

## RHODOPHYTA OF IRAQI COASTAL WATERS

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**ABSTRACT :** The marine red algae (Rhodophyta) of the north-west of Arabian Gulf, Iraqi coastal area received no attention comparing with other marine water bodies. During all past years, there is only one study on the benthic marine algae of this area, in which only 4 species of Rhodophyta were recorded comparing with many numbers of studies on the other parts of the Arabian Gulf. In the present work, a total of 29 species of Rhodophyta were collected from eight stations distributed along the coastal lines of north-west Arabian Gulf (Iraqi side) for the period of three years (2013-2015).

**Key words :** Rhodophyta, Arabian Gulf, Iraq.

### INTRODUCTION

The first description of the marine algae of the Arabian Gulf was by Endlicher and Diesing (1845). There have been several studies after that which have included species recorded from the Arabian Gulf coasts and adjacent regions as Abdel-Kareem (2000a, 2000b); Al-Abdelssalam (2007); Al-Hassan and Jones (1989); Basson (1979a, 1979b, 1992); Basson *et al* (1977, 1989); De-Clark (1996); De-Clark and Coppejans (1994); Dorgham (1990); John (2005, 2012); John and Al-Thani (2014); John and Goerge (2004); Kokabi and Yousif Zadi (2015); Nizamuddin and Gesver (1970); Rhizk *et al* (1999); Silva *et al* (1999); Sohrobipour *et al* (2004); Sohrobipour and Rabii (1999a, 1999b). On the other hand, there was no attention given to the macroalgae of Iraqi coastal waters. In all these years, one study had been done so far on benthic marine algae of this area by Hadi *et al* (1993) in which 14 species were recorded, 6.

Chlorophyta, 4 Phaeophyta and 4 Rhodophyta. Ibrahim (2017), recently studied the chlorophyta of north west of Arabian Gulf and recorded 18 species, 12 of them were new records for Iraq water and 4 of them were new for Arabian Gulf region. The chemical composition of some Iraqi marine macroalgae were also studied by Ibrahim and Al-Hassoon (2017) and they found that these seaweeds were valuable as food and pharmaceutical products. The seaweed of north west Arabian Gulf need more attention and studies from taxonomic, ecological, nutritional values and pollution aspects as these macroalgae regarded the future sources for human and animal nutrition beside their medical importance.

### MATERIALS AND METHODS

Algae were collected at various sites and depths from different zones at different times and seasons for the period of 2013-2015. Specimens were collected from eight stations at Iraqi coastal water in the north-west of Arabian Gulf (Fig. 1).

Specimens were collected from eight stations at Iraqi coastal water in the north-west of Arabian Gulf (Fig. 1). Algae were collected at various sites and depths from different zones at different times and seasons. Collected specimens were processed immediately as herbarium specimens as well as preserved in a solution of 4% formaldehyde in sea water. The collections have been deposited in Marine Science Centre, University of Basra for more identification. The algae species were identified using the following references: Abbott (1999); Cribb (1996); De Clerk and Coppejans (1996); Huisman (2000); Jassuad (1976); Littler and Littler (2003, 2004); Mayruder and Hunt (1979); Miller (1990); Moorjani and Simpson (1988); Payri *et al* (2000); Price and Scott (1992); Skeleton and South (2002); Tseng (1984). The distribution of the various species in the Arabian Gulf area was assessed based on literature data. New taxa for Iraq and the Arabic side of the Arabian Gulf are preceded by an asterisk, while the new records for Arabian Gulf area are preceded by double asterisk (Fig. 2).

### RESULTS AND DISCUSSION

#### Bangiaceae

#### *Bangia fuscopurpurea* (Dillw) Lyngbye

**References:** Hadi *et al* (1993), Silva *et al* (1996) (as *B. atropurpurea* (Mertens ex Roth) C. Aga Lynch *et al*

(2008) P. 610

**Ecology :** Epiphytic on rocks at shallow water.

**Arabian Gulf Records :** Kuwait, Iraq.

### Callithamniacea

#### *Callithamnion borrieri varelongatum* Kg.

**References:** Hadi *et al* (1993), Silva *et al* (1996), P. 419. This variety lies within *Pheonosporium borrieri* but has transferred.

