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## Algae of Turkey from the Herbarium Forsskålîi

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**Abstract:** The naturalist, Pehr Forsskål collected samples (phanerogams and cryptogams) from Estac (France), Turkey, Egypt and Yemen between 1761-1763. The collected plants were published in Flora Aegyptiaco-Arabica in 1775 including a list of 16 algal species from Turkey. In the present work, algae of Turkey from the Herbarium Forsskålîi were studied. Several herbarium sheets have been lost and therefore, we were unable to identify some of Forsskål's collections. The aim of this research was to identify some of the remaining species and to annotate with regard to taxonomy and nomenclature.

**Key words:** Algae, Turkey, herbarium Forsskålîi

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### INTRODUCTION

Forsskål (1732-1763) participated in the expedition to Egypt and Yemen supported by the King of Denmark. The expedition's route was given by Hepper and Friis (1994). The expedition visited Marseille and collected plants from Estac and these plants were published in the Flora Aegyptiaco-Arabica as Florula Estaciensis (1775: I-XIV), they went to Malta and after Malta, they went to Turkey [order Symrna (Izmir), Tenedos (Bozcada), Imros (Gokceada), Natolia (Dardanelles), Tekirdag and Istanbul]. The plants collected from Turkey were published as Flora Constantinopolitana littoralis ad Dardanelles et insularum Tenedos, Imros, Rhodi (1775: XV-XXXVI). Then he went to Egypt and later to Yemen where he died in 1763. This publication was published by C. Niebuhr in 1775.

Forsskål's specimens were later studied by Vahl, Mertens, C.A. Agardh, J.G. Agardh and Zeller (Børgesen, 1932). Børgesen (1932) examined the specimens in Forsskål's herbarium and he considered that 40 species were including 4 *Spongia*. Forsskål (1775) recorded 56 (6 Estac, 16 Turkey, 9 Egypt and 25 Yemen) algal species totally.

Forsskål (1775) listed 481 species (phanerogams and cryptogams) from Turkey. The list included 16 species of algae which were collected mainly from Imros (Gokceada), Tenedos (Bozcada) and Constantinopoli (Istanbul) (Table 1). These algae are the first collections from Turkey. In the present research, algae of Turkey from the Herbarium Forsskålîi were studied. *Jania rubens* (L.) J.V. Lamouroux and *Polysiphonia* cf. *breviarticulata* (C. Agardh) Zanardini were identified from the Herbarium Forsskålîi for the first time.

### RESULTS AND DISCUSSION

Forsskål (1775) listed 16 species of algae and two *Spongia* (*S. ramosa* and *S. vulgaris*) from Turkey. The Herbarium Forsskålîi contains only nine species: *Ulva compressa Rubra* Forsskål, *Fucus nodosus* Forsskål, *Fucus uvifer* Forsskål, *Fucus divaricatus* Forsskål, *Fucus muscoides*

Table 1: List of algae of Turkey from the Herbarium Forsskalii

Forsskål' species	Current name	Locality	Date
<i>Ulva intestinalis intestinalis</i> Forssk.*	**	Gokceada	
<i>Ulva compressa rubra</i> Forssk.	<i>Halarachmion ligulatum</i> (Woodward) Kützing	Istanbul	August, 1761
<i>Ulva flava</i> Forssk.*	**	Istanbul	
<i>Ulva viridis</i> Forssk.*	**	Istanbul	
<i>Fucus pavonicus</i> Forssk.*	**	Gokceada	
<i>Fucus nodosus</i> Forssk.	<i>Cystoseira barbata</i> (Stackh.) C. Agardh	Istanbul	August, 1761
<i>Fucus botryoid</i> Forssk.*	**	Istanbul	
<i>Fucus uvifer</i> Forssk.	<i>Laurencia uvifera</i> (Forssk.) Boergesen	Istanbul	August, 1761
<i>Fucus divaricatus</i> Forssk.	<i>Dictyota dichotoma</i> (Hudson) J.V. Lamouroux	Istanbul	August, 1761
	<i>Solieria dura</i> (Zanardini) F. Schmitz	Istanbul	August, 1761
<i>Fucus viscidus</i> Forssk.*	<i>Liagora viscida</i> (Forsk.) C. Agardh	Istanbul	
<i>Fucus muscoides muscosus</i> Forssk.	<i>Polysiphonia elongata</i> (Hudson) Sprengel	Istanbul	August, 1761
<i>Conferva viridis</i> Forssk.	<i>Cladophora</i> cf. <i>pellucida</i> (Hudson) Kützing	Istanbul	August, 1761
	August 1761		
	<i>Chaetomorpha linum</i> (O.F. Müller) Kützing	Bozcaada	July, 1761
<i>Conferva geniculata</i> Forssk.	<i>Ceramium rubrum</i> (Hudson) C. Agardh	Istanbul	August, 1761
<i>Conferva littoralis</i> Forssk.	<i>Bonnemaisonia asparagoides</i> (Woodward) C. Agardh	Istanbul	August, 1761
<i>Conferva corallina</i> Forssk.	<i>Ceramium diaphanum</i> (Lightfoot) Roth	Istanbul	August, 1761
<i>Conferva dichotoma</i> Forssk.*		Mare Mediterr. in Fucus	

