

## Studies on the genus *Vaucheria* III

### Remarks on some species from brackish water

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*Vaucheria erythrospora* nom. n.; syn. *V. hamata* sensu Goetz f. *salina* Rieth 1956.

This species is rather common in Sealand salt marshes. The author knew it from 9 stations when publishing his first list (1952), but left it unmentioned because he did not want to enter the problems of the *hamata* group yet, and found it out of place to describe a new species before giving a more precise account of the known species related to it. As the paper by Blum (1953) justified an isolated description, the author, after finding the species also in Germany and Sweden (cp. the text to fig. 2 a and b), decided to devote a separate note to its description, and this was just being prepared when Rieth (1956) announced his find of the same plant at Artern west of Leipzig, describing it as a brackish water form of *V. hamata* sensu Goetz, which is the known species it resembles most. On the basis of his personal observations the author thinks this *Vaucheria* deserves the rank of a species. The epithet applied by Rieth to his new form is occupied as a specific epithet, so a specific name is introduced above which refers to another character mentioned in the description of the type material.

As stated by Rieth, the most distinctive features of *V. erythrospora* are the empty apical part of the fertilised oogonium and the reddish colour of the oospore wall.

With regard to the former it should be noticed that the difference between *V. erythrospora* and *V. hamata* in this respect is conditioned by a different shape of the oogonium (cp. fig. 1 a), and does not come out just by a contraction of the oospore at fertilisation, which might perhaps have been caused by environmental factors. The mature spores

break off very easily and accumulate on the bottom of the jar where the material is kept. Such sedimented oospores are seen in fig. 2 c, which should be compared with the drawings given by Blum (1953 p. 480). The difference from *V. hamata* appears great enough to warrant, in itself, a specific independence, provided that no intermediate forms fill out the gap which separates the spores of *V. erythrospora* from those of *V. hamata*. Material from a single station has not allowed Rieth to form an estimate of this, but the author's collection now comprises material from 12 different localities, and shows full constancy.

The reddish brown colour of the mature oospore contrasts very strikingly with the greyish tint seen in *V. hamata*. It may be added to Rieth's description that the colour is confined to a relatively thin layer in the oospore wall, surrounded by a colourless layer on either side. Fig. 2 d—e show some unstained sections cut from fresh material and photographed in glycerine. With  $K_4Fe(CN)_6$  and HCl the brown layer turns blue, while the rest of the wall takes little or no colour.

A third character distinguishing *V. erythrospora* from *V. hamata* is afforded by the coiling of the antheridium and part of the fruiting branch beneath it. The spiral is a good deal more open in *V. erythrospora* than in *V. hamata*. Rieth has measured no less than 120 antheridia, and in a diagram (fig. 7) compares his results with those found for *V. hamata* and *V. terrestris* by Blum (1953). From the diagram Rieth concludes that his material must belong to *V. hamata* rather than to *V. terrestris*. The author should find it correcter to conclude that the Artern material belongs to neither of the two species, since the peak for this material nearly coincides with the line which delimits the domain of *V. hamata* from that of *V. terrestris*, and usually is not passed by any of these species.

Ecologically, *V. salina* differs from *V. hamata* in at least three respects. First, it is bound to slightly brackish water. Secondly, it has a greater demand for humidity than this species and, on the other hand, grows all right not only on moist soil, but also submerged, resembling in this respect *V. terrestris* more than *V. hamata*. Thirdly, it normally fruits in the colder seasons only. In a crude culture the author has observed fruiting organs in August, but all his samples of material fruiting in nature are collected in the months of March, September, October, November and December, and most of them in March and October.

