

CHECKLIST OF BENTHIC ALGAE FROM THE ASTURIAS COAST (NORTH OF SPAIN)

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ABSTRACT: *An annotated checklist of the marine benthic flora of Asturias coast (North of Spain), based on literature records, herbarium sheets and original data is presented. According to our data, the known list of algae totals 437 taxa: 42 Cyanophyta, 239 Rhodophyta, 101 Ochrophyta and 55 Chlorophyta. The number of specific and intraspecific taxa is 459: 42 Cyanophyta, 247 Rhodophyta, 111 Ochrophyta and 59 Chlorophyta. Phormidium autumnale, Drachiella spectabilis and Peyssonnelia harveyana are new records for Asturias. In addition, 18 taxa are considered as taxa excludenta, while 34 taxa were recorded as dubious and their presence in the coasts of Asturias must be confirmed and thoroughly studied in the future. Remarks on the most noteworthy features of the flora of the studied area are included. Also, we present lists of cold-temperate, warm-temperate, Lusitanic Province endemics, and alien species growing in Asturias. Finally, we compared the floristic character of Asturias coast flora with respect to the neighbouring regions (Britain, Ireland, Basque coast, Galicia, Portugal, Southern Iberian Peninsula, Canary Islands and Atlantic coast of Morocco) applying Feldmann's [Rhodophyta/Phaeophyta, or R/P] and Cheney's ratios [(Rhodophyta+Chlorophyta)/Phaeophyta, or (R+C)/P]. The resulting low values (2.36 and 2.91, respectively) are explained by the abundance of numerous cold temperate species like large fucoids and kelps.*

KEY WORDS: Biogeography. Cantabrian Sea. Checklist. Iberian Peninsula. Seaweeds. Systematics.

ABBREVIATIONS: Basionym [basion.]; Form [f.]; International Code of Botanical Nomenclature [ICBN]; *Nomen conservandum* [nom. cons.]; *Nomen illegitimum* [nom. illeg.]; *Nomen rejiciendum* [nom. rej.]; *Orthographia conservanda* [orth. cons.]; *Pro parte* [p.p.]; Subspecies [ssp.]; *Typus conservandus* [typ. cons.]; Variety [var.].

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RESUMEN: *Se presenta un catálogo de la flora bentónica marina de la costa asturiana basado en la consulta de citas bibliográficas, pliegos de herbario y datos originales. De acuerdo con nuestros datos, la lista de algas conocidas asciende a 437 especies: 42 Cyanophyta, 239 Rhodophyta, 101 Ochrophyta y 55 Chlorophyta. El número de taxa específicos e infraespecíficos asciende a 459: 42 Cyanophyta, 247 Rhodophyta, 111 Ochrophyta y 59 Chlorophyta. Phormidium autumnale, Drachiella spectabilis y Peyssonnelia harveyana son nuevas citas para Asturias. Además, 18 táxones se consideran como taxa excluida, mientras que 34 son considerados como dudosos y su presencia para las costas de Asturias debe ser confirmada y tratada más exhaustivamente en el futuro. Se incluyen comentarios sobre las características más destacables de la flora en el área de estudio. También se presentan listas de las principales especies templado-frías, templado-cálidas, endémicas de la provincia Lusitana y alóctonas que crecen en Asturias. Por último, se compara el carácter florístico de la flora asturiana con respecto a otras regiones próximas (Gran Bretaña e Irlanda, costa Vasca, Galicia, norte de Portugal, sur de Portugal, sur de la Península Ibérica, Islas Canarias y costa atlántica de Marruecos) aplicando el índice de Feldmann [Rhodophyta/ Phaeophyta, o R/P] y el índice de Cheney [(Rhodophyta+Chlorophyta)/ Phaeophyta, o (R+C)/P]. Los bajos valores resultantes (2,36 y 2,91 respectivamente), son explicados por la abundancia de numerosas especies templado-frías como las fucáceas y laminariales.*

PALABRAS CLAVE: Biogeografía. Mar Cantábrico. Catálogo. Península Ibérica. Algas marinas. Sistemática.

ABREVIATURAS: Basiónimo [basion.]; Forma [f.]; Código Internacional de Nomenclatura Botánica [ICBN]; *Nomen conservadum* [nom. cons.]; *Nomen illegitimum* [nom. illeg.]; *Nomen rejiciendum* [nom. rej.]; *Orthographia conservanda* [orth. cons.]; *Pro parte* [p.p.]; Subespecie [ssp.]; *Typus conservandus* [typ. cons.]; Variedad [var.].

INTRODUCTION

The coast of Asturias (North of Iberian Peninsula) is characterized by its 354 km of coasts, plenty of sandbars, inlets, cliffs, capes, bays and beaches. Asturias regional shores comprise from ria Tina Mayor in the East (neighbouring to Cantabria) to ria Eo in the West (limiting with Galicia). The main geographical feature is Cape Peñas, placed in the Central area, although there are other minor capes (Busto, Vidio, Prieto, etc.) as well as small rias (Villaviciosa, Avilés, etc.). As it has been described for other Spanish areas, the information concerning to the algae flora of Asturias coast has been sparse and little known compared to other European atlantic regions, such as England, Galicia or Basque Country (Gorostiaga & al., 2004). Seaweeds have been studied up to 200 years in Asturias, being herborized and compiled for the

first time by the botanist Lagasca (Bellón Uriarte, 1939); nevertheless, the first documented reference was the exsiccata *Plantae Selectae Hispano-Lusitanicae*. It was recorded by the French botanist Michel Charles Durieu de Maisonneuve, who travelled in 1835 through the Cantabrian territories in a botanical exploration, focusing on Asturias (Fernández Prieto & Vázquez, 2007). About exsiccata information, Winch (1836) summarized its content, providing 162 cryptogames (3 Fungi, 43 Algae, 16 Lichenes, 21 Hepaticae, 58 Musci, 21 Filices) and 250 fanerogames (65 Monocotyledones, 185 Dicotyledones). This work is the first one about seaweed in Asturias, and its aim is to compile the work of many authors who carried out up to 400 contributions during more than one century, improving the knowledge about Asturias seaweed flora (Cires Rodríguez & Cuesta Moliner, 2009).

Although it is not an objective of the present work, we would like to emphasize some of the main contributions, such as Colmeiro (1867, 1889), Amo y Mora (1870), Lázaro é Ibiza (1889, 1900), Sauvageau (1896a-b, 1897a-b, 1899, 1933), Chalon (1905), Rioja (1917) and Hamel (1928). In addition to this, in the 30's there is undoubtedly an outstanding figure of the phycology in Asturias: Faustino Miranda González (1905-1964), whom was born in Gijón. His thesis "*Sobre las algas y cianofíceas del Cantábrico, especialmente de Gijón*" was one of the first theses about algae in Spain, under the supervision of Arturo Caballero, head of the Laboratory of Phytogeography of the Royal Botanic Garden of Madrid. This work provided more than 300 species (60 of them new records for Spain), lots of anatomical and morphological descriptions of several algae and the characterization of phycological vegetation, supposing a turning point in the knowledge about marine flora of the North of the Iberian Peninsula.

Faustino Miranda González lived in different places throughout their life [Oviedo-Madrid-Paris-Marín (Pontevedra)], dying in Mexico, where he was exiled because of the Civil War (Dosil Mancilla & al., 2001). It was during the exile when he carried out the first checklist of algae of the North of the Peninsula (Miranda, 1943a-d), representing the first draft of a marine flora of the North and Northwest of the Iberian Peninsula. Other relevant authors of those times as of the following years were: Bellón Uriarte (1939), Fischer-Piette (1955, 1963), Dizerbo (1956), Seoane-Camba (1965, 1966). However, the knowledge of Asturias seaweeds increased in the 70's by several works related to other regions such as Portugal (Ardré, 1970, 1971) or Galicia (Pérez-Cirera, 1974, 1975a-b), as they also compiled information about Asturias. In the 80's by Anadón (1980, 1983), Anadón & Niell (1981), Anadón & Fernández (1986), Fernández (1980), Fernández & Niell (1981, 1982), Fernández & al. (1983), Seoane-Camba (1982), Pérez-Cirera (1981), Valenzuela & Pérez-

Cirera (1982), Weber-Peukert & Schnetter (1982), Arrontes (1983, 1987, 1993, 2002), Gallardo (1984), Gallardo & Álvarez (1985) and Gallardo & al. (1985). From 90's until now, lots of phycological contributions have been carried out, around 250 in the last 18 years (see Cires Rodríguez & Cuesta Moliner, 2009), highlighting some of them: Cremades & Bárbara (1990), Cremades & al. (1997, 2002), Pérez-Cirera & al. (1991), Poyal Cáliz (1992), Pérez-Ruzafa & al. (1993, 2002), Pérez-Ruzafa & Gallardo (1997, 1998), Viejo (1995, 1997), Dosil Mancilla & Cremades Ugarte (1998, 1999), Bárbara & al. (2002, 2003a-b, 2005b, 2006a-b), Dosil Mancilla (2001, 2007), Llera González & Álvarez Raboso (2007), and finally Díaz & al. (2008).

The aim of the present work is compiling the marine algae flora of the Asturias coast for the first time. It is worthy to highlight that a thorough knowledge of the natural resources of a territory is always required, not only for their evaluation and conservation management, but also for representing an exceptional valuable tool of scientific information. For this purpose a critical review of all published records has been carried out. We hope that the present catalogue will contribute to the bases of further studies, allowing the comparison of the marine flora of Asturias with relevant publications from similar geographic ranges, as equivalent reports from Britain and Ireland (Hardy & Guiry, 2003), Basque Country (Gorostiaga & al., 2004), Galicia (Bárbara & al., 2005a), North of Portugal (Ardre, 1970; Cremades & al., 2002; Bárbara & al., 2003b; Araújo & al., 2003), South of Portugal (Ardre, 1970), Andalucía (Flores Moya & al., 1995a-b; Conde & al., 1996), Atlantic coast of Morocco (Benhissoune & al., 2001, 2002a-b, 2003) and Canary Islands (Haroun & al., 2002).

In summary, this checklist does not attempt to be a definitive catalogue, as new records appear continuously, but it will contribute increasing the understanding of the biogeographical characteristics of this Atlantic coast area and the knowledge about its marine biodiversity.

MATERIAL AND METHODS

This catalogue is mainly based on the review of more than 400 scientific works (Cires Rodríguez & Cuesta Moliner, 2009) related to benthic marine algae of Asturias coast (Figure 1). In addition to journals and book chapters, other works have been taken into account, such as Minor Theses or Dissertations, Master in Sciences, Doctoral Theses, Conference Contributions and Technical Reports. Referring to Minor and Doctoral Theses, not only those belonging to University of Oviedo have been considered, but also those ones from other Spanish Universities, as well as the methodology of studying the vascular flora of Asturias (Fernández-Carvajal & al., 2007, 2009) was con-

sulted. Data presented here comprised information from 1836 to 2009. The herbarium specimens checked belong to University of Oviedo (FCO-Algae), University of País Vasco (BIO-Algae), Royal Botanic Garden of Madrid (MA-Algae) (see Pando, 2006), University of Barcelona (BCN-Phycophyta), and University of Santiago de Compostela (SANT-Algae) (see GBIF, 2008).

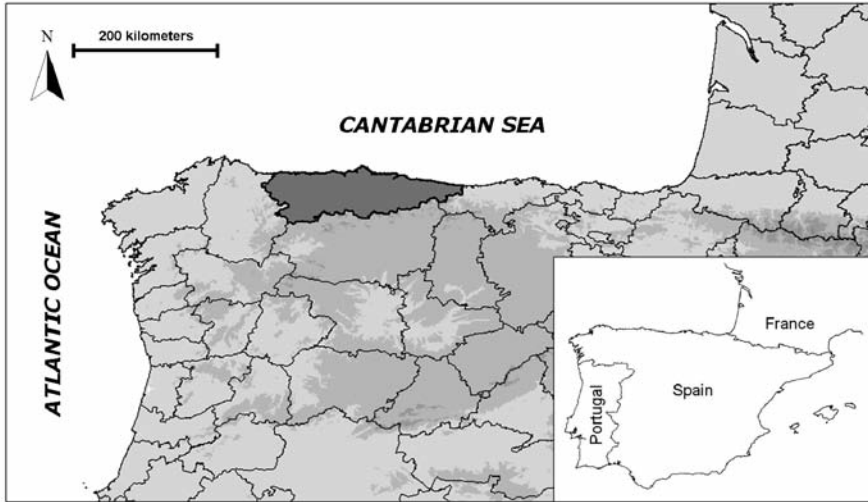


Figure 1. Location of the study area: Asturias region.

Taxa are designated as their nomenclatural authorities, and these names have been abbreviated following Brummitt & Powell (1992). The current taxonomic status and nomenclatural changes of the taxa concerned have been considered. The checklist includes the basionyms for all taxa and synonyms under which a specific or infraspecific taxon has been recorded. For each species, we have given infraspecific taxa and life history stage. Records that need to be confirmed are included in separate lists as *taxa inquirenda* and *potential taxa*. Likewise, a list of *taxa excludenda* is also given with pertinent comments and references. It has been considered the International Code of Botanical Nomenclature (ICBN) recommendations (Vienna Code) (McNeill & al., 2007), such as *nomina familiarum*, *generica* and *specifica conservanda*. For each genus, it has been provided the typification and nomenclatural status of generic names according to the *Index Nominum Genericorum* (Farr & Zijlstra, 2007) (see Index of Genera in Appendix I). For Cyanophyta, we follow Komárek and Anagnostidis's classification system (Komárek & Anagnostidis, 1986; also Anagnostidis & Komárek, 1988), with some remarks by Silva & al. (1996). Systematics arrangement of Rhodophyta, Ochrophyta and Chlorophy-

ta follows Bárbara & al. (2005b), Silva & al. (1996), Reviere & Rousseau (1999), Rousseau & Reviere (1999), Rousseau & al. (2001), Friedl & O'Kelly (2002) and O'Kelly & al. (2004a-b). Class, orders, families, genera and species are alphabetically arranged.

To classify the Asturias algae flora, we have applied Feldmann's ratio [R/P] (number of species of Rhodophyta / number of species of Phaeophyta) and Cheney's ratio [(R+C)/P], similar to Feldmann's but including green algae (Feldmann, 1937 and Cheney, 1977 respectively). These ratios are indices that show the position of a flora in relation to cold and warm waters.

RESULTS

The list of Asturias coast benthic algae is established in Table 1. The checklist includes 437 species: 42 Cyanophyta, 239 Rhodophyta, 101 Ochrophyta and 55 Chlorophyta. The number of specific and infraspecific taxa is 459: 42 Cyanophyta, 247 Rhodophyta, 111 Ochrophyta and 59 Chlorophyta. *Phormidium autumnale*, *Drachiella spectabilis*, and *Peyssonnelia harveyana* are new records for Asturias. In addition to this, 27 taxa are considered as *taxa inquirenda* (1 Cyanophyta, 14 Rhodophyta, 6 Ochrophyta and 6 Chlorophyta), 7 taxa are contemplated as *potential taxa* or species from nearby regions that should be confirmed for Asturias (3 Rhodophyta, 3 Ochrophyta and 1 Chlorophyta), and 18 as *taxa excludenda* (9 Rhodophyta, 5 Ochrophyta and 4 Chlorophyta). Moreover, we have excluded erroneous records like *Acrochaetium codicola*, *Antithamnion plumula* var. *genuinum*, *Cystoclonium purpureum*, *Cystoseira compressa*, *Dictyota linearis*, *Laminaria digitata*, *Nemacystus erythraeus*, *Ptilota gunneri*, or *Rhodymenia ligulata*. In the same way, we have also excluded the old ones such as *Acetabularia acetabulum*, *Botryocladia chiajeana*, *Ceramium gaditanum* var. *mediterraneum*, *Codium bursa*, *Entocladia leptochaete*, *Gelidium capense*, *Giraudia sphacelarioides*, *Halimeda opuntia*, *Lithophyllum crassum*.

DISCUSSION

Asturias, as Galicia does, marks the Southern limit of the typical fucoids and kelps vegetation, which are common on the North Atlantic European coast (Bárbara & al., 2005a). Some algae species in Asturias are characteristic from Arctic-cold temperate and North Atlantic climate, like *Ahnfeltia plicata*, *Delesseria sanguinea* and *Palmaria palmata*. Furthermore, a high number of large brown algae have been recorded, such as *Ascophyllum nodosum*, *Bifurcaria bifurcata*, *Desmarestia aculeata*, *Halidrys siliquosa*, *Himanthalia elongata*, *Laminaria hyperborea*, *Laminaria ochroleuca*, *Laminaria saccharina*, *Pelvetia canaliculata*, *Saccorhiza polyschides*.

The diversity of seaweed flora of Asturias, based on Feldmann's and Cheney's ratios (2.36 and 2.91, respectively), showed an intermediate value if they are compared to neighboring marine floras, like Britain and Ireland, Basque coast, Northern and Southern Portugal, Andalucia, Atlantic coast of Morocco and Canary Islands. It is interesting to note that these ratios are rather similar to those ones from nearby regions like Galicia (Table 2), and the predominant species, mainly large fucoids and kelps, are characterized by their cold-water preferences. Various of these Northern cold-temperate species are common to Galicia, England and Brittany, like the red algae: *Aglaothamnion roseum*, *A. sepositum*, *Bostrychia scorpioides*, *Brongniartella byssoides*, *Ceramium shuttleworthianum*, *Chondrus crispus*, *Cruoria pellita*, *Delesseria sanguinea*, *Dilsea carnosa*, *Dumontia contorta*, *Gloiosiphonia capillaris*, *Halarachnion ligulatum*, *Halurus flosculosus*, *Heterosiphonia plumosa*, *Mastocarpus stellatus*, *Palmaria palmata*, *Plumaria plumosa*, *Polysiphonia fucoides*, *P. lanosa*, *P. nigra*, *P. stricta*, *Porphyra linearis*, *P. purpurea*, *Rhodochorton purpureum*, *Rhodomela confervoides*, *Rhodothamniella floridula*; the brown algae: *Ascophyllum nodosum*, *Chorda filum*, *Desmarestia aculeata*, *D. ligulata*, *Ectocarpus fasciculatus*, *Elachista flaccida*, *E. fucicola*, *E. scutulata*, *Eudesme virescens*, *Fucus ceranoides*, *F. serratus*, *F. spiralis*, *F. vesiculosus*, *Halidrys siliquosa*, *Himanthalia elongata*, *Laminaria hyperborea*, *L. saccharina*, *Litosiphon laminariae*, *Pelvetia canaliculata*, *Pyraliella littoralis*, *Saccorhiza polyschides*, *Sphacelaria plumula*, *Vaucheria dichotoma*, *V. subsimplex*; and the green algae: *Prasiola stipitata*, *Pseudendoclonium submarinum* and *Urospora penicilliformis*.

Furthermore, Asturias coast constitutes an excellent sample of Southern warm-temperate taxa, mainly represented by Ceramiales such as *Ceramium echionotum*, *Ctenosiphonia hypnoides*, *Griffithsia schousboei*, *Leptosiphonia schousboei*, *Pleonosporium flexuosum*, *Polysiphonia polyspora*, *Spermothamnion repens* var. *flagelliferum* and *Streblocladia collabens*; and others species like *Codium decorticatum* (Bryopsidales), *Amphiroa van-bosseae* (Corallinales), *Peyssonnelia coriacea* (Cryptonemiales), *Cutleria adpersa* (Cutleriales), *Padina pavonica* (Dictyotales), *Gymnogongrus crenulatus* (Gigartinales) and *Halopteris filicina* (Sphacelariales). The presence of several warm-temperate species like *Colpomenia sinuosa*, *Chrysymenia ventricosa*, *Halopithys incurva*, *Ophidocladus simpliciusculus*, *Sargassum vulgare* and *Spatoglossum solierii*, establishes interesting floristic differences with respect to the Northwest coast of Iberian Peninsula, where these species are absent.

What it is more, and according to studies about Galicia (Bárbara & al., 2005a), Asturias coast also offers a seaweed representation of Lusitanic Province like the red algae: *Callithamnion tetricum*, *Drachiella spectabilis*,

ErythroGLOSSUM lusitanicum, *Gelidiocolax deformans*, *Gelidium maggsiae*, *Itonoa marginifera*, *Laurencia pyramidalis*, *Polyneura bonnemaisonii*, *Pterosiphonia complanata*, *Ptilothamnion sphaericum*, *Rhodymenia holmesii*; the brown algae: *Bifurcaria bifurcata*, *Cystoseira baccata*, *Cystoseira foeniculacea*, *Cystoseira nodicaulis*, *Laminaria ochroleuca*, *Petrospongium berkeleyi*, *Phyllariopsis brevipes*; and the green algae: *Codium tomentosum* var. *mucronatum* and *Ulva rigida* var. *fimbriata*.

The coast of Asturias, due to its geographical position and all the above-cited characteristics of its marine flora, represents a transitional area in the North of Spain. That is to say, Asturias constitutes a biogeographical border between two types of vegetation; cold temperate species are presented towards the West, i.e. Galicia coast (Bárbara & al., 2005a), and less cold-temperate species and more warm-temperate species are observed towards the East, i.e. the Basque coast (Gorostiaga & al., 2004). This fact is pointed out by the absence of certain cold-temperate species (*Chorda filum*, *Fucus serratus*, *Himantalia elongata*, *Laminaria hyperborea* or *L. saccharina*) in the East area of Asturias region (Llera González & Álvarez Raboso, 2007). As these species are absent, other taxons appear or increase their abundance, such as *Bifurcaria bifurcata*, *Corallina elongata*, *Cystoseira baccata*, *C. tamariscifolia*, *Gelidium corneum*, *G. spinosum* and *Lithophyllum byssoides* (Anadón, 1979). In agreement with Gutiérrez Morán (1994), the coast of Asturias could be classified into three biogeographic areas (Western, Central and Eastern) and two transition sections (the Western section from Valdés council to ria of Aviles; the Eastern one from Gijón to Ribadesella), which traits are a combination of the neighbouring areas. The Western section comprises ria Eo to Valdés council, and it is characterized by a higher number of cold-temperate species. One typical species of this Western area is *Fucus serratus* (Arrontes 1993, 2002). The Central section (from ria of Aviles to Gijón) is plenty of industrial places, and it is distinguished by the replacement of belts of *Chondrus crispus* by *Gelidium spinosum* ones. The coast of Ribadesella to ria Tina Mayor delimits the Eastern section, where warm-temperate species are abundant. The most relevant point is found in the presence of *Gelidium corneum*, which constitutes wide submareal fields in the Eastern area, decreasing their range from the Western Cape Peñas (Llera González & Álvarez Raboso, 2007).

For all these reasons, this new checklist has two meaningful applications: firstly, a better understanding of the marine flora of Asturias as well as its connections with nearby coastal areas such as Galicia or Basque Country. As a consequence of it, detailed biogeographical studies of certain marine areas could be carried out. In the second place, any attempt of species preservation must take into account their distribution instead of bureaucratic issues, so if

future conservation efforts would be proposed, an available reliable list of species is absolutely necessary. The presence of some catalogued algae (see Bárbara & al., 2006b) like *Cystoseira foeniculacea*, *Erythroglossum lusitanicum*, *Fauchea repens*, *Furcellaria lumbricalis*, *Gelidium maggsiae*, *Liagora distenta*, *Ptilothamnion sphaericum*, *Rhodomela confervoides* and *Solieria chordalis* must be considered in further catalogues of endangered species and red lists.

