

The Status of *Agardhiella tenera* and *Agardhiella baileyi* (Rhodophyta, Gigartinales)

by

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ABSTRACT

Evidence is presented to support the placement of *Agardhiella tenera* in *Solieria* (as *S. tenera* comb. nov.) for the reason that a large fusion cell is present in the center of the cystocarp. Since *A. tenera* is the type species of the genus, *Agardhiella* SCHMITZ (1896) becomes a junior synonym of *Solieria* J. AGARDH (1842). It is argued that *A. baileyi*, upon which the generic description of *Agardhiella* was based, is generically distinct from *Solieria*, and *Neoagardhiella* gen. nov. is proposed, with *N. baileyi* as the type species. *Agardhiella ramosissima* is also transferred into this new genus. The old observations of *Solieria* as a procarpial genus made by BORNET & THURET (1880) are reinforced by the present observations. This situation in the type genus of the family is contrasted with the nonprocarpial condition known in several other genera at present considered members of the Solieriaceae.

INTRODUCTION

The fact that two different taxa had been passing under the name *Agardhiella tenera* (J. AGARDH) SCHMITZ was first called to our attention by TAYLOR (1966) and later in more detail by TAYLOR & RHYNE (1970). The nomenclatural type was based upon plants collected in the West Indies; the lectotype was designated (TAYLOR & RHYNE, 1970) to be a specimen from Puerto Rico and now preserved in the Herbarium of the Universitets Botaniska Museum, Lund. However, the generic description (OSTERHOUT, 1896; KYLIN, 1928) was based upon plants collected at Woods Hole, Massachusetts, in southern New England. This latter alga was tentatively named *Agardhiella baileyi* (HARVEY EX KÜTZING) TAYLOR and lectotypified with a specimen originating from Long Island, New York, now preserved in the KÜTZING Herbarium at Leiden. It was distinguished

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from the southern species (i.e., *A. tenera sensu stricto*) on habit characteristics as well as on anatomical grounds. Furthermore, *A. tenera s. s.* appeared from preliminary evidence to actually belong to the genus *Solieria*, another genus in the same family Solieriaceae. The final disposition of these two entities (namely, *A. tenera* and *A. baileyi*) awaited collections of cystocarpic material for a more critical examination of female reproductive stages. Collections of *A. tenera* from the Texas coast have provided us with the opportunity to reach certain conclusions regarding the status of these two taxa as well as their relationship to other species.

HISTORICAL BACKGROUND

SCHMITZ (1889) introduced the genus *Agardhiella* as a *nomen nudum* but later (in SCHMITZ & HAUPTFLEISCH, 1896) provided a full description. The type species, *A. tenera*, was originally *Gigartina tenera* J. AGARDH (1841) from the West Indies. Much of our understanding concerning reproductive stages was contributed by the detailed investigations of OSTERHOUT (1986) and KYLIN (1928). Both authors reported a tissue of small cells lying in the center of the cystocarp. It is important to appreciate the fact that the specimens upon which these observations were carried out originated from the northern distributional range of the plants commonly called *A. tenera*.

The genus *Solieria* was established by J. AGARDH (1842) and based upon *Delesseria chordalis* C. AGARDH (1822), a plant occurring in southern Europe. These two genera, *Solieria* and *Agardhiella*, were distinguished by KYLIN (1956) on the criterion that the cystocarp of *Solieria* contained in its center a large, spherical fusion cell, whereas the center in his conception of *Agardhiella* contained a small-celled tissue. KYLIN (1928) also referred to the fact that auxiliary cells were not recognizable prior to fertilization in *Solieria*, but auxiliary cells were detectable before fertilization in his *Agardhiella* plants. KYLIN regarded both genera as nonprocarpial.

PRESENT OBSERVATIONS

Examination of dried cystocarpic specimens of West Indian plants of *Agardhiella tenera* and the observation of an apparently hollow central region caused TAYLOR & RHYNE (1970) to see some resemblance to the genus *Solieria*. Therefore, they expressed serious doubt that the northern and the southern plants (*A. baileyi* and *A. tenera*, respectively) could be retained in the same genus. Further studies of

recently collected specimens of the southern plant (i.e., genuine *A. tenera*) have reinforced their preliminary suspicions and have demonstrated the reality of a large central fusion cell, which is characteristic of *Solieria*.

Sections of cystocarpic material* revealed various manifestations of fusion cells comparable to the type figured for *Solieria* (KYLIN, 1932) and entirely at variance with the small-celled tissue which has been associated with the northern plant (*A. baileyi*). Figures 1 and 6 present some aspects of fusion cells in *A. tenera*.