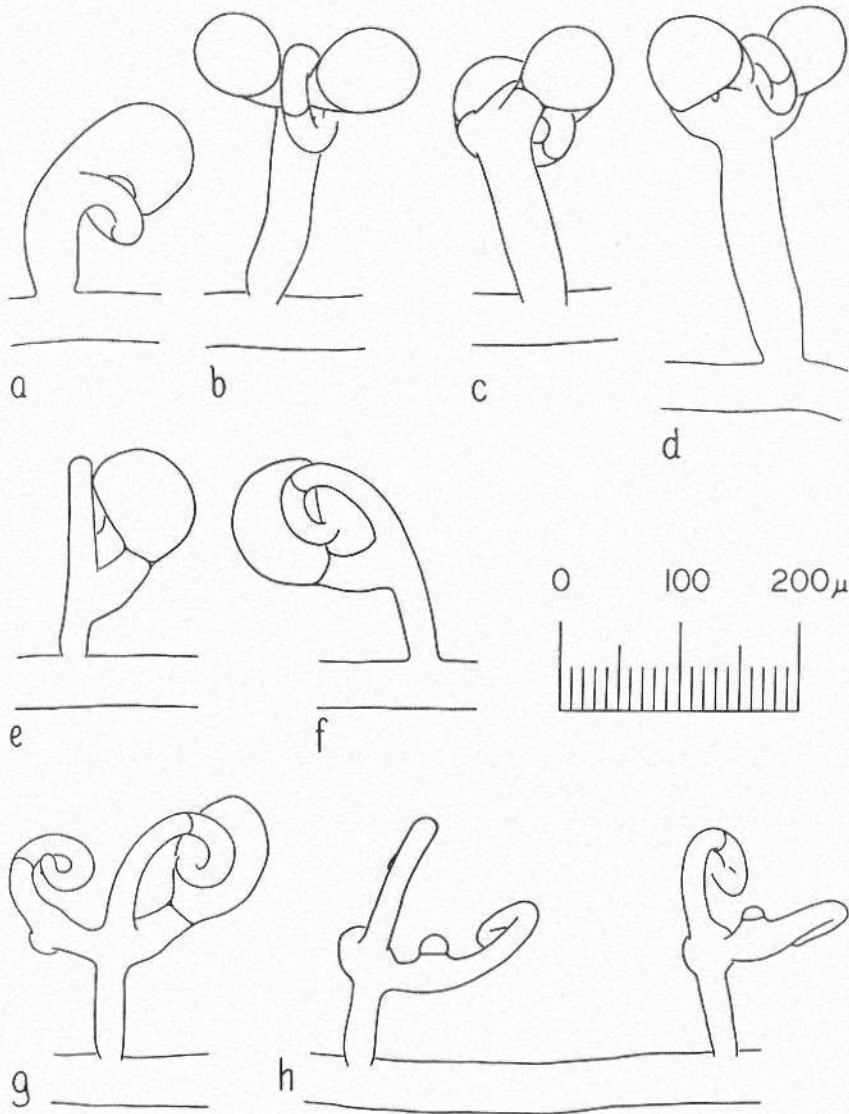


Fig. 1. — a *V. erythrospora*, no. 2568: 15-3-1945, submerged in shallow pool in the salt marsh of Avedøre Holme southwest of København; Denmark: top.-bot. distr. no. 45 a. — b—d *V. erythrospora*, no. 2557: 9-3-1945, submerged in broad ditch covered with ice, in the salt marsh of Hestefælleden west of Kongelunden, Amager; Denmark: top.-bot. distr. no. 46. — e—h *V. longata*, no. 6556: 9-3-1945, mingled with the preceding no. 2557.

*Vaucheria longata* Blum 1953.

When the author's oldest sample of *V. erythrospora* was produced to serve as type of the new species since then described by Rieth, the material was found to contain one more species, unnoticed until then. This second species, which is shown in fig. 1 e—h, fits with Blum's description and figures of *V. longata* in most respects, the diverse differences being most likely due to environmental or racial differences, or to the fact that *V. longata* was described on dried material. It is to be hoped that more samples will become available for a study of the variation, but in one respect the author feels rather sure that his observations, though made on a single sample, involve an emendation of the description of *V. longata*, and this point, therefore, should be particularly mentioned at the present stage: — The diagnosis includes some extraordinary exceptions from the general rule that the antheridium of racemose *Vaucheriae* is single and terminal on the fruiting branch. Such observations find their explanation by a consideration of the proliferation stages shown in fig. 1 g—h. It is seen that the branch of the first order is a good deal thinner than its lateral which bears the single oogonium. Proliferation takes place from the swelling at the insertion of this lateral, and results in another fruiting branch with a terminal antheridium quite as usual in all racemose species. In fig. 1 g the primary antheridium is opened and its oogonium fertilised, while the antheridium terminating the fruiting branch of the second order is closed at the tip. In fig. 1 h the mature oospores produced by the two fruiting branches of the first order have both fallen off. The fruiting branches of the second order have formed normal antheridia but only small rudimentary oogonia. A few more examples have been observed of similar half-developed oogonia, and another small number of proliferations with the second oogonium represented only by a swelling. Supplementary finds must show whether the latter stage is transitional or represents another, perhaps the commoner, final product of incomplete proliferation, but however this may be, there is little doubt that proliferating fruiting branches, whether quite like those pictured here or not, have formed the basis of the observation of supernumerary antheridia.

*Vaucheria sescuplicaria* Christensen 1952; *V. dichotoma* (L.). Ag. f. *arternensis* Rieth 1953.

