

**Typification of *Nitella gracilis* (Sm.) C. Agardh
var. *confervacea* Brébisson (= *N. confervacea* (Brébisson)
A. Braun ex Leonhardi) with remarks
on its nomenclatural history**

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Résumé – Typification de *Nitella gracilis* (Sm.) C. Agardh var. *confervacea* Brébisson (= *N. confervacea* (Brébisson) A. Braun ex Leonhardi) avec notes sur son histoire nomenclaturale. Le nom correct de la nitelle confervacée a été longtemps controversé. Ce problème est à présent résolu : *Nitella confervacea* (Brébisson) A. Braun ex Leonhardi prime sur le rang spécifique. Ce taxon considéré comme une espèce endémique du Nord-Ouest de la France, a été longtemps ignoré. Le basionyme *Nitella gracilis* var. *confervacea* Brébisson et d'autres noms qui lui sont reliés sont typifiés.

Characeae / nomenclature / typification / Normandie

Abstract – The correct name of the species of *Nitella* known as the “Least Stonewort” has long been under debate. The problem has now been resolved as *Nitella confervacea* (Brébisson) A. Braun ex Leonhardi. This taxon, once thought to be an endemic of north-western France, was neglected for a long time. The basionym *Nitella gracilis* var. *confervacea* Brébisson and other taxa connected to this name are typified, and their taxonomic status is assessed.

Characeae / nomenclature / typification / Normandy

INTRODUCTION

The species of *Nitella* named *Nitella batrachosperma* (e. g., Corillion, 1957; Krause, 1986 & 1997) or *Nitella confervacea* (Allen, 1950; Caisová & Gąbka, 2009; Moore, 1986) is the most delicate and tiny of all European *Nitella* species, rarely reaching a height of 5 cm and is therefore often termed the “Least Stonewort”. The species is similar to *N. gracilis*, *N. tenuissima*, and unusually small specimens of *N. mucronata*. *N. mucronata* and *N. tenuissima* have a reticulate oospore-membrane, that is granulate in *N. gracilis* and the “Least Stonewort”. In the “Least Stonewort”, gametangia are produced mainly in the first branchlet

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furcation, rarely in the second. In *N. gracilis* they occur at all branchlet furcations, in *N. mucronata* at the first and second, and in *N. tenuissima* at the second and rarely at the third.

The “Least stonewort” occurs over a huge area on the Northern Hemisphere covering North America, Europe, North Africa, and Asia (Wood, 1965). In Europe it is generally rare and its natural sites have greatly diminished (Blaženčić *et al.*, 2006; Schmidt *et al.*, 1996). On the other hand, it responds well to the conditions in newly formed water bodies. In Germany, where it was thought to be extinct, it is known today from dozens of gravel-pits in the Upper Rhine valley between Basel and Mainz (Pätzold, 2003; Korsch *et al.*, 2008) and in field ponds in Brandenburg (U. Raabe, unpublished).

Because there is some doubt about the correct name of this species, the inclusion of this taxon in ecological studies, and in lists of rare and threatened species, would be more certain if its nomenclature could be clarified. The aims of this research are (1) to summarize the nomenclatural and taxonomic history of the scientific names associated with the *Nitella* species informally known as the “Least Stonewort”; (2) to designate lectotypes where necessary; (3) to undertake a comparative examination of the types to determine which taxa are conspecific; and (4) to determine which scientific name correctly applies to the “Least Stonewort”. Herbarium abbreviations follow Thiers (2012).

THE SEARCH FOR THE CORRECT NAME OF THE “LEAST STONEWORT”

The story starts in the first half of the 19th century when Reichenbach (1830: t. DCCXCIV/f. 1070) published an excellent illustration of the “Least Stonewort” under the name *Chara batrachosperma* Thuillier based on material from the Berlin area. Thuillier’s name, however, does not refer to the drawn species. According to Braun (in Braun *et al.*, 1870: number 78), Thuillier’s *Chara batrachosperma* is synonymous with *Chara vulgaris* Linnaeus. This was confirmed by one author (JvR) via examination of a specimen from the Persoon herbarium in Leiden which bears the determination *Chara batrachosperma* in Thuillier’s handwriting. In the absence of Thuillier’s holotype, we designate the specimen in the Persoon herbarium as the lectotype of *Chara batrachosperma* Thuillier (Table 1). Thuillier (1799), however, was unaware of an earlier publication of *Chara batrachosperma* by Weis (1770), again an illegitimate name citing the rhodophyte “*Conferua (gelatinosa) ... Linn. Sp. Pl. p. 1635. n. 13*”.

