

## A Checklist of the Seaweeds of the Mediterranean and Atlantic Coasts of Morocco. II. Phaeophyceae

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A checklist of Moroccan marine brown algae, based on both literature records and some original data, is given. The distribution of each taxon for this region (12 Mediterranean and 27 Atlantic localities) is reported. Using present-day taxonomy, 131 species, infraspecific taxa and life-history phases are accepted for the Moroccan coasts.

### Introduction

Several attempts have been made to produce a checklist of Moroccan marine seaweeds. Some of these are blatantly out of date (*e.g.* Bornet 1892, Debray 1897, Gattefossé and Werner 1935, Gayral 1961). Others only concern the Mediterranean coast (Navarro and Gallardo 1989, Ribera *et al.* 1992, González-García and Conde-Poyales 1994), while the recent checklist of Riadi and Kazzaz (1998) appears to be incomplete and uncritical.

If biogeographical comparisons are to be made between Moroccan provinces, as well as between Morocco and neighbouring countries, on the basis of recent checklists (*e.g.* South and Tittley 1986, Lawson and John 1987, Fletcher 1987 and Ribera *et al.* 1992), an updated and critical checklist must be drawn up.

The present paper is the second part of a checklist intended to be a catalogue of benthic multicellular algae of the Moroccan coasts, which includes the Chlorophyceae *s. l.* (Benhissoune *et al.* 2001), Phaeophyceae (= Fucophyceae; present study) and Rhodophyta.

### Material and Methods

In this paper, the Moroccan coasts correspond to the geographical concept of Morocco, in other words, the Spanish territories of Ceuta, Melilla and the Chafarinas Islands are included. We have considered 39 localities (Fig. 1, Table I), 12 of which are in the Mediterranean (M; from East to West: Saaidia, Chafarinas Islands, Nador, Melilla, Al Hoceima, Jabha, Tamernoute, M'diq, Cabo Negro, Tetouan, Ceuta, Ksar-Sghir) and 27 are found along the Atlantic coast (A; from North to South: Tanger, Cap Spartel, Azilah, Larache, Moulay Bou Selham, Kenitra, Salé, Rabat, Temara, Bouznika, Mohammedia, Casablanca, El Jaidia, Oualidia, Safi, Djorf el Yhoudi, Sidi Boulbra, Essaouira, Imessouane, Cap Ghir, Agadir, Tifnit, Mirhleft, Sidi Ifni, Tan Tan).

Essaouira, Imessouane, Cap Ghir, Agadir, Tifnit, Mirhleft, Sidi Ifni, Tan Tan, Moroccan Sahara and Cap Blanc). The toponymy is that of the MARCUS map (1/1400000) edited in 1980 by the National Topographical Center of Morocco.

The accepted taxon name is followed (between square brackets) by the basionym and by the other synonyms used by the authors of Moroccan citations. The taxa (orders, families, genera and species) are arranged alphabetically. When infraspecific taxa are listed, the autonym, if present, is cited first. Delin-

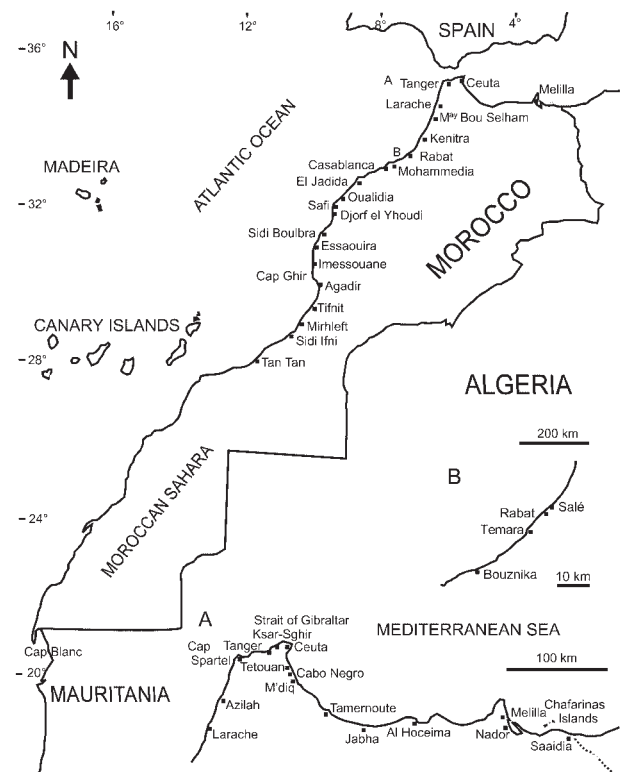


Fig. 1. Map of the Moroccan localities taken into consideration.

Table I. List of localities taken into consideration (see Fig. 1) and alternative names for these localities.

Localities	Alternative names	Neighbouring
Agadir		Amesnaz, El Khemiss
Al Hoceima		
Azilah	Assila, Azila	
Bouznika		Oued Cherrat
Cabo Negro	Cabo-negro	
Cap Blanc		
Cap Ghir		
Cap Spartel		
Casablanca	Aïn Diab, Aïn seba	El Hank, Sidi Abderrahmane, Oukacha, Dar Bouazza, Dar Ben Abid
Ceuta		Benyounes = Benzu
Chafarinas Islands		
Djorf el Yhoudi		Jorf el Yhoudi
El Jadida	Mazagan	Moulay Abdelah, Sidi Bouzid, Azemour
Essaouira	Saouira	Mogador
Imessouane		
Jabha		
Kenitra		Mehdia, Sebou
Ksar-Sghir	Ksar es ghir	
Larache		
M'diq		
Melilla		Cabo tres forces, Cala blanca, Segunda caseta, Atalayoun
Mirhleft	Mirleft	Aglou, sidi moussa d'Aglou, Tiznit
Mohammedia	Fedala, Zenatta, Zenattas	Oued Mellah, Oued Nefifikh, Lalla mimouna
Moroccan Sahara		Rio de Oro, Oued eddahab
Moulay Bou Selham		
Nador	Mar Chica, Sebcha Bouareg	Lagune de Nador
Oualidia		Sidi Moussa, lagune de sidi moussa
Rabat		
Saaidia	Essaaidia	
Safi	Asfi	Cap Cantin
Salé	Kasba Guenaoua	Camp sartige, Bou regreg, Bou Regreg, bou reg-reg
Sidi Boulbra		
Sidi Ifni		
Tamernoute		
Tan Tan	Tan-Tan, TanTan, Tantan	
Tanger	Tangiers	
Temara		Oued yquem, Rose marie, Gay Ville, Sables d'Or, El Harhoura, Skhirat
Tetouan		Cabo Mazari, Martil
Tifnit		

Citations from neighbouring localities were attributed to the names of the locality in the far left-hand column.

ation of the orders and families follows that used by Silva *et al.* (1996). For each taxon and each locality, the numbers between brackets refer to the references. A question mark after the reference number signifies that the taxon was mentioned with doubt. '\*' means that the taxon was collected by one of the authors of the present study (S. B.). The liquid preserved specimens and exsiccates were deposited in the Herbarium Benhissoune, Département de Biologie, Faculté des Sciences, Agadir.

## Results

The present checklist encompasses 131 items (species, infraspecific taxa and life-history phases). Some taxa

listed and cited here require further investigation (see the Notes section). In addition, three taxa are considered as taxa *excludenda* and two as taxa *inquirenda*.

## Checklist of Phaeophyceae

### Chordariales

#### Chordariaceae

*Cladosiphon zosterae* (J. Agardh) Kylin [= *Myriocladia zosterae* J. Agardh, *Castagnea zosterae* (J. Agardh) Thuret]. **A:** Tanger (9?).

*Levringia atlantica* (J. Feldmann) Kylin<sup>1</sup> [= *Myriogloea atlantica* J. Feldmann]. **A:** Rabat (42), Moroccan Sahara (23, 29, 30, 31, 42, 61).

- Levringia brasiliensis* (Montagne) A. B. Joly<sup>1</sup> [= *Mesogloea brasiliensis* Montagne]. **A:** Rabat (42), Temara (3, 12, 13, 40), without locality (41).  
*Liebmannia leveillei* J. Agardh. **A:** Tanger (9, 25, 38).  
*Mesogloia vermiculata* (J. E. Smith) S. F. Gray [= *Rivularia vermiculata* J. E. Smith]. **M:** Cabo Negro (58), Ksar-Sghir (58).  
*Sauvageaugloia divaricata* (Clemente) Cremades<sup>2</sup> [= *Ulva divaricata* Clemente, *Myriocladia chordariaeformis* P. L. Crouan et H. M. Crouan, *Sauvageaugloia chordariaeformis* (P. L. Crouan et H. M. Crouan) Kylin]. Without locality (8).  
*Sauvageaugloia griffithsiana* (A.W. Griffiths ex Harvey) G. Hamel ex Kylin<sup>2</sup> [= *Mesogloia griffithsiana* A.W. Griffiths ex Harvey]. **A:** Tanger (9, 25, 38, 100).

### Corynophlaeaceae

- Corynophlaea umbellata* (C. Agardh) Kützing [= *Corynophora umbellata* C. Agardh]. **A:** Tanger (38, 100).  
*Leathesia difformis* (Linnaeus) J. E. Areschoug [= *Tremella difformis* Linnaeus, *Leathesia difformis* (Linnaeus) J. E. Areschoug var. *tingitana* Schousboe ex Bornet]. Without locality (8). **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58). **A:** Tanger (9, 25, 38, 100), Temara (12, 21), Bouznika (100), without locality (20).  
*Myriactula arabica* (Kützing) J. Feldmann [= *Phycophila arabica* Kützing, *Myriactis arabica* (Kützing) Kuckuck] **A:** Tanger (38).

### Elachistaceae

- Elachista flaccida* (Dillwyn) Fries [= *Conferva flaccida* Dillwyn]. Without locality (8). **A:** Tanger (9, 25, 38, 100), Temara (3, 12), Mohammedia (3), Casablanca (21, 38, 100), El Jadida (21, 100), without locality (40).  
*Elachista fucicola* (Vellely) Areschoug [= *Conferva fucicola* Vellely]. **A:** El Jadida (\*), Oualidia (\*), Sidi Boulbra (6, 7), Essaouira (\*), Agadir (\*).  
*Elachista neglecta* Kuckuck. **A:** Temara (3), Mohammedia (3).

### Myrionemataceae

- Myrionema strangulans* Carmichael ex Greville [= *Myrionema vulgare* Thuret]. **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58). **A:** Tanger (9, 25, 38).

### Cutleriales

#### Cutleriaceae

- '*Aglaozonia chilosa* Falkenberg' life-history phase<sup>3</sup>. **M:** Saaidia (\*), M'diq (\*), Cabo Negro (58), Ksar-Sghir (\*). **A:** Tanger (\*), Temara (3, \*), Mohammedia (3, \*), El Jadida (\*).

'*Aglaozonia melanoidea* (Schousboe ex Bornet) Sauvageau' life-history phase<sup>4</sup> [= *Zonaria melanoidea* Schousboe ex Bornet]. **M:** Saaidia (\*), M'diq (\*), Tetouan (\*). **A:** Tanger (\*), Temara (3, \*), Mohammedia (3, \*).