**Ecology:** Epiphytic on some macroalgae fragments at low tide.

**Arabian Gulf Records:** Iraq.

### Ceramiaceae

#### \**Centrocerca sclavulatum* (C. agardh) Montagne

**References:** Jaasund (1976) 109, fig. 222; Tseng (1984): 126, pl. 66, fig. 2; Abbott (1999) 261, figs. 73; Littler and Littler (2000) 144, fig. p. 145; Payri *et al* (2000) 240, figs. p. 241

**Ecology :** Epilithic in high and low intertidal.

**Arabian Gulf Records :** United Arab Emirate (UAE), Bahrain, Iran, Kuwait, Saudi Arabia. New record for Iraqi water.

#### \**Ceramium flaccidum* (Ku" tzing) Ardisson

**References :** Jaasund (1976) 105, fig. 214pl. 31, Millar (1990) 395–396, figs. 42-43; Abbott (1999) 274, fig. 76; Littler and Littler (2000) 150, fig. p. 151; Payri *et al* (2000) 248, figures. p. 249.

**Ecology :** Epiphytic on *Centrocerasclavulatum*, intertidal to 8m depth.

**Arabian Gulf Records :** UAE, Bahrain, Iran, Kuwait, Saudi Arabia, New record for Iraq.

#### \**Ceramium maryae* Weber-van Bosse

**Reference :** Wynne (1995), 294, fig. 40, 41.

**Ecology :** Epiphytic on *Centrocerasclavulatum* in intertidal.

**Arabian Gulf Records :** Iran, Saudi Arabia, New record for Iraq.

### Champiaceae

#### \**Champia compressa* Harvey

**References :** Millar (1990) 371–373, fig. 30A; Huisman (2000) 108; Skelton and South (2002) 143, fig. 7; Littler and Littler (2003) 102- P103.

**Ecology :** Epiphytic on *Udoteasp* at shallow subtidal.

**Arabian Gulf Records :** Iran, New record for Iraq and the Arabian countries around Arabian Gulf.

#### \**Champia parvula* (C. agardh) Harvey

**References :** Jaasund (1976) 99, fig. 203; Tseng (1984) 122, pl. 64, fig. 2; Millar (1990) 371, fig. 29; Abbott (1999) 218, fig. 60; Huisman (2000) 109; Payri *et al* (2000) 238, fig. p. 239; Skelton and South (2002) 143, fig. 8; Littler and Littler (2003) 102-p103.

**Ecology :** Epiphytic on *Ulva* sp. at shallow water.

**Arabian Gulf Records :** UAE, Iran, Kuwait, Saudi Arabia, New record for Iraq.

### Cystocloniaceae

#### \**Hypnea cornuta* (Ku" tzing) J. Agardh

**References :** Jaasund (1976) 99, fig. 200; De Clerck and Coppejans (1996) 275, fig. 143, p144

**Ecology :** In the intertidal area.

**Arabian Gulf Records :** UAE, Bahrain Iran, Kuwait. Qatar, Saudi Arabia, New record for Iraq.

#### \**Hypnea musciformis* (Wulfen) Lamouroux

**References :** Jaasund (1976) 97, fig. 198; Abbott (1999) 116, fig. 24; Littler and Littler (2000) 76, fig. p 77.

**Ecology :** Epiphytic at shallow water.

**Arabian Gulf Records :** Iran, New record for Iraqi coastal waters and Arabic coasts of Arabian Gulf.

#### \**Hypnea pannosa* J. Agardh

**References :** Jaasund (1976) 97, fig. 198; Tseng (1984) 100, pl. 53, fig. 1; Abbott (1999) 117, fig. 25; Payri *et al* (2000) 222, fig. p 223; Skelton and South (2002) 143, fig. 7; Littler and Littler (2003) 76, fig. p 77.