Later, Braun (1847) described “*N[itella] batrachosperma* mihi” citing “*Ch. batrachosperma* Reichenb. Fl. exc. non Thuill.” This refers to Reichenbach’s “Flora Germanica excursoria” published in several parts between 1830 and 1832. The part dealing with *Chara batrachosperma* was published in 1831. Here, Reichenbach refers (1) to his own “Iconographia Botanica” from 1830 with the above mentioned plate DCCXCIV [794] and (2) to “*Ch. flexilis stellata* Wallr. ann. t. VI. f. 1”. The drawing in Wallroth (1815) is difficult to interpret, but it certainly does not depict the “Least Stonewort” as it shows gametangia in all branchlet nodes.

Despite this confusion for more than 100 years, *Nitella batrachosperma* A. Braun 1847 was used in Central Europe for the “Least Stonewort” (e.g., Migula, 1897; Krause, 1997). However, this goes against the rules of nomenclature (McNeill *et al.*, 2006) as Agardh (1824) had combined Thuillier’s *Chara batracho-*

sperma in *Nitella*. Therefore, in order to conform to the rules of nomenclature Groves & Groves (1890) coined the replacement name *Nitella nordstedtiana* for what had been called *N. batrachosperma* A. Braun.

NITELLA CONFERVACEA AND N. NORDSTEDTIANA – TWO SPECIES OR SYNONYMS?

Brébisson (1849) published the variety *confervacea* of *Nitella gracilis* from the Étang de Vrigny in the département Orne in Normandy. In the third edition of his Normandy flora (Brébisson, 1859) he renamed this variety as “*Brebissonii* A. Braun” and combined it with *N. tenuissima*. Leonhardi (1863) raised this variety as “*N. confervacea* A. Braun” to species rank. Neither Brébisson’s nor Leonhardi’s reference to A. Braun refers to a publication. Braun used “*Nitella confervacea* A. Br.” for the first time in 1867. The reference to Brébisson by Leonhardi (1863) is indirect but clear: “Der vorigen Art [*N. gracilis*] nahe stehend und vom Entdecker mit ihr verwechselt [Similar to the previous species [*N. gracilis*] and confused with it by the discoverer]”.

Braun (1867), Nordstedt (1882), Migula (1897), and Corillion (1946) considered *Nitella confervacea* and *N. nordstedtiana* (*N. batrachosperma* A. Braun aut.) to be distinct species. Hy (1905) regarded them as subspecies. Later, Corillion (1957, 1975) combined *Nitella confervacea* and *N. nordstedtiana*, albeit with reservations, giving the names as synonyms. Generally, modern authors consider both names synonymous (e.g., Krause, 1997; Moore, 1986; van Raam, 1998; Bryant, 2002). Wood (1965) suggested the possibility that *N. confervacea* is a depauperate or juvenile state of *N. tenuissima* or *N. gracilis*.

In the Herbarium cryptogamique du Muséum National d’Histoire Naturelle in Paris (PC) exists a specimen that was collected in 1837 by Brébisson in Argentan (fig. 1). The specimen was probably collected in the Étang de Vrigny 10 km south of Argentan, the only locality mentioned by Brébisson (1849, 1859, & 1869). The morphology of this specimen corresponds to *N. nordstedtiana*. Therefore, we regard *Nitella confervacea* and *N. nordstedtiana* as synonyms. We were also able to examine original material of *N. confervacea* in the Haussknecht herbarium in Jena (JE). It is labeled “*Nitella confervacea* A. Br. / Falaise c.[ommunicavit] Brebisson 1849. / Ex herb. Braun. / Aug. 1889. / Herb. Migula”. It is probably part of a specimen which reached the Migula herbarium from the herbarium of Alexander Braun. Braun’s herbarium was destroyed in Berlin in 1943. This specimen was probably collected in the Étang de Vrigny, too. According to Elisabeth Lambert further original material is present in the herbarium Angers (ANG). It is labelled: Scheda 1: *Nitella gracilis* [incomprehensible word] *confervacea*. Vrigny. Scheda 2: Étang de Vrigny, près Argentan juillet 1837.

One of the authors (TG) visited the Étang de Vrigny in July 2008. The lake was mostly drained and except for *Chara braunii*, there were no charophytes present. The exposed lake bed exhibited a rich flora of seasonally-inundated habitats with *Alisma gramineum*, *Baldellia ranunculoides*, *Carex viridula*, *Cicendia filiformis*, *Elatine hexandra*, *Eleocharis ovata*, *Juncus capitatus*, *J. tenageia*, *Littorella uniflora*, *Leontodon saxatilis*, *Myosotis sicula*, and *Laphangium luteoalbum* (= *Gnaphalium l.*). Furthermore, all other localities mentioned by Corillion (1946) for *N. confervacea* were visited. In 2008, none of them had ecological conditions suitable for *N. confervacea*. Thus material from the type locality has not been obtained.