'*Aglaozonia parvula* (Greville) Zanardini' life-history phase<sup>5</sup> [= *Zonaria parvula* Greville]. **M:** Saaidia (50, \*), Nador (50), Melilla (48, 50), Al Hoceima (50), Jabha (\*), Tetouan (\*). **A:** Tanger (\*), Larache (\*), Temara (3, \*), Mohammedia (3, \*).

*Cutleria adspersa* (Mertens ex Roth) De Notaris<sup>4</sup> [= *Ulva adspersa* Mertens ex Roth]. Without locality (8). **M:** Saaidia (50, \*), Melilla (50), Al Hoceima (50), Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58, \*). **A:** Tanger (9, 25, 38), Rabat (21), Temara (3, 12, \*), Mohammedia (3, 71), El Jadida (5), Essaouira (21, \*), Agadir (21, \*), without locality (20, 40).

*Cutleria multifida* (J. E. Smith) Greville<sup>5</sup> [= *Ulva multifida* J. E. Smith]. **M:** Melilla (50), Al Hoceima (50), Jabha (\*). **A:** Tanger (9, 25, 38).

*Zanardinia typus* (Nardo) G. Furnari [= *Stiffitia typus* Nardo, *Padina collaris* Montagne, *Zanardinia prototypus* (Nardo) Nardo nom. illeg., *Zanardinia collaris* (Montagne) P. L. Crouan et H. M. Crouan]. **M:** Saaidia (\*), Chafarinas Islands (35), Nador (69). **A:** Tanger (9, 25, 38), Casablanca (38).

### Desmarestiales

#### Arthrocladiaceae

*Arthrocladia villosa* (Hudson) Duby [= *Conferva villosa* Hudson]. **A:** Tanger (9).

#### Desmarestiaceae

*Desmarestia ligulata* (Lightfoot) J. V. Lamouroux [= *Fucus ligulatus* Lightfoot, *Desmarestia herbacea* (Turner) J. V. Lamouroux]. **A:** Tanger (9, 25, 38), Mohammedia (38), El Jadida (\*), Essaouira (21, \*), without locality (40).

### Dictyosiphonales

#### Asperococcaceae

*Asperococcus bullosus* J. V. Lamouroux [= *A. turneri* (Dillwyn ex J. E. Smith) W. J. Hooker]. **M:** Saaidia (\*), Nador (47, 50, 51), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*). **A:** Tanger (9, 25, 38, 100, \*), Azilah (\*), Larache (\*), Temara (\*), El Jadida (\*), Agadir (\*), Tan Tan (\*).

*Asperococcus compressus* A. W. Griffiths ex W. J. Hooker [= *Haloglossum compressum* (A. W. Griffiths ex W. J. Hooker) G. Hamel]. **A:** Tanger (9, 38), Temara (42).

*Hecatonema terminale* (Kützing) Kylin<sup>6</sup> [= *Ectocarpus terminalis* Kützing]. **A:** Tanger (9, 25, 38), Rabat (42), Temara (3), Mohammedia (3, 71).

## Myriotrichiaceae

*Litosiphon laminariae* (Lyngbye) Harvey [= *Bangia laminariae* Lyngbye]. **A:** Casablanca (21), Essaouira (21).

## Dictyotales

## Dictyotaceae

*Dictyopteris polypodioides* (De Candolle) J. V. Lamouroux [= *Ulva polypodioides* De Candolle, *Dictyopteris membranacea* (Stackhouse) Batters]. Without locality (8). **M:** Chafarinas Islands (14, 67), Melilla (10, 48), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*), without locality (50). **A:** Tanger (9, 16, 25, 38, 100), Rabat (12, 21, 25, 38, 100), Temara (12, 21, 100), Mohammedia (3, 71), Casablanca (21, 38, 81, 100), El Jadida (5, 18, 21, 25, 38, 81, 98, 100, \*), Oualidia (\*), Djorf el Yhoudi (98, 100), Sidi Boulbra (6, 7), Essaouira (21, 25, 38, 81, 98, 100, \*), Agadir (\*), Sidi Ifni (\*), cosmopolitan (21), without locality (40).

*Dictyota bartayresiana* J.V. Lamouroux [= *D. bartayresii* J.V. Lamouroux]. **A:** Moroccan Sahara (61).

*Dictyota ciliolata* Sonder ex Kützing. **A:** Moroccan Sahara (61).

*Dictyota dichotoma* (Hudson) J. V. Lamouroux var. *dichotoma* [= *Ulva dichotoma* Hudson]. Without locality (8). **M:** Saaidia (\*), Chafarinas Islands (14, 67), Nador (47, 51), Melilla (10, 48), Tamernoute (58), M'diq (\*), Cabo Negro (58), Tetouan (67, \*), Ksar-Sghir (58), without locality (50). **A:** Tanger (9, 25, 38, 100, \*), Azilah (\*), Rabat (21, 38, 81), Temara (3, 12, 100, \*), Mohammedia (3, 71, 72, \*), Casablanca (21, 38, 81, 98, 100), El Jadida (5, 18, 98, 100, \*), Oualidia (\*), Safi (100), Djorf el Yhoudi (100), Sidi Boulbra (6, 7), Essaouira (21, 38, 39, 81, 98, \*), Cap Ghir (98, 99, 100), Agadir (99, \*), Tan Tan (\*), cosmopolitan (21), without locality (40).

*Dictyota dichotoma* (Hudson) J. V. Lamouroux var. *intricata*<sup>7</sup> (C. Agardh) Greville [= *Zonaria dichotoma* (Hudson) C. Agardh var. *intricata* C. Agardh, *Dictyota dichotoma* (Hudson) J. V. Lamouroux var. *implexa* (Desfontaines) S. F. Gray]. **M:** Chafarinas Islands (14, 67), Melilla (48), M'diq (\*), Tetouan (\*), without locality (50). **A:** Tanger (9, 25, 38), Larache (\*), Temara (3, \*), Mohammedia (3, \*), El Jadida (\*), Agadir (\*), Tifnit (\*).

*Dictyota fasciola* (Roth) J.V. Lamouroux var. *fasciola* [= *Fucus fasciola* Roth, *Dilophus fasciola* (Roth) M. Howe]. Without locality (8). **M:** Chafarinas Islands (35), Nador (50), Melilla (50), Al Hoceima (50), Jabha (50), Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58). **A:** Rabat (100), Temara (3, 12, 21), Bouznika (100), Mohammedia (3, 71), El Jadida (5), without locality (20, 40).

*Dictyota fasciola* (Roth) J. V. Lamouroux var. *repens* (J. Agardh) Ardissonne [= *Dictyota repens* J. Agardh]. **A:** Tanger (9, 25, 38).

*Dictyota linearis* (C. Agardh) Greville<sup>7</sup> [= *Zonaria linearis* C. Agardh]. **M:** Saaidia (50), Nador (50), Melilla (10, 48, 50). **A:** Tanger (9, 25, 38, 100), Temara (21, 100), Bouznika (100).

*Dictyota spiralis* Montagne [= *Dictyota ligulata* Kützing, *Dilophus spiralis* (Montagne) G. Hamel, *Dilophus ligulatus* (Kützing) J. Feldmann]. Without locality (8). **M:** Chafarinas Islands (14, 67), Nador (51), Melilla (10, 48), Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58), without locality (50). **A:** Tanger (9, 25, 38, 100), Rabat (21, 38), Temara (3, 100), Mohammedia (3, 71), Casablanca (21, 38, 81, 100), El Jadida (5, 21, 100), Essaouira (21, 38, 81), Agadir (21, 100), without locality (40).

*Lobophora variegata* (J. V. Lamouroux) Womersley ex E. C. Oliveira [= *Dictyota variegata* J. V. Lamouroux, *Aglaozonia canariensis* Sauvageau]. Without locality (8). **A:** Moroccan Sahara (61).

*Padina pavonica* (Linnaeus) Thivy [= *Fucus pavonicus* Linnaeus, *Padina pavonia* J. V. Lamouroux]. Without locality (8). **M:** Chafarinas Islands (14, 67), Nador (47, 51), Melilla (10, 48), Tamernoute (58), M'diq (\*), Cabo Negro (58), Tetouan (\*), Ksar-Sghir (58, \*), without locality (50). **A:** Tanger (9, 25, 38), Azilah (\*), Larache (\*), Rabat (21, 38), Temara (3, 12, \*), Mohammedia (3, 71, \*), Casablanca (21, 38, 81), El Jadida (5, \*), Oualidia (\*), Essaouira (21, 38, \*), Cap Ghir (98, \*), Sidi Ifni (\*), Tan Tan (\*), cosmopolitan (21), without locality (40, 56).

*Spatoglossum schroederi* (C. Agardh) Kützing [= *Zonaria schroederi* C. Agardh, *Spatoglossum areschougii* J. Agardh]. **A:** Rabat (19, 21, 63, 100), Temara (19, 21, 100), Moroccan Sahara (61).

*Spatoglossum solieri* (Chauvin ex Montagne) Kützing [= *Dictyota solieri* Chauvin ex Montagne]. **M:** Saaidia (\*), Al Hoceima (50), Jabha (\*), M'diq (\*). **A:** Tanger (9, 19, 25, 38, 100, \*), Temara (3, 12, 21, \*), Bouznika (100), Mohammedia (3, 71, \*), Casablanca (19, 21, 38, 81, 100), El Jadida (\*), without locality (40, 43).

*Taonia atomaria* (Woodward) J. Agardh<sup>8</sup> [= *Ulva atomaria* Woodward]. Without locality (8). **M:** Saaidia (\*), Nador (47, 50, 51), Melilla (50), Al Hoceima (50), Jabha (\*), M'diq (\*), Tetouan (\*), Ksar-Sghir (\*). **A:** Tanger (9, 25, 38, 100, \*), Azilah (\*), Larache (\*), Temara (3, 12, 21, 100, \*), Bouznika (100), Mohammedia (3, 71, \*), Casablanca (21, 38, 81, 100), Oualidia (\*), Safi (100), Essaouira (\*), Sidi Ifni (\*), Tan Tan (\*), without locality (40).

*Taonia pseudociliata* (J. V. Lamouroux) Nizamuddin et Godeh<sup>8</sup> [= *Fucus pseudociliatus* J. V. Lamouroux, *Dictyota ciliata* J. V. Lamouroux, *Taonia atomaria* (Woodward) J. Agardh f. *ciliata* (J. V. Lamouroux) Nizamuddin]. **M:** Chafarinas Islands (67).

*Zonaria tournefortii* (J. V. Lamouroux) Montagne [= *Fucus tournefortii* J. V. Lamouroux]. Without locality (8). **M:** Nador (47, 50, 51), Melilla (10, 48, 50), Al Hoceima (50), Jabha (\*), M'diq (\*), Ksar-Sghir (\*). **A:** Tanger (9, 25, 38, 55, 100, \*), Azilah (\*), Larache

(\*), Rabat (21, 38, 81, 100), Temara (3, 12, 21, 99, 100, \*), Mohammedia (3, 71, 81, 99, 100, \*), Casablanca (21, 38, 81, 100), El Jadida (21, 25, 38, 81, \*), Cap Ghir (99, 100), Agadir (99, \*), Tifnit (\*), Sidi Ifni (\*), without locality (40).