After the establishment of this species two authors have given mutually contradictory opinions as to its proper position: Rieth (1954) questions the specific distinctness of *V. sescuplicaria* and *V. dichotoma*,

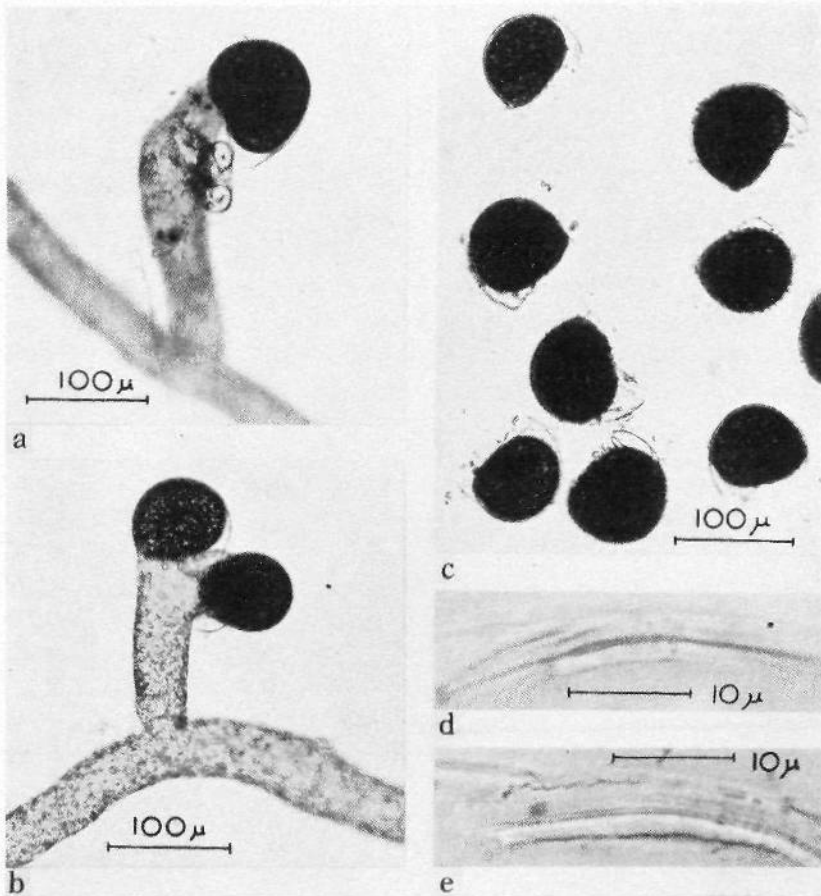


Fig. 2. — a *V. erythrospora*, no. 6381: 2-8-1954, mingled with *V. synandra* and *V. intermedia* under *Puccinellia maritima* in salt marsh southwest of Grossenbrode on the Baltic coast south of Fehmarn, Germany; fruiting material from a crude culture. — b—e *V. erythrospora*, no. 6548: 20-11-1955, under *Juncus gerardi*, etc. beside path through low and open growth of *Phragmites* on the shore immediately north of Landskrona, Skåne, Sweden; d—e show sections through the oospore wall.

while Erady (1954) finds their points of mutual resemblance "so meagre that it is difficult to understand their close similarity". As to Erady's statement it should be remembered that the young oogonium is filled up with protoplasm by the same peculiar process in *V. sescuplicaria* as in *V. dichotoma*, a process that has not been observed in any other species. This common feature is the main reason why the author regards

the two species as rather closely allied. Against the opinion given by Rieth (1954), on the other hand, arguing is probably unnecessary, as this author now (1956) adopts the name of *V. sescuplicaria* without comment, at the same time correcting his former conception of *V. dichotoma* (cp. Rieth 1953 fig. 12) which formed the basis of his statement.

*V. sescuplicaria* has now been found in Denmark, Spain, Germany, France (Christensen 1955), Tunis, Algeria (Gauthier-Lievre 1955) and, lately, in Sweden. The Swedish find was made by the author on Oct. 31st 1954. The species was mingled with *V. intermedia*, *V. synandra* and *V. compacta*, just covered with water between hummocks on a salt marsh much trodden by cattle, situated immediately northeast of Sölvesborg, Blekinge.

#### Summary

*Vaucheria erythrospora* nom. n., syn. *V. hamata* f. *salina* Rieth, is recorded from Denmark and Sweden, *V. longata* Blum from Denmark, and *V. sescuplicaria* Christensen from Sweden. Comments are given on various characters of the species mentioned.

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