Table 1. Summary of nomenclatural and taxonomic data for *Chara batrachosperma* Thuillier, *Nitella gracilis* var. *confervacea* Brébisson and associated taxa.

A. Data associated with *Chara batrachosperma* Thuillier

Chara batrachosperma Thuillier, 1799: 473, *nom. illeg.* (non Weis 1770: 33).

Lectotype (designated here): L, Herbarium Persoon. Specimen annotated by J.L. Thuillier as “*Chara batrachosperma* Thuillier” and by J.C. van Raam as “*C. vulgaris*” and “Type *Chara batrachosperma* Thuillier. 7/1996.”

Homotypic synonyms:

Nitella batrachosperma (Thuillier) C. Agardh, 1824: 126.

Nitella tenuissima (Desvaux) Kützing var. *batrachosperma* (Thuillier) Kützing, 1845: 256.

Chara tenuissima Desvaux var. *batrachosperma* (Thuillier) Ganterer, 1847: 10.

Remarks: *Chara batrachosperma* Thuillier is a heterotypic synonym of *Chara vulgaris* Linnaeus, 1753: 1156.

B. Data associated with *Nitella confervacea* (Brébisson) A. Braun ex Leonhardi.

Nitella confervacea (Brébisson) A. Braun ex Leonhardi, 1863: 146.

Basionym: *Nitella gracilis* (J.E. Smith) C. Agardh var. *confervacea* Brébisson, 1849: 338.

Lectotype (designated here): PC, Specimen is labeled (1) “Herb. G. Thuret / Brébisson dedit 1850 / *Nitella gracilis* V. confervacea / Argentan Jt. 1837” and (2) „Herbier Museum Paris Cryptogamie PC0719925“.

Homotypic synonyms:

Nitella tenuissima (Desvaux) Kützing var. *brebissonii* (Brébisson) A. Braun ex Brébisson, 1859: 383, *nom. illeg.*

Nitella confervacea (Brébisson) A. Braun ex Leonhardi subsp. *brebissonii* (A. Braun ex Brébisson) Hy 1905: 93, *nom. illeg.*

Nitella brebissonii (A. Braun ex Brébisson) Hy, 1914: 239, *nom. illeg.*

Heterotypic synonym:

Nitella nordstedtiana H. Groves et J. Groves, 1890: 66, *nom. nov.*

Replaced illegitimate name: *Nitella batrachosperma* A. Braun, 1847: 10, *nom. illeg.* (non C. Agardh 1824: 126).

Lectotype (designated here): Reichenbach 1830, plate DCCXCIV [794], fig. 1070.

Homotypic synonyms:

Nitella confervacea (Brébisson) A. Braun ex Leonhardi subsp. *nordstedtii* Hy, 1905: 93.

Nitella nordstedtii (Hy) Hy, 1914: 239, *nom. illeg.*

Nitella gracilis (J.E. Smith) C. Agardh subsp. *leptosoma* (Nordstedt) R.D. Wood var. *nordstedtiana* (H. Groves et J. Groves) R.D. Wood, 1962: 21.

Nitella batrachosperma A. Braun (*nom. illeg.*) f. *maxima* Migula, 1897: 189.

Lectotype (designated here): JE, Specimen is labeled “Flora der Pfalz. Teiche der Friesenheimer Insel bei Mannheim, Ufersäume / 22.11.1888 / F. Förster”.

Nitella batrachosperma A. Braun (*nom. illeg.*) f. *minor* Migula, 1897: 190.

Lectotype (designated here): Migula, *Chara. Deutschl.*, 185, f. 53.

Remarks: Drawn from two specimens of the botanical garden Karlsruhe; specimens not found by M. Scholler in the herbarium Karlsruhe (KR).

Nitella batrachosperma A. Braun (*nom. illeg.*) f. *fallax* Migula, 1897: 190.

Lectotype (designated here): Migula, *Chara. Deutschl.*, 186, f. 54g.

Nitella chevallerii Hy, 1892: 21 (as *chevallieri*).