## Ectocarpales

### Ectocarpaceae

*Acinetospora crinita* (Carmichael) Kornmann [= *Ectocarpus crinitus* Carmichael, *Acinetospora vidovichii* (Meneghini) Sauvageau, *A. pusilla* (Griffiths ex Harvey) De Toni, *Ectocarpus pusillus* Griffiths ex Harvey]. **M:** Saaidia (50, \*), Nador (50), Melilla (50), Jabha (\*), Tamernoute (58), M'diq (\*), Cabo Negro (58). **A:** Imessouane (42).

*Ectocarpus fasciculatus* Harvey var. *fasciculatus*. **M:** Melilla (48), Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58, \*). **A:** Larache (\*), Temara (3, 12, \*), Mohammedia (3, 71, 72), El Jadida (5, 99, 100, \*), Essaouira (21, 100), Agadir (21, 100), without locality (40).

*Ectocarpus fasciculatus* Harvey var. *pyncocarpus* (Rosenvinge) Cardinal [= *E. pyncocarpus* Rosenvinge]. **M:** Saaidia (\*), Melilla (50), Al Hoceima (50), Jabha (50, \*), M'diq (\*), Tetouan (\*).

*Ectocarpus siliculosus* (Dillwyn) Lyngbye var. *siliculosus* [= *Conferva siliculosa* Dillwyn, *Ectocarpus confervoides* (Roth) Le Jolis]. Without locality (8). **M:** Saaidia (50, \*), Chafarinas Islands (14, 67), Nador (47, 50, 51), Melilla (48, 50), Al Hoceima (50), Jabha (\*), Tamernoute (58), M'diq (\*), Cabo Negro (58), Tetouan (\*), Ksar-Sghir (58). **A:** Azilah (\*), Larache (\*), Rabat (21, 38), Temara (3, 12, 21, 38, 100), Mohammedia (3, 71), Casablanca (100), El Jadida (5, 21), Safi (21), without locality (40).

*Ectocarpus siliculosus* (Dillwyn) Lyngbye var. *crouanii* (Thuret) Gallardo [= *E. crouanii* Thuret]. **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58).

*Ectocarpus siliculosus* (Dillwyn) Lyngbye var. *penicillatus* C. Agardh [= *E. penicillatus* (C. Agardh) Kjellman]. **M:** Saaidia (50, \*), Nador (50), Melilla (50), Al Hoceima (50), Jabha (\*), Ksar-Sghir (\*).

*Ectocarpus virescens* Thuret ex Sauvageau. **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58). **A:** Rabat (38).

*Feldmannia battersiides* (Ercegovic) Cormaci et G. Furnari [= *Ectocarpus battersiides* Ercegovic]. **M:** Nador (50).

*Feldmannia caespitula* (J. Agardh) Knoepffler-Péguy var. *lebelii* (Areschoug ex P. L. Crouan et H. M. Crouan) Knoepffler-Péguy [= *Ectocarpus lebelii* Areschoug ex P. L. Crouan et H. M. Crouan, *Feldmannia lebelii* (Areschoug ex P. L. Crouan et H. M. Crouan) G. Hamel]. **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58). **A:** Tanger (9, 25, 38), Agadir (21).

*Feldmannia irregularis* (Kützinger) G. Hamel [= *Ectocarpus irregularis* Kützinger]. **M:** Nador (47, 51), Cabo Negro (58). **A:** Rabat (42), Mohammedia (3, 71), Casablanca (38), without locality (9).

*Feldmannia paradoxa* (Montagne) G. Hamel var. *paradoxa*<sup>9</sup> [= *Ectocarpus paradoxus* Montagne, *Ectocarpus globifer* Kützinger, *Feldmannia globifera* (Kützinger) G. Hamel]. **M:** Saaidia (\*), Nador (47, 50, 51), Melilla (48, 50), Al Hoceima (50), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58), without locality (50). **A:** Tanger (9, 25, 38, 100), Agadir (21, 100), without locality (20).

*Feldmannia simplex* (P. L. Crouan et H. M. Crouan) G. Hamel [= *Ectocarpus simplex* P. L. Crouan et H. M. Crouan]. **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58). **A:** Temara (3), Mohammedia (3, 71).

*Herponema valiantei* (Bornet ex Sauvageau) G. Hamel [= *Ectocarpus valiantei* Bornet ex Sauvageau]. **A:** El Jadida (21).

*Hincksia granulosa* (J. E. Smith) P. C. Silva [= *Conferva granulosa* J. E. Smith, *Ectocarpus granulosa* (J. E. Smith) C. Agardh, *Giffordia granulosa* (J. E. Smith) G. Hamel]. **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58). **A:** Tanger (9, 25, 38, 100), Rabat (21, 100), Temara (3), Mohammedia (3, 71), without locality (56).

*Hincksia hincksiae* (Harvey) P. C. Silva [= *Ectocarpus hincksiae* Harvey, *Giffordia hincksiae* (Harvey) G. Hamel]. **A:** Tanger (9, 25), Larache (\*), Temara (3, 12, \*), Mohammedia (3, 71, \*), Casablanca (21, 38), El Jadida (\*), Sidi Boulbra (6, 7), Essaouira (21), Agadir (21, \*), Sidi Ifni (\*), without locality (40).

*Hincksia mitchelliae* (Harvey) P. C. Silva [= *Ectocarpus mitchelliae* Harvey, *Giffordia mitchelliae* (Harvey) G. Hamel]. **M:** Saaidia (\*), Nador (47, 51), Melilla (48), M'diq (\*), without locality (50). **A:** Salé (21, 100), Rabat (21), Temara (21, 100), Casablanca (100), Agadir (21, 100).

*Hincksia ovata* (Kjellman) P. C. Silva [= *Ectocarpus ovatus* Kjellman, *Giffordia intermedia* (Rosenvinge) S. Lund]. **M:** Melilla (50), Al Hoceima (50), Jabha (\*), Tetouan (\*).

*Hincksia rallsiae* (Vickers) P. C. Silva [= *Ectocarpus rallsiae* Vickers, *Feldmannia rallsiae* (Vickers) G. Hamel, *Giffordia rallsiae* (Vickers) W. R. Taylor]. **A:** Rabat (21), Casablanca (21), Moroccan Sahara (61), without locality (20).

*Hincksia sandriana* (Zanardini) P. C. Silva [= *Ectocarpus sandrianus* Zanardini, *E. elegans* Thuret, *Giffordia sandriana* (Zanardini) G. Hamel]. **M:** Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58).

*Hincksia secunda* (Kützinger) P. C. Silva [= *Ectocarpus secundus* Kützinger, *Giffordia secunda* (Kützinger) Batters]. **A:** Tanger (9, 25, 38, 100), Temara (100), Casablanca (21, 100).

*Kuetzingiella battersii* (Bornet ex Sauvageau) Kornmann [= *Ectocarpus battersii* Bornet ex Sauvageau]. **M:** Tamernoute (58). **A:** Rabat (42).

*Streblonema deformans* (P. Dangeard) G. Hamel [= *Ectocarpus deformans* P. Dangeard]. **A:** Essaouira (21), without locality (20).

*Streblonema parasiticum* (Sauvageau) Levring [= *Ectocarpus parasiticus* Sauvageau, *Entonema parasiticum* (Sauvageau) G. Hamel]. **A:** Casablanca (21).

#### Pylaiellaceae

*Bachelotia antillarum* (Grunow) Gerloff<sup>10</sup> [= *Ectocarpus antillarum* Grunow, *Bachelotia fulvescens* (Bornet) Kuckuck ex G. Hamel, *Pylaiella fulvescens* Bornet]. **M:** Saaidia (\*), Jabha (\*), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*). **A:** Tanger (9, 25, 38, 40, \*), Azilah (\*), Rabat (40), Temara (3, 12, \*), Mohammedia (3, 21, 71, 72, \*), El Jadida (5, \*), Essaouira (\*), Cap Ghir (21, 40), Agadir (21, 40), without locality (20).

*Pylaiella littoralis* (Linnaeus) Kjellman<sup>11</sup> [= *Conferva littoralis* Linnaeus]. **A:** Casablanca (81).

#### Ralfsiaceae

*Hapalospongidion macrocarpum* (J. Feldmann) León Alvarez et González [= *Ralfsia macrocarpa* J. Feldmann, *Mesospora macrocarpa* (J. Feldmann) den Hartog, *Mesospora mediterranea* J. Feldmann]. **M:** Melilla (10, 48), Cabo Negro (58), without locality (50).

*Nemoderma tingitanum* Schousboe ex Bornet<sup>12</sup>. **M:** Saaidia (50, \*), Nador (50), Melilla (50), Jabha (\*), M'diq (\*). **A:** Tanger (9, 25, 38, 100), Azilah (\*), Temara (3, 21, \*), Bouznika (100), Mohammedia (3), El Jadida (\*).

*Pseudolithoderma adriaticum* (Hauck) Verlaque [= *Lithoderma adriaticum* Hauck]. **A:** Rabat (11), Temara (11).

*Pseudolithoderma extensum* (P. L. Crouan et H. M. Crouan) S. Lund [= *Ralfsia extensa* P. L. Crouan et H. M. Crouan, *Lithoderma fatiscens* Kuckuck nom. illeg.]. **A:** Rabat (11), Temara (11).

*Ralfsia verrucosa* (Areschoug) Areschoug [= *Cruoria verrucosa* Areschoug]. Without locality (8). **M:** Saaidia (50, \*), Melilla (48, 50), Al Hoceima (50), Jabha (\*), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58). **A:** Tanger (9, 25, 38, 100, \*), Azilah (\*), Temara (3, \*), Mohammedia (3, \*), Casablanca (21, 100), El Jadida (21, 100, \*), Oualidia (\*), Sidi Boulbra (6, 7), Essaouira (\*).

#### Fucales

##### Cystoseiraceae

*Bifurcaria bifurcata* R. Ross [= *B. rotunda* (Hudson) Papenfuss, *B. tuberculata* (Hudson) Stackhouse]. Without locality (8). **A:** Tanger (9, 38, 100, \*), Cap Spartel (9), Salé (24, 33), Rabat (9, 11, 21, 24, 26, 38, 98, 100, \*), Temara (3, 11, 12, 33, 36, 37, 100, \*),

Bouznika (99, 100), Mohammedia (3, 71, 72, 81, 98, 99, 100), Casablanca (21, 38, 39, 98, 100), El Jadida (5, 18, 21, 33, 38, 98, 100, \*), Oualidia (\*), Djorf el Yhoudi (98, 100), Sidi Boulbra (6, 7), Essaouira (39, 45, 98, 100, \*), Imessouane (33, 100), Cap Ghir (33, 45, 98, 100, \*), Agadir (21, \*), Mirhleft (21, 33, 98, 100, \*), Sidi Ifni (\*), Tan Tan (\*), Moroccan Sahara (61, 77, 96), Cap Blanc (81), cosmopolitan (21, 40), without locality (20, 22, 28, 32).