The alien species are presented along the coast of Asturias, being the most common ones: *Antithamnionella ternifolia*, *Asparagopsis armata* (includes the tetrasporophytic phase, *Falkenbergia rufolanosa*), *Codium fragile* ssp. *tomentosoides*, *Colpomenia peregrina*, *Grateloupia luxurians*, *Neosiphonia harveyi*, *Sargassum muticum* and *Undaria pinnatifida*.

Finally, the present list does not pretend to be a definitive catalogue, mainly after considering that new records appear continuously, there are several habitats poorly studied (e.g. subtidal environments), certain groups required detailed studies (e.g. Cyanophyceae were only specifically analyzed 70 years ago by Miranda) and possibly some groups still demand taxonomic re-investigation. In summary, as Gorostiaga & al. (2004) and Bárbara & al. (2005a), this report contributes to elucidate the marine flora diversity of the Cantabrian coast (North of the Iberian Peninsula).

Table 1. Catalogue of the benthic marine algae of Asturias.

CYANOPHYTA

CYANOPHYCEAE

CHROOCOCALES

CHAMAESIPHONACEAE

Chamaecalyx Komárek & Anagn.

Chamaecalyx leibleiniae (Reinsch) Komárek & Anagn.¹

= *Sphaenosiphon leibleiniae* Reinsch [basion.]

CHROOCOCCACEAE

Gloeocapsopsis Geitler ex Komárek

Gloeocapsopsis crepidinum (Thur.) Geitler ex Komárek²

= *Protococcus crepidinum* Thur. [basion.]

= *Gloeocapsa crepidinum* (Thur.) Thur.

DERMOCARPELLACEAE

1 Reported by Díaz & al. (2008) as new record for Asturias.

2 Miranda (1931b, 1943a); Herbarium SANT-Algae 14544 ["Playa de Pantorga". Designated by S. Calvo & M.C. López, 1997].

Cyanocystis Borzí

Cyanocystis violacea (P.Crouan & H.Crouan) Komárek & Anagn.³
= *Dermocarpa violacea* P.Crouan & H.Crouan [basion.]

Dermocarpella Lemmerm.

Dermocarpella prasina (Reinsch) Komárek & Anagn.⁴
= *Sphaenosiphon prasinus* Reinsch [basion.]
= *Dermocarpa prasina* (Reinsch) Bornet & Thur.

ENTOPHYSALIDACEAE

Entophysalis Kütz.

Entophysalis conferta (Kütz.) F.E.Drouet & W.A.Daily⁵
= *Palmella conferta* Kütz. [basion.]

HYELLACEAE

Hyella Bornet & Flahault

Hyella caespitosa Bornet & Flahault⁶

Pleurocapsa Thur.

Pleurocapsa fuliginosa Hauck⁷

MERISMOPEDIACEAE

Aphanocapsa Nägeli

Aphanocapsa litoralis Hansg.⁸

Merismopedia Meyen

Merismopedia mediterranea Nägeli⁹
= *Merismopedia glauca* f. *mediterranea* (Nägeli) Collins

XENOCOCCACEAE

Xenococcus Thur.

Xenococcus pyriformis Setch. & N.L.Gardner¹⁰

Xenococcus schousboei Thur.¹¹

= *Dermocarpa schousboei* (Thur.) Bornet

NOSTOCALES

NOSTOCACEAE

Anabaena Bory ex Bornet & Flahault [*nom. cons.*]

Anabaena torulosa Lagerh. ex Bornet & Flahault¹²

RIVULARIACEAE

Calothrix C.Agardh ex Bornet & Flahault

Calothrix aeruginea (Kütz.) Thur.¹³

³ Miranda (1931b, 1943a); Guillermes & Cremades (1993).

⁴ Miranda (1931b, 1943a); Valenzuela & Pérez-Cirera (1982); Valenzuela Miranda (2005a).

⁵ Reported by Anadón (1980).

⁶ Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

⁷ Reported by Miranda (1931b, 1943a).

⁸ Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

⁹ Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

¹⁰ Herbarium SANT-Algae 14938 ["Puente del Río Niembro". Designated by I. Bárbara, 1997]; reported by Bárbara & al. (2003a) as new record for Asturias.

¹¹ Reported by Miranda (1931b, 1943a).

¹² Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

¹³ Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

- = *Leibleinia aeruginea* Kütz. [basion.]
Calothrix confervicola (Dillwyn) C.Agardh¹⁴
 = *Conferva confervicola* Dillwyn [basion.]
Calothrix contarenii (Zanardini) Bornet & Flahault¹⁵
 = *Rivularia contarenii* Zanardini [basion.]
Calothrix crustacea Schousb. ex Thur.¹⁶
Calothrix parasitica (Chauv.) Thur.¹⁷
 = *Rivularia parasitica* Chauv. [basion.]
Calothrix scopulorum (F.Weber & D.Mohr) C.Agardh¹⁸
 = *Conferva scopulorum* F.Weber & D.Mohr [basion.]
Isactis Thur. ex Bornet & Flahault¹⁹
Isactis plana (Harv.) Thur. ex Bornet & Flahault
 = *Rivularia plana* Harv. [basion.]
Rivularia C.Agardh ex Bornet & Flahault [*nom. cons.*]
Rivularia atra Roth ex Bornet & Flahault²⁰
Rivularia biasoletiana Menegh.²¹
Rivularia bullata (Poir.) Berk. ex Bornet & Flahault
 = *Ulva bullata* Poir. [basion.]

OSCILLATORIALES

OSCILLATORIACEAE [*nom. cons.*]

- Blennothrix** Kütz. ex Anagn. & Komárek
Blennothrix glutinosa (Kütz. ex Gomont) Anagn. & Komárek²²
 = *Hydrocoleum glutinosum* Kütz. ex Gomont [basion.]
Blennothrix lyngbyacea (Kütz. ex Gomont) Anagn. & Komárek²³
 = *Hydrocoleum lyngbyaceum* Kütz. ex Gomont [basion.]
 = *Microcoleus lyngbyaceus* (Kütz.) P.Crouan & H.Crouan
Lyngbya C.Agardh ex Gomont [*nom. cons.*]
Lyngbya confervoides C.Agardh ex Gomont²⁴
Lyngbya majuscula (Dillwyn) Harv. ex Gomont
 = *Conferva majuscula* Dillwyn [basion.]
Lyngbya semiplena (C.Agardh) J.Agardh ex Gomont²⁵

14 Sauvageau (1897a); Miranda (1931b, 1943a); Seoane-Camba (1965); Valenzuela Miranda (2005b).

15 Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

16 Miranda (1931b, 1943a); Sierra (1983); Valenzuela Miranda (2005b).

17 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Herbarium SANT-Algae 14543 ["Tazones". Designated by M C. López, 1998]; Valenzuela Miranda (2005b).

18 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Valenzuela Miranda (2005b).

19 Sauvageau (1897a); Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

20 Sauvageau (1897a); Miranda (1931b, 1943a); Seoane-Camba (1965); Valenzuela Miranda (2005b).

21 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Valenzuela Miranda (2005b).

22 Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

23 Miranda (1931b, 1943a); Anadón (1980); Valenzuela Miranda (2005b).

24 Sauvageau (1897a); Miranda (1931b, 1943a); Seoane-Camba (1965); Valenzuela Miranda (2005b).

25 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Valenzuela Miranda (2005b).

- = *Calothrix semiplena* C.Agardh [basion.]
Lyngbya sordida Gomont²⁶
Oscillatoria Vaucher ex Gomont
Oscillatoria bonnemaisonii (P.Crouan & H.Crouan) P.Crouan & H.Crouan ex Gomont²⁷
 = *Oscillaria bonnemaisonii* P.Crouan & H.Crouan [basion.]

PHORMIDIACEAE

- Arthrospira** Stizenb. ex Gomont
Arthrospira miniata (Hauck) Gomont²⁸
 = *Spirulina miniata* Hauck [basion.]
Microcoleus Desm. ex Gomont
Microcoleus chthonoplastes (Mert.) Zanardini ex Gomont²⁹
 = *Conferva chthonoplastes* Mert. [basion.]
Phormidium Kütz. ex Gomont
Phormidium autumnale (C.Agardh) Trevis. ex Gomont³⁰
 = *Oscillatoria autumnalis* C.Agardh [basion.]
Phormidium corallinae (Kütz. ex Gomont) Anagn. & Komárek³¹
 = *Oscillatoria corallinae* Kütz. ex Gomont [basion.]
Symploca Kütz. ex Gomont
Symploca atlantica Gomont³²
Symploca hydnoides (Harv.) Kütz.³³
 = *Calothrix hydnoides* Harv. [basion.]

PSEUDANABENACEAE

- Leibleinia** (Gomont) L.Hoffm.
Leibleinia baculum (Gomont) L.Hoffm.³⁴
 = *Lyngbya baculum* Gomont [basion.]
Spirocoleus Moebius ex Crow
Spirocoleus terebrans (Bornet & Flahault) P.C.Silva³⁵
 = *Plectonema terebrans* Bornet & Flahault [basion.]
Spirulina Turpin ex Gomont
Spirulina major Kütz.³⁶
Spirulina subsalsa Oerst.³⁷

26 Sauvageau (1897a); Miranda (1943a).

27 Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

28 Reported by Miranda (1931b, 1943a).

29 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Valenzuela Miranda (2005b).

30 New record for Asturias, the sheet belongs to Herbarium SANT-Algae 12137 [*"Margen izquierda de la Ría de Navia"*. Designated by I. Bárbara, 1997].

31 Miranda (1943a); Valenzuela Miranda (2005b).

32 Sauvageau (1897a); Miranda (1943a).

33 Miranda (1931b, 1943a); Valenzuela & Pérez-Cirera (1982).

34 Reported by Díaz & al. (2008) as new record for Asturias.

35 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela Miranda (2005b).

36 Sauvageau (1897a); Miranda (1943a).

37 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Valenzuela Miranda (2005b).

SCHIZOTRICHACEAE

Schizothrix Kütz. ex Gomont*Schizothrix tenerrima* (Gomont) F.E.Drouet³⁸= *Microcoleus tenerrimus* Gomont [basion.]

STIGONEMATALES

MASTIGOCLADACEAE

Brachytrichia Zanardini ex Bornet & Flahault*Brachytrichia lloydii* (P.Crouan & H.Crouan) P.C.Silva³⁹= *Rivularia lloydii* P.Crouan & H.Crouan [basion.]= *Brachytrichia balani* Bornet & Flahault

NOSTOCHOPSACEAE

Mastigocoleus Lagerh. ex Bornet & Flahault*Mastigocoleus testarum* Lagerh. ex Bornet & Flahault⁴⁰

RHODOPHYTA

BANGIOPHYCEAE

BANGIALES

BANGIACEAE [*nom. cons.*]**Bangia** Lyngb.*Bangia atropurpurea* (Roth) C.Agardh= *Conferva atropurpurea* Roth [basion.]= *Bangia fuscopurpurea* (Dillwyn) Lyngb.**Porphyra** C.Agardh [*nom. cons.*]*Porphyra leucosticta* Thur.*Porphyra linearis* Grev.= *Porphyra umbilicalis* f. *linearis* (Grev.) Rosenv.*Porphyra purpurea* (Roth) C.Agardh⁴¹= *Ulva purpurea* (*nom. et typ. cons.*) Roth [basion.]= *Porphyra vulgaris* C.Agardh, *nom. illeg.*= *Ulva purpureoviolacea* Roth, *nom. rej.**Porphyra umbilicalis* (L.) Kütz.= *Ulva umbilicalis* L. [basion.]

ERYTHROPELTIDALES

ERYTHROTRICHIACEAE

Erythrotrichia Aresch. [*nom. cons.*]*Erythrotrichia bertholdii* Batters⁴²

38 Miranda (1931b, 1943a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Valenzuela Miranda (2005b).

39 Reported by Miranda (1931b, 1943a).

40 Miranda (1931b, 1943a); Valenzuela Miranda (2005b).

41 Colmeiro (1867, 1889); Dosil Mancilla & Cremades Ugarte (1998); Herbarium SANT-Algae 14887 ["Punta del Ratón". Designated by J. Cremades, 1998].

42 Miranda (1931b, 1943b); Pérez-Cirera (1975b) reported the quote of Miranda (1931b) and established as *Erythrotrichia bertholdii* distribution the Cantabrian coast. Although Díaz & al. (2008) reported as new record, the species had been cited in Asturias.

Erythrotrichia carnea (Dillwyn) J. Agardh⁴³

= *Conferva carnea* Dillwyn [basion.]

Erythrotrichia reflexa (P. Crouan & H. Crouan) Thur. ex De Toni⁴⁴

= *Bangia reflexa* P. Crouan & H. Crouan [basion.]

Erythrotrichia welwitschii (Rupr.) Batters⁴⁵

= *Cruoria welwitschii* Rupr. [basion.]

Porphyrostromium Trevis.

Porphyrostromium boryanum (Mont.) P. C. Silva⁴⁶

= *Porphyra boryana* Mont. [basion.]

= *Erythrotrichia boryana* (Mont.) Berthold

PORPHYRIDIALES

GONIOTRICHACEAE

Stylonema Reinsch

Stylonema alsidii (Zanardini) K. M. Drew⁴⁷

= *Bangia alsidii* Zanardini [basion.]

= *Goniotrichum alsidii* (Zanardini) M. Howe

= *Goniotrichum elegans* (Chauv.) Zanardini

Stylonema cornu-cervi Reinsch⁴⁸

= *Goniotrichum cornu-cervi* (Reinsch) Hauck

FLORIDEOPHYCEAE

ACROCHAETIALES

ACROCHAETIACEAE [*nom. cons.*]

Acrochaetium Nägeli

Acrochaetium chylocladiae (Batters) Batters⁴⁹

= *Colaconema chylocladiae* Batters [basion.]

= *Audouinella chylocladiae* (Batters) P. S. Dixon

Acrochaetium corymbiferum (Thur.) Batters⁵⁰

= *Chantransia corymbifera* Thur. [basion.]

= *Audouinella corymbifera* (Thur.) P. S. Dixon

Acrochaetium savianum (Menegh.) Nägeli⁵¹

= *Callithamnion savianum* Menegh. [basion.]

= *Acrochaetium thuretii* (Bornet) Collins & Herv.

43 Miranda (1931b, 1943b); Pérez-Cirera (1975b) reported the quote of Miranda (1931b) and established as *Erythrotrichia carnea* distribution the Cantabrian coast.

44 Reported by Miranda (1931b, 1943b).

45 Hamel (1928); Miranda (1931b, 1943b).

46 Reported by Miranda (1931b, 1943b).

47 Sauvageau (1897a); Miranda (1931b, 1943b); Pérez-Cirera (1975b) reported the quote of Miranda (1931b) and established as *Stylonema alsidii* distribution the Cantabrian coast; Miyares (1986); Fernández & Miyares (1989).

48 Reported by Miranda (1931b).

49 Reported by Miranda (1931b, 1943b).

50 Miranda (1931b, 1943b); Arrontes (1983); Cremades & Bárbara (1990).

51 Reported by Miranda (1931b, 1943c).

Acrochaetium secundatum (Lyngb.) Nägeli⁵²
 = *Callithamnion daviesii* var. *secundatum* Lyngb. [basion.]
 = *Acrochaetium virgatulum* f. *secundatum* (Lyngb.) Hamel

Acrochaetium virgatulum (Harv.) Batters⁵³
 = *Callithamnion virgatulum* Harv. [basion.]
 = *Audouinella virgatula* (Harv.) P.S.Dixon

Rhodochorton Nägeli [*nom. cons.*]

Rhodochorton purpureum (Lightf.) Rosenv.
 = *Byssus purpurea* Lightf. [basion.]
 = *Audouinella purpurea* (Lightf.) Woelk.
 = *Rhodochorton rothii* (Turton) Nägeli

AHNFELTIALES

AHNFELTIACEAE

Ahnfeltia Fr. [*nom. cons.*]

Ahnfeltia plicata (Huds.) Fr.⁵⁴
 = *Fucus plicatus* Huds. [basion.]
 = *Gymnogongrus plicatus* (Huds.) Kütz.
 = *Sterrocolax decipiens* F.Schmitz

BONNEMAISONIALES

BONNEMAISONIACEAE

Asparagopsis Mont.

Asparagopsis armata Harv.⁵⁵

Bonnemaisionia C.Agardh

Bonnemaisionia asparagoides (Woodw.) C.Agardh⁵⁶
 = *Fucus asparagoides* Woodw. [basion.]

Bonnemaisionia hamifera Harv.⁵⁷

CERAMIALES

CERAMIACEAE

Aglaothamnion Feldm.-Maz.

Aglaothamnion bipinnatum (P.Crouan & H.Crouan) Feldm.-Maz.⁵⁸
 = *Callithamnion bipinnatum* P.Crouan & H.Crouan [basion.]

Aglaothamnion diaphanum L'Hardy-Halos & Maggs⁵⁹

Aglaothamnion gallicum (Nägeli) L'Hardy-Halos & André⁶⁰

52 Miranda (1931b, 1943b); Pérez-Cirera (1975b) reported the quote of Miranda (1931b) and established as *Acrochaetium secundatum* distribution the Cantabrian coast.

53 Anadón (1980); Fernández (1980); Herbarium SANT-Algae 10406 [“Playa de Ñora”. Designated by I. Bárbara, 1997].

54 The tetrasporophytic phase *Porphyrodiscus simulans* Batters has not been recorded.

55 This species includes the tetrasporophytic phase, *Falkenbergia rufolanosa* (Harv.) F.Schmitz.

56 The sporophytic stage *Hymenoclonium serpens* (P.Crouan & H.Crouan) Batters has not been recorded.

57 This species includes the sporophytic stage, *Trailliella intricata* Batters.

58 Reported by Anadón (1980).

59 Herbarium SANT-Algae 6042 [“Al nordeste del cabo de San Agustín, Navia”. Designated by A. Veiga, 1994]; Veiga & al. (1995).

60 Miranda (1943c); Herbarium SANT-Algae 12169 [“Playa de Merón”. Designated by I. Bárbara, 1998]; Díaz & al. (2008).

- = *Maschlosporium gallicum* Nägeli [basion.]
Aglaothamnion hookeri (Dillwyn) Maggs & Hommers.
 = *Conferva hookeri* Dillwyn [basion.]
 = *Aglaothamnion scopulorum* (C.Agardh) Feldm.-Maz.
 = *Callithamnion brodiei* Harv.
 = *Callithamnion hookeri* (Dillwyn) Gray
 = *Callithamnion scopulorum* C.Agardh
Aglaothamnion roseum (Roth) Maggs & L'Hardy-Halos⁶¹
 = *Ceramium roseum* Roth [basion.]
 = *Callithamnion roseum* (Roth) Lyngb.
Aglaothamnion sepositum (Gunnerus) Maggs & Hommers.⁶²
 = *Conferva seposita* Gunnerus [basion.]
 = *Dasya arbuscula* (Dillwyn) C.Agardh
Aglaothamnion tenuissimum (Bonnem.) Feldm.-Maz.⁶³
 = *Ceramium tenuissimum* Bonnem. [basion.]
 = *Callithamnion byssoides* Arn. ex Harv.
Aglaothamnion tripinnatum (C.Agardh) Feldm.-Maz.⁶⁴
 = *Callithamnion tripinnatum* C.Agardh [basion.]
Anotrichium Nägeli
Anotrichium barbatum (C.Agardh) Nägeli⁶⁵
 = *Griffithsia barbata* C.Agardh [basion.]
Anotrichium furcellatum (J.Agardh) Baldock⁶⁶
 = *Griffithsia furcellata* J.Agardh [basion.]
 = *Neomonospora furcellata* (J.Agardh) Feldm.-Maz. & Meslin
Antithamnion Nägeli
Antithamnion cruciatum (C.Agardh) Nägeli⁶⁷
 = *Callithamnion cruciatum* C.Agardh [basion.]
Antithamnionella Lyle
Antithamnionella boergesenii (Cormaci & G.Furnari) Athanas.⁶⁸
 = *Antithamnionella elegans* var. *boergesenii* Cormaci & G.Furnari [basion.]
Antithamnionella multiglandulosa A.Secilla, A.Santolaria, I.Díez & J.M.Gorostiaga⁶⁹

61 Miranda (1931b, 1943c); Pérez-Cirera (1974, 1975a) reported the quote of Miranda (1931b) and established the Cantabrian coast of Asturias as its distribution.

62 Reported by Miranda (1931b, 1943d).

63 Although is reported by Díaz & al. (2008) as new record, the species had already been cited in Asturias (see Anadón, 1980; Fernández, 1980).

64 Although is reported by Díaz & al. (2008) as new record, the species had already been cited in Asturias (see Anadón, 1980; Arrontes, 1983).

65 Miranda (1943c); Dosil Mancilla & Cremades Ugarte (1998, 1999).

66 Fernández Pérez (1979) as *Neomonospora furcellata* (J.Agardh) Feldm.-Maz. & Meslin; Herbarium SANT-Algae 13210 ["Playa de Merón". Designated by I. Bárbara, 1998]; Bárbara & al. (2006a); Llera González & Álvarez Raboso (2007).

67 Reported by Weber-Peukert & Schnetter (1982). This species includes *Antithamnion cruciatum* var. *radicans* (J.Agardh) Collins collected by Miranda (1931b, 1943c).

68 Reported by Díaz & al. (2008) as new record for Asturias.

69 Reported by Díaz & al. (2008) as new record for Asturias.

Antithamnionella spirographidis (Schiffn.) E.M.Woll.

= *Antithamnion spirographidis* Schiffn. [basion.]

Antithamnionella ternifolia (Hook.f. & Harv.) Lyle

= *Callithamnion ternifolia* Hook.f. & Harv. [basion.]

= *Antithamnion sarniensis* (Lyle) Feldm.-Maz.

= *Antithamnionella sarniensis* Lyle

Bornetia Thur.

Bornetia secundiflora (J.Agardh) Thur.

= *Griffithsia secundiflora* J.Agardh [basion.]

Callithamnion Lyngb.

Callithamnion corymbosum (Sm.) Lyngb.⁷⁰

= *Conferva corymbosa* Sm. [basion.]

Callithamnion granulatum (Ducluz.) C.Agardh

= *Ceramium granulatum* Ducluz. [basion.]

Callithamnion tetragonum (With.) Gray

= *Conferva tetragona* With. [basion.]

= *Callithamnion tetragonum* f. *brachiatum* (Bonnem.) Gran

= *Callithamnion tetragonum* var. *brachiatum* (Bonnem.) J.Agardh

= *Callithamnion tetragonum* var. *fruticulosum* (J.Agardh) Rosenv.

Callithamnion tetricum (Dillwyn) Gray

= *Conferva tetrica* Dillwyn [basion.]

Ceramium Roth [*nom. cons.*]

Ceramium botryocarpum A.W.Griffiths ex Harv.⁷¹

Ceramium ciliatum (J.Ellis) Ducluz.