**Ecology :** Under spring low water.

**Arabian Gulf Records :** Iran, New record for Iraq.

### Dasyaceae

#### \**Dasyaana stomosans* (Weber-van Bosse) Wynne

**References :** Jaasund (1976) 121, fig. 245 (as *Dasyopsisipilosa*); De Clerck *et al* (1990): 429, 433–434 (as *Dasyapilosa* (Weber-van Bosse) Millar); Abbott (1999) 325, fig. 93 (as *Dasyapilosa*); Payri *et al* (2000) 264, fig. p 265 (as *Dasyapilosa*); Littler and Littler (2003) 128, p 129 (as *Dasyapilosa*).

**Ecology :** Epilithic at low tide.

**Arabian Gulf Records :** Bahrain, Kuwait, Saudi Arabia, New record for Iraq.

#### \**Heterosiphonia crispella* (C. agardh) Wynne

**References :** Jaasund (1976) 121, fig. 246; Abbott (1999) 328, fig. 94; Littler and Littler (2000) 180, fig. p 181; Payri *et al* (2000) 266, fig. p 267; Little and Littler

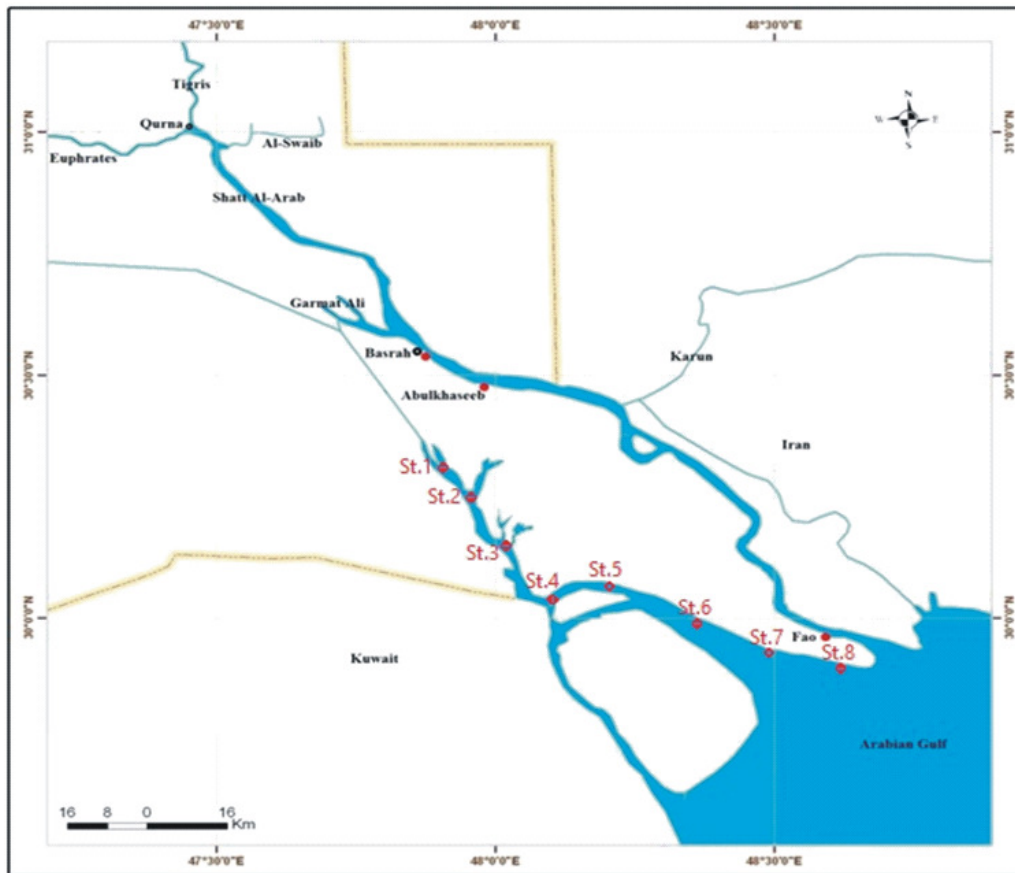


Fig. 1 : Location of sampling stations in the studied area.