*Cystoseira abies-marina* (S. G. Gmelin) C. Agardh [= *Fucus abies-marinus* S. G. Gmelin]. **A:** Rabat (38, 81), Casablanca (38, 81), Moroccan Sahara (30).

*Cystoseira amentacea* Bory var. *stricta* Montagne [= *Cystoseira stricta* (Montagne) Sauvageau]. **M:** Saaidia (50), Nador (15), Melilla (38, 50, 67, 91, 93, 100), Al Hoceima (50), M'diq (\*), Ksar-Sghir (\*), without locality (49).

*Cystoseira baccata* (S. G. Gmelin) P. C. Silva [= *Fucus baccatus* S. G. Gmelin, *Cystoseira fibrosa* (Hudson) Agardh, *Fucus fibrosus* Hudson]. **M:** Chafarinas Islands (49, 67). **A:** Tanger (9, 25, 38, 90, 100), Salé (33), Rabat (21, 100, \*), Temara (12, 33, 99, 100, \*), El Jadida (5, 18, 21, 25, 38, 98, 100, \*), Safi (100), Djorf el Yhoudi (98), Essaouira (21, 33, 38, 39, 81, 98, 100), Imessouane (33, 100), Cap Ghir (33), Agadir (21, 100, \*), Mirhleft (21, 33, 98, 100), Moroccan Sahara (96), cosmopolitan (21, 22), without locality (20, 24, 38, 40, 56).

*Cystoseira brachycarpa* J. Agardh var. *balearica* (Sauvageau) Giaccone [= *C. balearica* Sauvageau]. **M:** Nador (50), Melilla (50), Al Hoceima (50), without locality (49).

*Cystoseira compressa* (Esper) Gerloff et Nizamuddin [= *Fucus compressus* Esper, *Cystoseira abrotanifolia* (Desfontaine) C. Agardh, *C. abrotanifolia* C. Agardh f. *fimbriata* Sauvageau, *C. fimbriata* (Desfontaine) Bory]. **M:** Chafarinas Islands (14, 67), Nador (15, 38, 47, 51, 93), Melilla (10, 38, 48, 67, 93, 100), Tamernoute (58), M'diq (\*), Cabo Negro (58), Tetouan (67, \*), Ksar-Sghir (58, \*), without locality (49, 50). **A:** Tanger (9, 25, 38, 90, 100, \*), Rabat (21, 38), Temara (3, 12, 36, 100, \*), Bouznika (99, 100), Mohammedia (3, 71, \*), Casablanca (21, 25, 38, 81, 100), El Jadida (5, 18, 21, 25, 38, 100, \*), Essaouira (9, 21, 25, 38, 100, \*), Tan Tan (\*), Moroccan Sahara (96), cosmopolitan (21), without locality (38, 40).

*Cystoseira crinita* Duby. **M:** Nador (47, 50, 51), Melilla (48, 50), M'diq (\*), without locality (49). **A:** Tanger (9, 25, 38, 100, \*), Azilah (\*).

*Cystoseira elegans* Sauvageau. **M:** Saaidia (50, \*), Melilla (50), Al Hoceima (50), Jabha (50, \*), without locality (49). **A:** Rabat (18), El Jadida (18).

*Cystoseira foeniculacea* (Linnaeus) Greville [= *Fucus foeniculaceus* Linnaeus, *F. discors* Linnaeus, *Cystoseira discors* (Linnaeus) C. Agardh emend. Sauvageau, *Cystoseira ercegovicii* Giaccone]. **M:** Nador (15, 50, 93), Melilla (10, 38, 48, 49, 50, 67, 100), Ceuta (38, 49, 67, 100), without locality (49).

- A:** Tanger (38, 55, 93, 100), Rabat (99, 100), Temara (100), Casablanca (21, 38, 81, 100), El Jadida (21, 38, 100), Oualidia (21, 38, 81), Safi (100), Moroccan Sahara (61), cosmopolitan (22), without locality (56).
- Cystoseira humilis* Schousboe ex Kützing var. *humilis*. Without locality (8). **M:** Melilla (50), Al Hoceima (50), Jabha (50, \*), M'diq (\*), Without locality (49). **A:** Tanger (9, 38, 100), Cap Spartel (25, 38, 90), Larache (21, 100), Rabat (100), Temara (21), Bouznika (100), El Jadida (18, 21, 98, 100), Safi (21, 100), Essaouira (21, 98, 100), Cap Ghir (98, 100), Agadir (18, 21, 100).
- Cystoseira humilis* Schousboe ex Kützing var. *myriophylloides* (Sauvageau) J. H. Price et D. M. John [= *Cystoseira myriophylloides* Sauvageau]. **A:** Tanger (38?, 100?), Rabat (21, 38, 100), Temara (3, 12, 36, 66, 100, \*), Mohammedia (3, 71, 72, \*), Casablanca (21, 38, 81, 99, 100), El Jadida (5, 18, 98, 100), Oualidia (99), Djorf el Yhoudi (98), Essaouira (98, \*), Agadir (21, 100), cosmopolitan (21, 22), without locality (20, 24, 40).
- Cystoseira mauritanica* Sauvageau [= *Cystoseira tin-gitana* Sauvageau, *C. selaginoides* Valiante var. *gibraltarica* Sauvageau, *C. ericoides* (Linnaeus) C. Agardh var. *gibraltarica* Sauvageau *nomen nudum*, *C. gibraltarica* (Sauvageau) P. Dangeard]. **M:** Nador (38, 50, 93), Melilla (38, 50, 67, 93, 100), Al Hoceima (50), Jabha (50), Ceuta (38, 67, 91, 93), Ksar-Sghir (58), without locality (49). **A:** Tanger (38, 91, 93), Rabat (21), Temara (12), El Jadida (98), Djorf el Yhoudi (99), Essaouira (98), Agadir (18, 21), Mirhleft (21), cosmopolitan (21, 40), without locality (56).
- Cystoseira mediterranea* Sauvageau<sup>13</sup>. **M:** Saaidia (50), Chafarinas Islands (14, 50, 67), Nador (50, 51), Melilla (48), without locality (49). **A:** Tanger (25), Salé (18, 21, 40), Rabat (21, 25, 40, 100), Temara (3, 12, 99, 100), Mohammedia (3), El Jadida (25), Safi (40), Essaouira (100).
- Cystoseira nodicaulis* (Withering) M. Roberts [= *Fucus nodicaulis* Withering, *Fucus granulatus* Linnaeus, *Cystoseira granulata* (Linnaeus) C. Agardh]. **M:** Nador (15). **A:** Oualidia (21, 38, 81), Essaouira (21, 40, 100), cosmopolitan (22), without locality (24).
- Cystoseira platyclada* Sauvageau<sup>14</sup>. **M:** Nador (15), Melilla (38, 49, 67, 91, 93, 100).
- Cystoseira sauvageauana* G. Hamel var. *sauvageauana*<sup>15</sup> [= *C. selaginoides* Valiante]. **M:** Nador (50), Melilla (50), Al Hoceima (50), Jabha (50, \*), M'diq (\*), without locality (49). **A:** Temara (100), El Jadida (18, 100), Essaouira (18).
- Cystoseira sauvageauana* G. Hamel var. *polyoedematis* Sauvageau<sup>15</sup>. **M:** Nador (15).
- Cystoseira spinosa* Sauvageau. **M:** Saaidia (50), Chafarinas Islands (50), Nador (15), Melilla (10, 48, 50), without locality (49).
- Cystoseira tamariscifolia* (Hudson) Papenfuss<sup>13</sup> [= *Fucus tamariscifolius* Hudson, *Cystoseira ericoides* (Linnaeus) C. Agardh, *C. ericoides* (Linnaeus) C. Agardh var. *divaricata* P. Dangeard, *C. ericoides* (Linnaeus) C. Agardh var. *laevis* P. Dangeard, *Fucus ericoides* Linnaeus]. Without locality (8). **M:** Chafarinas Islands (67), Nador (15), Melilla (48), Tamernoute (58), Cabo Negro (58), Ceuta (38, 67, 93, 100), Ksar-Sghir (58), without locality (49, 50). **A:** Tanger (9, 38, 55, 90, 93, 100, \*), Salé (24, 33), Rabat (9, 11, 18, 21, 24, 38, 100), Temara (3, 11, 12, 33, 36, 37, 100, \*), Bouznika (99, 100), Mohammedia (3, 71, 72, 81, 99, 100), Casablanca (21, 38, 81, 98, 100), El Jadida (5, 21, 38, 81, 100, \*), Oualidia (99, 100, \*), Djorf el Yhoudi (98, 100), Sidi Boulbra (6, 7), Essaouira (21, 33, 100, \*), Imessouane (33, 100), Cap Ghir (33, 98, 100), Agadir (18, 21, 100, \*), Mirhleft (33, 98, 100), Tan Tan (\*), Moroccan Sahara (33, 61, 96), cosmopolitan (22), without locality (20, 24, 38, 40, 56).
- Cystoseira usneoides* (Linnaeus) M. Roberts [= *Fucus usneoides* Linnaeus, *Cystoseira concatenata sensu* C. Agardh *pro parte*]. **M:** Nador (15), Melilla (48, 50), Al Hoceima (50), Jabha (50, \*), M'diq (\*), Ceuta (25, 67), without locality (8, 49). **A:** Tanger (9, 25, 38, 42), Rabat (38, 81), Mohammedia (81), Casablanca (38, 81), El Jadida (25, 38), without locality (38).
- Cystoseira zosteroides* (Turner) C. Agardh [= *Fucus zosteroides* Turner *nom. illeg.*, *Cystoseira opuntiioides* Bory ex Montagne]. **M:** Chafarinas Islands (35), Melilla (50), Al Hoceima (50), without locality (49).