Lectotype (designated here): PC, Specimen is labeled (1) “S.E.F.F. [Société pour l’Étude de la Flore France] / 103 *Nitella* Chevallier Hy / in litt. 1890. Nova species / Sarthe: La Flèche, flaques d’eau / à la bouche de l’étang de la Guibonnière en / Mélinais / 7 septembre 1891. / Legit L. Chevallier [Étang de la Guibonnière at Melinai Manor owned by Lenormand 6 km southwest of La Flèche; France/dép. Sarthe]”; (2) “Herbier L. Chevallier / *Nitella* Chevallier. Hy, in litt. / 1890. n.sp. / La Flèche (Sarthe) : flaques d’eau / à la bonde de l’étang de la Guibonnière, / en Mélinais / 7 septembre 1891. / Legit L. Chevallier” and (3) “Herbier Museum Paris Cryptogamie PC0143210”.

Homotypic synonym: *Nitella confervacea* (Brébisson) A. Braun ex Leonhardi subsp. *chevallierii* Hy, 1905: 93.

Nitella confervacea (Bréb.) A. Braun ex Leonhardi subsp. *hariotii* Hy, 1905: 94.

Remarks: Hy (1905: 94) did not provide locality data in the protologue, but subsequently, Hy (1913: 18) noted that material came from “Aube : Étang de Barberey-aux-Moines” (Hariot, sub *N. gracilis*).

Table 1. Summary of nomenclatural and taxonomic data for *Chara batrachosperma* Thullier, *Nitella gracilis* var. *confervacea* Brébisson and associated taxa. (continued)

Lectotype (designated here): ANG, Specimen is labeled “*Nitella harioti* / Etang Barberey aux moines”.

Nitella confervacea (Brébisson) A. Braun ex Leonhardi subsp. *renovii* Hy, 1905: 93.

Lectotype (designated here): PC, Specimen is labeled (1) “*Nitella confervacea* forma *Renovi* / Dans le Maine à Chateauthébaud (L-Inf.) / 16/8 1864 . Legit Renov F. Hy” and (2) “Herbier Museum Paris Cryptogamie PC0143217”.

Homotypic synonym: *Nitella renovii* (Hy) Hy, 1914: 239.

Remarks: Hy (1905: 93) did not provide locality data in the protologue, but subsequently, Hy (1913: 18) noted that material came from “Loire-Inf. : Dans la Maine à Chateauthébaud (*Renou*, in herb. *F. Camus*, sub *N. gracilis*)”. The specimen designated as lectotype was labelled by Hy. Renou’s original label is lost or, maybe, Hy’s material was only a part of Renou’s collection.

C. Taxa of uncertain status and disposition linked to *Nitella confervacea*

Remarks: Types have not been designated for the taxa below, and no original material has been found during the present study.

Nitella confervacea (Brébisson) A. Braun ex Leonhardi subsp. *nordstedtii* H. Groves & J. Groves var. *neyrautiana* Hy, 1913: 18.

Homotypic synonym: *Nitella neyrautii* (Hy) Hy, 1914: 239.

Nitella simonii Hy, 1914: 239.

Chara tenuissima Desvaux var. *ramulosa* Ganterer, 1847: 10

Remarks: The fate of Ganterer’s herbarium is unknown. Searched in vain by one of us (UR) in W, WU & KL.



Fig. 1. Type of *Nitella gracilis* (J.E. Smith) C. Agardh var. *confervacea* Brébisson.

INTERSPECIFIC TAXA OF *NITELLA CONFERVACEA*

Having established that the taxon known as “Least Stonewort” is rightly called *Nitella confervacea* we have been able to assess the status of some of the specimens described as subtaxa of *N. confervacea* or its synonyms. Migula (1897) described three forms of *N. batrachosperma* A. Braun: *N. batrachosperma* f. *fallax*, *N. batrachosperma* f. *maxima*, and *N. batrachosperma* f. *minor*. For *N. batrachosperma* f. *fallax* and *N. batrachosperma* f. *minor* Migula’s drawings are designated (Table 1) as lectotypes. For *N. batrachosperma* f. *maxima* we designate (Table 1) a specimen from the Migula herbarium in Jena (JE) as lectotype. The original specimens of f. *fallax* and f. *minor* are considered lost, but the designated lectotype of f. *maxima* almost certainly is one of the specimens mentioned by Migula (1897: 189) in the protologue. All three taxa are treated here as heterotypic synonyms of *Nitella confervacea* (Table 1).

Hy (1892, 1905, 1913, & 1914) described five taxa from the “espèce collective” *Nitella confervacea*. For three of these taxa we saw original material and regard them as heterotypic synonyms of *N. confervacea* (Table 1).

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