Differences regarding the carpogonial branches may be cited. Material of *Agardhiella baileyi*** from Cape Cod, Massachusetts, was used. Carpogonial branches (Figs. 7 and 8) typically consisted of 3 cells, although occasional 4-celled carpogonial branches were observed. The basal cell, which is connected to a large, irregularly shaped supporting cell, is usually spherical and the largest cell of the carpogonial branch; it is multinucleate and has a gelatinous zone surrounding it. The hypogynous cell, situated between the basal cell and the carpogonium, is usually broader than long and often is protuding on one side. OSTERHOUT (1896, pl. 21, fig. 13) and KYLIN (1928, fig. 43 E) also illustrated this distinctive hypogynous cell. The carpogonium, following fertilization, will send out an oöblastic filament (Figs. 9 and 10) or filaments directly to the auxiliary cells, which are recognizable prior to fertilization. The auxiliary cell itself (Fig. 11) has a single enlarged nucleus (stainable with haematoxylyn) and is filled with starch. It bears three large cells, which in turn give rise to branched filaments. The presence of such clusters of densely staining cells, including pre-formed auxiliary cells, agrees with the observations of OSTERHOUT (1896) and KYLIN (1928). An auxiliary cell with the attachment of an oöblastic filament is illustrated Fig. 11).

Squashed preparations of *Agardhiella tenera* (Wynne 3225) revealed large numbers of carpogonial branches (Figs. 2—5). Certain differences from *A. baileyi* may be pointed out. Although these carpogonial branches also were typically comprised of 3 cells and the basal cell was the largest and multinucleate, the hypogynous cell was longer than broad and was symmetrical rather than protruding on one side. We could find no clearcut evidence of auxiliary cells; this subject will be resumed in the discussion.

Other distinguishing criteria between *A. tenera* and *A. baileyi* may

* Wynne 3225, southwest jetty at Port Aransas, Nueces County, Texas; collected by ROBERT ELIAS; 12-xii-1970.