= *Conferva ciliata* J.Ellis [basion.]

Ceramium diaphanum (Lightf.) Roth

= *Conferva diaphana* Lightf. [basion.]

= *Ceramium gracillimum* (Kütz.) Zanardini

= *Ceramium tenuissimum* (Roth) Aresch.

Ceramium echionotum J.Agardh

Ceramium flaccidum (Harv. ex Kütz.) Ardiss.⁷²

= *Hormoceras flaccidum* Harv. ex Kütz. [basion.]

= *Ceramium gracillimum* var. *byssoidesum* Feldm.-Maz.

70 Miranda (1931b, 1943c); Pérez-Cirera (1974, 1975b); Anadón (1980); Fernández (1980); Fernández & Niell (1981); Weber-Peukert & Schnetter (1982); Anadón & Fernández (1986).

71 Reported by Díaz & al. (2008) as new record for Asturias.

72 Weber-Peukert & Schnetter (1982); Herbarium SANT-Algae 7414 ["Serantes". Designated by I. Bárbara, 1990]; Herbarium SANT-Algae 10396 ["Playa de Ñora". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 12168 ["Playa de Merón". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 13123 ["Playa de Perlorá". Designated by M.C. López & S. Calvo, 1998]; Herbarium SANT-Algae 13208 ["Playa de Merón". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 13232 ["Lastrás de Pechón". Designated by J. Cremades, 1998]; Herbarium SANT-Algae 14550, 14576 ["Playa de Pendueles e Islote Picones". Designated by I. Bárbara & M.C. López, 1998]; Herbarium SANT-Algae 14909 ["Punta del Ratón". Designated by J. Cremades, 1998]; Herbarium SANT-Algae 14923 ["Tazones". Designated by M. López, 1998].

- Ceramium gaditanum* (Clemente) Cremades
 = *Conferva gaditana* Clemente [basion.]
 = *Ceramium flabelligerum* J.Agardh
- Ceramium secundatum* Lyngb.⁷³
- Ceramium shuttleworthianum* (Kütz.) Rabenh.
 = *Acanthoceras shuttleworthianum* Kütz. [basion.]
 = *Ceramium acanthonotum* (Carmich. ex Harv.) J.Agardh
- Ceramium virgatum* Roth
 = *Ceramium rubrum* C.Agardh
 = *Conferva rubra* Huds.
- Compsothamnion** (Nägeli) F.Schmitz
- Compsothamnion gracillimum* De Toni
- Compsothamnion thuyoides* (Sm.) Nägeli
 = *Conferva thuyoides* Sm. [basion.]
- Crouania** J.Agardh
- Crouania attenuata* (C.Agardh) J.Agardh⁷⁴
 = *Mesogloia attenuata* C.Agardh [basion.]
- Griffithsia** C.Agardh [*nom. et orth. cons.*]
- Griffithsia schousboei* Mont.⁷⁵
- Gymnothamnion** J.Agardh
- Gymnothamnion elegans* (Schousb. ex C.Agardh) J.Agardh⁷⁶
 = *Callithamnion elegans* Schousb. ex C.Agardh [basion.]
 = *Plumaria schousboei* (Bornet) F.Schmitz
- Halurus** Kütz.
- Halurus equisetifolius* (Lightf.) Kütz.
 = *Conferva equisetifolis* Lightf. [basion.]
- Halurus flosculosus* (J.Ellis) Maggs & Hommers.⁷⁷
 = *Conferva flosculosa* J.Ellis [basion.]
 = *Griffithsia flosculosa* (J.Ellis) Batters
 = *Griffithsia setacea* (Huds.) C.Agardh
- Microcladia** Grev.
- Microcladia glandulosa* (Sol. ex Turner) Grev.
 = *Fucus glandulosus* Sol. ex Turner [basion.]

73 Reported by Díaz & al. (2008) as new record for Asturias.

74 Weber-Peukert & Schmetter (1982); Herbarium SANT-Algae 12205 ["Playa de Pendueles e Islote Picones". Designated by I. Bárbara & M.C. López, 1998]; Herbarium SANT-Algae 14930 ["Tazonas". Designated by M. López, 1998]; Bárbara & al. (2002).

75 Miranda (1931b, 1943c); Ardré (1971); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Pérez-Cirera & al. (1989); Herbarium SANT-Algae 12079 ["Bañugues". Designated by M.C. López & S. Calvo, 1997].

76 Miranda (1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

77 Sauvageau (1897a); Seoane-Camba (1965); Fernández Pérez (1979); Anadón (1980); Fernández (1980). This species includes *Halurus flosculosus* var. *sphaericus* (Schousb. ex C.Agardh) A.Gómez Garreta, T.Gallardo, M.A.Ribera, Cormaci, G.Furnari, Giaccone & Boudour., collected by Fernández (1980).

Monosporus Solier*Monosporus pedicellatus* (Sm.) Solier⁷⁸= *Conferva pedicellata* Sm. [basion.]= *Corynospora pedicellata* (Sm.) J.Agardh**Pleonosporium** Nägeli [*nom. cons.*]*Pleonosporium borrieri* (Sm.) Nägeli= *Conferva borrieri* Sm. [basion.]*Pleonosporium flexuosum* (C.Agardh) Bornet ex De Toni⁷⁹= *Ceramium flexuosum* C.Agardh [basion.]**Plumaria** F.Schmitz [*nom. cons.*]*Plumaria plumosa* (Huds.) Kuntze⁸⁰= *Fucus plumosus* Huds. [basion.]= *Plumaria elegans* (Bonnem.) F.Schmitz**Pterothamnion** Nägeli*Pterothamnion crispum* (Ducluz.) Nägeli⁸¹= *Ceramium crispum* Ducluz. [basion.]= *Antithamnion plumula* var. *crispum* (Ducluz.) Hauck= *Antithamnion crispum* (Ducluz.) Thur.*Pterothamnion plumula* (J.Ellis) Nägeli= *Conferva plumula* J.Ellis [basion.]= *Antithamnion plumula* (J.Ellis) Thur.**Ptilothamnion** Thur.*Ptilothamnion pluma* (Dillwyn) Thur.= *Conferva pluma* Dillwyn [basion.]*Ptilothamnion sphaericum* (P.Crouan & H.Crouan ex J.Agardh) Maggs & Hommers.⁸²= *Callithamnion sphaericum* P.Crouan & H.Crouan ex J.Agardh [basion.]**Scageliopsis** E.M.Woll.*Scageliopsis patens* E.M.Woll.⁸³**Spermothamnion** Aresch.*Spermothamnion repens* (Dillwyn) Rosenv.⁸⁴

78 Sauvageau (1897a); Miranda (1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

79 Miranda (1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Weber-Peukert & Schnetter (1982).

80 Miranda (1931b, 1943c); Pérez-Cirera (1974); Anadón (1980); Herbarium SANT-Algae 10295 ["Playa de Barro". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 13252 ["Playa del Bozo". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 14849 ["Playa de Cadavedo". Designated by J. Cremades & J. Dosil, 1998].

81 Miranda (1931b, 1943c); Fernández (1980); Llera González & Álvarez Raboso (2007).

82 Díaz Tapia & Bárbara (2005); Bárbara & al. (2006a, 2006b).

83 New record for Asturias, reported by Secilla & al. (2008). Deposited in the Herbarium SANT-Algae 18907 ["Ribadedeva, Playa de La Franca" (43°23'45"N, 4°34'07"W), 6-X-2006, growing on sandy rocks in the low intertidal zone]. (Personal communication I. Bárbara, 2007).

84 Sauvageau (1897a); Miranda (1931b, 1943c). This species includes *Spermothamnion repens* var. *flagelliferum* (De Not.) Feldm.-Maz. (see Bárbara & al., 2003a; Herbarium SANT-Algae 10400 ["Playa de Nora". Designated by I. Bárbara, 1997]).

- = *Conferva repens* Dillwyn [basion.]
- = *Spermothamnion repens* f. *turneri* (Mert. ex Roth) Rosenv.
- = *Spermothamnion repens* var. *turneri* (Mert. ex Roth) Miranda
- = *Spermothamnion turneri* (Mert. ex Roth) Aresch.

Sphondylothamnion Nägeli

- Sphondylothamnion multifidum* (Huds.) Nägeli⁸⁵
 = *Conferva multifida* Huds. [basion.]

Spyridia Harv.

- Spyridia griffithsiana* (Sm.) Zuccarello, Prud'homme & Stegenga⁸⁶
 = *Conferva griffithsiana* Sm. [basion.]

DASYACEAE

Dasya C.Agardh [*nom. et orth. cons.*]

- Dasya hutchinsiae* Harv.⁸⁷
 = *Dasya arbuscula* sensu Harv.
Dasya ocellata (Gratel.) Harv.⁸⁸
 = *Ceramium ocellatum* Gratel. [basion.]

Heterosiphonia Mont. [*nom. cons.*]

- Heterosiphonia plumosa* (J.Ellis) Batters
 = *Conferva plumosa* J.Ellis [basion.]
 = *Conferva coccinea* Huds.
 = *Dasya coccinea* (Huds.) Aresch.
 = *Heterosiphonia coccinea* (Huds.) Falkenb.
 = *Trichothamnion coccineum* (Huds.) Kütz.

DELESSERIAEAE

Acrosorium Zanardini ex Kütz.

- Acrosorium ciliolatum* (Harv.) Kylin
 = *Nitophyllum ciliolatum* Harv. [basion.]
 = *Acrosorium uncinatum* (J.Agardh) Kylin
 = *Acrosorium venulosum* (Zanardini) Kylin
 = *Nitophyllum uncinatum* (Turner) J.Agardh

Apoglossum J.Agardh

- Apoglossum ruscifolium* (Turner) J.Agardh
 = *Fucus ruscifolius* Turner [basion.]
 = *Delesseria ruscifolia* (Turner) J.V.Lamour.

Cryptopleura Kütz. [*nom. cons.*]

85 Sauvageau (1897a); Miranda (1931a, 1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Weber-Peukert & Schnetter (1982); Arrontes (1987) as *Sphondylothamnion* sp.; Otero Schmitt (1993); Llera González & Álvarez Raboso (2007).

86 *Spyridia filamentosa* (Wulfen) Harv. was reported from Asturias by Silva (1985) and Silva & Fernández (1988), but records of *S. filamentosa* from Europe correspond to *Spyridia griffithsiana* (Sm.) Zuccarello, Prud'homme & Stegenga (see Zuccarello & al., 2004). This species has only been found in the Northeastern Atlantic Ocean (North Spain, Atlantic France and Great Britain), plus the Western Mediterranean Sea (where it co-occurs with *S. filamentosa*).

87 Reported by Weber-Peukert & Schnetter (1982).

88 Miranda (1931b, 1943d); Seoane-Camba (1965).

Cryptopleura ramosa (Huds.) Kylin ex L.Newton

= *Ulva ramosa* Huds. [basion.]

= *Acrosorium uncinatum* (Turner) Kylin

= *Cryptopleura lacerata* (S.G.Gmel.) Kütz.

= *Nitophyllum laceratum* (S.G.Gmel.) Grev.

Delesseria J.V.Lamour. [*nom. cons.*]

Delesseria sanguinea (Huds.) J.V.Lamour.

= *Fucus sanguineus* Huds. [basion.]

= *Hydrolapathum sanguineum* (Huds.) Stackh.

Drachiella J.Ernst & Feldmann

Drachiella minuta (Kylin) Maggs & Hommers.

= *Myriogramme minuta* Kylin [basion.]

= *Myriogramme carnea* f. *minuta* (Kylin) Miranda, *nom. illeg.*

Drachiella spectabilis J.Ernst & Feldmann⁸⁹

Erythroglossum J.Agardh

Erythroglossum laciniatum (Lightf.) Maggs & Hommers.⁹⁰

= *Ulva laciniata* Lightf. [basion.]

= *Porphyra umbilicalis* f. *laciniata* (C.Agardh) Thur.

Erythroglossum lusitanicum Ardre⁹¹

Erythroglossum sandrianum (Zanardini) Kylin⁹²

= *Delesseria sandriana* Zanardini [basion.]

Haraldiophyllum Zinova

Haraldiophyllum bonnemaisonii (Kylin) Zinova⁹³

= *Myriogramme bonnemaisonii* Kylin [basion.]

= *Nitophyllum bonnemaisonii* (Kylin) Kylin

Hypoglossum Kütz.

Hypoglossum hypoglossoides (Stackh.) Collins & Herv.

= *Fucus hypoglossoides* Stackh. [basion.]

= *Delesseria hypoglossum* (Woodw.) J.V.Lamour.

= *Hypoglossum woodwardii* Kütz.

Nitophyllum Grev. [*nom. cons.*]

Nitophyllum punctatum (Stackh.) Grev.

= *Fucus punctatus* Stackh. [basion.]

Polyneura (J.Agardh) Kylin [*nom. cons.*]

89 New record for Asturias, the sheet belongs to Herbarium FCO-Algae 378 ["Concha de Artedo, lado E, 15-20 m.". Designated by J.M. Rico, 1994].

90 Miranda (1929a, 1929b, 1931b); Herbarium SANT-Algae 10350, 10404 ["Playa de Ñora". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 13181 ["La Isla". Designated by M.C. López & S. Calvo, 1997].

91 Bárbara & al. (2006b); Díaz & al. (2009)

92 Anadón (1980); Fernández (1980).

93 Miranda (1936, 1943c); Pérez-Cirera (1974); Anadón (1980); Fernández (1980); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Viejo (1995, 1997); Andrew & Viejo (1998).

Polyneura bonnemaisonii (C.Agardh) Maggs & Hommers.⁹⁴

= *Delesseria bonnemaisonii* C.Agardh [basion.]

= *Nitophyllum hilliae* (Grev.) Grev.

= *Polyneura hilliae* (Grev.) Kylin

RHODOMELACEAE [*nom. cons.*]

Aiolocolax Pocock

Aiolocolax pulchella Pocock⁹⁵

Boergeseniella Kylin

Boergeseniella fruticulosa (Wulfen) Kylin

= *Fucus fruticulosus* Wulfen [basion.]

= *Polysiphonia fruticulosa* (Wulfen) Spreng.

Boergeseniella martensiana (Kütz.) Ardre⁹⁶

= *Polysiphonia martensiana* Kütz. [basion.]

Boergeseniella thuyoides (Harv.) Kylin

= *Polysiphonia thuyoides* Harv. [basion.]

= *Pterosiphonia thuyoides* (Harv.) F.Schmitz

Bostrychia Mont. [*nom. cons.*]

Bostrychia scorpioides (Huds.) Mont.

= *Fucus scorpioides* Huds. [basion.]

= *Fucus amphibius* Huds.

Brongniartella Bory

Brongniartella byssoides (Gooden. & Woodw.) F.Schmitz⁹⁷

= *Fucus byssoides* Gooden. & Woodw. [basion.]

Chondria C.Agardh [*nom. cons.*]

Chondria capillaris (Huds.) M.J.Wynne

= *Ulva capillaris* Huds. [basion.]

= *Chondria tenuissima* C.Agardh, *nom. illeg.*

Chondria coerulescens (J.Agardh) Falkenb.

= *Chondriopsis coerulescens* J.Agardh [basion.]

Chondria dasyphylla (Woodw.) C.Agardh

= *Fucus dasyphyllus* Woodw. [basion.]

Chondria scintillans Feldm.-Maz.⁹⁸

Ctenosiphonia Falkenb.

Ctenosiphonia hypnoides (Welw. ex J.Agardh) Falkenb.

94 Fernández Pérez (1979) and Llera González & Álvarez Raboso (2007) as *Polyneura hilliae* (Grev.) Kylin; Herbarium FCO-Algae 442 ["Concha de Artedo". Designated by J.M. Rico, 1994]; Herbarium FCO-Algae 536 ["Concha de Artedo, 6 m., bajo Cystoseira". Designated by J.M. Rico, 1999].

95 Reported by Díaz et al. (2008) as new record for Asturias.

96 Anadón (1980); Herbarium MA-Algae 1415, 1416 [Designated by Lagasca (undated). Reviewed by J. Cremades, 1988].

97 Herbarium MA-Algae 1411, 1412 [Designated by Lagasca (undated). Reviewed by J. Cremades, 1985]; Llera González & Álvarez Raboso (2007).

98 Herbarium SANT-Algae 13117 ["Playa de Pantorga". Designated by M.C. López & S. Calvo, 1997]; Herbarium SANT-Algae 14847 ["Playa de Cadavedo". Designated by J. Cremades & J. Dosal, 1998]; Bárbara & al. (2003a, 2006a).

= *Polysiphonia hypnoides* Welw. ex J. Agardh [basion.]

Gonimophyllum Batters

Gonimophyllum buffhamii Batters⁹⁹

Halopithys Kütz.

Halopithys incurva (Huds.) Batters

= *Fucus incurvus* Huds. [basion.]

= *Halopithys pinastroides* (Stackh.) Kütz.

Herposiphonia Nägeli

Herposiphonia secunda f. *tenella* (C. Agardh) M.J. Wynne¹⁰⁰

= *Hutchinsia tenella* C. Agardh [basion.]

= *Herposiphonia tenella* (C. Agardh) Ambronn

Laurencia J.V. Lamour. [nom. cons.]

Laurencia obtusa (Huds.) J.V. Lamour.

= *Fucus obtusus* Huds. [basion.]

Laurencia pyramidalis Bory¹⁰¹

Leptosiphonia Kylin

Leptosiphonia schousboei (Thur.) Kylin¹⁰²

= *Polysiphonia schousboei* Thur. [basion.]

Lophosiphonia Falkenb.

Lophosiphonia obscura (C. Agardh) Falkenb.¹⁰³

= *Hutchinsia obscura* C. Agardh [basion.]

= *Lophosiphonia subadunca* (Kütz.) Falkenb.

Lophosiphonia reptabunda (Suhr) Kylin¹⁰⁴

= *Hutchinsia reptabunda* Suhr [basion.]

Neosiphonia M.S. Kim & I.K. Lee

Neosiphonia harveyi (Bailey) M.S. Kim, H.G. Choi, Guiry & G.W. Saunders

= *Polysiphonia harveyi* Bailey [basion.]

= *Polysiphonia insidiosa* (J. Agardh) P. Crouan & H. Crouan, nom. illeg.

Ophidocladus Falkenb.

Ophidocladus simpliciusculus (P. Crouan & H. Crouan) Falkenb.

= *Polysiphonia simpliciuscula* P. Crouan & H. Crouan [basion.]

99 Escudero & Gallardo (2008); Escudero & al. (2009).

100 Miranda (1931b, 1943d); Seoane-Camba (1965).

101 Herbarium SANT-Algae 10279 ["Playa de Barro". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 10387 ["Playa de Ñora". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 13207, 13220 ["Playa de Merón". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 13229 ["Lastrás de Pechón". Designated by J. Cremades, 1998]; Herbarium SANT-Algae 13264 ["Playa del Bozo". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 14586 ["Playa de Pendueles e Is-lote Picones". Designated by I. Bárbara & M.C. López, 1998]; Herbarium SANT-Algae 14852, 14855 ["Playa de Cadavedo". Designated by J. Cremades & J. Dosil, 1998]; Herbarium SANT-Algae 14927 ["Tazones". Designated by M. López, 1998]; Bárbara & al. (2003a); Díaz & al. (2008).

102 Herbarium SANT-Algae 12131 ["Playa de Tourán". Designated by I. Bárbara, 1997]; Díaz & al. (2008).

103 Sauvageau (1897a); Miranda (1931b, 1943d); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

104 Reported by Díaz & al. (2008) as new record for Asturias.

= *Polysiphonia obscura* Harv.

Osmundea Stackh.

Osmundea hybrida (DC.) K.W.Nam

= *Fucus hybridus* DC. [basion.]

= *Laurencia hybrida* (DC.) T.Lestib.

Osmundea pinnatifida (Huds.) Stackh.

= *Fucus pinnatifidus* Huds. [basion.]

= *Laurencia pinnatifida* (Huds.) J.V.Lamour.

Polysiphonia Grev. [*nom. cons.*]

Polysiphonia atlantica Kapraun & J.N.Norris

= *Polysiphonia macrocarpa* Harv., *nom. illeg.*

Polysiphonia brodiei (Dillwyn) Spreng.

= *Conferva brodiei* Dillwyn [basion.]

Polysiphonia denudata (Dillwyn) Grev. ex Harv.

= *Conferva denudata* Dillwyn [basion.]

= *Polysiphonia variegata* (C.Agardh) Zanardini

Polysiphonia elongata (Huds.) Spreng.

= *Conferva elongata* Huds. [basion.]

Polysiphonia fibrata (Dillwyn) Harv.¹⁰⁵

= *Conferva fibrata* Dillwyn [basion.]

Polysiphonia fibrillosa (Dillwyn) Spreng.¹⁰⁶

= *Conferva fibrillosa* Dillwyn [basion.]

= *Polysiphonia richardsonii* Hook. ex Harv.

Polysiphonia fucoides (Huds.) Grev.

= *Conferva fucoides* Huds. [basion.]

= *Polysiphonia nigrescens* (Huds.) Grev. ex Harv.

= *Polysiphonia violacea* (Roth) Spreng.

Polysiphonia lanosa (L.) Tandy

= *Fucus lanosus* L. [basion.]

= *Polysiphonia fastigiata* (Roth) Grev.

= *Vertebrata lanosa* (L.) T.A.Chr.

Polysiphonia nigra (Huds.) Batters

= *Conferva nigra* Huds. [basion.]

= *Polysiphonia atrorubescens* (Dillwyn) Grev.

Polysiphonia opaca (C.Agardh) Moris & De Not.¹⁰⁷

= *Hutchinsia opaca* C.Agardh [basion.]

Polysiphonia polyspora (C.Agardh) Mont.¹⁰⁸

= *Hutchinsia polyspora* C.Agardh [basion.]

105 Reported by Miranda (1931b, 1943c).

106 Sauvageau (1896a); Weber-Peukert & Schnetter (1982).

107 Silva (1985); Silva & Fernández (1988).

108 Miranda (1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Herbarium MA-Algae 1339, 1340, 1341 [Designated by Rojas Clemente (undated). Reviewed by J. Cremades, 1988].

- Polysiphonia rhunensis* Thur.¹⁰⁹
Polysiphonia scopulorum Harv.¹¹⁰
Polysiphonia simulans Harv.
Polysiphonia stricta (Dillwyn) Grev.¹¹¹
 = *Conferva stricta* Dillwyn [basion.]
 = *Polysiphonia urceolata* (Lightf. ex Dillwyn) Grev.
Polysiphonia subulata (Ducluz.) P.Crouan & H.Crouan¹¹²
 = *Ceramium subulatum* Ducluz. [basion.]

Pterosiphonia Falkenb.