## Fucaceae

- Fucus spiralis* Linnaeus [= *F. platycarpus* Thuret *nom. illeg.*, *F. platycarpus* Thuret f. *linearis* Schousboe ex Bornet, *F. platycarpus* Thuret f. *minor* Schousboe ex Bornet, *F. platycarpus* Thuret f. *nana* Schousboe ex Bornet, *F. vesiculosus* Linnaeus var. *limitaneus* Montagne, *F. spiralis* [var. *platycarpus* (Thuret) Batters] f. *limitaneus* (Montagne) Børgesen]. Without locality (8). **M:** Nador (15), Melilla (48, 50), Al Hoceima (50), Jabha (50), Tamernoute (58), Cabo Negro (58), Ceuta (25, 38, 50, 67, 91, 93, 100), Ksar-Sghir (58), without locality (49). **A:** Tanger (9, 25, 38, 55, 100), Cap Spartel (9, 25, 38), Azilah (\*), Salé (24, 33), Rabat (11, 21, 24, 38, 98, 100), Temara (3, 11, 12, 33, 36, 37, 66, 100, \*), Bouznika (100), Mohammedia (3, 71, 98, \*), Casablanca (21, 38, 81, 100), El Jadida (5, 18, 21, 24, 25, 33, 38, 40, 98, 100, \*), Oualidia (\*), Safi (40, 99, 100), Djorf el Yhoudi (98, 100), Sidi Boulbra (6, 7), Essaouira (18, 22, 24, 33, 39, 40, 45, 98, 100, \*), Imessouane (33, 100), Cap Ghir (33, 98), Mirhleft (33, 98, 100, \*), Moroccan Sahara (28, 31, 33, 61, 65, 77, 96), cosmopolitan (21, 22), without locality (28, 32).
- Fucus vesiculosus* Linnaeus [= *F. axillaris* J. Agardh *nom. illeg.*, *F. lutarius* (Chauvin) Kützing, *F. vesiculosus* Linnaeus var. *grandifrons* C. Agardh]. **M:**

Nador (15, 50). **A:** Tanger (9, 25, 38, 100), Azilah (\*), Larache (\*), Kenitra (18, 21, 22, 66, \*), Sale (100), Rabat (18, 21, 22, 38, 44, 63, 100), Temara (3, 12, \*), Casablanca (25, 38, 100), El Jadida (5, 38, 81, 100), Oualidia (21, 38, 40, 81, 100), Safi (21, 38, 100), Djorf el Yhoudi (100), Essaouira (38, 100), without locality (28, 40).

*Halidrys siliquosa* (Linnaeus) Lyngbye [= *Fucus siliquosus* Linnaeus]. **A:** Tanger (16).

#### Sargassaceae

*Sargassum acinarium* (Linnaeus) Setchell [= *Fucus acinarius* Linnaeus, *Fucus linifolius* Turner, *Sargassum linifolium* (Turner) C. Agardh, *Sargassum linifolium* (Turner) C. Agardh [var. *amygdalifolium* Montagne] f. *gibraltaria* Grunow]. **M:** Nador (50, 51), Melilla (48), M'diq (\*), without locality (49). **A:** Tanger (9, 25, 38), Rabat (38), Casablanca (38, 81), Oualidia (81), without locality (56).

*Sargassum desfontainesii* (Turner) C. Agardh [= *Fucus desfontainesii* Turner]. **M:** Melilla (48, 50), without locality (49).

*Sargassum flavifolium* Kützing [= *S. vulgare* C. Agardh var. *flavifolium* (Kützing) Grunow]. **A:** Casablanca (81).

*Sargassum furcatum* Kützing. **M:** Chafarinas Islands (35).

*Sargassum hornsuschii* C. Agardh. **M:** Nador (50), Melilla (48, 50), Al Hoceima (50), Jabha (\*), M'diq (\*), Tetouan (50, 67), without locality (49).

*Sargassum natans* (Linnaeus) Gaillon [= *Fucus natans* Linnaeus, *Fucus bacciferus* Turner, *Sargassum bacciferum* (Turner) C. Agardh]. **A:** Casablanca (38, 81).

*Sargassum vulgare* C. Agardh nom. illeg.<sup>16</sup> [= *S. megalophyllum* Montagne, *S. vulgare* C. Agardh var. *megalophyllum* (Montagne) Grunow]. Without locality (8). **M:** Saaidia (\*), Chafarinas Islands (67), Nador (47, 51), Melilla (10, 48), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*), without locality (49, 50). **A:** Tanger (9, 38, 40, 55, 100, \*), Azilah (\*), Larache (\*), Rabat (21, 100), Temara (3, 12, 21, 99, 100, \*), Bouznika (100), Mohammedia (3, 72, \*), Casablanca (21, 38, 81, 98, 100), El Jadida (5, 18, 21, 98, \*), Safi (100), Djorf el Yhoudi (100), Essaouira (98, 100, \*), Cap Ghir (98, 100), Agadir (100), Tan Tan (\*), Moroccan Sahara (61, 77), without locality (56).

### Laminariales

#### Alariaceae

*Ecklonia muratii* J. Feldmann. **A:** Mirhleft (\*), Sidi Ifni (\*), Tan Tan (\*), Moroccan Sahara (30, 31, 60, 61), Cap Blanc (28, 31).

#### Laminariaceae

*Laminaria ochroleuca* De La Pylaie [= *L. iberica* (G.

Hamel) Lami, *L. lejolisii* Sauvageau, *L. pallida* Greville ex J. Agardh var. *iberica* G. Hamel]. Without locality (8). **M:** Nador (15), Jabha (\*), M'diq (\*). **A:** Tanger (9, 25, 27, 38, 98, 100), Azilah (\*), Temara (36), El Jadida (5, 17, 18, 33, 38, 81, 98, 100, \*), Oualidia (\*), Safi (100), Djorf el Yhoudi (98, 100), Sidi Boulbra (6, 7), Essaouira (17, 18, 27, 33, 39, 98, 100, \*), Imessouane (33, 98, 100, \*), Cap Ghir (33, 98, 100, \*), Mirhleft (98, 100, \*), Tan Tan (\*), Moroccan Sahara (33, 61, 64, 65, 77), Cap Blanc (98), without locality (27, 32, 40).

*Laminaria rodriguezii* Bornet. **M:** Nador (15), Melilla (27, 38, 49, 67, 93, 100).

#### Phyllariaceae

*Phyllariopsis brevipes* (C. Agardh) E. C. Henry et South [= *Laminaria brevipes* C. Agardh, *Laminaria reniformis* J. V. Lamouroux, *Phyllaria reniformis* (J. V. Lamouroux) Rostafinski]. **M:** Chafarinas Islands (35, 38), Nador (15), Melilla (27, 38, 48, 50, 67, 93, 100), Al Hoceima (50), Jabha (50), Ceuta (38, 50, 67, 100), without locality (49). **A:** Tanger (9, 25, 27, 38, 40, 55, 100, \*), Azilah (\*), Temara (21, 100), Bouznika (100), Casablanca (21, 38, 81, 100), El Jadida (18, 21, 25, 27, 38, 98, 100, \*), Djorf el Yhoudi (98, 100), Essaouira (18, 21, 27, 81, 98, 100, \*), Cap Ghir (98, 100), Mirhleft (21, 100, \*), Moroccan Sahara (28, 31, 61), without locality (20, 28).

*Phyllariopsis purpurascens* (C. Agardh) E. C. Henry et South [= *Laminaria purpurascens* C. Agardh, *Phyllaria purpurascens* (C. Agardh) Rostafinski]. Without locality (8). **M:** Nador (15), Melilla (27, 38, 49, 67, 93, 100). **A:** Tanger (9, 25, 27, 38, 100), Casablanca (21, 27, 38, 40, 81, 100), Essaouira (21, 40, 100), Cap Ghir (21, 100), Agadir (18, 21, 40, 100).

*Saccorhiza polyschides* (Lightfoot) Batters [= *Fucus polyschides* Lightfoot, *Saccorhiza bulbosa* (Hudson) De La Pylaie]. Without locality (8). **M:** Nador (15), Melilla (27, 38, 48, 50, 67, 93, 100), Jabha (50, \*), Ceuta (38, 50, 67, 100), Ksar-Sghir (58), without locality (49). **A:** Tanger (9, 25, 38, 100), Azilah (\*), Larache (18, 98, 100), Salé (18, 21, 33, 98), Rabat (18, 21, 38, 98, 100), Temara (12, 33, 37, 100), Bouznika (100), Mohammedia (98, 100), Casablanca (21, 38, 81, 100), El Jadida (5, 18, 21, 33, 38, 81, 98, 100, \*), Oualidia (\*), Safi (100), Djorf el Yhoudi (98, 100), Sidi Boulbra (6, 7), Essaouira (18, 27, 33, 38, 39, 81, 98, 100, \*), Imessouane (33, 100), Cap Ghir (98, 99, 100), Agadir (99, 100), Mirhleft (21, 33, 98, 100, \*), Moroccan Sahara (28, 33, 61, 64, 65, 68, 69, 77), Cap Blanc (98), without locality (20, 27, 28, 32, 40).

### Scytosiphonales

#### Scytosiphonaceae

*Colpomenia peregrina* Sauvageau. **M:** Melilla (50), Al Hoceima (50), Jabha (\*), M'diq (\*), Ksar-Sghir (\*). **A:** Mirhleft (21).

*Colpomenia sinuosa* (Mertens ex Roth) Derbès et Solier [= *Ulva sinuosa* Mertens ex Roth]. Without locality (8). **M:** Chafarinas Islands (14), Nador (47, 51), Melilla (10, 48), Jabha (\*), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*), without locality (50). **A:** Tanger (9, 25, 38, 100, \*), Rabat (21, 38), Temara (3, 12, 100, \*), Bouznika (99, 100), Mohammedia (3, 71, 72, 99, 100, \*), Casablanca (21, 38, 81, 100), El Jadida (5, 100), Djorf el Yhoudi (100), Cap Ghir (45, 100, \*), Agadir (21, 100, \*), Tan Tan (\*), without locality (40).

*Hydroclathrus clathratus* (Bory ex C. Agardh) M. Howe [= *Encoelium clathratum* Bory ex C. Agardh]. **A:** Cap Ghir (45).

*Petalonia fascia* (O. F. Müller) Kuntze [= *Fucus fascia* O. F. Müller, *Laminaria debilis* C. Agardh, *Petalonia fascia* (O. F. Müller) Kuntze var. *debilis* (C. Agardh) G. Hamel, *Phyllitis debilis* (C. Agardh) Kützing]. Without locality (8). **M:** Nador (50), Melilla (10, 48), Al Hoceima (50), Cabo Negro (58), Ksar-Sghir (58). **A:** Tanger (9?), Rabat (63), Temara (3, 12, \*), Mohammedia (3, 71, \*), El Jadida (5, \*), Oualidia (\*), without locality (40, 42).

*Scytosiphon lomentaria* (Lyngbye) Link<sup>17</sup> [= *Chorda lomentaria* Lyngbye, *Scytosiphon simplicissimus* (Clemente) Cremades, *Ulva simplicissima* Clemente]. **M:** Saaidia (\*), Nador (47, 50, 51), Melilla (10, 50), Al Hoceima (50), Jabha (50), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*). **A:** Tanger (9, 25, 38, \*), Temara (3), Mohammedia (3, 71), El Jadida (\*), Oualidia (\*), Agadir (\*).

## Sphacelariales

### Choristocarpaceae

*Discosporangium mesarthrocarpum* (Meneghini) Hauck [= *Callithamnion mesarthrocarpum* Meneghini]. **M:** Chafarinas Islands (14, 50, 67).

### Cladostephaceae

*Cladostephus spongiosus* (Hudson) C. Agardh f. *spongiosus* [= *Conferva spongiosa* Hudson]. **M:** Melilla (10, 48). **A:** Tanger (9, 25, 38, 92, 100).