** Wynne 3310, West Falmouth Jetty, Barnstable County, Massachusetts; collected by RICHARD WETHERBEE; 21-vii-1971.

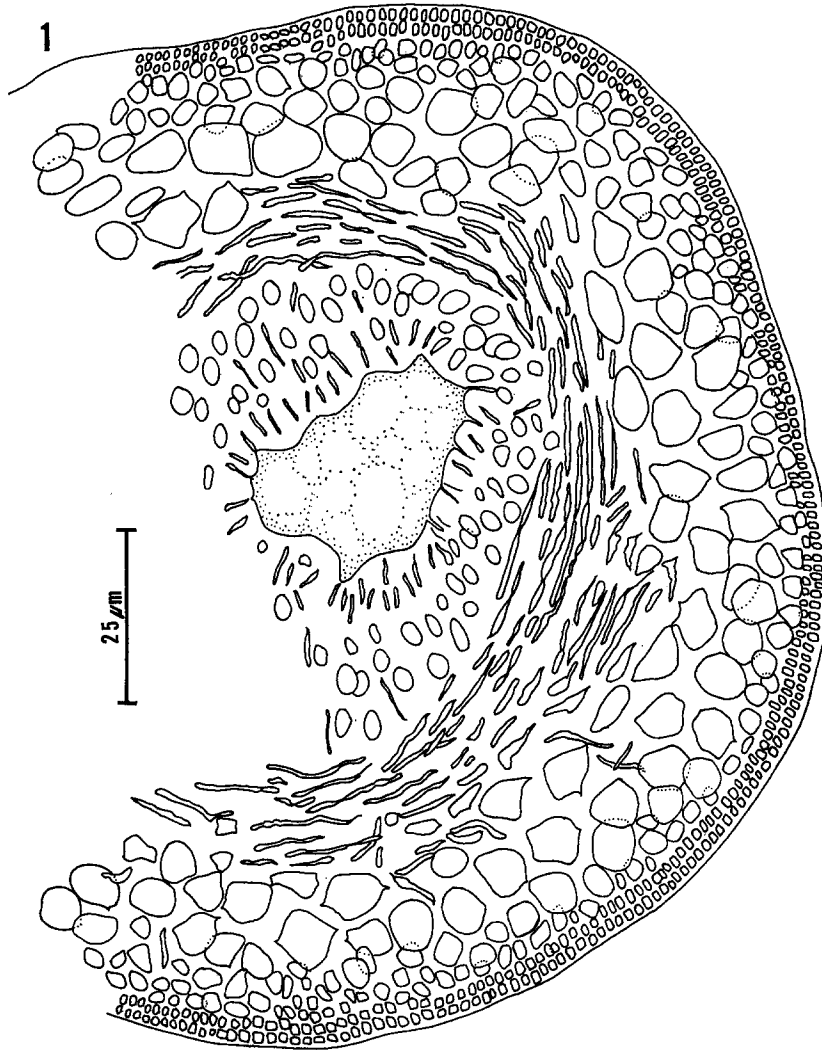
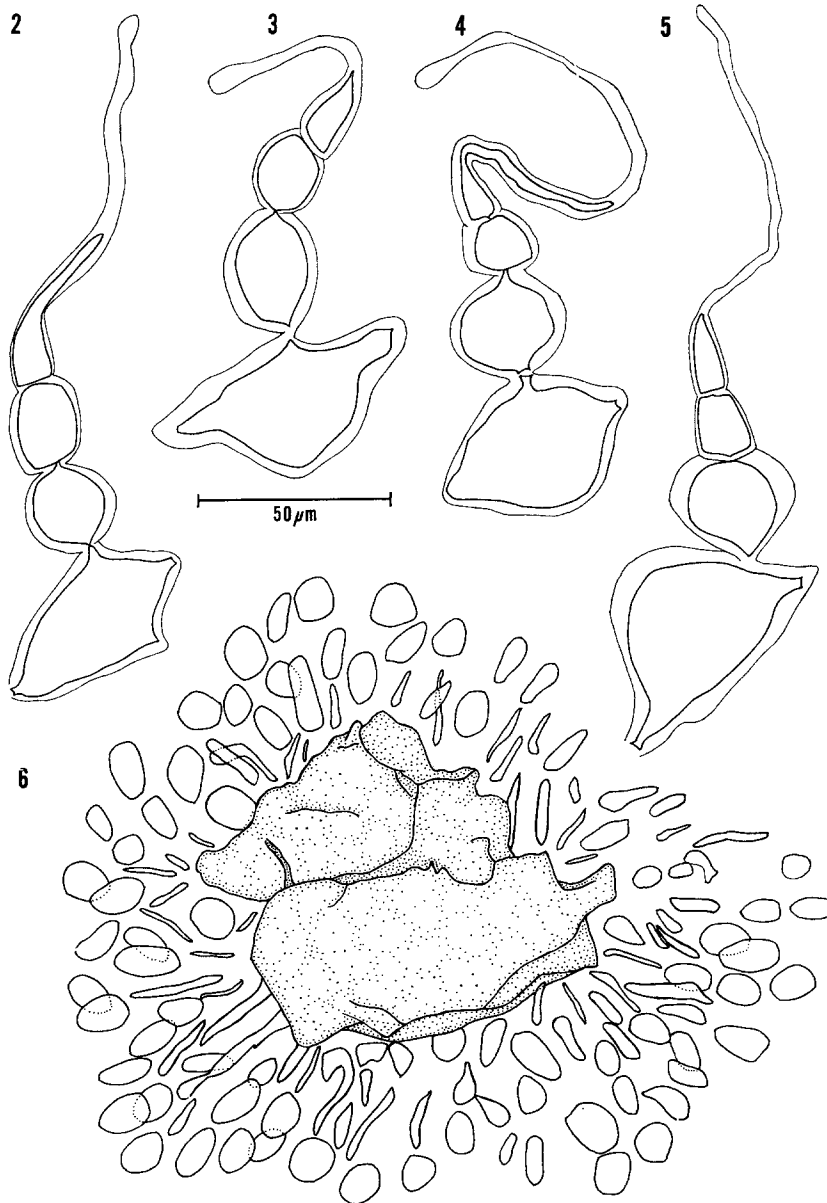