- Pterosiphonia ardreana* Maggs & Hommers.¹¹³
Pterosiphonia complanata (Clemente) Falkenb.
 = *Fucus complanatus* Clemente [basion.]
 = *Polysiphonia complanata* (Clemente) J.Agardh, *nom. illeg.*
 = *Rytiphlaea complanata* (Clemente) C.Agardh
Pterosiphonia parasitica (Huds.) Falkenb.
 = *Conferva parasitica* Huds. [basion.]
Pterosiphonia pennata (C.Agardh) Sauv.
 = *Hutchinsia pennata* C.Agardh [basion.]
Pterosiphonia pinnulata (Kütz.) Maggs & Hommers.¹¹⁴
 = *Polysiphonia pinnulata* Kütz. [basion.]
 = *Pterosiphonia spinifera* (Kütz.) Ardré

Rhodomela C.Agardh [*nom. cons.*]

- Rhodomela confervoides* (Huds.) P.C.Silva¹¹⁵
 = *Fucus confervoides* Huds. [basion.]
 = *Rhodomela subfusca* (Woodw.) C.Agardh
 = *Sphaerococcus confervoides* (Huds.) C.Agardh, *nom. illeg.*
Rhodomela lycopodioides (L.) C.Agardh¹¹⁶
 = *Fucus lycopodioides* L. [basion.]

Streblocladia F.Schmitz

109 Miranda (1931b, 1943c); Weber-Peukert & Schnetter (1982).

110 Reported by Díaz & al. (2008) as new record for Asturias.

111 Weber-Peukert & Schnetter (1982); Silva (1985); Silva & Fernández (1988); Llera González & Álvarez Raboso (2007); Díaz & al. (2008).

112 Chalon (1905); Miranda (1943d).

113 Herbarium SANT-Algae 7416 [“Serantes”. Designated by I. Bárbara, 1990]; Herbarium SANT-Algae 10347, 10365 [“Playa de Nora”. Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 14566, 14579 [“Playa de Pendueles e Islote Picones”. Designated by I. Bárbara & M.C. López, 1998]; Bárbara & al. (2003a); Díaz & al. (2008).

114 Anadón (1980) and Fernández (1980) as *Pterosiphonia spinifera* (Kütz.) Ardré. According to Gorostiaga & al. (2004), *P. spinifera* is a synonym of *P. pinnulata* (Kütz.) Maggs & Hommers. On the contrary, Díaz Tapia & Bárbara (2004) questioned the presence of *P. pinnulata*, suggesting the necessity of carrying out a widely study to check the existence of this species in the Iberian Peninsula.

115 Amo y Mora (1870); Colmeiro (1867, 1889); Miranda (1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Bárbara & al. (2006b); Herbarium MA-Algae 3329, 3330, 3331 [“En el mar de Asturias”. Gijón (undated)].

116 Bellón Uriarte (1939); Herbarium MA-Algae 4102 [“Gijón”. Designated by Lagasca (undated)].

Streblocladia collabens (C.Agardh) Falkenb.¹¹⁷
 = *Hutchinsia collabens* C.Agardh [basion.]
 = *Polysiphonia collabens* (C.Agardh) Kütz.

COLACONEMATALES

COLACONEMATACEAE

Colaonema Batters

Colaonema caespitosum (J.Agardh) J.J.Jackelman, Stegenga & J.J.Bolton¹¹⁸
 = *Callithamnion caespitosum* J.Agardh [basion.]
 = *Rhodothamniella caespitosa* (J.Agardh) Feldmann

Colaonema daviesii (Dillwyn) Stegenga¹¹⁹
 = *Conferva daviesii* Dillwyn [basion.]

= *Acrochaetium daviesii* (Dillwyn) Nägeli
Colaonema membranaceum (Magnus) Woelk.¹²⁰
 = *Callithamnion membranaceum* Magnus [basion.]
 = *Audouinella membranacea* (Magnus) Papenf.

CORALLINALES

CORALLINACEAE

Amphiroa J.V.Lamour.

Amphiroa van-bosseae Me.Lemoine¹²¹
 = *Amphiroa subcilindrica* E.Y.Dawson

Boreolithon A.S.Harvey & Woelk.

Boreolithon van-heurckii (Heydr.) A.S.Harvey & Woelk.¹²²
 = *Lithothamnion van-heurckii* Heydr. [basion.]
 = *Epilithon van-heurckii* (Heydr.) Heydr.

Choreonema F.Schmitz

Choreonema thuretii (Bornet) F.Schmitz¹²³
 = *Melobesia thuretii* Bornet [basion.]

Corallina L.

Corallina elongata J.Ellis & Sol.
 = *Corallina mediterranea* Aresch.

Corallina officinalis L.

Haliptilon (Decne.) Lindl.

Haliptilon squamatum (L.) H.W.Johans., L.M.Irvine & A.M.Webster
 = *Corallina squamata* L. [basion.]

Hydrolithon (Foslie) Foslie

117 Sauvageau (1897a); Miranda (1931b, 1943d).

118 Reported by Guillerme & Cremades (1993) as *Rhodothamniella caespitosa* (J.Agardh) Feldmann (see *Acrochaetium codicola* Børgesen at *taxa excludenda*).

119 Sauvageau (1897a); Miranda (1931b, 1943c); Pérez-Cirera (1975b) reported the quote of Miranda (1931b) and established as *Colaonema daviesii* distribution the Cantabrian coast.

120 Anadón (1980); Anadón & Niell (1981).

121 Herbarium SANT-Algae 7298 ["Playa de Serrantes". Designated by I. Bárbara, 1990]; Cremades & al. (1997).

122 Reported by Miranda (1932, 1943c).

123 Miranda (1931b, 1943c); Bárbara & al. (2006a).

Hydrolithon farinosum (J.V.Lamour.) Penrose & Y.M.Chamb.¹²⁴

= *Melobesia farinosa* J.V.Lamour. [basion.]

Jania J.V.Lamour.

Jania longifurca Zanardini

Jania rubens (L.) J.V.Lamour.¹²⁵

= *Corallina rubens* L. [basion.]

Lithophyllum Phil.

Lithophyllum byssoides (Lam.) Foslie

= *Nullipora byssoides* Lam. [basion.]

= *Lithophyllum lichenoides* Phil., *nom. illeg.*

= *Lithophyllum tortuosum* (Esper) Foslie

= *Millepora tortuosa* Esper

= *Tenarea tortuosa* (Esper) Me.Lemoine

Lithophyllum incrustans Phil.

= *Lithothamnion incrustans* (Phil.) Foslie

Lithophyllum orbiculatum (Foslie) Foslie¹²⁶

= *Lithothamnion orbiculatum* Foslie [basion.]

Melobesia J.V.Lamour.

Melobesia membranacea (Esper) J.V.Lamour.¹²⁷

= *Corallina membranacea* Esper [basion.]

= *Epilithon membranaceum* (Esper) Heydr.

Mesophyllum Me.Lemoine

Mesophyllum expansum (Phil.) Cabioch & M.L.Mend.¹²⁸

= *Lithophyllum expansum* Phil. [basion.]

= *Lithophyllum frondosum* (L.Dufour) G.Furnari, Cormaci & Alongi

= *Lithophyllum stictaeforme* (Aresch.) Hauck

= *Pseudolithophyllum expansum* (Phil.) Me.Lemoine

Mesophyllum lichenoides (J.Ellis) Me.Lemoine

= *Corallium lichenoides* J.Ellis [basion.]

= *Lithothamnion lichenoides* (J.Ellis) Foslie

Phymatolithon Foslie [*nom. cons.*]

Phymatolithon lenormandii (Aresch.) W.H.Adey

= *Melobesia lenormandii* Aresch. [basion.]

= *Lithothamnion lenormandii* (Aresch.) Foslie

Titanoderma Nägeli

Titanoderma corallinae (P.Crouan & H.Crouan) Woelk., Y.M.Chamb. & P.C.Silva¹²⁹

124 Sauvageau (1897a); Miranda (1931b, 1943c); Seoane-Camba (1965); Pérez-Cirera (1974, 1975b).

125 This species includes *Jania rubens* var. *corniculata* (L.) Yendo reported by Miranda (1931b, 1943c); Seoane-Camba (1965); Anadón (1980); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Herbarium SANT-Algae 13154 ["La Isla". Designated by M.C. López & S. Calvo, 1997].

126 Reported by Anadón (1980).

127 Sauvageau (1897a); Miranda (1931b, 1943c); Seoane-Camba (1965); Pérez-Cirera (1974, 1975b).

128 Rioja (1917); Herbarium SANT-Algae 14846 ["Playa de Cadavedo". Designated by J. Cremades & J. Dosil, 1998]; Llera González & Álvarez Raboso (2007).

129 Miranda (1931b, 1943c); Anadón (1980).

- = *Melobesia corallinae* P.Crouan & H.Crouan [basion.]
- = *Dermatolithon corallinae* (P.Crouan & H.Crouan) Foslie
- = *Lithophyllum corallinae* (P.Crouan & H.Crouan) Heydr.
- Titanoderma pustulatum* (J.V.Lamour.) Nägeli¹³⁰
- = *Melobesia pustulata* J.V.Lamour. [basion.]
- = *Dermatolithon pustulatum* (J.V.Lamour.) Foslie

CRYPTONEMIALES

DUMONTIACEAE

Dilsea Stackh.

- Dilsea carnosa* (Schmidel) Kuntze
- = *Fucus carnosus* Schmidel [basion.]
- = *Dilsea edulis* Stackh.
- = *Halymenia edulis* (Stackh.) C.Agardh
- = *Iridaea edulis* (Stackh.) Bory

Dumontia J.V.Lamour.

- Dumontia contorta* (S.G.Gmel.) Rupr.
- = *Fucus contortus* S.G.Gmel. [basion.]
- = *Dumontia incrassata* (O.F.Müll.) J.V.Lamour.
- = *Dumontia filiformis* (Hornem.) Grev.

GLOIOSIPHONIAEAE

Gloiosiphonia Carmich.

- Gloiosiphonia capillaris* (Huds.) Carmich.¹³¹
- = *Fucus capillaris* Huds. [basion.]

HALYMENIACEAE

Cryptonemia J.Agardh

- Cryptonemia lomation* (Bertol.) J.Agardh¹³²
- = *Fucus lomation* Bertol. [basion.]
- = *Cryptonemia lactuca* (C.Agardh) J.Agardh
- = *Cryptonemia seminervis* (C.Agardh) J.Agardh

Grateloupia C.Agardh [*nom. cons.*]

- Grateloupia dichotoma* J.Agardh
- Grateloupia filicina* (J.V.Lamour.) C.Agardh
- = *Delesseria filicina* J.V.Lamour. [basion.]

KALLYMENIACEAE

Callophyllis Kütz.

- Callophyllis laciniata* (Huds.) Kütz.
- = *Fucus laciniatus* Huds. [basion.]

130 Sauvageau (1897a); Seoane-Camba (1965); Pérez-Cirera (1974, 1975b); Fernández (1980); Weber-Peukert & Schnetter (1982).

131 Miranda (1932, 1943c); Herbarium SANT-Algae 10419, 13107 ["Playa de Pantorga". Designated by M.C. López & S. Calvo, 1997]; Herbarium SANT-Algae 13227 ["Lastrás de Pechón". Designated by J. Cremades, 1998]; Bárbara & al. (2002); Llera González & Álvarez Raboso (2007).

132 According to Bárbara & al. (2005a), *Cryptonemia seminervis* (C.Agardh) J.Agardh corresponds to young individuals of *Cryptonemia lomation* (Bertol.) J.Agardh.

Kallymenia J.Agardh*Kallymenia reniformis* (Turner) J.Agardh= *Fucus reniformis* Turner [basion.]**Meredithia** J.Agardh*Meredithia microphylla* (J.Agardh) J.Agardh= *Kallymenia microphylla* J.Agardh [basion.]

PEYSSONNELIACEAE

Peyssonnelia Decne.*Peyssonnelia atropurpurea* P.Crouan & H.Crouan*Peyssonnelia coriacea* Feldmann¹³³*Peyssonnelia dubyi* P.Crouan & H.Crouan¹³⁴= *Cruoriella dubyi* (P.Crouan & H.Crouan) F.Schmitz*Peyssonnelia harveyana* P.Crouan & H.Crouan ex J.Agardh¹³⁵*Peyssonnelia rubra* (Grev.) J.Agardh¹³⁶= *Zonaria rubra* Grev. [basion.]*Peyssonnelia squamaria* (S.G.Gmel.) Decne.¹³⁷= *Fucus squamarius* S.G.Gmel. [basion.]

GELIDIALES

GELIDIACEAE

Gelidium J.V.Lamour. [nom. cons.]*Gelidium cantabricum* Seoane-Camba¹³⁸*Gelidium corneum* (Huds.) J.V.Lamour.¹³⁹= *Fucus corneus* Huds. [basion.]= *Gelidium sesquipedale* (Clemente) Thur.*Gelidium crinale* (Hare ex Turner) Gaillon= *Fucus crinalis* Hare ex Turner [basion.]*Gelidium maggsiae* Rico & Guiry¹⁴⁰*Gelidium pulchellum* (Turner) Kütz.= *Fucus corneus* var. *pulchellus* Turner [basion.]= *Gelidium pulchellum* var. *claviferum* (Turner) Kütz.*Gelidium pusillum* (Stackh.) Le Jol.¹⁴¹= *Fucus pusillus* Stackh. [basion.]*Gelidium spathulatum* (Kütz.) Bornet

133 Seoane-Camba (1965); Anadón (1980); Fernández (1980); Herbarium SANT-Algae 12195, 14567 ["Playa de Pendueles e Isote Picones". Designated by I. Bárbara & M.C. López, 1998].

134 Miranda (1931b, 1943c); Herbarium SANT-Algae 10287 ["Playa de Barro". Designated by I. Bárbara, 1997].

135 New record for Asturias, the sheet belongs to Herbarium FCO-Algae 509 ["Concha de Artedo, lado E, 15-20 m.". Designated by J.M. Rico, 1994].

136 Reported by Miranda (1931b, 1943c).

137 Colmeiro (1889); Lázaro é Ibiza (1889); Miranda (1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Anadón & Fernández (1986); Llera González & Álvarez Raboso (2007).

138 Reported by Seoane-Camba (1982).

139 This species includes *Gelidium corneum* var. *pectinatum* Ardiss. & J.Straff.

140 Personal communication Rico, 2005.

141 Includes *Gelidium pusillum* var. *pulvinatum* (C.Agardh) Feldmann.

- = *Acrocarpus spathulatus* Kütz. [basion.]
- Gelidium spinosum* (S.G.Gmel.) P.C.Silva
- = *Fucus spinosus* S.G.Gmel. [basion.]
- = *Gelidium attenuatum* (Turner) Thur.
- = *Gelidium latifolium* (Grev.) Bornet & Thur.

Parviphycus Santel.

- Parviphycus tenuissimus* (Feldmann & Hamel) Santel.¹⁴²
- = *Gelidiella tenuissima* Feldmann & Hamel [basion.]
- = *Gelidiella pannosa* Feldmann & Hamel

Pterocladia Santel. & Hommers.

- Pterocladia capillacea* (S.G.Gmel.) Santel. & Hommers.
- = *Fucus capillaceus* S.G.Gmel. [basion.]
- = *Gelidium capillaceum* (S.G.Gmel.) Kütz.
- = *Pterocladia capillacea* (S.G.Gmel.) Bornet
- Pterocladia melanoidea* (Schousb. ex Bornet) Santel. & Hommers.¹⁴³
- = *Gelidium melanoideum* Schousb. ex Bornet [basion.]
- = *Pterocladia melanoidea* (Schousb. ex Bornet) E.Y.Dawson

GIGARTINALES

ARESCHOUGIACEAE

Solieria J.Agardh

- Solieria chordalis* (C.Agardh) J.Agardh¹⁴⁴
- = *Delesseria chordalis* C.Agardh [basion.]

CAULACANTHACEAE

Catenella Grev. [*nom. cons.*]

- Catenella caespitosa* (With.) L.M.Irvine
- = *Ulva caespitosa* With. [basion.]
- = *Catenella opuntia* (Gooden. & Woodw.) Grev., *nom. illeg.*
- = *Catenella repens* (Lightf.) Batters

Caulacanthus Kütz.

- Caulacanthus ustulatus* (Mert. ex Turner) Kütz.
- = *Fucus acicularis* var. *ustulatus* Mert. ex Turner [basion.]

CRUORACEAE

Cruoria Fr.

- Cruoria pellita* (Lyngb.) Fr.¹⁴⁵
- = *Chaetophora pellita* Lyngb. [basion.]

CYSTOCLONIACEAE

142 Miranda (1943c); Herbarium SANT-Algae 12104 ["Playa de Tourán". Designated by I. Bárbara, 1997]; Dosil Mancilla & Cremades Ugarte (1998, 1999).

143 According to Rico & al. (1997), *Pterocladia melanoidea* occurs intertidally on the North coast of Spain. This species has been found in Galicia and the North of Portugal (Bárbara & al., 2003a, Bárbara & al., 2005a, Díaz Tapia & Bárbara, 2005). Díaz & al. (2008) found this species, and therefore, it was a new record for Asturias.

144 Sauvageau (1897a); Hamel (1922); Miranda (1943d); Herbarium FCO-Algae 168 ["Concha de Arredo, lado E". Designated by J.M. Rico, 1994].

145 Miranda (1931b, 1943c); Dizerbo (1956) as *Cruoria* sp.

Calliblepharis Kütz. [*nom. cons.*]*Calliblepharis ciliata* (Huds.) Kütz.= *Fucus ciliatus* Huds. [basion.]*Calliblepharis jubata* (Gooden. & Woodw.) Kütz.= *Fucus jubatus* Gooden. & Woodw. [basion.]**Rhodophyllis** Kütz. [*nom. cons.*]*Rhodophyllis divaricata* (Stackh.) Papenf.= *Bifida divaricata* Stackh. [basion.]= *Rhodophyllis bifida* Kütz.

FURCELLARIACEAE

Furcellaria J.V.Lamour. [*nom. cons.*]*Furcellaria lumbricalis* (Huds.) J.V.Lamour.¹⁴⁶= *Fucus lumbricalis* Huds. [basion.]= *Furcellaria fastigiata* (Turner) J.V.Lamour.**Halarachnion** Kütz.*Halarachnion ligulatum* (Woodw.) Kütz.¹⁴⁷= *Ulva ligulata* Woodw. [basion.]= *Cruoria rosea* (P.Crouan & H.Crouan) P.Crouan & H.Crouan [stage]= *Halymenia ligulata* (Woodw.) C.Agardh

GIGARTINACEAE

Chondracanthus Kütz.*Chondracanthus acicularis* (Roth) Fredericq= *Ceramium aciculare* Roth [basion.]= *Gigartina acicularis* (Roth) J.V.Lamour.= *Gigartina falcata* J.Agardh*Chondracanthus teedei* (Mert. ex Roth) Kütz.= *Ceramium teedei* Mert. ex Roth [basion.]= *Gigartina teedei* (Mert. ex Roth) J.V.Lamour.**Chondrus** Stackh.*Chondrus crispus* Stackh.¹⁴⁸

146 Colmeiro (1867, 1889); Sauvageau (1897a); Miranda (1931b, 1943c); Pérez-Cirera (1974, 1975a); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Arrontes (1983); Poyal Cáliz (1992); Arce (1994); Bárbara & al. (2006b); Llera González & Álvarez Raboso (2007); Díaz & al. (2008).

147 Lázaro é Ibiza (1889) and Dizerbo (1956) as *Halymenia ligulata* (Woodw.) C.Agardh; Viejo (1995); Llera González & Álvarez Raboso (2007); Herbarium FCO-Algae 156 ["Oviñana". Designated by J.M. Rico, 1994].

148 This species includes *Chondrus crispus* f. *angustifrons* Mazza (see Herbarium MA-Algae 3795 ["Llanes". Designated by L. Aterido, 1903]) and *Chondrus crispus* f. *filiformis* (Huds.) M.Thomas. (see Anadón, 1980; Herbarium MA-Algae 1515, 1558 [Designated by Lagasca (undated). Reviewed by J. Cremades, 1989; with *Lomentaria articulata*]; Herbarium MA-Algae 5074 ["Playa de Luarda". Designated by J. Cremades & M. Buján, 1992]; Herbarium SANT-Algae 10309 ["Playa de Barro". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 10367 ["Playa de Ñora". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 12080 ["Bañugues". Designated by M.C. López & S. Calvo, 1997]; Herbarium SANT-Algae 12141 ["Punta del Ratón". Designated by J. Cremades, 1998]; Herbarium SANT-Algae 12152 ["Playa de Merón". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 12173 ["Playa de Perflora". Designated by J. Cremades & J. Dosil, 1998]; Herbarium

Gigartina Stackh.*Gigartina pistillata* (S.G.Gmel.) Stackh.= *Fucus pistillatus* S.G.Gmel. [basion.]

HYPNEACEAE

Hypnea J.V.Lamour.*Hypnea musciformis* (Wulfen) J.V.Lamour.= *Fucus musciformis* Wulfen [basion.]NEMASTOMATACEAE [*nom. cons.*]**Itonoa** Masuda & Guiry*Itonoa marginifera* (J.Agardh) Masuda & Guiry¹⁴⁹= *Nemastoma marginiferum* J.Agardh [basion.]= *Platoma marginifera* (J.Agardh) Batters

PETROCELIDACEAE

Mastocarpus Kütz.*Mastocarpus stellatus* (Stackh.) Guiry¹⁵⁰= *Fucus stellatus* Stackh. [basion.]= *Fucus mamillosus* Gooden. & Woodw.= *Gigartina mamillosa* (Gooden. & Woodw.) J.Agardh= *Gigartina stellata* (Stackh.) Batters= *Mastocarpus mamillosus* (Gooden. & Woodw.) Kütz.

PHYLLOPHORACEAE

Ahnfeltiopsis P.C.Silva & T.C.DeCew*Ahnfeltiopsis devoniensis* (Grev.) P.C.Silva & T.C.DeCew= *Fucus devoniensis* Grev. [basion.]= *Gymnogongrus devoniensis* (Grev.) Schotter**Coccotylus** Kütz.*Coccotylus truncatus* (Pall.) M.J.Wynne & J.N.Heine¹⁵¹= *Fucus truncatus* Pall. [basion.]= *Phyllophora truncata* (Pall.) Zinova= *Coccotylus brodiei* (Turner) Kütz.= *Fucus brodiei* Turner= *Phyllophora brodiei* (Turner) Endl.= *Phyllophora truncata* f. *brodiaei* Turner**Gymnogongrus** Mart.*Gymnogongrus crenulatus* (Turner) J.Agardh= *Fucus crenulatus* Turner [basion.]

SANT-Algae 12183 ["Tazones". Designated by M.C. López, 1998]; Herbarium SANT-Algae 12188 ["Lastrás de Pechón". Designated by J. Cremades, 1998]; Herbarium SANT-Algae 12223 ["Playa de Pendueles e Islote Picones". Designated by I. Bárbara & M.C. López, 1998]; Herbarium SANT-Algae 13044 ["Playa de Luarca". Designated by J. Cremades & M. Buján, 1992]; Bárbara & al. 2006b; Díaz & al. (2008).

149 Sauvageau (1897a), Miranda (1931b, 1943c), Valenzuela Miranda (1979) and Valenzuela & Pérez-Cirera (1982) as *Platoma marginifera* (J.Agardh) Batters; Valenzuela Miranda (2003).