*Cladostephus spongiosus* (Hudson) C. Agardh f. *verticillatus* (Lightfoot) Prud'homme van Reine [= *Conferva verticillata* Lightfoot, *Cladostephus verticillatus* (Lightfoot) C. Agardh, *Fucus hirsutus* Linnaeus, *Cladostephus hirsutus* (Linnaeus) Prud'homme van Reine]. Without locality (8). **M:** Saaidia (\*), Chafarinas Islands (14), Tamernoute (58), Cabo Negro (58), Ceuta (25, 38, 100), Ksar-Sghir (58), without locality (50). **A:** Tanger (9, 25, 38, 92, 100, \*), Rabat (38), Temara (3, 21, 100, \*), Mohammedia (3, 71, 72, 81, \*), Casablanca (38, 100), El Jadida (5, \*), Sidi Boulbra (6, 7), Essaouira (38, 81, 100), Cap Ghir (100), Agadir (21, 100, \*), Mirhleft (21, \*), without locality (40).

### Sphacelariaceae

*Sphacelaria brachygonia* Montagne. **M:** Saaidia (50, \*), Nador (50), Melilla (50), Jabha (\*), M'diq (\*). **A:** Tanger (78, 87), Azilah (\*), Larache (\*), Temara (\*), Oualidia (\*), Sidi Boulbra (6, 7), Essaouira (\*), Agadir (\*), Sidi Ifni (\*).

*Sphacelaria cirrosa* (Roth) C. Agardh [= *Conferva cirrosa* Roth, *Sphacelaria hystrix* Suhr ex Reinke]. **M:** Chafarinas Islands (14, 67), Melilla (48), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*), without locality (50). **A:** Tanger (9, 25, 38, 78, 86, 87, 100), Larache (\*), Temara (3, \*), Mohammedia (3, 71, \*), Casablanca (21, 38, 78, 81, 100), El Jadida (\*), Mirhleft (21, 100, \*).

*Sphacelaria fusca* (Hudson) S. F. Gray [= *Conferva fusca* Hudson]. Without locality (8). **M:** Nador (47, 51), Melilla (48), Tamernoute (58), Cabo Negro (58), Ksar-Sghir (58), without locality (50). **A:** Larache (\*), Moulay Bou Selham (42), Rabat (42), Temara (3, 12, \*), Mohammedia (3, 71, \*), El Jadida (5, \*), Oualidia (\*), Sidi Boulbra (6, 7), Essaouira (\*), Agadir (\*), without locality (40).

*Sphacelaria plumula* Zanardini. **M:** Al Hoceima (50), Jabha (50).

*Sphacelaria radicans* (Dillwyn) C. Agardh [= *Conferva radicans* Dillwyn]. **A:** El Jadida (21, 38, 81).

*Sphacelaria rigidula* Kützing [= *Sphacelaria furcigera* Kützing]. **M:** Saaidia (\*), Nador (47, 51), Melilla (48), Jabha (\*), Tamernoute (58), M'diq (\*), Cabo Negro (58), without locality (50). **A:** Tanger (78), Temara (\*), Casablanca (78), El Jadida (\*), Oualidia (\*), Sidi Boulbra (6, 7), Essaouira (\*), Sidi Ifni (\*).

*Sphacelaria tribuloides* Meneghini. **M:** Nador (50), Melilla (10, 48, 50, 78), Al Hoceima (50), Jabha (\*), M'diq (\*), Cabo Negro (58), Ceuta (78). **A:** Temara (3, \*), Mohammedia (3, 71, \*), Agadir (21, 100, \*), without locality (78).

### Stypocaulaceae

*Halopteris filicina* (Grateloup) Kützing [= *Ceramium filicinum* Grateloup]. Without locality (8). **M:** Saaidia (\*), Chafarinas Islands (67), Nador (47, 51), Melilla (10, 48), Jabha (\*), Tamernoute (58), M'diq (\*), Cabo Negro (58), Tetouan (67), Ksar-Sghir (58), without locality (50). **A:** Tanger (9, 25, 38, 88, 100, \*), Azilah (\*), Rabat (21, 100), Temara (3, 12, 21, \*), Mohammedia (3, 71, 72, 100, \*), El Jadida (5, \*), Agadir (\*), Tan Tan (\*), without locality (40).

*Halopteris scoparia* (Linnaeus) Sauvageau [= *Conferva scoparia* Linnaeus, *Stypocaulon scoparium* (Linnaeus) Kützing]. Without locality (8). **M:** Saaidia (\*), Chafarinas Islands (14), Nador (47, 51), Melilla (10, 48), Tamernoute (58), M'diq (\*), Cabo Negro (58), Ksar-Sghir (58, \*), without locality (50). **A:** Tanger (9, 25, 38, 55, 89, 100), Azilah (\*), Larache (\*), Rabat (21, 38), Temara (3, 12, 100, \*),

Mohammedia (3, 71, 72, 81, 100, \*), Casablanca (21, 38, 81, 100), El Jadida (5, 21, 81, 100, \*), Oualidia (\*), Sidi Boulbra (6, 7), Essaouira (\*), Cap Ghir (100, \*), Agadir (21, 100, \*), Sidi Ifni (\*), without locality (40).

## Sporochnales

### Sporochnaceae

*Carpomitra costata* (Stackhouse) Batters var. *costata* [= *Fucus costatus* Stackhouse, *Carpomitra cabreræ* (Clemente) Kützing]. **A:** Tanger (9, 38).

*Carpomitra costata* (Stackhouse) Batters var. *mediterranea* J. Feldmann. **M:** Ceuta (42).

*Nereia filiformis* (J. Agardh) Zanardini [= *Desmarestia filiformis* J. Agardh]. **A:** Tanger (9, 25).

*Sporochnus gaertneri* (S. G. Gmelin) C. Agardh [= *Fucus gaertneri* S. G. Gmelin]. **A:** Tanger (9, 25, 38).

*Sporochnus pedunculatus* (Hudson) C. Agardh [= *Fucus pedunculatus* Hudson]. **A:** Tanger (9, 25, 38).

## Excludenda

*Cystoseira amentacea* var. *amentacea* Bory. **A:** Tanger (9?), Rabat (11), Temara (11). The presence of this eastern Mediterranean taxon along the Atlantic coast of Morocco is unlikely.

*Himanthalia elongata* (Linnaeus) S. F. Gray [= *Fucus elongatus* Linnaeus, *Fucus loreus* Linnaeus, *Himanthalia lorea* (Linnaeus) Lyngbye]. **A:** Tanger (9, 25, 38). Only drift material has been collected in Tanger.

*Laminaria saccharina* (Linnaeus) J. V. Lamouroux [= *Fucus saccharinus* Linnaeus]. **A:** without locality (9?).

## Inquirenda

*Pilinia ramosa* Kützing. **A:** Casablanca (21), El Jadida (21). According to Hooper *et al.* (1987) and O'Kelly (1989), the holotype of this species is a member of Phaeophyceae. However, its assignment to a definite species remains unclear (see Silva *et al.* 1996, for a review).

*Sargassum coarctatum* Kützing [= *S. linifolium* C. Agardh var. *salicifolium* J. Agardh]. **A:** Tanger (9, 38), Casablanca (38, 81). This species, the type locality of which is the Gulf of Naples (Italy), is also observed in the Indian Ocean (Silva *et al.* 1996). It is considered to be a synonym of *S. vulgare* C. Agardh by Hamel (1939).

## Notes

<sup>1</sup> *Levringia atlantica* (J. Feldmann) Kylin may be conspecific with the earlier described *L. brasiliensis* (see Price *et al.* 1978).

<sup>2</sup> According to some authors *Sauvageaugloia divaricata*

and *S. griffithsiana* may be the same entity (Guiry and Nic Dhonncha 2001). Pending new investigations, it seems preferable to maintain the distinction between these two taxa.

<sup>3</sup> '*Aglaozonia chilosa* Falkenberg' life-history phase is the prostrate sporophytic phase of *Cutleria chilosa* (Falkenberg) P. C. Silva.

<sup>4</sup> '*Aglaozonia melanoidea* (Schousboe ex Bornet) Sauvageau' life-history phase is the prostrate sporophytic phase of *Cutleria adspersa* (Mertens ex Roth) De Notaris.

<sup>5</sup> '*Aglaozonia parvula* (Greville) Zanardini' life-history phase is the prostrate sporophytic phase of *Cutleria multifida* (J. E. Smith) Greville.

<sup>6</sup> According to Pedersen (1984: 60), *Hecatonema terminale* (Kützing) Kylin may be a synonym of *H. maculans* (Collins) Sauvageau, both being considered as a microthallus of well-known macroalgae belonging to the genus *Asperococcus*.

<sup>7</sup> According to Schnetter *et al.* (1987), *Dictyota linearis* (C. Agardh) Greville and *Dictyota dichotoma* (Hudson) J. V. Lamouroux var. *intricata* (C. Agardh) Greville belong to the same entity. However, Ribera *et al.* (1992) and Silva *et al.* (1996) still recognize *D. linearis*.

<sup>8</sup> Guiry and Nic Dhonncha (2001) do not distinguish *Taonia pseudociliata* (J. V. Lamouroux) Nizamuddin *et* Godeh as distinct from *Taonia atomaria* (Woodward) J. Agardh.

<sup>9</sup> *Feldmannia paradoxa* (Montagne) G. Hamel var. *paradoxa*: according to Kim and Lee (1994), *Feldmannia globifera* is a synonym of *F. paradoxa* var. *paradoxa*.

<sup>10</sup> According to Silva *et al.* (1996), *Bachelotia antillarum* (Grunow) Gerloff and *Bachelotia fulvescens* (Bornet) Kuckuck *ex* G. Hamel may be two different taxa. Citations from Morocco all concern the latter entity.

<sup>11</sup> The presence of *Pylaiella littoralis* (Linnaeus) Kjellman, a cold water species, in Morocco needs to be confirmed.

<sup>12</sup> We follow the proposal of Rousseau (1999), which places *Nemoderma tingitanum* Schousboe *ex* Bornet within the Ralfsiaceae.

<sup>13</sup> *Cystoseira mediterranea* and *C. tamariscifolia* are considered as being vicariant species (Roberts 1978). For this reason, the co-occurrence of both species in the same locality (e.g.: Chafarinas Islands) requires a critical review of the records.

<sup>14</sup> The taxonomic status of this species is doubtful. Ribera *et al.* (1992) included *C. platyclada* in Taxa Inquirenda.

<sup>15</sup> According to Gómez Garreta *et al.* (2000), this taxon does not differ from the type variety.

<sup>16</sup> *Sargassum vulgare*, at the time of its publication, was superfluous and hence illegitimate since the species to which it applied included *Fucus salicifolius* S. G. Gmelin. However, this earlier entity cannot serve as a basionym because of the prior existence of *S. salicifolium* Naccari (see Silva *et al.* 1996).

<sup>17</sup> In accordance with Art. 56.1 of the International Code of Botanical Nomenclature (Greuter *et al.* 2000), the name *Ulva simplicissima* Clemente, and consequently the combination *Scytosiphon simplicissimus* (Clemente) Cremades, has been rejected (Pedersen and Kristiansen 1994).

Table II. Number of items (species, infraspecific taxa and life-history phases) recorded in Morocco and in adjacent regions or countries.