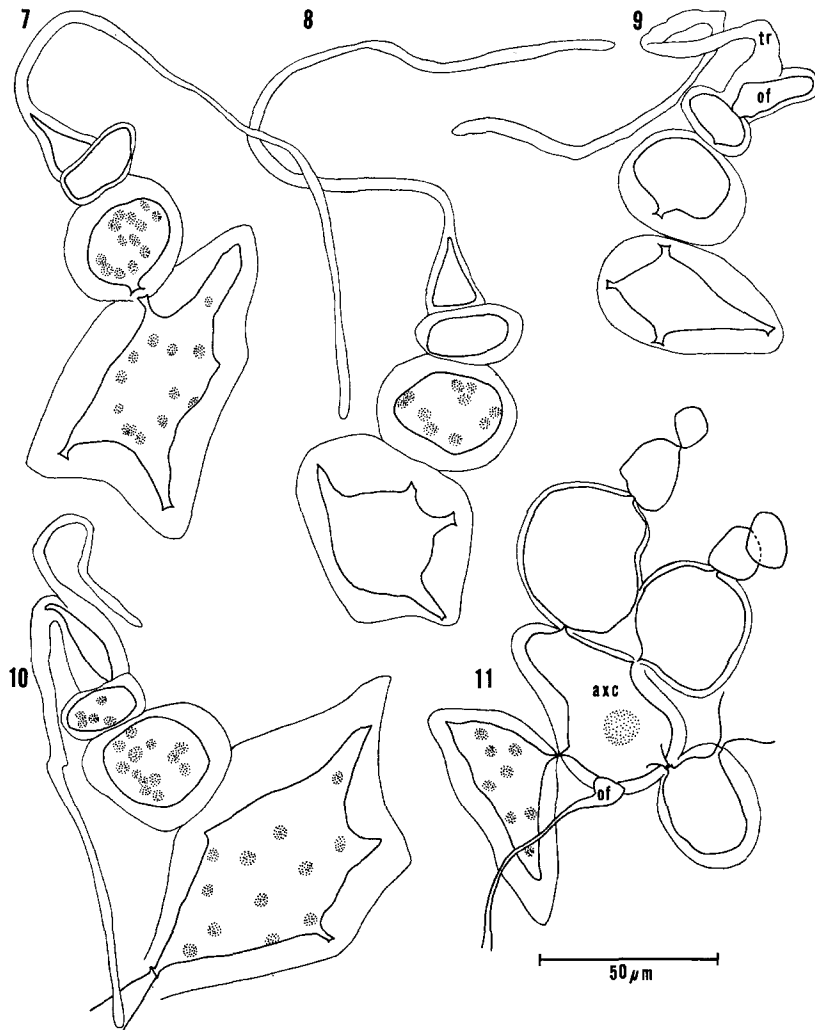
Fig. 1. *Solieria tenera*. Transection of mature cystocarp with fusion cell.

be enumerated. TAYLOR & RHYNE (1970, p. 12) noted that the dimensions of the tetrasporangia in *A. baileyi* were twice those of *A. tenera*. Further measurements made on liquid-preserved specimens of these two species confirm this additional characteristic for distinguishing them. Tetrasporic specimens from the same collection from Massachusetts (*Wynne 3310*) provided the following data: zonate tetrasporangia 60—74 μm in length and 28—42 μm in diam. Although these figures are somewhat less than those provided by



Figs. 2—6. *Solieria tenera*. Figs. 2—5, carpogonial branches, Fig. 6, fusion cell with carposporangia in young cystocarp.

TAYLOR & RHYNE, they overlap their measurements and are based on liquid-preserved material rather than dried and re-soaked samples. Similarly, measurements were tabulated on liquid-preserved speci-



Figs. 7—11. *Neogardiella baileyi*. Figs. 7 & 8, carpoogonial branches. Figs. 9 & 10, oöblastic filaments (*of*) arising from fertilized carpoogonium, with withered trichogyne (*tr*). Fig. 11, auxiliary cell (*axc*) with attached oöblastic filament, auxiliary cell has a single large nucleus.

mens of *A. tenera*; tetrasporangia ranged from 27 to 33 μm in length and 17 to 23 μm in diameter. Again, although these values are less than those stated by TAYLOR & RHYNE, they still tend to overlap, and, more significantly, they confirm their generalization that the tetrasporangia of the northern plant (i.e., *A. baileyi*) are double the size of the southern plant (i.e., genuine *A. tenera*).

The anatomical difference of conspicuous, thick-walled and con-

tinuous medullary filaments present in *A. tenera* contrasted with the absence of such medullary filaments also serves to differentiate these two superficially similar taxa. Of course, the major portion of the medullary tissue in both is comprised of slender, thin-walled filaments coursing in all directions. Finally, the loose, fibrous basal portion of *A. tenera* is in marked contrast to the simple basal attachment of *A. baileyi*. Unfortunately, the basal portion is often lost in the process of collecting and preserving specimens of *A. tenera*; but it serves as a useful diagnostic trait, as TAYLOR & RHYNE (1970) have pointed out.