(2003) 130 p131.

**Ecology :** On silty sand, at 8m depth.

**Arabian Gulf Records :** UAE, Iran, Kuwait, Saudi Arabia, New record for Iraq.

### Erythrotrichiaceae

#### *Erythrotrichia carnea* (Dillwyn) J. Agardh

**References :** Cribb (1983) 10, pl. 1, figs. 4–6; Garbary *et al* (1980) 144, fig. 4i, Magne (1990) 157, figs. 1–8; Stegenga *et al* (1997) 216–218, pl. 64, figs. 1–6.

**Ecology :** epiphyte on macroalgae

**Arabian Gulf Records :** UAE, Bahrain, Iran, Iraq, Kuwait, Saudi Arabia,

### Galaxauraceae

#### \*\**Actinotrachia fragilis* (Forsska<sup>o</sup>) Børgesen

**References :** Tseng (1984) 58, pl. 32, fig. 1; Abbott (1999) 64, fig. 7; Payri *et al* (2000) 160, p161; Skelton and South (2002) 138, fig. 3; Littler and Littler (2003) 62, p 63.

**Ecology :** Epilithic on rock in low intertidal.

**Arabian Gulf Records :** Iran, New record for Iraq

and the Arabic coasts of Arabian Gulf.

#### \*\**Galaxauram arginata* (Ellis and Solander) Lamouroux

**References :** Tseng (1984) 62, pl. 34, fig. 2; Littler and Littler (2000) 58, fig. p59; Payri *et al* (2000) 164, figs. pp. 163, 165; Littler and Littler (2003) 64, p 65.

**Ecology :** Subtidal at 8m depth.

**Arabian Gulf Records :** New record for Arabian Gulf area.

#### \**Galaxaur arugosa* (Ellis and Solander) Lamouroux

**References :** Abbott (1999) 68, fig. 8; Huisman (2000) 39; Payri *et al* (2000) 166, fig. p167; Littler and Littler (2003) 66, fig. p 67.