150 This species includes the tetrasporophytic stage, *Petrocelis cruenta* J.Agardh.

151 Colmeiro (1889); Lázaro é Ibiza (1889); Miranda (1931b); Arrontes (1983).

- = *Actinococcus peltaeformis* F.Schmitz
 = *Gymnogongrus norvegicus* (Gunnerus) J.Agardh
Gymnogongrus griffithsiae (Turner) Mart.
 = *Fucus griffithsiae* Turner [basion.]
 = *Actinococcus aggregatus* F.Schmitz
- Phyllophora** Grev. [*nom. cons.*]
Phyllophora crispa (Huds.) P.S.Dixon
 = *Fucus crispus* Huds. [basion.]
 = *Phyllophora rubens* (Gooden. & Woodw.) Grev.
Phyllophora sicula (Kütz.) Guiry & L.M.Irvine¹⁵²
 = *Phyllotylus siculus* Kütz. [basion.]
 = *Phyllophora palmettoides* J.Agardh
- Schottera** Guiry & Hollenb.
Schottera nicaeënsis (J.V.Lamour. ex Duby) Guiry & Hollenb.
 = *Halymenia nicaeënsis* J.V.Lamour. ex Duby [basion.]
 = *Gymnogongrus nicaeënsis* (J.V.Lamour. ex Duby) Ardiss. & J.Straff.
 = *Petroglossum nicaeënsis* (Duby) Schotter
- Stenogramme** Harv.
Stenogramme interrupta (C.Agardh) Mont. ex Harv.
 = *Delesseria interrupta* C.Agardh [basion.]
- SCHIZYMENIACEAE
- Schizymenia** J.Agardh [*nom. cons.*]
Schizymenia dubyi (Chauv. ex Duby) J.Agardh¹⁵³
 = *Halymenia dubyi* Chauv. ex Duby [basion.]
- SPHAEROCOCCACEAE
- Sphaerococcus** Stackh.
Sphaerococcus coronopifolius Stackh.¹⁵⁴
 = *Rhynchococcus coronopifolia* (Stackh.) Kütz.
- GRACILARIALES
- GRACILARIACEAE
- Gracilaria** Grev. [*nom. cons.*]
Gracilaria bursa-pastoris (S.G.Gmel.) P.C.Silva
 = *Fucus bursa-pastoris* S.G.Gmel. [basion.]
 = *Gracilaria compressa* (C.Agardh) Grev.
Gracilaria gracilis (Stackh.) M.Steentoft, L.M.Irvine & W.F.Farnham
 = *Fucus gracilis* Stackh. [basion.]
 = *Gracilaria confervoides* (L.) Grev., *nom. illeg.*

152 Anadón (1980); Fernández (1980); Fernández & Niell (1981); Weber-Peukert & Schnetter (1982) as *Phyllophora palmettoides* J.Agardh; Herbarium SANT-Algae 9186 ["Bañugues". Designated by M.C. López & S. Calvo, 1997]; Herbarium SANT-Algae 13193 ["La Isla". Designated by M.C. López & S. Calvo, 1997]; Veiga & al. (1998); Bárbara & al. (2003a); Sánchez (2005); Sánchez & Fernández (2005); Sánchez & al. (2005).

153 This species includes the tetrasporophytic stage, *Haematocelis rubens* J.Agardh. (see Bárbara & al., 2003a, 2005b).

154 This species includes the sporophytic stage, *Haematocelis fissurata* P.Crouan & H.Crouan.

- = *Gracilaria verrucosa* (Huds.) Papenf.
- Gracilaria multipartita* (Clemente) Harv.
- = *Fucus multipartitus* Clemente [basion.]
- = *Gracilaria foliifera* (Forssk.) Børgesen

Gracilariopsis E.Y.Dawson

- Gracilariopsis longissima* (S.G.Gmel.) M.Steentoft, L.M.Irvine & W.F.Farnham
- = *Fucus longissimus* S.G.Gmel. [basion.]

PTEROCLADIOPHILACEAE

Gelidiocolax N.L.Gardner

- Gelidiocolax deformans* Seoane-Camba¹⁵⁵
- Gelidiocolax margaritoides* (M.T.Martin & Pocock) K.C.Fan & Papenf.¹⁵⁶
- = *Choreocolax margaritoides* M.T.Martin & Pocock [basion.]

Holmsella Struch

- Holmsella pachyderma* (Reinsch) Sturch¹⁵⁷
- = *Choreocolax pachydermus* Reinsch [basion.]

HILDENBRANDIALES

HILDENBRANDIACEAE

Hildenbrandia Nardo [*nom. et orth. cons.*]

- Hildenbrandia crouaniorum* J.Agardh
- = *Hildenbrandia crouanii* J.Agardh
- Hildenbrandia rubra* (Sommerf.) Menegh.
- = *Verrucaria rubra* Sommerf. [basion.]
- = *Hildenbrandia prototypus* Nardo

NEMALIALES

GALAXAURACEAE

Scinaia Biv.

- Scinaia furcellata* (Turner) J.Agardh
- = *Ulva furcellata* Turner [basion.]
- = *Scinaia pseudocrispa* (Clemente) M.J.Wynne
- Scinaia interrupta* (DC.) M.J.Wynne
- = *Ulva interrupta* DC. [basion.]
- = *Scinaia turgida* Chemin

LIAGORACEAE

Helminthocladia J.Agardh [*nom. cons.*]

- Helminthocladia calvadosii* (J.V.Lamour. ex Duby) Setch.
- = *Dumontia calvadosii* J.V.Lamour. ex Duby [basion.]
- = *Helminthocladia purpurea* (Harv.) J.Agardh

Liagora J.V.Lamour.

- Liagora distenta* (Mert. ex Roth) J.V.Lamour.¹⁵⁸

155 Seoane-Camba (1982); Gallardo & al. (1985).

156 Herbarium SANT-Algae 10282 ["Playa de Barro". Designated by I. Bárbara, 1997]; Herbarium SANT-Algae 12069 ["Bañugues". Designated by M.C. López & S. Calvo, 1997]; Herbarium SANT-Algae 12126 ["Playa de Tourán". Designated by I. Bárbara, 1997]; Bárbara & al. (2002, 2003a).

157 Reported by Díaz & al. (2008) as new record for Asturias.

158 Sánchez & al. (2003); Bárbara & al. (2003a, 2006b).

= *Fucus distentus* Mert. ex Roth [basion.]

Liagora viscida (Forssk.) C.Agardh¹⁵⁹

= *Fucus viscidus* Forssk. [basion.]

Nemalion Duby

Nemalion helminthoides (Velley) Batters

= *Fucus helminthoides* Velley [basion.]

= *Nemalion lubricum* Duby

= *Nemalion multifidum* (F.Weber & D.Mohr) Endl.

PALMARIALES

PALMARIACEAE

Palmaria Stackh.

Palmaria palmata (L.) Kuntze

= *Fucus palmatus* L. [basion.]

= *Rhodymenia palmata* (L.) Grev.

= *Sphaerococcus palmatus* (L.) Wahlenb.

RHODOPHYSEMATACEAE

Rhodophysema Batters

Rhodophysema georgei Batters¹⁶⁰

= *Rhododermis georgei* (Batters) Collins

RHODOTHAMNIELLACEAE

Rhodothamniella Feldmann

Rhodothamniella floridula (Dillwyn) Feldmann

= *Conferva floridula* Dillwyn [basion.]

= *Audouinella floridula* (Dillwyn) Woelk.

= *Rhodochorton floridulum* (Dillwyn) Nägeli

PLOCAMIALES

PLOCAMIACEAE [*nom. cons.*]

Plocamium J.V.Lamour. [*nom. cons.*]

Plocamium cartilagineum (L.) P.S.Dixon

= *Fucus cartilagineus* L. [basion.]

= *Gelidium cartilagineum* (L.) Gaillon

= *Plocamium coccineum* (Huds.) Lyngb.

Plocamium raphelisianum P.J.L.Dang.¹⁶¹

RHODYMENIALES

CHAMPIACEAE

Champia Desv.

Champia parvula (C.Agardh) Harv.

= *Chondria parvula* C.Agardh [basion.]

Chylocladia Grev. [*nom. cons.*]

159 Sauvageau (1897a); Miranda (1931b, 1943c); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Bárbara & al. (2003a); Sánchez & al. (2003); Llera González & Álvarez Raboso (2007).

160 Reported by Miranda (1932, 1943c).

161 Herbarium SANT-Algae 10412 ["Playa de Ñora". Designated by I. Bárbara, 1997]; Cremades & al. (2007).

- Chylocladia verticillata* (Lightf.) Bliding
 = *Fucus verticillatus* Lightf. [basion.]
 = *Chylocladia kaliformis* (Gooden. & Woodw.) Grev.
 = *Chylocladia squarrosa* (Kütz.) Thur.
 = *Gastroclonium kaliforme* (Gooden. & Woodw.) Ardiss.

Gastroclonium Kütz. [*nom. cons.*]

- Gastroclonium ovatum* (Huds.) Papenf.
 = *Fucus ovatus* Huds. [basion.]
 = *Chylocladia ovalis* (Huds.) Grev.
 = *Gastroclonium ovale* (Huds.) Kütz.
Gastroclonium reflexum (Chauv.) Kütz.
 = *Lomentaria reflexa* Chauv. [basion.]
 = *Chylocladia reflexa* (Chauv.) Zanardini

FAUCHEACEAE

Faucha Mont. & Bory

- Faucha repens* (C.Agardh) Mont. & Bory¹⁶²
 = *Sphaerococcus repens* C.Agardh [basion.]

LOMENTARIACEAE [*nom. cons.*]

Lomentaria Lyngb.

- Lomentaria articulata* (Huds.) Lyngb.
 = *Ulva articulata* Huds. [basion.]
Lomentaria clavellosa (Turner) Gaillon¹⁶³
 = *Fucus clavellus* Turner [basion.]
 = *Chylocladia clavellosa* (Turner) Aresch.
Lomentaria orcadensis (Harv.) Collins ex W.R.Taylor¹⁶⁴
 = *Chrysymenia orcadensis* Harv. [basion.]
 = *Chylocladia rosea* (Harv.) Harv.
 = *Lomentaria rosea* (Harv.) Thur. ex Farl.

RHODYMENIACEAE

Chrysymenia J.Agardh

- Chrysymenia ventricosa* (J.V.Lamour.) J.Agardh¹⁶⁵
 = *Dumontia ventricosa* J.V.Lamour. [basion.]

Cordylecladia J.Agardh

- Cordylecladia erecta* (Grev.) J.Agardh¹⁶⁶
 = *Sphaerococcus erectus* Grev. [basion.]

Rhodymenia Grev. [*nom. et orth. cons.*]

- Rhodymenia holmesii* Ardiss.¹⁶⁷

162 Miranda (1931b, 1943d); Dosil Mancilla & Cremades Ugarte (1998); Bárbara & al. (2006b).

163 Sauvageau (1897a); Miranda (1931b, 1943d); Pérez-Cirera (1974, 1975b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Llera González & Álvarez Raboso (2007).

164 Miranda (1931b, 1934, 1943d); Pérez-Cirera (1974, 1975a); Anadón (1980).

165 Reported by Llera González & Álvarez Raboso (2007).

166 Reported by Díaz & al. (2008) as new record for Asturias.

167 Valenzuela & Pérez-Cirera (1982); Pérez-Cirera & al. (1989); Herbarium SANT-Algae 12208 ["Playa de Pendueles e Isote Picones". Designated by I. Bárbara & M.C. López, 1998]; Díaz & al. (2008).

- = *Rhodymenia pseudopalmata* var. *ellisiae* (Duby) Guiry
Rhodymenia pseudopalmata (J.V.Lamour.) P.C.Silva
 = *Fucus pseudopalmatus* J.V.Lamour. [basion.]
 = *Rhodymenia palmetta* (J.V.Lamour.) Grev.
 = *Sphaerococcus palmetta* (J.V.Lamour.) Lyngb.

OCHROPHYTA [=HETEROKONTOPHYTA]

PHAEOPHYCEAE

CUTLERIALES

CUTLERIACEAE

Cutleria Grev.

- Cutleria adspersa* (Mert. ex Roth) De Not.¹⁶⁸
 = *Ulva adspersa* Mert. ex Roth [basion.]
Cutleria multifida (Turner) Grev.¹⁶⁹
 = *Ulva multifida* Turner [basion.]
 = *Aglaozonia reptans* (P.Crouan & H.Crouan) Kütz.

Zanardinia Nardo ex P.Crouan & H.Crouan

- Zanardinia typus* (Nardo) G.Furnari¹⁷⁰
 = *Stiffia typus* Nardo [basion.]
 = *Zanardinia collaris* (Mont.) P.Crouan & H.Crouan
 = *Zanardinia prototypus* (Nardo) Nardo, *nom. illeg.*

DESMARESTIALES

DESMARESTIACEAE

Desmarestia J.V.Lamour. [*nom. cons.*]

- Desmarestia aculeata* (L.) J.V.Lamour.
 = *Fucus aculeatus* L. [basion.]
Desmarestia ligulata (Lightf.) J.V.Lamour.
 = *Fucus ligulatus* Lightf. [basion.]

DICTYOTALES

DICTYOTACEAE

Dictyopteris J.V.Lamour. [*nom. cons.*]

- Dictyopteris ambigua* (Clemente) Cremades¹⁷¹
 = *Fucus ambiguus* Clemente [basion.]
 = *Dictyopteris polypodioides* sensu J.V.Lamour. non *D. polypodioides* (DC.)
 J.V.Lamour.
Dictyopteris polypodioides (DC.) J.V.Lamour.

168 Sauvageau (1899); Miranda (1931b, 1943b). This species includes the sporophytic stage, *Aglaozonia melanoidea* (Schousb. ex Bornet) Sauv.

169 This species includes the sporophytic stage, *Aglaozonia parvula* (Grev.) Zanardini.

170 Miranda (1931b, 1943b); Anadón (1980); Fernández (1980); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Llera González & Álvarez Raboso (2007).

171 Herbarium SANT-Algae 12170 ["Playa de Merón". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 12207, 14554 ["Playa de Pendueles e Islote Picones". Designated by I. Bárbara & M.C. López, 1998]; Herbarium SANT-Algae 13143 ["Playa de Perlorá". Designated by J. Dosiil, 1998]; Herbarium SANT-Algae 13237 ["Lastrás de Pechón". Designated by J. Cremades, 1998].

- = *Ulva polypodioides* DC. [basion.]
- = *Dictyopteris membranacea* (Stackh.) Batters
- = *Fucus polypodioides* Desf. non S.G.Gmel.
- = *Haliseris polypodioides* (DC.) C.Agardh

Dictyota J.V.Lamour. [*nom. cons.*]

Dictyota dichotoma (Huds.) J.V.Lamour.¹⁷²

- = *Ulva dichotoma* Huds. [basion.]
- = *Dictyota dichotoma* f. *latifolia* (Kütz.) Vinassa

Dictyota spiralis Mont.¹⁷³

- = *Dilophus spiralis* (Mont.) Hamel

Padina Adans. [*nom. cons.*]

Padina pavonica (L.) Thivy

- = *Fucus pavonicus* L. [basion.]
- = *Padina pavonia* J.V.Lamour.
- = *Zonaria pavonia* C.Agardh

Spatoglossum Kütz.

Spatoglossum solierii (Chauv. ex Mont.) Kütz.¹⁷⁴

- = *Dictyota solieri* Chauv. ex Mont. [basion.]

Taonia J.Agardh

Taonia atomaria (Woodw.) J.Agardh

- = *Ulva atomaria* Woodw. [basion.]

ECTOCARPALES

ACINETOSPORACEAE

Acinetospora Bornet

Acinetospora crinita (Carmich.) Kornmann¹⁷⁵

- = *Ectocarpus crinitus* Carmich. [basion.]
- = *Ectocarpus pusillus* A.W.Griffiths ex Harv.

Feldmannia Hamel

Feldmannia irregularis (Kütz.) Hamel¹⁷⁶

- = *Ectocarpus irregularis* Kütz. [basion.]

Feldmannia lebelii (Aresch. ex P.Crouan & H.Crouan) Hamel¹⁷⁷

- = *Ectocarpus lebelii* Aresch. ex P.Crouan & H.Crouan [basion.]

172 This species includes *Dictyota dichotoma* var. *intricata* (C.Agardh) Grev. (see Miranda, 1931b; Valenzuela Miranda, 1979; Valenzuela & Pérez-Cirera, 1982).

173 Fernández Pérez (1979); Weber-Peukert & Schmetter (1982); Llera González & Álvarez Raboso (2007).

174 Herbarium SANT-Algae 12192 ["Playa de Pendueles e Islote Picones". Designated by I. Bárbara & M.C. López, 1998]; Bárbara & al. (2003a); Llera González & Álvarez Raboso (2007).

175 Miranda (1931b, 1943b); Pérez-Cirera (1974, 1975b) reported the quote of Miranda (1931b) and established as *Acinetospora crinita* distribution the Cantabrian coast. Although Díaz & al. (2008) reported as new record, the species had been cited in Asturias.

176 Sauvageau (1897a, 1933); Miranda (1936, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

177 Sauvageau (1896b, 1897a); Miranda (1931b, 1943b), Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

- Feldmannia padinae* (Buffham) Hamel¹⁷⁸
 = *Giffordia padinae* Buffham [basion.]
 = *Ectocarpus padinae* (Buffham) Sauv.
Feldmannia paradoxa (Mont.) Hamel¹⁷⁹
 = *Ectocarpus paradoxus* Mont. [basion.]
 = *Ectocarpus globifer* Kütz.
 = *Feldmannia globifera* (Kütz.) Hamel
Feldmannia simplex (P.Crouan & H.Crouan) Hamel¹⁸⁰
 = *Ectocarpus simplex* P.Crouan & H.Crouan [basion.]

Hincksia J.E.Gray

- Hincksia granulosa* (Sm.) P.C.Silva
 = *Conferva granulosa* Sm. [basion.]
 = *Ectocarpus granulatus* (Sm.) C.Agardh
 = *Giffordia granulosa* (Sm.) Hamel
Hincksia hincksiae (Harv.) P.C.Silva
 = *Ectocarpus hincksiae* Harv. [basion.]
 = *Giffordia hincksiae* (Harv.) Hamel
Hincksia mitchelliae (Harv.) P.C.Silva¹⁸¹
 = *Ectocarpus mitchelliae* Harv. [basion.]
 = *Giffordia mitchelliae* (Harv.) Hamel
Hincksia sandriana (Zanardini) P.C.Silva¹⁸²
 = *Ectocarpus sandrianus* Zanardini [basion.]
 = *Giffordia sandriana* (Zanardini) Hamel
Hincksia secunda (Kütz.) P.C.Silva
 = *Ectocarpus secundus* Kütz. [basion.]
 = *Giffordia secunda* (Kütz.) Batters

Pogotrichum Reinke

- Pogotrichum filiforme* Reinke¹⁸³
 = *Litosiphon filiformis* (Reinke) Batters

Pylaiella Bory [nom. et orth. cons.]

- Pylaiella littoralis* (L.) Kjellm.
 = *Conferva littoralis* L. [basion.]
 = *Ectocarpus littoralis* (L.) Lyngb.

CHORDARIACEAE

Ascocyclus Magnus

- Ascocyclus orbicularis* (J.Agardh) Kjellm.¹⁸⁴

178 Reported by Miranda (1932, 1943b).

179 Sauvageau (1897a); Miranda (1943b); Anadón (1980); Fernández (1980); Dosil Mancilla & Cremades Ugarte (1998, 1999).

180 Miranda (1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

181 Reported by Weber-Peukert & Schnetter (1982).

182 Anadón (1980); Fernández (1980); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Herbarium SANT-Algae 12157 ["Playa de Merón". Designated by I. Bárbara, 1998].

183 Anadón (1980); Fernández (1980).

184 Reported by Miranda (1931b).

- = *Myrionema orbiculare* J.Agardh [basion.]
- Asperococcus** J.V.Lamour.
Asperococcus bullosus J.V.Lamour.
Asperococcus ensiformis (Chiaje) M.J.Wynne
 = *Laminaria ensiformis* Chiaje [basion.]
 = *Asperococcus compressus* A.W.Griffiths ex Hook.
Asperococcus fistulosus (Huds.) Hook.
 = *Ulva fistulosa* Huds. [basion.]
 = *Chilionema reptans* (P.Crouan & H.Crouan) Sauv.
 = *Hecatonema reptans* Sauv.
 = *Scytosiphon fistulosus* (Huds.) C.Agardh
- Elachista** Duby [*nom. et orth. cons.*]
Elachista flaccida (Dillwyn) Fr.
 = *Conferva flaccida* Dillwyn [basion.]
Elachista fucicola (Velley) Aresch.
 = *Conferva fucicola* Velley [basion.]
Elachista scutulata (Sm.) Duby¹⁸⁵
 = *Conferva scutulata* Sm. [basion.]
- Eudesme** J.Agardh
Eudesme virescens (Carmich. ex Berk.) J.Agardh
 = *Mesogloia virescens* Carmich. ex Berk. [basion.]
 = *Castagnea virescens* (Carmich. ex Harv.) Thur.
- Hecatonema** Sauv.
Hecatonema terminale (Kütz.) Kylin¹⁸⁶
 = *Ectocarpus terminalis* Kütz. [basion.]
 = *Hecatonema maculans* (Collins) Sauv.
- Herponema** J.Agardh
Herponema valianteri (Bornet ex Sauv.) Hamel¹⁸⁷
 = *Ectocarpus valianteri* Bornet ex Sauv. [basion.]
Herponema velutinum (Grev.) J.Agardh
 = *Sphacelaria velutina* Grev. [basion.]
 = *Ectocarpus velutinus* (Grev.) Kütz.
- Leathesia** Gray
Leathesia difformis (L.) Aresch.
 = *Tremella difformis* L. [basion.]
- Liebmannia** J.Agardh
Liebmannia leveillei J.Agardh
 = *Mesogloia leveillei* (J.Agardh) Menegh.
- Litosiphon** Harv.

185 Chalon (1905); Miranda (1931b, 1943b); Pérez-Cirera (1974).

186 Miranda (1936, 1943b); Pérez-Cirera (1974, 1975b); Anadón (1980).

187 Sauvageau (1897a); Miranda (1931b, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

Litosiphon laminariae (Lyngb.) Harv.¹⁸⁸

= *Bangia laminariae* Lyngb. [basion.]

= *Litosiphon pusillus* (Carmich. ex Hook.) Harv.

Mesogloia C.Agardh

Mesogloia vermiculata (Sm.) Gray¹⁸⁹

= *Rivularia vermiculata* Sm. [basion.]

Mikrosyphar Kuck.

Mikrosyphar polysiphoniae Kuck.¹⁹⁰

Mikrosyphar porphyrae Kuck.¹⁹¹

Myriactula Kuntze

Myriactula rivulariae (Suhr) Feldmann¹⁹²

= *Elachista rivulariae* Suhr [basion.]

= *Elachista pulvinata* (Kütz.) Harv.

Myrionema Grev.

Myrionema magnusii (Sauv.) Loiseaux¹⁹³

= *Ascocyclus magnusii* Sauv. [basion.]

Myrionema strangulans Grev.

= *Myrionema vulgare* Thur.