EMENDATION OF AGARDHIELLA TENERA

The structure of the cystocarp in *Agardhiella tenera*, as has been discussed above, makes it necessary that this species be included in the genus *Solieria*. The question might be asked whether the species of the West Indies is separable from the type species, *S. chordalis*. It is to be remembered that at one point HARVEY (1853) listed *S. chordalis* as occurring along the east coast of North America from Cape Cod to Key West, Florida. In addition, a plant has been distributed in the Phycotheca Boreali-Americana (COLLINS, HOLDEN & SETCHELL, 1897) as *S. chordalis*, originating from Jupiter Inlet, Palm Beach County, Florida. Finally, it may be noted that COLLINS (1901) recorded both *Agardhiella tenera* and *Solieria chordalis* from Jamaica.

European material* of authentic *Solieria chordalis* was examined. Certain differences exist between *Solieria chordalis* of southern Europe and the plant under consideration from the western Atlantic. In the original description of *S. chordalis* C. AGARDH (1822) referred to the dichotomous branching of this plant. Branching is not so regularly dichotomous in so-called *A. tenera*. Plants of *S. chordalis* have a much larger number of short ultimate branches, giving a proliferous appearance. Axes of *S. chordalis* seem to be less robust than *A. tenera*, seldom more than 1 mm in diam. and with a very dense medulla of compactly arranged filaments. Plants of both species agree in having fibrous holdfasts (cf. BORNET & THURET, 1880, p. 188; DETONI, 1897, p. 366) and in lacking the spindle-

* FRANCE: Ille-et-Vilaine, Saint-Malo, E. CHEMIN, 11 Sept. 1928 (WRT); A. HAMEL-JOUKOV (Algues de France No. 189), Sept. 1931 (UM). Côtes du Nord, Cap Fréhel, W. R. TAYLOR 26644, Sept. 1959 (WRT). Finistère, Brest, St. Marc & Banc du Moulin-Blanc, J. FELDMANN 8969, 4 April 1954 (UM); Banc au Ros-Bren, A. DIZERBO, 1963 (UM). Morbihan, Golfe du Morbihan, herb. G. THURET, 17 August 1872 (UM). Vendée, Ile de Noirmoutier, J. CABIOCH, Sept. 1967 (TEX).

shaped branches tapering to the point of their attachment, which is so characteristic of the *A. baileyi*. Our conclusion is that the American plant seems to be specifically different from the European *S. chordalis*, and thus the following transfer is proposed:

Solieria tenera (J. AGARDH) comb. nov.

Basionym: *Gigartina tenera* J. AGARDH, 1841, p. 18.

Synonyms: *Sphaerococcus tener* (J. AGARDH) KÜTZING, 1849, p. 777.

Rhabdonia tenera (J. AGARDH) J. AGARDH, 1851, p. 354.

Agardhiella tenera (J. AGARDH) SCHMITZ in SCHMITZ & HAUPTFLEISCH, 1896, p. 371.

REASSIGNMENT OF AGARDHIELLA BAILEYI

Since the nomenclatural type of *Agardhiella tenera* is congeneric with *Solieria* J. AGARDH (1842), *Agardhiella* SCHMITZ must be regarded as a junior synonym of *Solieria*. Since the species upon which the description of *Agardhiella* is based (presently, *A. baileyi*) has been demonstrated to be generically distinct from *Solieria*, this species must be transferred to some other generic name. There is no available generic name nor an appropriate described genus. Thus, a new genus must be established. The name *Neoagardhiella* is hereby designated as that of the new genus.

Neoagardhiella gen. nov.

Plantae erectae, ramosae, unus vel aliquot sulculi ex haptero discoideo enascentes; rami cylindrici, radiatim aut distiche ordinati; cortex compactus, e cellulis externis parvis, atque interioribus maioribus compositus; cellulae interiores rhizoidea filamentosa quae filamentis centralibus multis systematis multiaxialis crescentiae ad medullam formandam intermiscunt efficientes: plantae unisexuales; spermatangia primum in maculis parvis in ramis iuvenibus, postea in areolis amplis formata; rami carpogoniales in cellulis corticalibus interioribus lateraliter nati, typice tricellulares (interdum quadricellulares), trichogyna superficiei thalli abrupte observa; cellula auxiliares ut cellulae intercalares filamentorum corticalium amplificatae compactionesque agnoscibiles; communicatio cellulae auxiliari filamentum coniungente e carpogonio fecundato enascente efficitur; cystocarpium sparsi inclusique, cortice superiacente, autem, saepe conspicue eminente; cystocarpus e tela centrali sterili atque cellulis periferilibus terminalibus quae in carposporangia evolvunt compositus; carposporangia per ostiolum liberata; filamenta cystocarpium dense circumscripta tegentiaque, et filamenta quae e tela centrali sterili radiatim extendunt contingentia; tetrasporangia in indi-

viduis isomorphis quae super thallum distribuntur producta, in cortice exteriori inclusa, zonate divisa.