**Ecology :** Under spring low watermark.

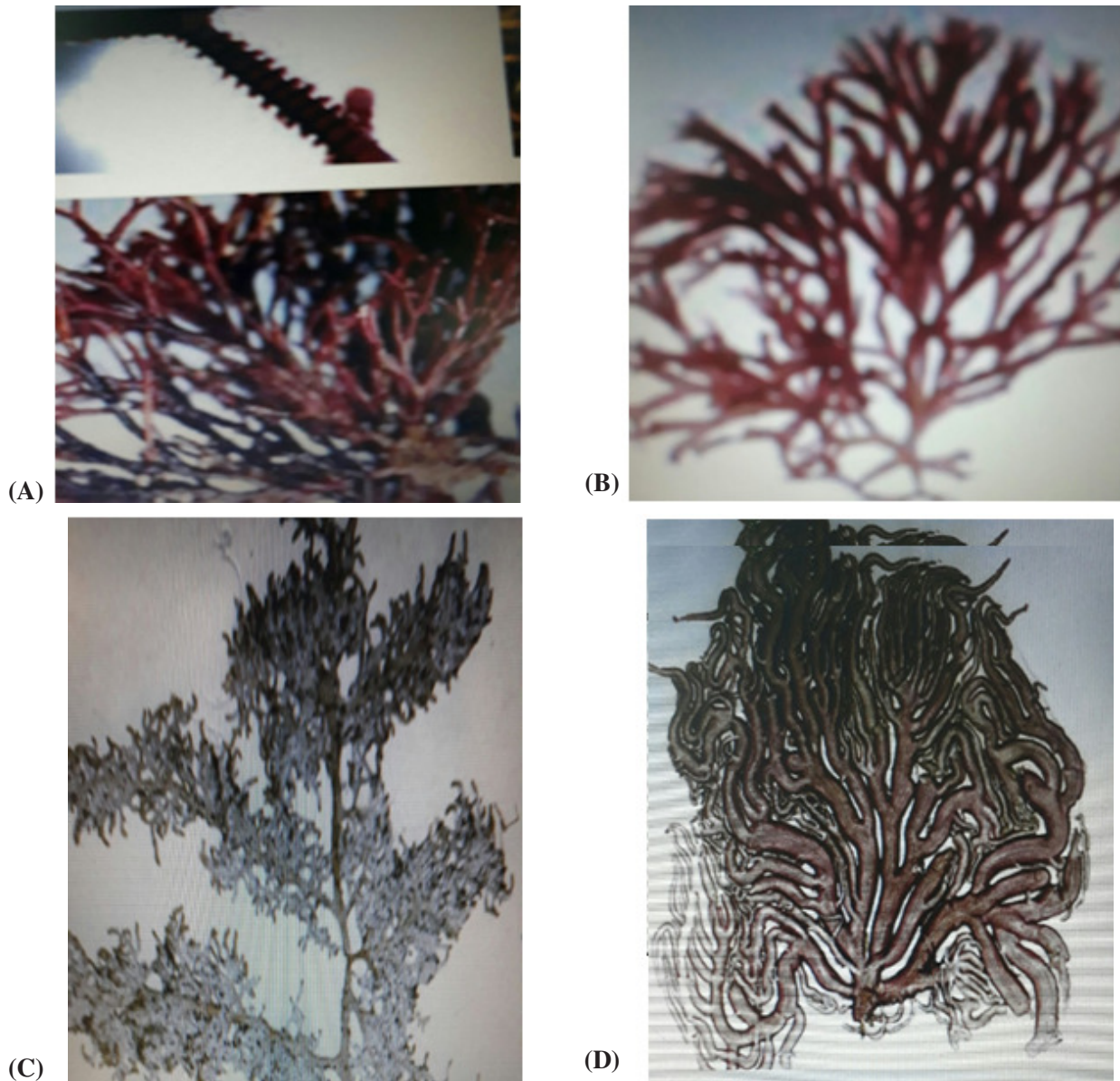
**Arabian Gulf Records :** Iran. New record for Iraq and Arabic side of the Arabian Gulf.

### Glacellariaceae

#### \**Gracilaria corticata* (J. Agardh) J. Agardh

**References :** Jaasund (1976) 83, fig. 168; Moorjani and Simpson (1988) 29, pl. 59d.

**Ecology :** Epilithic, high intertidal pools.



**Fig. 2 :** A- (*Actinotrichia fragilis*), B- (*Galaxauram arginata*), C- (*Izziella orientalis*), D- (*Trichogloeare quienii*).

**Arabian Gulf Records :** UAE, Iran, Kuwait, New record for Iraq.

**\**Gracilaria salicornia* (C. Agardh) Dawson**

**References :** Jaasund (1976) 85, fig. 171; Tseng (1984) 108, pl. 57, fig. 1; Cribb (1996) 87, fig. p 86; Abbott (1999) 214, fig. 59; Littler and Littler (2003) 100, p101.

**Ecology :** Epilithic, on intertidal rocks,

**Arabian Gulf Records :** Iran, Kuwait, New record for Iraqi water.

### **Liagoraceae**

**\*\**Izziella orientalis* (J. Agardh) Huisman and Schils**

**References :** Doty (1978) 33–39, figs. 1–9 (as *Izziella abbotiae* Doty); Abbott (1999) 87, fig. 14 F–J (as *Liagora orientalis* J. Agardh).

**Ecology :** Epilithic on rock pools at low intertidal.

**Arabian Gulf Records :** New for Iraq and Arabian Gulf region.

**\**Liagoracer anoides* Lamouroux**

**References :** Tseng (1984) 54, pl. 30, fig. 2; Cribb (1996) 103, fig. p102; Abbott (1999) 84, fig. 13I; Littler and Littler (2000) 50, fig. p51; Payri *et al* (2000) 158,

fig. p159; Skelton and South (2002) 139, fig. 3.

