

Checklist of the Marine Macroalgae of Algerian West Coast (Ain Témouchent site)

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Macroalgae are very abundant organisms in the Algerian coastal zone and not well-known on the west coast of Algeria. The research aimed to identify marine macroalgae in Ain Témouchent littoral (northwest Algeria). A checklist of macroalgae, based on new collections, is given. Using present-day taxonomy, sampling species of macroalgae have been identified to date. The results showed that 32 marine macroalgae were found and identified. They are divided into 3 taxa: Chlorophyta (4 orders, 5 families, 7 genera, 8 species), Ochrophyta (4 orders, 4 families, 6 genera, 8 species) and Rhodophyta (9 orders, 11 families, 13 genera, and 16 species). Some species are remarkable for their endemism and their character as indicators of disturbance of the marine environment, and others of its good quality, excellent protection, and preservation. We annotated the presence of the *Cystoseira stricta*, which is reliable indicator of a healthy marine environment. We concluded that the invasive species are rarely present in this area.

Keywords: Macroalgae, checklist, marine environment, invasive species, Ain Temouchent, Algerian coastal zone.

Introduction

The macroalgae are essential elements in the food chain of marine and coastal ecosystems. Generally, the aquatic macroalgae are not well-known on the west coast of Algeria (Traiche et al., 2018). Most of the inventories conducted in the benthic flora of the continental shelf of the west coast of Algeria have not been updated (Bentallah and Kerfouf, 2013; Borsali et al., 2020). The absence of synthesis work led us to consider the census and update the checklist of marine macroalgae presented in Ain Temouchent littoral on the west coast of Algeria (Ballesteros et al., 2007).

Materials and methods

Three stations (Bouzedjar, Tergu, and Beni Saf) are chosen according to the state of the coastal ecosystem, whether or not it is subject to anthropogenic pressure due to urban, industrial, and port activities (Fig. 1).

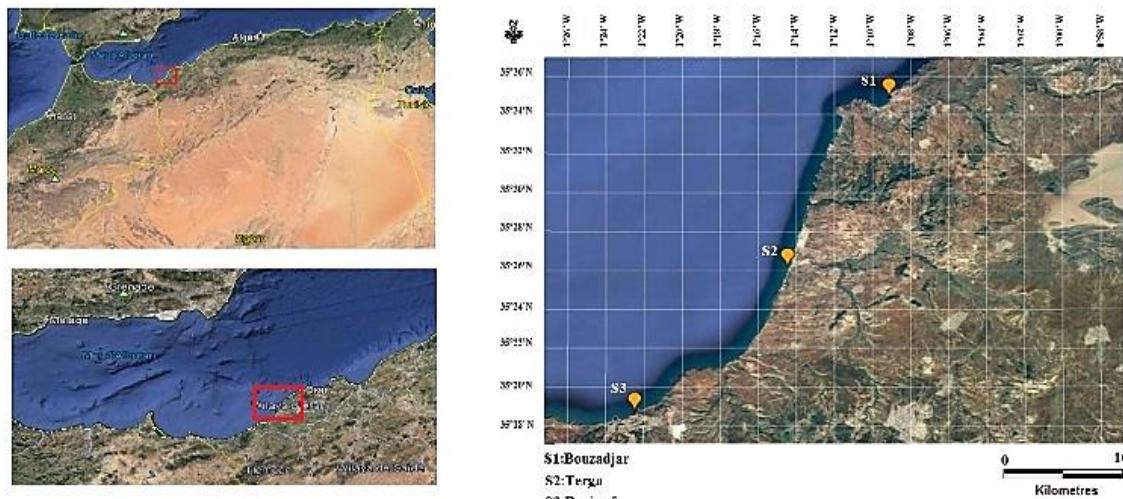


Fig. 1. The geographical location of the studied area.

These coastal zones concentrate numerous resources, and they are exposed to the pollutions and other deteriorations resulting from the development of multiple socio-economic activities: urbanization, desalination unit, touristic complex (Remili & Kerfouf, 2013, Kies & Kerfouf, 2014). Marine hydrology of this study area is characterized by turbulent circulation along the coast, which supports the dispersion of possible sources of pollution and enriched the entire chain food surface (Millot, 1989; Ghodbani & Bougerira, 2019; Kies et al., 2020). The marine algae were isolated, and each of its individuals was identified according to several determination keys, such as Boudouresque & Seridi (1989), Birje et al. (1996), Cabioch et al. (2006), Fischer et al. (2007), Ramdani et al. (2015), and AlgaeBase (Global Algal Database of Taxonomic, Nomenclatural and Distributional Information).

Results and discussion

The sampling campaign made it possible to inventory macroalgae of Ain Témouchent littoral (western Algerian coast). Thirty-two species were harvested. They are divided into three taxa: Chlorophyta, Ochrophyta, and Rhodophyta:

1. Chlorophyta (4 order / 5 families / 7 genera / 8 species),

1.1. Class: Ulvophyceae

Order: Ulvales

Family: Ulvaceae

Genus: Ulvaria

Species: *Ulvaria obscura* (Gayral ex Bliding, 1969).

Genus: Ulva

Species: *Ulva lactuca* (Linnaeus.C. 1753).

Genus: Ulva

Species: *Ulva rigida* (C. Agardh, 1823).

Genus: Enteromorpha

Species: *Enteromorpha intestinalis* (Linnaeus) Nees 1820.

Order: Bryopsidales

Family: Codiaceae

Genus: Codium

Species: *Codium decorticatum* (M. A. Howe, 1911)

Order: Cladophorales

Family: Cladophoraceae

Genus: Cladophora

Species: *Cladophora laetevirens* (Dillwyn Kützing, 1843).

