

Checklist of Benthic Marine Macroalgae in Western Algeria

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Generally, the benthic aquatic macroalgae is not well-known in the west coast of Algeria. In this study, a revised checklist of macroalgae of algerian west coast with an updated nomenclature and taxonomy has been update. Using currently accepted names, 22 species and infraspecific taxa of macroalgae have been identified , including Chlorophyta (3orders / 4 families / 6 genera / 8 species), Ochrophyta (4 orders/ 4 families / 5 genera / 5 species), and Rhodophyta (7 orders / 7 families / genera / 7 species). The algal diversity of the algerian west coast within the Arzew Gulf is less than that within the Gulf of Oran. The Rhodophyceae occupy the most important average coverage (47.80%), followed by Chlorophyceae (33.06%) and Pheophyceae (19.14%). Given that this is the first inclusive checklist of macroalgae of west coast, it could serve as a foundation for future phycological and biogeographical studies of the taxa in the country and the region.

Keywords: Benthic macroalgae, Checklist, Chlorophyta, Ochrophyta, Rhodophyta, Algerian west coastal.

Introduction

Macrophytes are an indicator of the state of coastal ecosystems, and their study is, therefore, a significant issue. Generally, the benthic macroalgae is not well-known in the west coast of Algeria (Traiche and al., 2018, Bachir Boudjra, 2012). The diversity of macroalgae in aquatic environments can help assess the health of ecosystems, and provide information on invasions of new species (Ramdani et al., 2020). The absence of synthesis work (Boudjra, 2010; Borsali et al., 2020) led us to consider the census and update the checklist of marine benthic macroalgae presented in the west coast of Algeria). Other similar research has been carried out in other areas: Ould-Ahmed et al. (2013), Senties and Dreckmann (2013), Vietnam (Van Nguyen, 2013), Iran (Kokabi and Youcefzadi, 2015).

Materials and methods

Three stations (Mostaganem, Arzew, and Oran) 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).

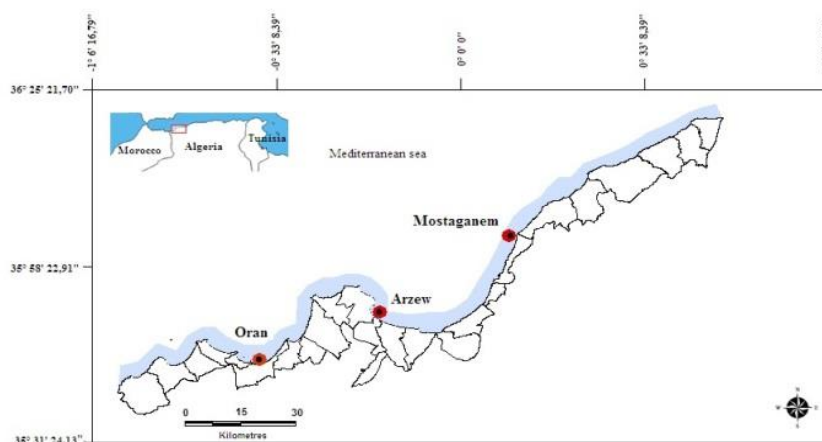


Fig. 1. Geographical location of the studied area.

Waters supply the Gulf of Oran, and the Gulf of Arzew originated from the Atlantic Ocean, and the circulation seems to be very turbulent along the African continent. These turbulences favor the dispersion of eventual pollution sources and permit such relative significant food chain development (Millot, 1989, Kies and al., 2020). The marine algae were isolated, and each of its individuals was identified according to several determination keys, such as Debray (1893), Boudouresque and Seridi (1989), Birje et al. (1996),

Boudouresque and Verlaque (2002), Cabioc'h et al. (2006), Fischer et al. (2007), Ballesteros et al. (2007), Bachir Boudjra (2012), and AlgaeBase (global algal database of taxonomic, nomenclatural and distributional information).

Results and discussion

The sampling campaign made it possible to inventory macroalgae in Algerian west coast, and 22 species were harvested. They are divided into 3 taxa: Chlorophyta, Ochrophyta, and Rhodophyta:

1. Ochrophyta / Heterokontophyta (4 orders / 4 families / 5 genera / 5 species)

Class: Phaeophyceae (Fig. 2)



Caulerpa racemose:



Caulerpa prolifera :



Cladophoropsis membranacea



Codium decorticatum



Enteromorpha compressa



Enteromorpha intestinalis :



Ulva lactuca



Ulva rigida

Fig. 2. Chlorophyta (Mansouri, 2021).