Neoagardhiella gen. nov.

Plants erect, branching, with one to several shoots from a discoid holdfast; branches cylindrical, radially or distichously arranged; cortex compact, composed of outer smaller cells and inner larger cells, the latter giving rise to filamentous rhizoids which intermix with many central filaments of the multiaxial growth system to form the medulla; plants unisexual; spermatangia formed in small patches on young branches, later in extensive areas; carpogonial branches borne laterally on inner cortical cells, typically 3-celled (occasionally 4-celled) with trichogyne turning abruptly toward the thallus surface; auxiliary cells recognizable as enlarged denser intercalary cells of cortical filaments; communication with an auxiliary cell is made by a oöblastic filament from a fertilized carpogonium; cystocarps scattered and embedded, but the overlying cortex often conspicuously protruding; cystocarp composed of a central sterile tissue with peripheral, terminal cells developing into carposporangia, which are released through an ostiole; a thick investment of filaments surrounding the cystocarp and in contact with filaments radiating from the central sterile tissue; tetrasporangia produced on isomorphic individuals, distributed over the thallus, embedded in the outer cortex, zonately divided.

Type species: *Neoagardhiella baileyi* (HARVEY EX KÜTZING) comb. nov.

Basionym: *Rhabdonia baileyi* HARVEY EX KÜTZING, 1866, p. 26, pl. 74.

Synonym: *Agardhiella baileyi* (HARVEY EX KÜTZING) TAYLOR in TAYLOR & RHYNE, 1970, p. 13.

Agardhiella tenera sensu OSTERHOUT, 1896, sensu KYLIN, 1928.

DISTRIBUTIONAL NOTES

As presently circumscribed, *Solieria tenera* in the western Atlantic is basically a warm water species confined to the Caribbean Sea and the Gulf of Mexico, whereas *Neoagardhiella baileyi* is primarily a cold water species ranging northward to southern New England (TAYLOR, 1962; TAYLOR & RHYNE, 1970). However, this statement does not preclude their distributional overlap. Indeed, both species can be found in the same vicinity, e.g., at Port Aransas, Texas*. Yet

* We are grateful to DR. PETER EDWARDS for providing us with his collection data for these two species.

interestingly there exist significant seasonal and niche differences as to their occurrences. *Solieria tenera* grows on the exposed jetty at Port Aransas in the upper sublittoral zone and can be collected throughout the year, with its peak of development during summer and autumn. It seems to prefer a wave-swept habitat. *Neoagardhiella baileyi*, on the other hand, is here restricted to quiet, protected Redfish Bay, where it grows attached to shells. There it has been observed only in the spring, namely, February to April. Such ecological differences along with the already stated anatomical and reproductive differences, support the idea that two very distinct entities are involved.

The distribution of *Solieria tenera* ranges to West Africa. Due to the kindness of DR. D. M. JOHN of the University of Ghana, we have been able to examine several specimens collected from near Tema and Accra in Ghana. Tetrasporangia measure 28—34 μm in length and 16—20 μm in diameter (based upon re-wet pressed samples), and thick-walled, continuous medullary filaments were apparent. Although we were unable to check cystocarpic plants, these above traits sufficiently relate the plant to *S. tenera*.

JOLY (1965) listed '*Agardhiella tenera*' from the State of São Paulo, Brazil. His illustration of a transection of a cystocarp (pl. XXVI, fig. 366) revealed what appears to be a large fusion cell in the center of the cystocarp. The plant in question would appear to be *Solieria tenera*.

One unresolved issue concerns BØRGESEN's (1919) description of auxiliary cells and oöblastic filaments in his collection from the Virgin Islands. We have examined his specimens from St. Croix, St. Thomas, and St. Jan of the Virgin Islands, now preserved in the Botanical Museum of the University of Copenhagen, and find them to be exclusively *S. tenera*. It is uncertain what material BØRGESEN based his figures 356 and 357 upon; only one cystocarpic plant (from St. Croix) was present among his Caribbean specimens.

