtedly due to inaccuracies on the part of the CROUAN's.

FELDMANN (1958) expresses the hope that things will be settled by an examination of CROUAN type material. The present author has looked for such material in the two CROUAN herbaria without success. A specimen may still exist, as there is much unsorted material (cf. DIXON 1967). Even without such a specimen, however, the identity of the two species is obvious.

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