Family: Caulerpaceae

Genus: Caulerpa

Species: *Caulerpa racemosa* (Forsskal) J.Agardh 1873.

Order: Ulotrichales

Family: Ulotrichaceae

Genus: Spongomerpha

Species: *Spongomerpha aeruginosa* (Linnaeus) Hoek 1963.

2. Ochrophyta (4 order/ 4 family / 6 genus / 8 species)

2.1. Class: Phaeophyceae

Order: Sphaerelariales

Family : Stypocaulaceae

Genus: Halopteris

Species: *Halopteris scoparia* (Linnaeus) Sauvageau, 1904.

Species: *Halopteris filicina* (Gratieloup) Kutzing 1843.

Order: Dictyotales

Family: Dictyotaceae

Genus: Dictyota

Species: *Dictyota dichotoma* (Hudson) J.V.Lamouroux 1809.

Genus: Padina

Species: *Padina pavonica* (Linnaeus) Thivy 1960.

Order: Fucales

Family: Sargassaceae

Genus: Cytoseira

Species: *Cytoseira compressa* (Esper) Gerloff, Nizamuddin 1975.

Species : *Cytoseira stricta* (Carl Von Linné, 1758).

Genus: Sargassum

Species: *Sargassum muticum* (Yendo) Fensholt 1955.

Order: Ectocarpales

Family: Scytoniphonaceae

Genus: Colpomenia

Species: *Colpomenia sinuosa* (Mertens ex Roth) Derbès & Solier 1851.

3. Rhodophyta (9 order / 11 family / 13 genus /16 species)

3.1. Class: Florideophyceae

Order: Ceramiales

Family: Rhodomelaceae

Genus: Halopitys

Species: *Halopitys incurvus* (Hudson) Batters 1902.

Genus: Osmundea

Species: *Osmundea osmunda* (K.W.Nam & Maggs, 1994).

Species : *Osmundea pinnatifida* (Hudson) Stackhouse 1809. !!

Order: Ahnfeltiales

Family: Ahnfeltiaceae

Genus: Ahnfeltia

Species: *Ahnfeltia plicata* (Hudson) E.M.Fries 1836.

Order: Gigartinales

Family: Gigartinaceae

Genus: Chondracanthus

Species: *Chondracanthus acicularis* (Roth) Fredericq 1993

Family: Phyllophoraceae

Genus: Phyllophora

Species: *Phyllophora crispa* (Hudson) P.S Dixon 1964.

Family: Cystocloniaceae

Genus: Hypnea

Species: *Hypnea spinella* (C.Agardh) 1847.

Species: *Hypnea musciformis* (Wulfen) J.V. Lamouroux 1813.

Order: Corallinales

Family: Corallinaceae

Genus: Corallina

Species: *Corallina elongata* (Ellis & Solander, 1786).

Species: *Corallina granifera* (J.Ellis & Solander, 1786).

Order: Peyssonneliales

Family: Peyssonneliaceae

Genus: Peyssonnelia

Species: *Peyssonnelia squamaria* (S.G.Gmelin) Decaisne ex J.Agardh 1842.

Order: Gélidiales

Family: Pterocladiaceae

Genus: Pterocladia

Species: *Pterocladia capillacea* (S.G.Gmelin) Bornet 1876.

Order: Bonnemaisoniales

Family: Bonnemaisoniaceae

Genus: Asparagopsis

Species: *Asparagopsis armata* (Harvey, 1855).

Genus: Falkenbergia

Species: *Falkenbergia rufolansa* (Harvey) F.Schmitz 1897.

Order: Rhodymeniales

Family: Faucheaceae

Genus: Gloiocladia

Species: *Gloiocladia repens* (C.Agardh) N.Sanchez & Rodriguez-Prieto 2007.

Order: Plocamiales

Family: Plocamiaceae

Genus: Plocamium

Species: *Plocamium cartilagineum* (linnaeus) P.S Dixon 1967.

Discussion and Conclusion

We found that the variation in the average recovery rate of species over the four seasons does not obey a specific rule, as it is still influenced by several biotic and abiotic factors, which was also reported by Rodriguez-Prieto & Polo (1996). We suggested that the presence of a Pheophycea at all stations could indicate the good environmental condition with presence of *Cystoseria stricta* (Ramdani et al., 2020), and *Caulerpa racemosa*, which is not widely represented in this area (Boudouresque et al., 2002; Bachir et al., 2010). The augmentation of the pollution flows bonded to the urban development of the last years and the growing economic activities, will lead to time disturbances on the phytobenthic community in quantitative and qualitative domains, which was mentioned by Bachir (2012). We believed that our study should be continued over several annual cycles to understand the evolution of intertidal macroalgae better.

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Ulvaria obscura



Ulva rigida



Codium decorticatum



Enteromorpha intestinalis



Cladophora laetevirens



Spongomerpha aeruginosa



Ulva lactuca



Caulerpa racemosa

Photo board 1
(Chlorophyta) (© Hellal, 2021)



Halopteris scoparia



Cystoseira stricta



Halopteris Filicina



Padina pavonica



Dictyota dichotoma



Sargassum muticum



Cytoseira compressa



Colpomenia sinuosa

Photo board 2
(*Ochrophyta*) (© Hellal, 2021)



Halopitys incurvus



Peyssonnelia squamaria



Hypnea musciformis



Coralina elongata



Phyllophora crispa



Osmundea osmunda



Ahnfeltia plicata



Corallina granifera



Pterocladia capillacea



Chondracanthus acicularis



Osmundea pinnatifida



Falkenbergia rufolans



Asparagopsis armata



Gloiocladia repens



Hypnea spinella



Plocamium cartilagineum

Photo board 3
(Rhodophyta) (© Hellal, 2021)