In reference to other species of *Solieria*, we have examined a cystocarpic specimen* of *S. robusta* (GREV.) KYLIN and observed the large fusion cell in the cystocarp typical of the genus. This Australian species, however, is a much coarser, broader plant than either *S. chordalis* or *S. tenera*. Likewise, *S. dura* (ZANARDINI) SCHMITZ from the Red Sea is a much heavier, irregularly branched plant (ZANARDINI, 1858, pl. 11, fig. 1).

* Norris 1957 (TEX), Narrawong Beach, Portland, Victoria, Australia; 14-iv-1959.

DISPOSITION OF OTHER SPECIES OF AGARDHIELLA

Additional species of *Agardhiella* have been recognized, such as *A. ramosissima*, *A. coulteri*, and *A. mexicana*. *Agardhiella ramosissima* (HARVEY) KYLIN has been recorded from Florida and various islands in the Caribbean to Venezuela and Brazil (TAYLOR, 1960; JOLY et al., 1968). It is easily distinguished by its branches of lower rank being flattened and by the distichous arrangement of all the branchlets.

We have examined collections* of cystocarpic *Agardhiella ramosissima* and have observed the cystocarps to possess a central tissue of small cells comparable to that of *Neoagardhiella baileyi* rather than a large fusion cell. JOLY et al. (1968), who recorded *A. ramosissima* var. *dilatata* from the State of Ceará, Brazil, depicted (pl. 2, fig. 3) a sectioned cystocarp with a central region composed of a tissue of small cells. We are thus induced to transfer *A. ramosissima* to *Neoagardhiella*.

Neoagardhiella ramosissima (HARVEY) comb. nov.

Basionym: *Chrysymenia ramosissima* HARVEY, 1853, p. 190, Pl. 30, fig. B.

Synonym: *Rhabdonia ramosissima* (HARVEY) J. AGARDH, 1876, p. 593.
Agardhiella ramosissima (HARVEY) KYLIN, 1932, p. 17.

Two varieties of this species have been recognized (AGARDH, 1885; TAYLOR, 1960), and they are accordingly included here.

Neoagardhiella ramosissima v. *Harveyana* (J. AGARDH) var. nov.

Basionym: *Rhabdonia ramosissima* a. *Harveyana* J. AGARDH, 1885, p. 85.

Neoagardhiella ramosissima v. *dilatata* (J. AGARDH) var. nov.

Basionym: *Rhabdonia ramosissima* b. *dilatata* J. AGARDH, 1885, p. 85.

A related species of the Gulf of Mexico, *Eucheuma acanthocla-*

* Cystocarpic specimens examined: FLORIDA: Dade County, between Mangrove Key and Key West, W. R. TAYLOR 10304, 31 May 1925 (WRT); Jupiter Inlet. Mrs. G. A. HALL, (var. *dilatata*), 10 Sept. 1896 (PB-A in UM, WRT, and TEX). Citrus County, Buoy 2 off Homosassa River, D. CHENEY 70-118, 20 Sept. 1971 (USF). Non-cystocarpic specimens examined: FLORIDA: Dade County, Key West, Mrs. G. A. HALL, April 1897 (PB-A in UM and TEX); Levy County, Cedar Key, E. L. PIERCE 2, 11 August 1949 (UM) and E. L. PIERCE 14, 23 August 1949 (UM). Sarasota County, 50 ft. depth off Sarasota, C. DAWES 7040, 30 June 1971 (USF). Lee County, C. DAWES 2062, 25 June 1964 (USF). Monroe County, Content Key, DAWES 3917, 24 June 1966 (USF). NETHERLANDS WEST INDIES: Aruba I., cove at Punta Basora, W. R. TAYLOR 20249 (var. *dilatata*), 10 April 1939 (WRT).

*dum** (HARVEY) J. AGARDH, presents a superficially similar appearance to *Neoagardhiella ramosissima*. Both species tend to have a flattened primary axis with a distichous arrangement of branches in 5—6 ranks and a fleshy texture. But the cervicorn, often second final branches of *E. acanthocladum* and the denser arrangement of medullary filaments should serve to separate this species from *N. ramosissima*. TAYLOR (1928, pl. 31, fig. 1) depicted a specimen of *E. acanthocladum*.