Myriotrichia Harv.

Myriotrichia clavaeformis Harv.¹⁹⁴

= *Myriotrichia filiformis* Harv.

= *Streblonema sphaericum* (Derbès & Solier) Thur.

Nemacystus Derbès & Solier

Nemacystus hispanicus (Sauv.) Kylin¹⁹⁵

= *Nemacystus erythraeus* var. *hispanicus* Sauv. [basion.]

Petrospongium Nägeli ex Kütz.

Petrospongium berkeleyi (Grev.) Nägeli ex Kütz.¹⁹⁶

= *Chaetophora berkeleyi* Grev. [basion.]

= *Cylindrocarpus berkeleyi* (Grev.) P.Crouan & H.Crouan

188 Sauvageau (1897a); Miranda (1931b, 1943b); Anadón (1980); Fernández (1980); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Herbarium SANT-Algae 12156 [“Playa de Merón”. Designated by I. Bárbara, 1998].

189 Miranda (1936, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

190 Reported by Pérez-Cirera (1974).

191 Reported by Miranda (1931b, 1943b).

192 Sauvageau (1897a); Miranda (1931b, 1943b).

193 Reported by Miranda (1943b). According to Fletcher (1987), *Myrionema magnusii* (Sauv.) Loiseaux could be a stage of another species.

194 Sauvageau (1897a); Miranda (1931b, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Otero Schmitt (1993).

195 According to Jong & Prud'homme van Reine (1997) the distribution of this species is: North coast of Spain (Gijón), Algeria, Madeira, Gran Canarias, and Azores. Expected in Portugal and (potentially) in North Morocco.

196 Miranda (1931b, 1943b); Anadón (1980); Fernández (1980); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Weber-Peukert & Schnetter (1982); Sierra (1983); Sierra & Fernández (1984a, 1984b); Miyares (1986); Bárbara & al. (2006a); Llera González & Álvarez Raboso (2007).

Pleurocladia A.Braun*Pleurocladia lacustris* A.Braun¹⁹⁷= *Ectocarpus maritimus* (Kjellm.) Rosenv.= *Pilinia maritima* (Kjellm.) Rosenv.**Punctaria** Grev.*Punctaria latifolia* Grev.*Punctaria tenuissima* (C.Agardh) Grev.¹⁹⁸= *Zonaria tenuissima* C.Agardh [basion.]= *Desmotrichum undulatum* (J.Agardh) Reinke= *Punctaria crouaniorum* (Thur.) Bornet**Sauvageaugloia** Hamel ex Kylin*Sauvageaugloia divaricata* (Clemente) Cremades¹⁹⁹= *Ulva divaricata* Clemente [basion.]= *Castagnea chordariaeformis* (P.Crouan & H.Crouan) Thur.= *Mesogloia griffithsiana* A.W.Griffiths ex Hook.= *Sauvageaugloia chordariaeformis* (P.Crouan & H.Crouan) Kylin= *Sauvageaugloia griffithsiana* (A.W.Griffiths ex Harv.) Hamel ex Kylin**Spongonema** Kütz.*Spongonema tomentosum* (Huds.) Kütz.²⁰⁰= *Conferva tomentosa* Huds. [basion.]= *Ectocarpus tomentosus* (Huds.) Lyngb.**Streblonema** Derbès & Solier*Streblonema maculans* (P.A.Dang.) South & Tittley²⁰¹= *Ectocarpus maculans* P.A.Dang. [basion.]**Strepsithalia** Bornet ex Sauv.*Strepsithalia liebmanniae* Miranda²⁰²

ECTOCARPACEAE

Ectocarpus Lyngb. [*nom. cons.*]*Ectocarpus fasciculatus* Harv.*Ectocarpus siliculosus* (Dillwyn) Lyngb.= *Conferva siliculosa* Dillwyn [basion.]= *Ectocarpus confervoides* (Roth) Le Jol.= *Ectocarpus siliculosus* var. *confervoides* (Roth) Kjellm.*Ectocarpus virescens* Thur. ex Sauv.²⁰³

RALFSIACEAE

197 Miranda (1931b, 1936, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

198 Reported by Miranda (1931b, 1943b).

199 Sauvageau (1897a); Miranda (1931b, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Arce (1994); Valenzuela Miranda (2005b); Bárbara & al. (2006a); Herbarium MA-Algae 2034 [Designated by Rojas Clemente (undated)].

200 Reported by Miranda (1931b, 1943b) as *Ectocarpus tomentosus* (Huds.) Lyngb.

201 Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).

202 Miranda (1928, 1931b, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Dosiil Mancilla (2001, 2007).

203 Sauvageau (1897a); Miranda (1931b, 1943b).

Ralfsia Berk.

- Ralfsia verrucosa* (Aresch.) Aresch.
= *Cruoria verrucosa* Aresch. [basion.]

SCYTOSIPHONACEAE

Petalonia Derbès & Solier [*nom. cons.*]

- Petalonia fascia* (O.F.Müll.) Kuntze²⁰⁴
= *Fucus fascia* O.F.Müll. [basion.]
= *Phyllitis caespitosa* Le Jol.
= *Phyllitis debilis* (C.Agardh) Kütz.

Scytosiphon C.Agardh [*nom. cons.*]

- Scytosiphon lomentaria* (Lyngb.) Link [*nom. cons.*]
= *Chorda lomentaria* Lyngb. [basion.]
= *Scytosiphon simplicissimus* (Clemente) Cremades

Colpomenia (Endl.) Derbès & Solier

- Colpomenia peregrina* Sauv.
Colpomenia sinuosa (Mert. ex Roth) Derbès & Solier²⁰⁵
= *Ulva sinuosa* Mert. ex Roth [basion.]

FUCALES

CYSTOSEIRACEAE

Bifurcaria Stackh.

- Bifurcaria bifurcata* R.Ross
= *Bifurcaria tuberculata* Stackh.
= *Pycnophycus tuberculatus* (Stackh.) Kütz.

Cystoseira C.Agardh [*nom. cons.*]

- Cystoseira baccata* (S.G.Gmel.) P.C.Silva
= *Fucus baccatus* S.G.Gmel. [basion.]
= *Cystoseira fibrosa* (Huds.) C.Agardh
= *Phyllacantha fibrosa* (S.G.Gmel.) Kütz.
Cystoseira foeniculacea (L.) Grev.
= *Fucus foeniculaceus* L. [basion.]
= *Cystoseira concatenata* (L.) C.Agardh
= *Cystoseira discors* (L.) C.Agardh
= *Fucus abrotanifolius* L.
Cystoseira humilis var. *myriophylloides* (Sauv.) J.H.Price & D.M.John
= *Cystoseira myriophylloides* Sauv. [basion.]
Cystoseira nodicaulis (With.) M.Roberts
= *Fucus nodicaulis* With. [basion.]

204 Sauvageau (1897a) and Miranda (1931b, 1943b) as *Phyllitis debilis* (C.Agardh) Kütz.; Pérez-Cirera (1974, 1975b); Fernández Pérez (1979); Weber-Peukert & Schnetter (1982); Sánchez & al. (2003); Llera González & Álvarez Raboso (2007).

205 Miranda (1931b, 1943b); Ardré (1970); Anadón (1980); Fernández (1980); Anadón & Niell (1981); Weber-Peukert & Schnetter (1982); Herbarium SANT-Algae 13218 ["Playa de Merón". Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 13236 ["Lastrás de Pechón". Designated by J. Cremades, 1998]; Herbarium SANT-Algae 14912 ["Tazones". Designated by M. López, 1998].

- = *Cystoseira granulata* C.Agardh
- Cystoseira tamariscifolia* (Huds.) Papenf.
- = *Fucus tamariscifolius* Huds. [basion.]
- = *Cystoseira ericoides* (L.) C.Agardh
- = *Fucus ericoides* L.
- = *Halerica ericoides* (fide Colmeiro, 1867)

Halidrys Lyngb. [*nom. cons.*]

- Halidrys siliquosa* (L.) Lyngb.
- = *Fucus siliquosus* L. [basion.]

FUCACEAE

Ascophyllum Stackh. [*nom. et orth. cons.*]

- Ascophyllum nodosum* (L.) Le Jol.
- = *Fucus nodosus* L. [basion.]
- = *Ozothallia vulgaris* Decne. & Thur., *nom. illeg.*

Fucus L.

- Fucus ceranoides* L.
- Fucus serratus* L.
- Fucus spiralis* L.²⁰⁶
- = *Fucus vesiculosus* var. *spiralis* (L.) C.Agardh
- Fucus vesiculosus* L.²⁰⁷
- = *Fucus vesiculosus* var. *angustifolius* C.Agardh

Pelvetia Decne. & Thur.

- Pelvetia canaliculata* (L.) Decne. & Thur.
- = *Fucus canaliculatus* L. [basion.]

HIMANTHALIACEAE

Himanthalia Lyngb. [*nom. cons.*]

- Himanthalia elongata* (L.) Gray
- = *Fucus elongatus* L. [basion.]
- = *Himanthalia lorea* (L.) Lyngb.

206 Includes *Fucus spiralis* var. *limitaneus* (Mont.) Pérez-Ruzafa (see Miranda, 1931b; Gómez Garreta, 2001; Pérez-Ruzafa & Gallardo, 1997, 1998) and *Fucus spiralis* var. *platycarpus* Batters (see Sauvageau, 1897a; Miranda, 1931b, 1943b; Fischer-Piette, 1955; Dizerbo, 1956; Díaz, 1981; Valenzuela Miranda, 1979; Valenzuela & Pérez-Cirera, 1982; Pérez-Ruzafa & al., 1993; Pérez-Ruzafa & Gallardo, 1997; Gómez Garreta, 2001; Herbarium MA-Algae 3534 ["Llanes"]. Designated by L.Aterido, undated)].

207 Includes *Fucus vesiculosus* var. *compressus* Kjellm. (see Pérez-Ruzafa & Gallardo, 1997; Herbarium SANT-Algae 14880 ["Punta del Ratón"]. Designated by J. Cremades, 1998]; Gómez Garreta, 2001), *Fucus vesiculosus* var. *linearis* (Huds.) Kütz. (see Miranda, 1931b, 1943b; Anadón, 1980; Fernández & Niell, 1982; Anadón, 1983; Juanes, 1983; Sierra, 1983; Pérez-Ruzafa & al., 1993; Pérez-Ruzafa & Gallardo, 1997; Herbarium SANT-Algae 12135 ["Playa de Tourán"]. Designated by I. Bárbara, 1997]; Gómez Garreta, 2001), *Fucus vesiculosus* var. *vadorum* Aresch. (see Pérez-Ruzafa & al., 1993; Pérez-Ruzafa & Gallardo, 1997; Gómez Garreta, 2001) and *Fucus vesiculosus* var. *volubilis* Gooden. & Woodw. (see Colmeiro, 1867; Sauvageau, 1897a; Miranda, 1931b, 1943b; Seoane-Camba, 1965). At the present time we consider the var. *linearis* opposite to *Fucus chalonii* Feldmann, waiting for elucidating the taxonomic position of this reduced form of *Fucus*, applying transplant and culture experiments, together with genetic markers (see Gorostiaga, 1994).

SARGASSACEAE

Sargassum C.Agardh [*nom. cons.*]*Sargassum flavifolium* Kütz.²⁰⁸*Sargassum muticum* (Yendo) Fensholt= *Sargassum kjellmanianum* f. *muticum* («muticus») Yendo [basion.]*Sargassum vulgare* C.Agardh²⁰⁹

LAMINARIALES

ALARIACEAE

Undaria Suringar*Undaria pinnatifida* (Harv.) Suringar²¹⁰= *Alaria pinnatifida* Harv. [basion.]

CHORDACEAE

Chorda Stackh.*Chorda filum* (L.) Stackh.²¹¹= *Fucus filum* L. [basion.]

LAMINARIACEAE

Laminaria J.V.Lamour. [*nom. cons.*]*Laminaria hyperborea* (Gunnerus) Foslie= *Fucus hyperboreus* Gunnerus [basion.]= *Laminaria cloustoni* Edmondston*Laminaria ochroleuca* Bach.Pyl.*Laminaria saccharina* (L.) J.V.Lamour.= *Fucus saccharinus* L. [basion.]= *Laminaria saccharina* var. *bullata* C.Agardh= *Saccharina latissima* C.E.Lane, C.Mayes, Druehl & G.W.Saunders= *Ulva lactuca* var. *latissima* L.

PHYLLARIACEAE

Phyllariopsis E.C.Henry & South*Phyllariopsis brevipes* (C.Agardh) E.C.Henry & South²¹²²⁰⁸ Ardré (1971); Fernández & Sánchez (2002).²⁰⁹ Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982).²¹⁰ Salinas & al. (1996); Pérez-Ruzafa & al. (2002); Silva & al. (2002); Freire-Gago & al. (2006); Llera González & Álvarez Raboso (2007).²¹¹ Colmeiro (1867, 1889); Sauvageau (1897a, 1900-1914); Miranda (1928, 1931b, 1934, 1943b); Fischer-Piette (1963); Alvarado (1967); Fernández & Niell (1982); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Anadón (1983); Juanes (1983); Sierra (1983); Poyal Cáliz (1992); Llera González & Álvarez Raboso (2007).²¹² Sauvageau (1897a); Lázaro é Ibiza (1900); Miranda (1943b); Seoane-Camba (1965); Flores-Moya & al. (1993). This species also includes the subspecies *Phyllariopsis brevipes* ssp. *pseudopurpurascens* Pérez-Cirera, Cremades, Bárbara & M.C.López; according to Pérez-Cirera & al. (1991); Herbarium SANT-Algae 6565 [“Cudillero”. Designated by A.J. Veiga, 1994]; Herbarium SANT-Algae 8487 [“Cabo Buscos, Queirás”. Designated by J.L. Izquierdo, 1995]; Herbarium SANT-Algae 8488 [“Tapia de Casariego, Mántaras”. Designated by J.L. Izquierdo, 1995]; Herbarium SANT-Algae 12149 [“Playa de Merón”. Designated by I. Bárbara, 1998]; Herbarium SANT-Algae 12209 [“Playa de Pendueles e Islote Picones”. Designated by I. Bárbara & M.C. López, 1998]; Herbarium SANT-Algae 14900 [“Punta del Ratín”. Designated by J. Cremades, 1998].

- = *Laminaria brevipes* C.Agardh [basion.]
- = *Phyllaria reniformis* (J.V.Lamour.) Rostaf.

Saccorhiza Bach.Pyl. [*nom. cons.*]

- Saccorhiza polyschides* (Lightf.) Batters
- = *Fucus polyschides* Lightf. [basion.]
- = *Haligenia bulbosa* (Huds.) Decne.
- = *Saccorhiza bulbosa* J.Agardh, *nom. illeg.*

SPHACELARIALES

CLADOSTEPHACEAE

Cladostephus C.Agardh

- Cladostephus spongiosus* (Huds.) C.Agardh
- = *Conferva spongiosa* Huds. [basion.]
- = *Cladostephus spongiosus* f. *verticillatus* (Lightf.) Prud'homme

SPHACELARIACEAE

Sphacelaria Lyngb.

- Sphacelaria cirrosa* (Roth) C.Agardh
- = *Conferva cirrosa* Roth [basion.]
- = *Sphacelaria hystrix* Suhr ex Reinke
- = *Sphacelaria pennata* (Huds.) Lyngb.
- Sphacelaria fusca* (Huds.) Gray
- = *Conferva fusca* Huds. [basion.]
- Sphacelaria nana* Nägeli ex Kütz.²¹³
- = *Sphacelaria britannica* Sauv.
- Sphacelaria plumula* Zanardini²¹⁴
- Sphacelaria radicans* (Dillwyn) C.Agardh²¹⁵
- = *Conferva radicans* Dillwyn [basion.]
- Sphacelaria rigidula* Kütz.²¹⁶
- Sphacelaria tribuloides* Menegh.²¹⁷

STYPOCAULACEAE

Halopteris Kütz.

- Halopteris filicina* (Gratel.) Kütz.
- = *Ceramium filicinum* Gratel. [basion.]

Stypocaulon Kütz.

- Stypocaulon scoparium* (L.) Kütz.
- = *Conferva scoparia* L. [basion.]
- = *Halopteris scoparia* (L.) Sauv.
- = *Sphacelaria scoparia* (L.) Lyngb.

XANTHOPHYCEAE

213 Reported by Weber-Peukert & Schnetter (1982).

214 Miranda (1931b, 1943b); Anadón (1980); Anadón & Niell (1981); Weber-Peukert & Schnetter (1982).

215 Reported by Anadón (1980).

216 Reported by Díaz & al. (2008) as new record for Asturias.

217 Reported by Miranda (1931b, 1943b).

VAUCHERIALES

VAUCHERIACEAE

Vaucheria DC.*Vaucheria dichotoma* (L.) Mart.= *Conferva dichotoma* L. [basion.]*Vaucheria subsimplex* P.Crouan & H.Crouan²¹⁸

INCERTAE SEDIS

Bachelotia (Bornet) Kuck. ex Hamel*Bachelotia antillarum* (Grunow) Gerloff²¹⁹= *Ectocarpus antillarum* Grunow [basion.]= *Bachelotia fulvescens* (Bornet) Kuck. ex Hamel= *Pylaiella fulvescens* Bornet**Pilinia** Kütz.*Pilinia rimosa* Kütz.²²⁰= *Leptonema lucifugum* Kuck.

CHLOROPHYTA

BRYOPSISIDOPHYCEAE

ACROSIPHONIALES

ACROSIPHONIACEAE

Acrosiphonia J.Agardh*Acrosiphonia spinescens* (Kütz.) Kjellm.²²¹= *Cladophora spinescens* Kütz. [basion.]**Spongomorpha** Kütz.*Spongomorpha aeruginosa* (L.) C.Hoek= *Conferva aeruginosa* L. [basion.]= *Codiolum petrocelidis* Kuck.**Urospora** Aresch. [*nom. cons.*]*Urospora penicilliformis* (Roth) Aresch.= *Conferva penicilliformis* Roth [basion.]= *Hormiscia penicilliformis* (Roth) Aresch.= *Urospora mirabilis* Aresch.

BRYOPSISDALES

BRYOPSISACEAE

Bryopsis J.V.Lamour.*Bryopsis hypnoides* J.V.Lamour.²²²

218 Herbarium SANT-Algae 14942 ["Marisma de Villaviciosa". Designated by I. Bárbara, M.C. López & S. Calvo, 1997]; Bárbara & al. (2003a).

219 Sauvageau (1897a); Miranda (1931b, 1943b); Valenzuela Miranda (1979); Valenzuela & Pérez-Cirera (1982); Herbarium MA-Algae 750 ["Llanes, playa del Sablón". Designated by I. Bárbara & J. Cremades, 1986].

220 Reported by Miranda (1932, 1936, 1943b).

221 Reported by Weber-Peukert & Schnetter (1982).

222 Miranda (1931b, 1943b); Fernández Pérez (1979); Fernández (1985); Fernández & al. (1987).

Bryopsis plumosa (Huds.) C.Agardh
= *Ulva plumosa* Huds. [basion.]

CODIACEAE

Codium Stackh.

Codium adhaerens C.Agardh
Codium decorticatum (Woodw.) M.Howe
= *Ulva decorticata* Woodw. [basion.]
= *Codium elongatum* (Turner) C.Agardh
Codium fragile (Suringar) Har.²²³
= *Acanthocodium fragile* Suringar [basion.]
Codium tomentosum Stackh.²²⁴
Codium vermilara (Olivi) Chiaje²²⁵
= *Lamarckia vermilara* Olivi [basion.]

DERBESACEAE

Derbesia Solier

Derbesia tenuissima (Moris & De Not.) P.Crouan & H.Crouan²²⁶
= *Bryopsis tenuissima* Moris & De Not. [basion.]

Pedobesia MacRaidl & Womersley

Pedobesia simplex (Menegh. ex Kütz.) M.J.Wynne & Leliaert²²⁷
= *Bryopsis simplex* Menegh. ex Kütz. [basion.]
= *Derbesia lamourouxii* (J.Agardh) Solier
= *Pedobesia lamourouxii* (J.Agardh) Feldmann, Loreau, Codomier & Couté

OSTREOBIACEAE

Ostreobium Bornet & Flahault

Ostreobium quekettii Bornet & Flahault²²⁸

CLADOPHOROPHYCEAE

CLADOPHORALES

CLADOPHORACEAE [*nom. cons.*]

Chaetomorpha Kütz. [*nom. cons.*]

Chaetomorpha aerea (Dillwyn) Kütz.

223 According to Cires Rodríguez (2005); Cires Rodríguez & Cuesta Moliner (2006); Cires Rodríguez & Rico Ordás (2007), this species includes: *Codium fragile* ssp. *atlanticum* (Cotton) P.C.Silva [= *Codium mucronatum* var. *atlanticum* Cotton] and *Codium fragile* ssp. *tomentosoides* (Goor) P.C.Silva [= *Codium mucronatum* var. *tomentosoides* Goor]. For more information, see *Codium fragile* ssp. *fragile* (Suringar) Har. at taxa inquirenda.

224 Includes *Codium tomentosum* var. *mucronatum* (Hamel) Ardré (see Herbarium SANT-Algae 14555 ["Playa de Pendueles e Islote Picones". Designated by I. Bárbara & M.C. López, 1998]).

225 Herbarium SANT-Algae 13184 ["La Isla". Designated by M.C. López & S. Calvo, 1997]; Herbarium SANT-Algae 14875 ["Playa de Cadavedo". Designated by J. Cremades & J. Dosil, 1998]; Bárbara & al. (2003a, 2006a).

226 This species includes the gametophytic stage, *Halicystis parvula* F.Schmitz ex Murray.

227 Miranda (1931b, 1943b); Ardré (1971); Herbarium SANT-Algae 14848 ["Playa de Cadavedo". Designated by J. Cremades & J. Dosil, 1998]; Bárbara & al. (2003a). *Pedobesia simplex* (Menegh. ex Kütz.) M.J.Wynne & Leliaert is a new name for *P. lamourouxii* (J.Agardh) Feldmann, Loreau, Codomier & Couté (see Wynne & Leliaert, 2001).