Mediterranean regions	No of items	Reference	Atlantic regions	No of items	Reference
Algeria	87	Ribera <i>et al.</i> 1992	Azores	41	Prud'homme van Reine 1988
Algeria	95	Perret Boudouresque and Seridi 1989	British Isles	185*	Guiry and Nic Dhonncha 2001
Balearic Islands	87	Ribera <i>et al.</i> 1992	Canary Islands	118*	Afonso Carrillo and Sansón 1999
Mediterranean Spain**	124	Ribera <i>et al.</i> 1992	Cape Verde Islands	44	Prud'homme van Reine and Hoek 1988
Sicily	157	Ribera <i>et al.</i> 1992	Portugal	98	Ardre 1970
Tunisia	87	Ribera <i>et al.</i> 1992	Portugal	77	South and Tittley 1986
Mediterranean Morocco	90	This work	Atlantic Morocco	107	This work

Heteromorphic phases (life-history phases), when present, are treated here as different taxa. (\* Infraspecific taxa and life-history phases not taken into consideration; \*\* Balearic Islands and Spanish North African Territories excluded).

## Discussion and Conclusion

Although the marine flora of Morocco has not been extensively studied, as compared to that of countries such as the British Isles or Spain, the diversity of the Moroccan brown algae (131 species, infraspecific taxa and life-history phases) appears to be relatively high (Table II). The reason for this could reside in the fact that the Moroccan coasts belong to three biogeographical provinces: the western Mediterranean, the temperate Atlantic and the tropical Atlantic (Moroccan Sahara), the last of which remains poorly explored.

## References

- Afonso Carrillo, J. and M. Sansón. 1999. *Algas, hongos y fanerógamas marinas de las Islas Canarias. Clave analítica*. Servicio de Publicaciones, Univ. de La Laguna, Santa Cruz de Tenerife, Spain. pp. 254.
- Ardre, F. 1970. Contribution à l'étude des algues marines du Portugal. I. La Flore. *Portug. Acta. Biol.* 10: 1–423, pls 1–56.
- Benhisoune, S. 1995. Contribution à l'étude phyto-écologique du phytobenthos marin de la région de Rabat-Mohammedia (Atlantique marocain). Thèse 3ème Cycle, Université Mohammed V, Faculté des Sciences Rabat, Morocco. pp. 253.
- Benhisoune, S., C. F. Boudouresque and M. Verlaque. 2001. A check-list of marine seaweeds of the Mediterranean and Atlantic coasts of Morocco. I. Chlorophyceae Wille s. l. *Bot. Mar.* 44: 171–182.
- Berday, N. 1989. Contribution à l'étude écologique du phytobenthos de la zone littorale de la région d'El Jadida. Thèse 3ème Cycle, Université Mohammed V, Faculté des Sciences Rabat, Morocco. pp. 170.
- Birje, J. W. 1995. Etude spatio-temporelle des peuplements phytobenthiques du littoral de Sidi Boulbra (Province de Safi, Maroc atlantique). Thèse Université Aix-Marseille II, France. pp. xiii, 216.
- Birje, J., M. Verlaque and F. Poydenot. 1996. Macrophytobenthos des platiers intertidaux et semi-exposés de la région de Safi-Essaouira (Maroc occidental). *Oceanologica Acta* 19: 561–574.
- Bitar, R. G. 1987. Etude des peuplements benthiques littoraux des côtes atlantiques et méditerranéennes du Maroc. Impact de la pollution – comparaisons biogéographiques. Thèse doct. es-Sciences, Université Aix-Marseille II, France. pp. 395.
- Bornet, E. 1892. Les algues de P.-K.-A Schousboe récoltées au Maroc et dans la Méditerranée de 1815 à 1829 et déterminées par M. Edouard Bornet. *Mém. Soc. Sci. Nat. Math. Cherbourg, 3ème Série* 28: 165–378, pls 1–3.
- Bueno del Campo, I. and J. A. González García. 1996. *Guía marina de la región de Melilla*. Ciudad autónoma de Melilla, Servicio de Publicaciones, Melilla, Spain. pp. 276.
- Burollet, P. A. 1935. Les horizons bionomiques supérieurs de la côte atlantique marocaine, au sud de Rabat. *Bull. Soc. Sci. Nat. Maroc* 15: 109–130.

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12. Cavassillas, Y. 1963a. Etude morphologique, écologique et floristique du bassin d'El Harhoura (Maroc). *Mém. Soc. Sci. Nat. Phys. Maroc, Bot., N. S. 3*: 1–140.
13. Cavassillas, Y. 1963b. Observations sur le développement et la reproduction de *Levringia brasiliensis* (Mont.) B. Joly (Phéophycée, Chordariale). *Rev. gén. Bot. 70*: 621–632.
14. Conde, F. 1984. Contribución al conocimiento de la flora algal bentónica del Mar de Alborán, Islas Chafarinas. *Acta Bot. Malacitana 9*: 41–46.
15. Conde Poyales, F. 1989. Ficogeografía del mar de Alborán en el contexto del Mediterráneo occidental. *Anales Jard. Bot. Madrid 46*: 21–26.
16. Conde Poyales, F. 1992. Sobre la colección de algas del herbario de la Sociedad Malagueña de Ciencias (S. XIX). *Acta Bot. Malacitana 17*: 29–55.
17. Dangeard, P. 1935. Sur l'identité de *Laminaria lejolisii* Sauvageau et de *L. iberica* (Hamel) Lami. *C. R. Acad. Sci. 201*: 615–617.
18. Dangeard, P. 1937. Sur les zones d'algues marines du Maroc occidental. *C. R. Acad. Sci. 204*: 795–797.
19. Dangeard, P. 1939. Sur quelques algues marines nouvelles pour le Maroc occidental. *C. R. Acad. Sci. 208*: 1334–1336.
20. Dangeard, P. 1948. Sur la flore des algues marines du Maroc occidental. *C. R. Acad. Sci. 227*: 364–365.
21. Dangeard, P. 1949a. Les algues marines de la côte occidentale du Maroc. *Le Botaniste 34*: 89–189.
22. Dangeard, P. 1949b. Les algues marines de la côte occidentale du Maroc. *Bul. Soc. Linn. Bordeaux, Séance 15 janvier 1949*. pp. 2.
23. Dangeard, P. 1952. Algues de la presqu'île du Cap Vert (Dakar) et ses environs. *Le Botaniste 36*: 193–329.
24. Dangeard, P. 1959. Observations écologiques sur les algues du Maroc atlantique. In: *Ecologie des Algues Marines*. Colloque Internat. CNRS. Dinard 20–28 Septembre 1957. CNRS Paris. pp. 57–63.
25. Debray, F. 1897. *Catalogue des algues du Maroc, d'Algérie et de Tunisie*. Librairie Adolphe Jourdan, Alger. pp. 78.
26. Elkaim, B. 1967. Recherches bionomiques sur les biocoenoses du substrat solide dans l'estuaire de l'oued Bou Regreg (Maroc). *Bull. Soc. Sci. Nat. Phys. Maroc 47*: 295–315.
27. Feldmann, J. 1934. Les Laminariacées de la Méditerranée et leur répartition géographique. *Bull. Trav. Stat. Aquiculture Pêche Castiglione 2*: 143–184.
28. Feldmann, J. 1937. Sur une nouvelle espèce de Laminariacée de Mauritanie, *Ecklonia muratii* nov. sp. *Bull. Soc. Sci. Nat. Afrique Nord 28*: 325–327.
29. Feldmann, J. 1938. Sur une nouvelle espèce de Phéophycée du Rio de Oro, *Myriogloea atlantica* nov. sp. *Bull. Soc. Sci. Nat. Afrique Nord 29*: 113–116.
30. Feldmann, J. 1946. La flore marine des îles atlantides. *Mém. Soc. Biogéogr. 8*: 395–435.
31. Feldmann, J. 1951. La flore marine de l'Afrique du Nord. *C. R. Soc. Biogéogr. 243*: 103–108.
32. Feldmann, J. 1953. La zonation des algues sur la côte atlantique du Maroc comparée à celle des côtes de la Manche. *C. R. Soc. Biogéogr. 259*: 34–35.
33. Feldmann, J. 1955. La zonation des algues sur la côte atlantique du Maroc. *Bull. Soc. Sci. Nat. Phys. Maroc 35*: 9–17.
34. Fletcher, R. L. 1987. *Seaweeds of the British Isles. 3. Fucoephyceae (Phaeophyceae). Part 1*. British Museum (Natural History), London. pp. 359.
35. Flores Moya, A. and F. Conde 1998. Fragmentos taxonómicos, corológicos, nomenclaturales y fitocenológicos (67–74). 67- Nuevas citas de macroalgas marinas para las islas Chafarinas. *Acta bot. Malacitana 23*: 197–199.
36. Gantès, H. 1950. Niveaux d'algues sur la côte atlantique à Témara (Maroc). *C. R. Acad. Sci. 231*: 1328–1329.
37. Gantès, H. 1967. Aperçu de la zonation de la côte rocheuse marocaine. *Bull. Soc. Sci. Nat. Phys. Maroc 47*: 317–327.
38. Gattefossé, J. and R. G. Werner. 1935. *Catalogus algarum maroccanorum adhuc cognitorum*. *Bull. Soc. Sci. Nat. Maroc 15*: 72–107.
39. Gayral, P. 1957. Résultat d'une prospection algologique à l'île de Mogador. *C. R. Acad. Sci. 245*: 358–360.
40. Gayral, P. 1958. *Algues de la côte atlantique marocaine*. Edita, Casablanca, Morocco. pp. 523.
41. Gayral, P. 1959–60. Sur la présence au Maroc et à Dakar de *Levringia brasiliensis* (Mont.) B. Joly. *Rev. Algol., N. S. 5*: 49–54.
42. Gayral, P. 1961. Liste commentée des algues marines nouvelles pour le Maroc, reconnues depuis 1949. *Bull. Soc. Sci. Nat. Phys. Maroc 41*: 1–17.
43. Gayral, P. 1962. Viviparité, multiplication asexuée et régénération chez la Dictyotacée *Spatoglossum solierii* (Chauv.) Kütz. *Rev. Algol., N. S. 6*: 105–111.
44. Gayral, P. and J. Seizilles de Mazancourt. 1961. Résultats d'une étude écologique et floristique de l'embouchure de l'oued Bou Regreg (Maroc). *Verh. Internat. Verein. Limnol. 14*: 475–480.
45. Gil Rodríguez, M. C. and J. S. Socorro Hernández. 1986. Notas ficológicas acerca de la costa atlántica-marroquí. *Vieraea 16*: 193–198.
46. Gómez Garreta, A., M. C. Barceló Martí, M. A. Ribera Siguan and J. Rull Luch. 2000. *Cystoseira* C. Agardh. In: (A. M. Gómez Garreta, ed.) *Flora Phycologica Iberica. I Fucales*, Universidad de Murcia. pp. 99–166.
47. González, J. A. and F. Conde. 1991. Estudio florístico, fenológico, autoecológico y fitogeográfico del macrofitobentos de la Mar Chica (Sebcha Buareg de Nador, Mediterráneo Marroquí). *Acta Bot. Malacitana 16*: 63–80.
48. González García, J. A. 1994. *La Flora Marina del Litoral Próximo a Melilla*. Servicio de Publ. Ayuntamiento, Fundación municipal sociocultural, Melilla, Spain. pp. 212.
49. González García, J. A. and F. Conde Poyales. 1993. Estudio biogeográfico de las Fucales y Laminariales atlánticas en el litoral mediterráneo de Marruecos. *Acta Bot. Malacitana 18*: 39–44.
50. González García, J. A. and F. Conde Poyales. 1994. Catálogo del macrofitobentos del Mediterráneo de Marruecos. *Acta Bot. Malacitana 19*: 5–27.
51. González García, J. A. and F. Conde Poyales. 1995. Etudes comparatives sur le macrophytobenthos de