**Ecology** : Epilithic at low intertidal.

**Arabian Gulf Records** : Bahrain, New record for Iraq.

**\*\**Trichogloea requienii* (Montagne) Kutzing**

**References** : Magruder and Hunt (1979) 95, fig.3 p 94; Cribb (1996) 117, fig. p116; Abbott (1999) 96, fig. 18; Millar *et al* (1999) 551, fig. 1D; Huisman (2000) 35; Littler and Littler (2000) 56, fig. p 57.

**Ecology** : Epilithic on rocks at low tide.

**Arabian Gulf Records** : New record for Iraq and Arabian Gulf region.

**Rhodomelaceae**

**\**Chondria collinsiana* Howe**

**References** : Jaasund (1976) 135, fig. 275; Coppejans *et al* (2000) 42, fig. 9; Huisman (2000) 157; Littler and Littler (2000) 200, p 201.

**Ecology** : At 10m depth attached to some macroalgae.

**Arabian Gulf Records** : Qatar, Saudi Arabia, New record for Iraq.

**\**Chondria dasyphylla* (Woodward) C. Agardh**

**References** : Jaasund (1976) 135, fig. 274; Littler and Littler (2000) 202, p 203; Payri *et al* (2000) 274, p 275.

**Ecology** : In shallow silty sandy pools in mid-intertidal area.

**Arabian Gulf Records** : UAE, Bahrain, Iran, Kuwait, Qatar, Saudi Arabia, New record for Iraq.

**\**Laurenciac f. obtusa* (Hudson) Lamouroux**

**References** : Jaasund (1976) 143, fig. 289; Tseng (1984) 152, pl. 79, fig. 4; De Clerck and Coppejans (1996) 263, fig. 110–112; Littler and Littler (2000) 216, fig. p. 217.

**Ecology** : Silty turbid water at 12m depth.

**Arabian Gulf Records** : Bahrain, Kuwait, New record for Iraq.

**\**Lophocladia lallemandii* (Montagne) Schmitz**

**Reference** : Millar (2000) 94.

**Ecology** : Silty pools at 0.5m depth.

**Arabian Gulf Records** : Iran, Saudi Arabia .New record for Iraq.

**\**Polysiphonia platycarpa* Børgesen**

**Reference** : Jaasund (1976) 123, fig. 25.

**Ecology** : Epiphytic on *Gelidiopsis intricata* in

intertidal rock area.

**Arabian Gulf Records** : Kuwait, Qatar, New record for Iraq.

***Polysiphonia variegata* (Ag.) Zanardini**

**References** : Jaasund (1976) 125 Hadi *et al* (1993).

**Ecology** : Epiphytic on macroalgae or rocks in the intertidal area.

**Arabian Gulf Records** : Iraq.

**Spiridiaceae**

**\**Spyridia filamentosa* (Wulfen) Harvey**

**References** : Tseng (1984) 132, pl. 69, fig. 3; Cribb (1996) 117, fig. p 116; Abbott (1999) 313, fig. 88; Littler and Littler (2000) 164, fig. p165; Payri *et al* (2000) 256, figs. p257; Littler and Littler (2003) 124, p 125.

**Ecology** : Shallow pools of mid-intertidal area.

**Arabian Gulf Records** : UAE, Bahrain, Iran, Kuwait, Qatar, Saudi Arabia, New record for Iraq.

**Wrangeliaceae**

**\**Griffithsia globulifera* Harvey ex Ku'tzing**

**References** : Littler and Littler (2000) 156, fig. p157.

**Ecology** : Epiphytic on *Ceramium* sp. at 5m depth.

**Arabian Gulf Record** : Iran, New record for Iraq and Arab side of the Arabian Gulf.

**CONCLUSION**

Total of 25 species were recorded for the first time in Iraqi coastal waters, 5 of them were new for the Arabic coastal lines of Arabian Gulf and 4 species, belonging to (*Actinotrichia fragilis*, *Galaxaura marginata*, *Iziella orientalis*, *Trichogloe arequienii*) were new records for the Arabian Gulf region.

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