228 Reported by Miranda (1931b, 1943b).

- = *Conferva aerea* Dillwyn [basion.]
Chaetomorpha linum (O.F.Müll.) Kütz.
 = *Conferva linum* O.F.Müll. [basion.]
Cladophora Kütz. [*nom. cons.*]
Cladophora albida (Nees) Kütz.
 = *Annulina albida* Nees [basion.]
 = *Cladophora refracta* Kütz.
Cladophora hutchinsiae (Dillwyn) Kütz.²²⁹
 = *Conferva hutchinsiae* Dillwyn [basion.]
Cladophora laetevirens (Dillwyn) Kütz.²³⁰
 = *Conferva laetevirens* Dillwyn [basion.]
Cladophora lehmanniana (Lindenb.) Kütz.²³¹
 = *Conferva lehmanniana* Lindenb. [basion.]
 = *Cladophora utriculosa* Kütz.
Cladophora pellucida (Huds.) Kütz.
 = *Conferva pellucida* Huds. [basion.]
Cladophora prolifera (Roth) Kütz.
 = *Conferva prolifera* Roth [basion.]
Cladophora rhodolithicola Leliaert²³²
Cladophora rupestris (L.) Kütz.
 = *Conferva rupestris* L. [basion.]
Cladophora sericea (Huds.) Kütz.²³³
 = *Conferva sericea* Huds. [basion.]
 = *Cladophora glaucescens* (A.W.Griffiths ex Harv.) Harv., *p.p.*
Rhizoclonium Kütz.
Rhizoclonium riparium (Roth) Harv.
 = *Conferva riparia* Roth [basion.]
 = *Rhizoclonium implexum* (Dillwyn) Kütz.
 = *Rhizoclonium kochianum* Kütz.
Rhizoclonium tortuosum (Dillwyn) Kütz.²³⁴
 = *Conferva tortuosa* Dillwyn [basion.]
 = *Chaetomorpha capillaris* (Kütz.) Børgesen
 = *Chaetomorpha tortuosa* Kütz., *nom. illeg.*

229 Sierra (1983); Sierra & Fernández (1984a).

230 Pérez-Cirera (1974, 1975b); Fernández Pérez (1979). Although Díaz & al. (2008) reported as new record, the species had been cited in Asturias.

231 Sauvageau (1897a); Miranda (1931b, 1943b); Seoane-Camba (1965); Weber-Peukert & Schnetter (1982).

232 Herbarium SANT-Algae 17817 ["On sand covered *Lithophyllum*, low intertidal". Designated by P. Díaz & I. Bárbara, 2006]; Leliaert & al. (2009).

233 Fernández (1980); Fernández & al. (1983); Sierra (1983); Sierra & Fernández (1984a).

234 Anadón (1980); Fernández (1980); Anadón & Fernández (1986); Herbarium SANT-Algae 12139 ["Margen izquierda de la Ría de Navia". Designated by I. Bárbara, 1997]. We follow Silva & al. (1996) in considering *Rhizoclonium riparium* (Roth) Harv. and *Rhizoclonium tortuosum* (Dillwyn) Kütz. as distinct species.

= *Rhizoclonium lubricum* Setch. & N.L.Gardner

TREBOUXIOPHYCEAE

PRASIOLALES

PRASIOLACEAE

Prasiola Menegh. [*nom. cons.*]

Prasiola stipitata Suhr ex Jess.²³⁵

ULVOPHYCEAE

ULOTRICHALES

ULOTRICHACEAE

Ulothrix Kütz.

Ulothrix flacca (Dillwyn) Thur.

= *Conferva flacca* Dillwyn [basion.]

= *Ulothrix consociata* Wille

= *Ulothrix pseudoflacca* Wille

Ulothrix subflaccida Wille

ULVALES

CHAETOPHORACEAE

Bolbocoleon Pringsh.

Bolbocoleon piliferum Pringsh.²³⁶

Tellamia Batters

Tellamia contorta Batters²³⁷

ENDOSPHAERACEAE

Chlorochytrium Cohn

Chlorochytrium cohnii E.P.Wright²³⁸

GOMONTIACEAE

Gomontia Bornet & Flahault

Gomontia polyrhiza (Lagerh.) Bornet & Flahault²³⁹

= *Codiolum polyrhizum* Lagerh. [basion.]

KORNMANIACEAE

Pseudendoclonium Wille

Pseudendoclonium submarinum Wille²⁴⁰

MONOSTROMATACEAE

Monostroma Thur.

Monostroma obscurum (Kütz.) J.Agardh

= *Ulva obscura* Kütz. [basion.]

= *Ulvaria obscura* (Kütz.) Gayral ex Bliding

235 Miranda (1932, 1943b); Pérez-Cirera (1974, 1975b); Weber-Peukert & Schnetter (1982); Llera González & Álvarez Raboso (2007). Following Friedl & O'Kelly (2002), *Prasiola* is included in Trebouxiophyceae.

236 Reported by Miranda (1931b, 1943b).

237 Reported by Miranda (1931b, 1943b).

238 Reported by Miranda (1931b, 1943b).

239 Miranda (1931b, 1943b); Gallardo (1984); Gallardo & Álvarez (1985).

240 Miyares (1986); Fernández & Miyares (1989).

Monostroma oxyspermum (Kütz.) Doty²⁴¹

= *Ulva oxysperma* Kütz. [basion.]

= *Gayralia oxysperma* (Kütz.) K.L.Vinogr. ex Scagel, P.W.Gabrielson, Garbary, Golden, M.W.Hawkes, S.C.Lindstr., J.C.Oliveira & Widd.

= *Monostroma latissimum* Witttr.

= *Ulvaria oxysperma* (Kütz.) Bliding

PHAEOPHILACEAE

Phaeophila Hauck

Phaeophila dendroides (P.Crouan & H.Crouan) Batters²⁴²

= *Ochlochaete dendroides* P.Crouan & H.Crouan [basion.]

= *Phaeophila floridearum* Hauck

ULVALES

ULVACEAE

Blidingia Kylin

Blidingia marginata (J.Agardh) P.J.L.Dang. ex Bliding²⁴³

= *Enteromorpha marginata* J.Agardh [basion.]

= *Enteromorpha micrococca* Kütz.

Blidingia minima (Nägeli ex Kütz.) Kylin

= *Enteromorpha minima* Nägeli ex Kütz. [basion.]

Percursaria Bory

Percursaria percursa (C.Agardh) Rosenv.

= *Conferva percursa* C.Agardh [basion.]

= *Enteromorpha percursa* (C.Agardh) J.Agardh

Ulva L. [*nom. cons.*]

Ulva clathrata (Roth) C.Agardh

= *Conferva clathrata* Roth [basion.]

= *Enteromorpha clathrata* (Roth) Grev.

= *Enteromorpha crinita* Nees

= *Enteromorpha muscoides* (Clemente) Cremades

= *Enteromorpha ramulosa* (Sm.) Carmich.

Ulva compressa L.

= *Enteromorpha complanata* Kütz.

= *Enteromorpha compressa* (L.) Nees

Ulva flexuosa Wulfen²⁴⁴

= *Enteromorpha flexuosa* (Wulfen) J.Agardh

= *Enteromorpha juergensii* Kütz., *nom. illeg.*

Ulva gigantea (Kütz.) Bliding

241 Miranda (1931b); Dizerbo (1956); Anadón (1980); Herbarium SANT-Algae 12138 ["Margen izquierda de la Ría de Navia". Designated by I. Bárbara, 1997].

242 Reported by Miranda (1931b, 1943b) as *Phaeophila floridearum* Hauck.

243 Miranda (1931b, 1943a); Fernández Pérez (1979); Weber-Peukert & Schnetter (1982); Gallardo (1984).

244 Miranda (1931b, 1943a); Pérez-Cirera (1974, 1975b); Anadón (1980); Weber-Peukert & Schnetter (1982); Gallardo (1984); Gallardo & Álvarez (1985).

- = *Phycoseris gigantea* Kütz. [basion.]
Ulva intestinalis L.
 = *Enteromorpha intestinalis* (L.) Link
Ulva lactuca L.²⁴⁵
Ulva linza L.
 = *Enteromorpha linza* (L.) J.Agardh
Ulva prolifera O.F.Müll.
 = *Enteromorpha prolifera* (O.F.Müll.) J.Agardh
Ulva pseudolinza (Koeman & C.Hoek) Hayden, Blomster, Maggs, P.C.Silva,
 M.J.Stanhope & J.R. Waaland²⁴⁶
 = *Enteromorpha pseudolinza* Koeman & C.Hoek [basion.]
Ulva rigida C.Agardh²⁴⁷
Ulva rotundata Bliding²⁴⁸
Umbraulva Bae & I.K.Lee
Umbraulva olivascens (P.J.L.Dang.) Bae & I.K.Lee
 = *Ulva olivascens* P.J.L.Dang. [basion.]
 ULVELLACEAE
Acrochaete Pringsh.
Acrochaete repens Pringsh.²⁴⁹
Entocladia Reinke
Entocladia viridis Reinke²⁵⁰
 = *Endoderma viride* (Reinke) De Toni
 = *Phaeophila viridis* (Reinke) Burrows
Ulvella P.Crouan & H.Crouan
Ulvella lens P.Crouan & H.Crouan²⁵¹

245 This species includes *Ulva lactuca* f. *lacunculata* (Kütz.) Hauck. Reported by Miranda (1931b, 1943a); Valenzuela Miranda (1979) and Valenzuela & Pérez-Cirera (1982) under the name *Ulva rigida* f. *lacunculata* Hauck. However, Hauck (pp. 437, 1884) only described the form *lacunculata* to the species *U. lactuca*. For the moment, we do not have any data indicating that this species, *Ulva lactuca* L., has a more Northern distribution (Arctic region, Scandinavia and Great Britain), as it is indicated by some authors (see Bliding, 1968; Gorostiaga & al., 2004).

246 Reported by Díaz & al. (2008) as new record for Asturias.

247 Includes *Ulva rigida* var. *fimbriata* (Welw.) J.Agardh (see Herbarium SANT-Algae 14853 [“Playa de Cadavedo”]. Designated by J. Cremades & J. Dosil, 1998]; Bárbara & al., 2003a).

248 Reported by Arrontes (1983).

249 Reported by Miranda (1931b, 1943b).

250 Miranda (1943b); Pérez-Cirera (1974, 1975b); Anadón (1980).

251 Reported by Bárbara & al. (2006a).

Table 2. Number of species from Britain and Ireland (Hardy & Guiry, 2003), Basque coast (Gorostiaga & al., 2004), Asturias (this article); Galicia (Bárbara & al., 2005a), North of Portugal (Ardre, 1970; Cremades & al., 2002; Bárbara & al., 2003b; Araújo & al., 2003), South of Portugal (Ardre, 1970), Andalucía (Flores Moya & al., 1995a, 1995b; Conde & al., 1996), Atlantic coast of Morocco (Benhissoune & al., 2001, 2002a, 2002b, 2003) Canary Islands (Haroun & al., 2002) as well as comparative Feldmann's (Rhodophyta/Pheophyta; Feldmann, 1937) and Cheney's (Rhodophyta+Chlorophyta/Pheophyta; Cheney, 1977) ratios.

	Britain and Ireland	Basque coast	Asturias	Galicia	N Portugal	S Portugal	Andalucía	Atlantic coast of Morocco	Canary Islands
Rhodophyta	341	215	239	296	205	215	348	314	385
Ochrophyta	182	65	101	127	67	75	108	107	125
Chlorophyta	120	51	55	77	46	46	86	83	117
R/P ratio	1.87	3.31	2.36	2.33	3.06	2.87	3.22	2.93	3.08
R+C/P ratio	2.53	4.09	2.91	2.94	3.75	3.48	4.02	3.71	4.02

TAXA EXCLUDENDA

Rhodophyta

Acrochaetium codicola Børgesen

= *Audouinella codicola* (Børgesen) Garbary

Sheet number 320 from Faustino Miranda herbarium was determined by himself as *Acrochaetium codicola* from «La Cantábrica» (Gijón) over *Codium adhaerens*, and published under the same name by Miranda (1931b, 1943c), Valenzuela Miranda (1979) and Valenzuela & Pérez-Cirera (1982); however it actually belongs to *Rhodothamniella caespitosa* (J.Agardh) Feldmann (synonyms of *Colaconema caespitosum* (J.Agardh)) according to Guillermes & Cremades (1993).

Antithamnion plumula var. *genuinum* Hauck

Few individuals were observed in «playa de San Pedro» and «playa de Xagó» (Miranda 1931b). According to Guiry & Guiry (2007) further investigations are needed to determine the taxonomic status of this variety. The individuals collected by Faustino Miranda in Asturias seem to be *Pterothamnion plumula* (J.Ellis) Nägeli.

Botryocladia chiajeana (Menegh.) Kylin

= *Chrysomenia chiajeana* Menegh. [basion.]

Miranda (1931b, 1943d) under the name *Chrysomenia chiajeana*, pointed out the mediterranean character of this species, which was collected in «el Piles». Afonso-Carrillo & al. (2006), suggested that *Botryocladia* and *Irvinea* genera should be discriminated mostly by molecular evidence, as morphological characters vary considerably. On the other hand, nowadays the described distribution of *B. chiajeana* is just the Western Mediterranean (Spain, France and Western Italy), the Adriatic Sea (Croatian and Eastern Italy) and the Canary Islands, so it should be excluded from the Asturias seaweeds flora.

Ceramium gaditanum var. *mediterraneum* (Debray) Cremades
= *Ceramium flabelligerum* var. *mediterraneum* Debray [basion.]

Under the name *Ceramium flabelligerum* var. *mediterraneum*, Weber-Peukert & Schnetter (1982) reported this variety in Celorio. However, the distribution range of this taxon, as it is well indicated in the specific epithet of the variety, it is limited to the Mediterranean (Guiry & Guiry, 2007).

Cystoclonium purpureum (Huds.) Batters
= *Fucus purpureus* Huds. [basion.]

Reported by Lázaro é Ibiza (1889) from Salinas (Avilés). This record could be bad-state specimens of *Rhodomela subfusca* (Woodw.) C.Agardh (synonyms of *Rhodomela confervoides* (Huds.) P.C.Silva) (see Miranda, 1936). Nowadays the meridional line of the distribution of *Cystoclonium purpureum* seems to be in France (Dosil Mancilla, 2007).

Gelidium capense (S.G.Gmel.) P.C.Silva
= *Fucus capensis* S.G.Gmel. [basion.]

Gelidium capense was collected by Lázaro in the North of the Peninsula: A Coruña, San Vicente de la Barquera, Candás (Herbarium MA-Algae 4202. Designated by I. Bárbara & J. Cremades, 1996). More than two centuries ago, it was collected in several localities of British Islands and in other places in Europe; however, if we take into account the current distribution, this species is limited to South Africa (see Dosil Mancilla, 2007).

Lithophyllum crassum Phil.

This taxon was reported by Sauvageau (1897) from Gijón. The author described this specie as highly abundant. However, the type locality is at Mediterranean Sea (near Sicily), so it seemes that a misinterpretation occurred with the species collected by Sauvageau, so it could be other species of the genus *Lithophyllum*.

Ptilota gunneri P.C.Silva, Maggs & L.M.Irvine
= *Ptilota plumosa* C.Agardh

Reported by Colmeiro (1867, 1889) as *Ptilota plumosa* is the only record of this septentrional species, easy to confuse with *Plumaria plumosa* (Huds.) Kuntze (see Miranda, 1943c). Moreover, no herbarium vouchers from Asturias were found.

Rhodymenia ligulata Zanardini

Several specimens were collected by Lázaro é Ibiza (1889), which seem to be *Callophyllis laciniata* (Huds.) Kütz., *Gracilaria multipartita* (Clemente)

Harv. and *Rhodymenia pseudopalmata* (J.V.Lamour.) P.C.Silva (see Dosil Mancilla, 2007).

Ochrophyta

Cystoseira compressa (Esper) Gerloff & Nizam.

= *Fucus compressus* Esper [basion.]

= *Cystoseira fimbriata* Bory

Reported by Ardre (1971) and Ortea Rato (1977). *Cystoseira compressa* is excluded because its main range covers the Southern Iberian Peninsula, Africa, Caribbean and Mediterranean coasts (see Gómez Garreta, 2001; Barceló & al., 1994). This report could belong to *Cystoseira foeniculacea* (L.) Grev., as was pointed out by Bárbara & al. (2005a) in the coasts of Galicia.

Dictyota linearis (C.Agardh) Grev.

= *Zonaria linearis* C.Agardh [basion.]

No further information was given for this meridional taxon after Colmeiro (1889) and Lázaro é Ibiza (1889). Probably, they referred to *Dictyota dichotoma* var. *intricata* (C.Agardh) Grev.

Giraudia sphacelarioides Derbès & Solier

Sauvageau (1897a) found in Gijón some specimens of this taxon, designating as «strange individuals» of small size. Afterwards, Miranda (1943b) supported this quote. Referring to Iberian Peninsula, at present *Giraudia sphacelarioides* seems to belong to a more meridional distribution.

Laminaria digitata (Huds.) J.V.Lamour.

= *Fucus digitatus* Huds. [basion.]

= *Laminaria flexicaulis* Le Jol.

Reported by Lázaro e Ibiza (1889) and Miranda (1931b), they did not record them in Spanish coasts. Seoane-Camba (1966) concluded that all Iberian Peninsula records of this Northern taxon are misidentifications of *Laminaria ochroleuca* Bach.Pyl. mainly (see also Gorostiaga & al., 2004; Bárbara & al., 2005a).

Nemacystus erythraeus (J.Agardh) Sauv.

= *Cladosiphon erythraeus* J.Agardh [basion.]

In 1926, Miranda (1931b, 1943b) confirmed its presence in several localities: Jove, Perlora, Cervigón and La Providencia. Almost 30 years before, it was collected by Sauvageau (1897a) in Gijón, near to “la colline de Coronó” and in the same work it was set that the genus *Nemacystus* was not found in the

Atlantic Ocean. At the present time, distribution range of this species seems to be restricted to: Atlantic Islands (Canary Islands, Madeira, Salvage Islands), Africa (Egypt, Mauritania, Mauritius) and Southwest Asia (Sri Lanka) according to Guiry & Guiry (2007). Sauvageau found quite difficult to distinguish among the genus *Castagnea*, *Cladosiphon* and *Nemacystus*; even he decided to compare the material from Gijón to the herbarium sheets of Gustave Adolphe Thuret. He observed that plants from Asturias presented less rounded filament cells, considering insufficient trait for establishing a new species, although it could support a different variety *hispanicus*. Taking into account the holotype proposal by Jong & Prud'homme van Reine (1997) "PC (Herb. Thuret) (iso BM 2181), loc. Gijón (on *Cystoseira tamariscifolia* (Huds.) Papenf.), 5 Oct. 1895, leg. M.C. Sauvageau", we could define that the taxon collected by Sauvageau would belong to *Nemacystus hispanicus* (Sauv.) Kylin.

Chlorophyta

Acetabularia acetabulum (L.) P.C.Silva

= *Madrepora acetabulum* L. [basion.]

Weber-Peukert & Schnetter (1982) quoted near Celorio. Currently its presence is focused on Mediterranean basin and the Northeastern Atlantic Sea, according to Cabioc'h & al. (2007).

Codium bursa (L.) C.Agardh

= *Alcyonium bursa* L. [basion.]

The presence of this species in Asturias (La Franca; Candás) was revealed by Lázaro é Ibiza (1889). Later references of *C. bursa* in the coasts of Asturias were recorded (see Colmeiro, 1889; Seoane-Camba, 1965; Poyal Cáliz, 1992). However, it is questioned the presence of this species in the North and Northwestern coast of Spain, mainly because none researcher have observed it (Miranda, 1943d; Gorostiaga & al., 2004; Bárbara & al., 2005a; Cires Rodríguez & Rico Ordás, 2007).

Entocladia leptochaete (Huber) Burrows

= *Endoderma leptochaete* Huber [basion.]

= *Ectochaete leptochaete* (Huber) Wille

Miranda (1931b, 1943b) reported this taxon as *Ectochaete leptochaete*, which grows on the cortical cells of *Polysiphonia* sp. According to Thivy (1942) its geographical distribution is restricted to the Western Mediterranean and Atlantic coast of England and France, so it should be excluded from the Asturias seaweeds flora.

Halimeda opuntia (L.) J.V.Lamour.

= *Corallina opuntia* L. [basion.]

There are only two records of this species. The first one belongs to Lázaro é Ibiza (1889) at the locality Candás, and the second one to Colmeiro (1889), who also placed it near Candás. On the other hand, Miranda (1943d) considers the previous quotes as a label mistake in the herbarium of Lázaro é Ibiza, and not recent records exist. Indeed, *Halimeda opuntia* is the most common and widespread species of *Halimeda* worldwide, being considered pantropical.

TAXA INQUIRENDA (TAXA FROM ASTURIAS COAST THAT SHOULD BE CONFIRMED)

Cyanophyta

Brachytrichia quoyi (C.Agardh) Bornet & Flahault

= *Nostoc quoyi* C.Agardh [basion.]

The only quoted of this species corresponds to Anadón (1980). It is likely that a misinterpretation occurred, as it happened in Galicia (Bárbara & al., 2005a), corresponding to *Brachytrichia lloydii* (P.Crouan & H.Crouan) P.C.Silva. Further investigations are needed to determine its taxonomic status.

Rhodophyta

Acrochaetium desmarestiae Kylin

= *Acrochaetium sinaiae* E.Y.Dawson

Only one record in Asturias (Cabo de Peña) about *Desmarestia ligulata* (Miranda 1931b, 1943c). This author clearly found differences not only in the length of filaments but also in the number of cells compared to the plant described by Kylin (1925) from the Pacific coast of Northamerica, so the presence of this taxon is in some way dubious and requires further investigation.

Acrochaetium humile (Rosenv.) Børgeesen

= *Chantransia humilis* Rosenv. [basion.]

As the previous case, only Miranda (1931b, 1943c) described it in the North of the Iberian Peninsula. He found it in Jove (Gijón), over *Cladophora refrecta*. Following Guiry & Guiry (2007), this taxon has a more meridional distribution, such as Atlantic coasts of Morocco (Benhissoune & al., 2002), so it does not seem to be currently in our coasts. Therefore, futher investigations are required to confirm the presence of these taxa.

Acrochaetium maluinum Hamel

= *Audouinella maluina* (Hamel) South & Tittley

Only one record for Asturias coast (Miranda 1931b, 1943b). Under the

name of *Audouinella maluina*, it was located in France and Italy (Guiry & Guiry, 2007), but we should take into account that the genus *Audouinella* is considered as one of the most confused of the seaweeds (Conde, 1991; Báez & al., 2005), so further investigations are needed to determine the taxonomic status.

Asparagopsis taxiformis (Delile) Trevis.

= *Fucus taxiformis* Delile [basión.]

= *Falkenbergia hillebrandii* (Bornet) Falkenb. [tetrasporophytic phase]

The tropical-subtropical red seaweed *Asparagopsis* Montagne constitutes the haploid, gametophytic phase in a heteromorphic diplo-haplontic life cycle. The diploid tetrasporophyte is known as the *Falkenbergia* stage. Miranda (1936) collected the tetrasporophytic phase, *Falkenbergia hillebrandii*, and quotes “Jove (Gijón), julio 1935; rara, en grandes ejemplares, sobre *Cladostephus*, a muy baja mar”. For another time Miranda (1943d) includes the record of this seaweed in Gijón and in the ria of Pontevedra. On the other hand, some authors like Valenzuela Miranda (1979) and Valenzuela & Pérez-Cirera (1982) identify this tetrasporophytic phase as *Falkenbergia rufolanosa* (Harv.) F.Schmitz., and taking into account that the gametophyte of *Asparagopsis taxiformis*, which lacks spines, is cosmopolitan in warm-temperate to tropical waters. Therefore, the taxa reported by Miranda as *Falkenbergia hillebrandii* [stage] require confirmation.

Drachiella heterocarpa (Chauv. ex Duby) Maggs & Hommers.

= *Halymenia heterocarpa* Chauv. ex Duby [basión.]