In his description of the female plants of Pacific Coast *Agardhiella coulteri* (HARVEY) SETCHELL, SMITH (1955) claimed that the auxiliary cell is distinguishable prior to fertilization from other vegetative cells by its denser protoplasm. He also depicted the cystocarp as being composed of a mass of small-called intertwined filaments which radiate outwards. No evidence of a large fusion cell was shown. DR. I. A. ABBOTT (pers. comm.) has confirmed this structure of the cystocarp. Both of these traits indicate that the Pacific Coast species belongs to *Neoagardhiella* rather than *Solieria*. Whether it can be legitimately separated from the Atlantic *N. baileyi* is debatable. We tend to agree with those workers (HOWE, 1914; TAYLOR, 1945; DAWSON, 1961) who have regarded it as conspecific with the Atlantic species and therefore to be called *N. baileyi*.

Agardhiella mexicana DAWSON (1944) has been regarded (TAYLOR, 1945; DAWSON, 1961) as a synonym of '*A. tenera*' (i.e., *N. baileyi*).

DISCUSSION

The Solieriaceae has been characterized as a nonprocarpial family (KYLIN, 1932, 1956; FRITSCH, 1959) primarily on the basis of investigations on *Neoagardhiella baileyi* (formerly *Agardhiella tenera* p. p.) (OSTERHOUT, 1896; BØRGESEN, 1919; KYLIN, 1928). It is worth while to briefly trace the development of our concept of some related families of the Gigartinales. KYLIN (1925) divided the large family Rhodophyllidaceae into two groups: the procarpial family Rhodophyllidaceae in the restricted sense, containing *Rhodophyllis*, *Cystoclonium* and *Euthora*, and the nonprocarpial Rhabdoniaceae, a new family containing *Rhabdonia*, *Agardhiella*, *Anatheca*, *Flahautia*, and *Solieria*. This latter family was subsequently subdivided by KYLIN (1932) on the basis of vegetative construction: Rhabdoniaceae was characterized by uniaxial growth (with the genera

* Specimens examined: FLORIDA: Sarasota County, 55 ft. depth off Sarasota, C. DAWES 7058, 18 July 1971 (USF). Monroe County, Content Key, C. CROLEY 985, 18 Feb. 1967 (USF). Off Florida Keys (81° 35'/24° 47'), C. DAWES 2632, April 1965 (USF).

Rhabdonia, *Catenella*, *Erythroclonium*, and *Areschougia*) and the Solieriaceae (a name first used by HAUCK, 1885) was characterized by multiaxial growth (with the genera *Thysanocladia**, *Flahautia*, *Sarcodiotheca*, *Agardhiella*, *Solieria*, *Sarconema*, *Eucheuma*, *Anatheca*, *Meristotheca*, and *Euryomma*). Several genera have subsequently been added to the Rhabdoniaceae (cf. KYLIN, 1956; SEARLES, 1968); however the Solieriaceae has remained relatively unchanged.

The investigations of BORNET & THURET (1880) revealed the apparent origin of the gonimoblast directly from the carpogonial branch (= their 'procarp'). This observation seems to have been ignored by later workers. KYLIN (1932) clouded the issue by suggesting that auxiliary cells were merely recognizable before fertilization and that the family Solieriaceae lacked procarps. In our own studies, the apparent absence of separate auxiliary cells and of oöblastic filaments strongly suggests that a cell of the carpogonial branch acts as the auxiliary cells, although we have not observed the critical stages. However, we see no reason to doubt the original observations made on *Solieria chordalis* by BORNET & THURET (1880).

Such a new interpretation of the Solieriaceae as procarpial, based on the type genus, would necessitate the separation of *Solieria* from the other genera in the family which are known to be nonprocarpial (e.g., *Neoagardhiella*, *Sarcodiotheca*, *Turnerella*, *Opuntiella* and *Callophycus***). *Solieria* agrees with the monotypic family Rissoellaceae in having a large fusion cell at the center of the cystocarp, the occurrence of procarps, zonately divided tetrasporangia, an inward development of the gonimoblast, and a multiaxial system of growth; but some significant reproductive differences exist between these two genera (cf. KYLIN, 1956; SCHOTTER & CABIOCH, 1963).

Several genera presently included in the Solieriaceae have not been subjected to critical studies regarding their immediate post-fertilization development. It is apparent at present that an important difference separates the procarpial genus *Solieria*, the name to which the family is tied, from several other genera contained in the family, which are known to be nonprocarpial. This criterion has served as a fundamental means of delineating families of this order. So, in conclusion, we wish to call attention to this problem of an apparently heterogeneous assemblage currently constituting the Solieriaceae, but we feel that a review of the reproductive features of these other genera from material, not from the literature, should be carried out in the light of what we have found in *Solieria* before family reorganization is attempted.

* This genus is now known as *Callophycus* (SILVA, 1957).

** See HEWITT, 1960.

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