- trois lagunes côtières de la Méditerranée occidentale. *Nova Hedwigia* 61: 377–390.
52. Greuter, W., J. McNeill, F. R. Barrie, H. M. Burdet, V. Demoulin, T. S. Filgueiras, D. H. Nicolson, P. C. Silva, J. E. Skog, P. Trehane, N. J. Turland, D. L. Hawksworth. 2000. *International Code of Botanical Nomenclature (Saint Louis Code) adopted by the Sixteenth International Botanical Congress, St Louis, Missouri, July-August 1999*. Koeltz Scientific Books, Königstein, Germany. pp. i-xviii, 474.
  53. Guiry, M. D and E. Nic Dhonncha. 2001. AlgaeBase. <http://www.algaebase.com>. 8 June 2001.
  54. Hamel, G. 1939. *Phéophycées de France. Fasc. V*. Paris: 337–432, pls I–XLVII.
  55. Hariot, P. 1909. Sur une collection d'algues recueillies au Maroc par M. Buchet. *Bull. Mus. Nation. Hist. Nat. Paris* 15: 128–130.
  56. Hariot, P. 1911. Algues de Mauritanie recueillies par M. Chudeau. *Bull. Soc. Bot. Fr.* 58 (sér. 4, 11): 438–445.
  57. Hooper, R. G., G. R. South and R. Nielsen. 1987. Transfer of *Pilinia* Kützing from Chlorophyceae with *Waerniella* Kylin in synonymy. *Taxon* 36: 439–440.
  58. Kazzaz, M. 1989. Contribution à l'étude de la flore algale marine de la région ouest de la Méditerranée. Thèse 3ème Cycle, Université Mohammed V, Faculté des Sciences Rabat, Morocco. pp. 246.
  59. Kim, H. and K. Lee. 1994. Morphotaxonomic studies on the Korean Ectocarpaceae (Phaeophyta) III. Genus *Feldmannia* Hamel, specially referred to morphogenesis and phylogenetic relationship among related genera. *Korean J. Phycol.* 9: 153–168.
  60. Lawson, G. W. 1966. The littoral ecology of west Africa. *Oceanogr. Mar. Biol. Ann. Rev.* 4: 405–448.
  61. Lawson, G. W. and D. M. John. 1977. The marine flora of the Cap Blanc peninsula: its distribution and affinities. *Bot. J. Linn. Soc.* 75: 99–118.
  62. Lawson, G. W. and D. M. John. 1987. The marine algae and coastal environment of tropical west Africa (second edition). *Nova Hedwigia* 93: i–vi, 1–415.
  63. Mazancourt, J. de. 1960. Etude écologique et biologique de la végétation algale de l'estuaire de l'oued Bou Regreg (Maroc). *Trav. Inst. Sci. Cherifien, Sér. Bot.* 16: 1–95, pls 1–17.
  64. Michanek, G. 1971. A preliminary appraisal of world seaweed resources. *FAO Fisheries circular* 128, Rome: 1–37.
  65. Michanek, G. 1975. Seaweeds resources of the ocean. *FAO Fisheries Technical paper* 138, Rome: 1–127.
  66. Moujahid, A. 1994. Etude de la composition minérale et hormonale des différents groupes d'algues: production et applications. Thèse 3ème Cycle, Université Mohammed V, Faculté des Sciences Rabat, Morocco. pp. 149.
  67. Navarro, M. J. and T. Gallardo. 1989. Aportación al conocimiento de la flora bentónica de las costas mediterráneas africanas occidentales. *Bot. Complutensis* 15: 203–214.
  68. Norton, T. A. 1970. Synopsis of biological data on *Sacchoriza polyschides*. *FAO Fisheries Synopsis* 83, Rome: 1–28.
  69. Norton, T. A. 1977. Experiments on the factors influencing the geographical distribution of *Sacchoriza polyschides* and *Sacchoriza dermatodea*. *New Phytol.* 78: 625–635.
  70. O'Kelly, C. J. 1989. Preservation of cytoplasmic ultrastructure in dried herbarium specimens: the lectotype of *Pilinia rimosa* (Phaeophyta, formerly Chlorophyta). *Phycologia* 28: 369–374.
  71. Ouahi, M. 1987. Contribution à l'étude de la végétation algale marine de la zone de Mohammedia. Mém. D.E.A. Université Mohammed V, Faculté des Sciences Rabat, Morocco. pp. 111.
  72. Ouahi, M. 1993. Contribution à l'étude biologique, systématique, phénologique et écologique du *Gelidiocolax verruculata* sp. nov., parasite des Gélidiacées du littoral marocain: station de Mohammedia. Thèse 3ème Cycle, Université Mohammed V, Faculté des Sciences Rabat, Morocco. pp. 101, pls 17.
  73. Pedersen, P. M. 1984. Studies on primitive brown algae (Fucophyceae). *Opera Bot.* 74: 1–76.
  74. Pedersen P. M. and A. Kristiansen. 1994. Proposals to conserve or reject (1111). Proposal to reject *Ulva simplicissima* Clemente, the basionym of *Scytosiphon simplicissimus* (Clemente) Cremades (Phaeophyceae). *Taxon* 43: 645.
  75. Perret Boudouresque, M. and H. Seridi. 1989. *Inventaire des algues marines benthiques d'Algérie*. GIS Posidonie publ., Marseille. pp. 117.
  76. Price, J. H., D. M. John and G. W. Lawson. 1978. Seaweeds of the western coast of tropical Africa and adjacent islands: a critical assessment. II. Phaeophyta. *Bull. Br. Mus. Nat. Hist. (Bot.)* 7: 87–182.
  77. Primo, C. 1953. A contribution to the study of the seaweeds of Spanish west Africa. *Proc. Internation. Seaweed Symp. I*: 23–24.
  78. Prud'homme van Reine, W. F. 1982. A taxonomic revision of the European Sphacelariaceae (Sphacelariales, Phaeophyceae). *Leiden Botanical Serie* 6. pp. x, 293.
  79. Prud'homme van Reine, W. F. 1988. Phytogeography of seaweeds of the Azores. *Helgol. Meeresunters.* 42: 165–185.
  80. Prud'homme van Reine, W. F. and C. van den Hoek. 1988. Phytogeography of Capverdean seaweeds. *Cour. Forsch. Inst. Senckenberg* 105: 35–49.
  81. Raphélis, A. 1929. Algues du Maroc récoltées par M. J. Gattefossé. *Bull. Soc. Bot. Fr.* 76: 719–730.
  82. Riadi, H. and M. Kazzaz. 1998. Inventaire bibliographique des algues benthiques du littoral Marocain I. Chlorophyceae et Phaeophyceae. *Acta Bot. Malacitana* 23: 23–41.
  83. Ribera, M. A., A. Gómez Garreta, T. Gallardo, M. Cormaci, G. Furnari and G. Giaccone. 1992. Check-list of Mediterranean seaweeds. I. Fucophyceae (Warming, 1884). *Bot. Mar.* 35: 109–130.
  84. Roberts, M. 1978. Active speciation in the taxonomy of the genus *Cystoseira* C. Agardh. In: (D. E. G. Irvine and J. H. Price) *Modern Approaches to the Taxonomy of Red and Brown Algae*. Academic Press. London, New York. pp. 399–422.
  85. Rousseau, F. 1999. Phylogénie moléculaire des Fucales et tendances évolutives au sein des algues brunes.

- Thèse Doctorat, Muséum National d'Histoire Naturelle, Paris France. pp. 240.
86. Sauvageau, C. 1902a. Remarques sur les Sphacélariacées (Suite). *J. Bot.* 16: 325–349.
  87. Sauvageau, C. 1902b. Remarques sur les Sphacélariacées (Suite). *J. Bot.* 16: 393–416.
  88. Sauvageau, C. 1903. Remarques sur les Sphacélariacées (Suite). *J. Bot.* 17: 228–332.
  89. Sauvageau, C. 1904. Remarques sur les Sphacélariacées. Second fascicule. Reprint from *J. Bot.* 17–18 pro parte. *Bibliotheca phycologica* 14, Cramer, Lehre: 321–480.
  90. Sauvageau, C. 1912. A propos des *Cystoseira* de Banyuls et de Guéthary. *Bull. Stat. Biol. Arcachon* 14: 1–424.
  91. Sauvageau, C. 1913. Sur les Fucacées du détroit de Gibraltar. *C. R. Acad. Sci.* 157: 1–3.
  92. Sauvageau, C. 1914. Remarques sur les Sphacélariacées. Troisième fascicule. Reprint from *Fac. Sci. Bordeaux Impr.*: 481–634.
  93. Sauvageau, C. 1920. A propos des *Cystoseira* de Banyuls et de Guethary. *Bull. Stat. biol. Arcachon* 17: 5–52.
  94. Schnetter, R. I. Hörnig and G. Weber-Peukert. 1987. Taxonomy of some North Atlantic *Dictyota* species (Phaeophyta). *Hydrobiologia* 151/152: 193–197.
  95. Silva, P. C., P. W. Basson and R. L. Moe. 1996. *Catalogue of the Benthic Marine Algae of the Indian Ocean*. University of California Press, Berkeley. pp. 1259.
  96. Sourie, R. 1954. Contribution à l'étude écologique des côtes rocheuses du Sénégal. *Mém. Inst. Fr. Afr. Noire* 38: 1–342.
  97. South, G. R. and I. Tittley. 1986. *A Checklist and Distributional Index of the Benthic Marine Algae of the North Atlantic Ocean*. Huntsman Marine Laboratory and British Museum (Natural History), St. Andrews and London. pp. 76.
  98. Werner, R. G. 1948. Observations sur la répartition des algues et en particulier des laminaires au Maroc. *Bull. Soc. Sci. Nat. Maroc* 28: 56–58.
  99. Werner, R. G. 1956. Réflexions au sujet de la zonation au Maroc. *Bull. Soc. Sci. Nat. Phys. Maroc* 36: 319–333.
  100. Werner, R. G. 1962. Essai d'une étude de la répartition des cryptogames marines et maritimes du Maroc. *Bull. Soc. Sci. Nat. Phys. Maroc* 42: 1–33.