= *Myriogramme heterocarpum* (Chauv. ex Duby) J.Ernst & Feldmann

Miranda (1943d) stated that its presence is unlikely in Northwestern Spain, and suggested as the most Southern locality the French atlantic coasts (Finistère). The presence of this species requires confirmation.

Grateloupia subpectinata Holmes

= *Grateloupia filicina* var. *luxurians* A.Gepp & E.Gepp.

= *Grateloupia luxurians* (A.Gepp & E.Gepp) R.J.Wilkes, L.M.McIvor & Guiry

Reported by Arronte & al. (2007) as *Grateloupia filicina* var. *luxurians*. According to I. Bárbara (personal communication, 2008), this taxon have been reported only from Galicia and Guipúzcoa. Further investigations are needed to confirm this aliens species in Asturias.

Griffithsia corallinoides (L.) Trevis.

= *Conferva corallinoides* L. [basion.]

Reported recently by Llera González & Álvarez Raboso (2007), but could be a misidentification with *Griffithsia schousboei* Mont., previously cited by Miranda (1943d). Further investigations are needed to determine the presence of this taxon.

Gymnogongrus patens (Gooden. & Woodw.) J.Agardh

= *Fucus patens* Gooden. & Woodw. [basion.]

Reported by Dizerbo (1956), Weber-Peukert & Schnetter (1982) and Fernández (1980) but no voucher specimens could be found until now of this cold-water taxon. Thus the occurrence of the first in the Asturias coast should be confirmed.

Meiodiscus spetsbergensis (Kjellm.) G.W.Saunders & McLachlan

= *Thamnidium spetsbergense* Kjellm. [basion.]

= *Rhodochorton penicilliforme* (Kjellm.) Rosenv.

Reported by Miranda (1931b, 1932, 1943c) as *Rhodochorton penicilliforme* in different places of the coast of Gijón, over same individuals of the cnidarian *Sertularia operculata* L., conferring its red colour. Valenzuela Miranda (2005a) mentions that Faustino Miranda, while he was developing the seaweeds catalogue for the Atlantic coasts of France, did not find it in Bretagne. He also mentioned that some individuals of this species were collected in Cantabrian Sea, Pointe de la Varde and Saint-Malo. Therefore, further investigations are required for this species for confirming the presence of this taxon.

Phycodrys rubens (L.) Batters

= *Fucus rubens* L. [basion.]

= *Delesseria sinuosa* J.V.Lamour., *nom. illeg.*

= *Phycodrys sinuosa* (Gooden. & Woodw.) Kütz.

Following Bárbara & al. (2005a), is possible that *Phycodrys rubens* reported by Lázaro é Ibiza (1889); Miranda (1931b, 1943c) and Pérez-Cirera (1975b) corresponds to drift and spoil material of *Delesseria sanguinea*, so more studies would be necessary for confirming the presence of this taxon.

Phyllophora pseudoceranoïdes (S.G.Gmel.) Newroth & A.R.A.Taylor

= *Fucus pseudoceranoïdes* S.G.Gmel. [basion.]

Reported by Fernández (1980) and Anadón & Niell (1981). To our knowledge, this species could be confused with *Gymnogongrus crenulatus* (Turner) J.Agardh and further studies are needed for confirmation the presence of this taxon.

Phymatolithon calcareum (Pall.) W.H.Adey & D.L.McKibbin

= *Millepora calcarea* Pall. [basion.]

= *Lithothamnion calcareum* (Pall.) Aresch.

The only record of this taxon in Asturias belongs to Poyal Cáliz (1992) as *Lithothamnion calcareum*. Therefore, further investigations are required for confirming the presence of this species on maërl beds.

Polyides rotundus (Huds.) Gaillon

= *Fucus rotundus* Huds. [basion.]

= *Polyides lumbricalis* C.Agardh, *nom. illeg.*

Polyides rotundus strongly resembles *Furcellaria lumbricalis* (Huds.) J.V.Lamour. Reports by Miranda (1931b, 1943c), Anadón (1980), Fernández (1980), Valenzuela Miranda (1979), Valenzuela & Pérez-Cirera (1982) and Fernández & al. (1983) should therefore be re-examined and requires taxonomic re-investigation.

Polysiphonia foetidissima Cocks ex Bornet

This species was reported only by Anadón (1980) and Fernández (1980) but there are no voucher specimens to confirm its presence in the Asturias coast.

Ochrophyta

Chilionema hispanicum (Sauv.) R.L.Fletcher

= *Ascocyclus hispanicus* Sauv. [basion.]

Reported by Sauvageau (1897b) as *Ascocyclus hispanicus* requires confirmation.

Cladostephus tomentosus Kütz.

Lázaro é Ibiza (1889) cited this species in San Vicente de la Barquera (Cantabria), Candás (Asturias) and A Coruña (Galicia). Also Colmeiro (1889) quoted it in San Vicente de la Barquera, Candás, and adds a new site close to Cádiz (Andalucía). We are not sure if the described species in the *Species Algarum* (Kützing, 1849: 469) should be treated as synonym of *Cladostephus spongiosus* or on the contrary it has its own identity. Therefore it requires confirmation and taxonomic re-investigation. A original description is stated below: “*Cl. trunco rigido fragili, dichotomo ramosissimo, ramis patentibus apice nudis, deorsum ex verticillorum, ramellis confervoides brevissimis densissimisque tomentoso-annulatis, annulorum (s. verticillorum) interstitiis diametro 3-4plo brevioribus; ramellis verticillorum fuscis, $\frac{1}{60}$ - $\frac{1}{50}$ ''' crassis flaccidis, articulis diametro duplo brevioribus. Altitudo 4'', crassities ramorum primar. pennae merulae. Color fuscus.- Ad. Gades (v.s.)*”.

Cystoseira barbata (Stackh.) C.Agardh

= *Abrotanifolia barbata* Stackh. [basion.]

No further information was given for this Mediterranean taxon after Lázaro é Ibiza (1889). There is only one record by the malacologist Ortea Rato (1977), in his doctoral thesis. It seems likely that a misinterpretation of this species was done, mistaking its identification, so it needs to be confirmed from the Asturias seaweeds flora.

Microspongiium globosum Reinke

= *Myrionema polycladum* Sauv.

Sauvageau (1897b) and Miranda (1943b) cited this species as *Myrionema polycladum*; no further information was given for this taxon, therefore it requires confirmation.

Sporochnus pedunculatus (Huds.) C.Agardh

= *Fucus pedunculatus* Huds. [basion.]

Miranda (1943d) indicated the likely presence of this species in the North of Iberian Peninsula. However no herbarium vouchers from Asturias have been found and this taxon requires confirmation.

Sphacelaria mirabilis (Reinke ex Batters) Prud'homme

= *Battersia mirabilis* Reinke ex Batters [basion.]

Reported by Anadón (1980) in the coasts of Asturias. However, the presence of this septentrional species is restricted to Britain, Ireland and Scandinavia according to Guiry & Guiry (2007) and Hardy & Guiry (2003). The presence of this seaweed in the coasts of Asturias requires confirmation.

Chlorophyta

Codium effusum (Raf.) Chiaje

= *Myrsidrum effusum* Raf. [basion.]

= *Codium difforme* Kütz.

This species has been quoted in the vertical walls of rocks at the inferior sublittoral level in Gijón by Miranda (1943b) (see also Seoane-Camba, 1965; Valenzuela Miranda, 1979 and Valenzuela & Pérez-Cirera, 1982). Moreover, Fischer-Piette (1963) reported this taxon as *Codium difforme*. The last cited author pointed out the difficulty of distinguishing between *C. effusum* and *C. adhaerens* C.Agardh. On the contrary, Sauvageau (1897a) commented the impossibility of determining if the individuals collected in Gijón belong to *C. difforme* or *C. adhaerens*. On the other hand, it is noticeable that *C. effusum* has a meridional distribution and no further information has been given for it, there-

fore its occurrence in the Asturias coast should be confirmed because they are often confused with *C. adhaerens*.

Codium fragile ssp. *fragile* (Suringar) Har.

= *Acanthocodium fragile* Suringar [basion.]

It is relevant to note that for many authors it has been assumed as two independent subspecies, *Codium fragile* ssp. *fragile* (Suringar) Har. and *C. fragile* ssp. *tomentosoides* (Goor) P.C.Silva. This assumption was also supported by genetic studies (see Goff & al., 1992; Pedroche, 2001; Pedroche & al., 2002). However, at the present time the invasive green alga *C. fragile* ssp. *tomentosoides* is considered a synonym of *C. fragile* ssp. *fragile* (Guiry & Guiry, 2007). According to Provan & al. (2008) and Verbruggen & al. (2007), the degree of both (small) genotypic variations reported and (large) phenotypic variation described makes the described subspecies and varieties unsustainable and it would be better to recognise one variable species for all practical purposes. In our opinion, more genetic and taxonomic studies are still needed in order to elucidate if we are talking about one or two subspecies. The presence of *Codium fragile* ssp. *tomentosoides* in the coasts of Asturias, has been confirmed in several times (Cires Rodríguez, 2005; Cires Rodríguez & Cuesta Moliner, 2006; Cires Rodríguez & Rico Ordás, 2007; Provan & al., 2008; Arronte & al., 2007). Also noteworthy that morphological analysis of *Codium* from different sites throughout Asturias coast (Cires Rodríguez, 2005; Cires Rodríguez & Rico Ordás, 2007) supported the presence of a group of individuals not previously described, where their mucrons were of intermediate length and did not overlap with any species or subspecies from other sites (this phenomenon was also reported by Kusakina & al. (2006) in Atlantic Canada). Mucron length has always been one of the main features used to distinguish between *Codium* subspecies (Prince & Trowbridge, 2004; Trowbridge, 1998, 2001; Trowbridge & al. 2004). Using only morphometrical analysis, it was difficult to decide whether these thallis were a phenotypic variant of either ssp. *fragile*, ssp. *tomentosoides* or ssp. *atlanticum*, or whether they represented a separate introduction of a different or new subspecies (maybe between *C. tomentosum* and some subspecies of *C. fragile* or among different subspecies of *C. fragile*). The discussion on the taxonomic ranks infraspecific exceeds the intent of this study, so this group still requires taxonomic re-investigation.

Enteromorpha compressa var. *caespitosa* (Le Jol.) Rabenh.

= *Ulva enteromorpha* f. *caespitosa* Le Jol. [basion.]

Lázaro é Ibiza (1889) and Gallardo (1984), point out its presence in Asturias in the localities of Franca and Candás. According to Benhissoune & al. (2001) this variety has to be referred *Enteromorpha muscoides* (Clemente) Cre-

mades; and this name is currently regarded as a synonym of *Ulva clathrata* (Roth) C.Agardh. Following Hayden & al. (2003), the genus *Enteromorpha* is included in *Ulva*.

Enteromorpha intestinalis f. *cornucopiae* (Lyngb.) J.Agardh
 = *Scytosiphon intestinalis* var. *cornucopiae* Lyngb. [basion.]
 = *Enteromorpha intestinalis* var. *cornucopiae* (Lyngb.) Rabenh.

Miranda (1931b) reported it in the mouths of freshwater streams, while Lázaro é Ibiza (1889) described it at «Playa de La Franca». So, the infraspecific form of *Enteromorpha intestinalis* should be named as *Ulva intestinalis*. This is a provisional entry and it has not been subject to verification. More studies are needed to clarify whether it is a variety form or they do not have a taxonomic identity of its own.

Enteromorpha intestinalis var. *mesenteriformis* Kütz.

This variety has been reported by Lázaro é Ibiza (1889) in Candás. Kützing (1845: 247), provides as type locality: «In der Ostsee» (Germany: Baltic Sea). It is also quoted by Silva & al. (1996) for the Indian Ocean. Its presence and taxonomic treatment need to be confirmed.

Epicladia perforans (Huber) R.Nielsen
 = *Endoderma perforans* Huber [basion.]

Anadón (1980) quoted this species for the coast of Asturias as *Endoderma perforans*. According to Brodie & al. (2005), this record is quiet difficult to distinguish from other species. Currently, this species is located in more septentrional coastal areas; further investigations are needed to determine the presence of this species.

POTENTIAL TAXA (TAXA FROM NEARBY REGIONS THAT SHOULD BE CONFIRMED FOR ASTURIAS)

Rhodophyta

Ceramium deslongchampsii Chauv. ex Duby

Requires confirmation since no herbarium vouchers from Asturias have been found; as it happens in Galicia (Bárbara & al., 2005a) it could be *Ceramium diaphanum* (Lightf.) Roth.

Dasya sessilis Yamada

The alien species *Dasya sessilis* Yamada is a new record for the European Atlantic coasts (Peña & Bárbara, 2006) exactly in A Coruña, Lugo, Pontevedra, and for the moment it has not been found in Asturias. *D. sessilis* was misiden-

tified with other Dasyaceae species (Bárbara & al., 2005a). Therefore, this genus requires taxonomic re-investigacion for Asturias.

Grateloupia turuturu Yamada

The presence of this invasive species requires confirmation since no herbarium vouchers from Asturias have been found. Previous studies (Bárbara & Cremades, 2004) have pointed out the presence of this species in the North of Iberian Peninsula, and it is not reject its future expansion along the whole Cantabrian coast. Therefore, and considering the above-cited taxon, further investigations are needed dentro about *Grateloupia* genus to determinate its taxonomic status.

Ochrophyta

Alaria esculenta (L.) Grev.

= *Fucus esculentus* L. [basion.]

This species has a septentrional distribution and no further information has been given for it, therefore its occurrence in the Asturias coast should be confirmed. *Alaria esculenta*, has a distinct midrib as *Undaria pinnatifida* (Harv.) Suringar but is much narrower than the second. Its blade is not divided into lobes and it is quite different from the wavy frills of *Undaria pinnatifida*. According to Pérez-Ruzafa & al. (2002), the only species of the family Alariaceae is *Undaria pinnatifida*.

Carpomitra costata (Stackh.) Batters

= *Fucus costatus* Stackh. [basion.]

This species ha been quoted in the North of Iberian Peninsula (Gorostiaga & al., 2004; Bárbara & al., 2005a). However, the presence of this seaweed in the coasts of Asturias requires confirmation.

Desmarestia dudresnayi J.V.Lamour. ex Léman

This species ha been quoted in the North of Iberian Peninsula (Gorostiaga & al., 2004; Bárbara & al., 2005a). Nevertheless, this species requires confirmation.

Chlorophyta

Ulva pertusa Kjellm.

Revision of *Ulva* specimens shows that *Ulva pertusa* has often misidentified on the Northwest of Iberian Peninsula coast, for example as *Ulva rigida* C.Agardh or *Umbraulva olivascens* (P.J.L.Dang.) Bae & I.K.Lee (see Baamonde López & al., 2007). It may have been present for some time in the Northwest of Iberian Peninsula, but overlooked or mistaken for another species of this genus. However, the presence of this species has not yet been confirmed in Asturias.

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Appendix I. Index of genera. The type of a generic name based on *Index Nominum Genericorum* (Farr & Zijlstra, 2007) is shown in brackets.

<i>Acinetospora</i> { <i>A. pusilla</i> (A.W.Griffiths ex Harv.) De Toni}	172	<i>Ceramium</i> { <i>C. virgatum</i> Roth (<i>typ. cons.</i>)}	151
<i>Acrochaete</i> { <i>A. repens</i> Pringsh.}	186	<i>Chaetomorpha</i> { <i>C. melagonium</i> (F.Weber & D.Mohr) Kütz.}	182
<i>Acrochaetium</i> { <i>A. secundatum</i> (Lyngb.) Nägeli} ...	148	<i>Chamaecalyx</i> { <i>C. swirenkoi</i> (Schirsch.) Komárek & Anagn.}	143
<i>Acrosiphonia</i> { <i>non designatus</i> }	181	<i>Champia</i> { <i>C. lumbricalis</i> (L.) Desv.}	169
<i>Acrosorium</i> { <i>A. aglaophylloides</i> Zanardini ex Kütz.}	154	<i>Chlorochytrium</i> { <i>C. lemnae</i> Cohn}	184
<i>Aglaothamnion</i> { <i>A. furcellariae</i> (J.Agardh) Feldm.- Maz.}	149	<i>Chondracanthus</i> { <i>C. chauvinii</i> (Bory) Kütz.}	165
<i>Ahnfeltia</i> { <i>A. plicata</i> (Huds.) Fr. (<i>typ. cons.</i>)}	149	<i>Chondria</i> { <i>C. tenuissima</i> (With.) C.Agardh}	156
<i>Ahnfeltiopsis</i> { <i>A. linearis</i> (C.Agardh) P.C.Silva & T.C.DeCew}	166	<i>Chondrus</i> { <i>C. crispus</i> Stackh.}	165
<i>Aiolocolax</i> { <i>A. pulchella</i> Pocock}	156	<i>Chorda</i> { <i>C. filum</i> (L.) Stackhouse}	179
<i>Amphiroa</i> { <i>A. tribulus</i> (J.Ellis & Sol.) J.V.Lamour.}	160	<i>Choreonema</i> { <i>C. thuretii</i> (Bornet) F.Schmitz}	160
<i>Anabaena</i> { <i>A. oscillarioides</i> Bory ex Bornet & Flahault}	144	<i>Chrysmenia</i> { <i>C. ventricosa</i> (J.V.Lamour.) J.Agardh}	170
<i>Anotrichium</i> { <i>A. barbatum</i> (C.Agardh) Nägeli} ...	150	<i>Chylocladia</i> { <i>C. kaliformis</i> (With.) Grev.}	169
<i>Antithamnion</i> { <i>A. cruciatum</i> (C.Agardh) Nägeli} .	150	<i>Cladophora</i> { <i>C. oligoclona</i> (Kütz.) Kütz.}	183
<i>Antithamnionella</i> { <i>A. sarniensis</i> Lyle}	150	<i>Cladostephus</i> { <i>C. spongiosus</i> (Huds.) C.Agardh} .	180
<i>Aphanocapsa</i> { <i>A. parietina</i> (Nägeli) Nägeli}	144	<i>Coccotylus</i> { <i>C. brodiaei</i> (Turner) Kütz.}	166
<i>Apoglossum</i> { <i>A. ruscifolium</i> (Turner) J.Agardh} ...	154	<i>Codium</i> { <i>C. tomentosum</i> Stackh.}	182
<i>Arthrospira</i> { <i>A. jenneri</i> Stizenb. ex Gomont}	146	<i>Colaconema</i> { <i>C. bonnemaisoniae</i> Batters}	160
<i>Ascocyclus</i> { <i>A. magnusii</i> Sauv.}	173	<i>Colpomenia</i> { <i>C. sinuosa</i> (Mert. ex Roth) Derbès & Solier}	177
<i>Ascophyllum</i> { <i>A. laevigatum</i> Stackh., <i>nom. illeg.</i> }	178	<i>Compsothamnion</i> { <i>C. thuyoides</i> (Sm.) Nägeli}	152
<i>Asparagopsis</i> { <i>A. delilei</i> (Mont.) Mont., <i>nom.</i> <i>illeg.</i> }	149	<i>Corallina</i> { <i>C. officinalis</i> L.}	160
<i>Asperococcus</i> { <i>non designatus</i> }	174	<i>Cordylecladia</i> { <i>C. erecta</i> (Grev.) J.Agardh}	170
<i>Bachelotia</i> { <i>B. fulvescens</i> (Bornet) Kuck. ex Hamel}	181	<i>Crouania</i> { <i>C. attenuata</i> (C.Agardh) J.Agardh}	152
<i>Bangia</i> { <i>B. fuscopurpurea</i> (Dillwyn) Lyngb.}	147	<i>Cruoria</i> { <i>C. pellita</i> (Lyngb.) Fr.}	164
<i>Bifurcaria</i> { <i>B. tuberculata</i> Stackh.}	177	<i>Cryptonemia</i> { <i>C. lactuca</i> (C.Agardh) J.Agardh} ...	162
<i>Blennothrix</i> { <i>B. vermicularis</i> (Gomont) Kütz. ex Anagn. & Komárek}	145	<i>Cryptopleura</i> { <i>C. lacerata</i> (S.G.Gmel.) Kütz.}	154
<i>Blidingia</i> { <i>B. minima</i> (Nägeli ex Kütz.) Kylin}	185	<i>Ctenosiphonia</i> { <i>C. hypnoides</i> (Welw. ex J.Agardh) Falkenb.}	156
<i>Boergesenella</i> { <i>B. fruticulosa</i> (Wulfen) Kylin} ...	156	<i>Cutleria</i> { <i>C. multifida</i> (Sm.) Grev.}	171
<i>Bolbocoleon</i> { <i>B. piliferum</i> Pringsh.}	184	<i>Cyanocystis</i> { <i>C. versicolor</i> Borzi}	144
<i>Bonnemaisonia</i> { <i>B. asparagoides</i> (Woodw.) C.Agardh}	149	<i>Cystoseira</i> { <i>C. concatenata</i> (L.) C.Agardh}	177
<i>Boreolithon</i> { <i>B. van-heurckii</i> (Heydr.) A.S. Harvey & Woelk.}	160	<i>Dasya</i> { <i>D. pedicellata</i> (C.Agardh) C.Agardh}	154
<i>Bornetia</i> { <i>B. secundiflora</i> (J.Agardh) Thur.}	151	<i>Delesseria</i> { <i>D. sanguinea</i> (Huds.) J.V.Lamour.} ...	155
<i>Bostrychia</i> { <i>B. scorpioides</i> (Huds.) Mont.}	156	<i>Derbesia</i> { <i>D. marina</i> (Lyngb.) Solier}	182
<i>Brachytrichia</i> { <i>B. quoyi</i> Bornet & Flahault}	147	<i>Dermocarpella</i> { <i>D. hemisphaerica</i> (Lemmerm.) Lemmerm.}	144
<i>Brongniartella</i> { <i>B. elegans</i> Bory, <i>nom. illeg.</i> }	156	<i>Desmarestia</i> { <i>D. aculeata</i> (L.) J.V.Lamour.}	171
<i>Bryopsis</i> { <i>B. pennata</i> J.V.Lamour.}	181	<i>Dictyopteris</i> { <i>D. polyodioides</i> (DC.) J.V.Lamour.}	171
<i>Calliblepharis</i> { <i>C. ciliata</i> (Huds.) Kütz.}	165	<i>Dictyota</i> { <i>D. dichotoma</i> (Huds.) J.V.Lamour. (<i>typ.</i> <i>cons.</i>)}	172
<i>Callithamnion</i> { <i>C. corymbosum</i> (Sm.) Lyngb.} ...	151	<i>Dilsea</i> { <i>D. edulis</i> (Stackh.) Stackh.}	162
<i>Callophyllis</i> { <i>C. variegata</i> (Bory) Kütz.}	162	<i>Drachiella</i> { <i>D. spectabilis</i> J.Ernst & Feldmann} ..	155
<i>Calothrix</i> { <i>C. confervicola</i> C.Agardh ex Bornet & Flahault}	144	<i>Dumontia</i> { <i>D. incrassata</i> (O.F.Müll.) J.V.Lamour.}	162
<i>Catenella</i> { <i>C. opuntia</i> (Gooden. & Woodw.) Grev.}	164	<i>Ectocarpus</i> { <i>E. siliculosus</i> (Dillwyn) Lyngb.}	176
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