Order: Ectocarpales

Family: Scytosiphonaceae

Genus: Colpomenia

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

Order: Fucales
Family: Sargassaceae
Genus: *Cystoseira*
Species: *Cystoseira stricta* (Sauvageau) 1911
Order: Dictyotales
Family: Dictyotaceae
Genus: *Dictyota*
Species: *Dictyota dichotoma* (Huds, J.V. Lamour) 1809
Genus: *Padina*
Species: *Padina pavonica* (Linnaeus, Thivy) 1960
Order: Fucales
Family: Sargassaceae
Genus: *Sargassum*
Species: *Sargassum muticum* (Yendo, Fensholt) 1955

2. Chlorophyta (3 orders / 4 families / 6 genera / 8 species)

Class: Ulvophyceae (Fig. 3)



Colpomenia sinuosa



Cystoseira stricta



Dictyota dichotoma



Padina pavonica



Sargassum muticum:

Fig. 3. Phéophyta (Mansouri, 2021).

Order: Bryopsidales
Family: Caulerpaceae
Genus: *Caulerpa*
Species: *Caulerpa prolifera* (Forssk., J.V.Lamour.) 1809
Family: Codiaceae
Genus: *Codium*
Species: *Codium Decorticutum* (Woodward, M.Howe,) 1911
Genus: *Caulerpa*
Species: *Caulerpa Racemosa* (Forsskal, J. Agardh1873)

Order: Cladophorales
Family: Boodleaceae
Genus: *Cladophoropsis*
Species: *Cladophoropsis membranacea* (Hofman bang ex C.Agardh, Borgesen) 1905
Order: Ulvales
Family: Ulvaceae

Genus: Enteromorpha
Species: *Enteromorpha compressa* (Linnaeus) 1753

Genus: Enteromorpha
Species: *Enteromorpha intestinalis* (Linnaeus) 1753

Genus: Ulva
Species: *Ulva lactuca* (Linnaeus) 1753

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

3. Rhodophyta (7 orders /7 families / 8 gen/ 7 species)

Class : Florideophyceae (Fig. 4)



Asparagopsis armata



Corallina elongata



Haloptys incurvus



Gelidium crinale



Gracilaria verrucosa



Hypnea musciformis



Peyssonnelia squamaria



Laurencia papillosa



Osmundea pinnatifida

Fig. 4. Rhodophyta (Mansouri, 2021).

Order: Bonnemaisoniales
Family: Bonnemaisoniaceae
Genus: Asparagopsis
Species: *Asparagopsis Armata* (Harvey) 1855

Order: Corallinales
Family: Corallinaceae
Genus: Corallina
Species: *Corallina Elongata* (Lenormand ex Kützing) 1858

Order: Gelidiales
Family: Gelidiaceae
Genus: *Gelidium* (J.V.Lamour) 1813
Genus: *Gelidium*
Species: *Gelidium crinale* (Hare ex Turner, Gaillon) 1828

Order: Gracilariales
Family: Gracilariaceae
Genus: *Gracilaria*
Species: *Gracilis verrucosa* (Robert Kaye Greville) 1830
Order: Gigartinales
Family: Cystocloniaceae
Genus: *Hypnea*
Species: *Hypnea Musciformis* (Wulfen, J.V.Lamouroux) 1813
Order: Ceramiales
Family: Rhodomelaceae
Genus: *Laurencia*
Species: *Laurencia Papillosa* (C. Agardh, Greville) 1830
Genus: *Osmundea*
Species: *Osmundea pinnatifida* (Hudson, Stackh) 1809

Order: Peyssonneliales
Family: Peyssonneliaceae
Genus: *Peyssonnelia* (Decaisne) 1839
Species: *Peyssonnelia squamaria* (S.G.Gmelin) Decaisne ex J.Agardh 1842.

Conclusion

The macroalgae of the Algerian coast remain little studied (Seridi, 2007; Ould-Ahmed et al., 2019). This study made it possible to inventory macroalgae and assess their diversity in the Algerian west coast coastal zone. The Chlorophyceae are represented particularly by *Ulva lactuca* with a recovery of 23.8%, and the Phaeophyceae are represented by *Padina pavonica* with a recovery rate of 17%. The other stations (Arzew and Oran), are characterized by an important general average recovery of Chlorophyceae respectively of 36.36% and 52.53%, with a notable recovery in the two stations, *Ulva lactuca* of (25.2%; 27 %) and for *Hyphenia musiformis* (23.2 and 12.8%). It should be noted that the presence of a Pheophyceae at these two stations (Oran and Mostaganem) indicating the good environmental condition: *Cystoseira stricta* with a rate of 17.8% and 12.8%. The species of *Caulerpa racemosa*, is widely represented in Oran and Arzew, while she is absent in Mostaganem (Ould-Ahmed and Meinesz, 2007; Bachir Bouiadjra et al., 2010). This study deserves to be continued over several annual cycles to better understand the evolution of intertidal macroalgae (Rodriguez-Prieto and Polo, 1996).

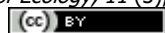
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