\*: These species have been lost in the herbarium, \*\*: Forsskål's name has not been transferred to a current name

*muscosus* Forsskål, *Conferva viridis* Forsskål, *Conferva geniculata* Forsskål, *Conferva littoralis* Forsskål and *Conferva corallina* Forsskål. Seven species have been lost in the Herbarium Forsskalii (Table 1).

Børgesen (1932) reported 6 species (*Conferva littoralis* Forsskål, *Conferva dichotoma* Forsskål, *Fucus uvifer* Forsskål, *Fucus divaricatus* Forsskål, *Fucus viscidus* Forsskål and *Fucus muscoides* Forsskål) from Forsskål's algae from Turkey. *Fucus uvifer* Forsskål was transferred to *Laurencia uvifera* (Forsskål) by Børgesen (1932).

The name *Halarachmion ligulatum* (Woodward) Kützing was established on the basis of *Ulva ligulata* Woodward by Kützing (1843). Although the name *Ulva compressa rubra* Forsskål (1775: xxxvi) is older than *Ulva ligulata* Woodward (1797), Forsskål's name can not be used (Greuter *et al.*, 1994). Type locality (Yarmouth and Cromer, Norfolk, U.K.) and lectotype were given by Dixon and Irvine (1977) and they selected an unlocalised specimen as provisional lectotype, labelled from Mr Woodward. *Ulva compressa rubra* was collected from Istanbul (Turkey) by Forsskål in August 1761 (Fig. 1).

The name *Fucus nodosus* Forsskål is an older name than *Abrotanifolia barbata* Stackhouse (1809) (= *Cystoseira barbata* (Stackhouse) C. Agardh), but Forsskål's name is a younger homonym of *Fucus nodosus* Linnaeus (1753) (= *Ascophyllum nodosum* (L.) Le Jolis) and therefore illegitimate.

Two sheets were indicated as *Fucus divaricatus* Forsskål in the Herbarium Forsskalii from Turkey (August 1761): *Dictyota dichotoma* (Hudson) J.V. Lamouroux and *Solieria dura* (Zanardini) F. Schmitz. The name *Fucus divaricatus* Forsskål can not be used (Børgesen, 1932).

*Fucus viscidus* Forsskål (= *Liagora viscida* (Forsskål) C. Agardh) the type locality was Istanbul (Turkey), but the type specimen has been lost in the Herbarium Forsskalii. Therefore, has been selected a neotype and neotype locality, Anse du Troc, Banyuls-sur-Mer, France (Guiry and Guiry, 2007).

There are two species in the sheet of *Conferva viridis* Forsskål: *Cladophora* cf. *pellucida* (Hudson) Kützing and *Chaetomorpha linum* (O.F. Müller) Kützing. *Cladophora* cf. *pellucida* was collected from Istanbul but *Chaetomorpha linum* was collected from Bozcaada (Tenedos).



Fig. 1: *Ulva compressa rubra* Forsskål (Locality: Istanbul, Turkey, August 1761)

The sheet of *Conferva corallina* Forsskål belongs to *Ceramium diaphanum* (Lightfoot) Roth. The name *Ceramium diaphanum* was established based on *Conferva diaphana* Lightfoot. Although Forsskål's name is the older than Lightfoot's name (1777) it is a homonym of *Conferva corallina* Murray (1774) (= *Griffithsia corallinoides* (Linnaeus) Trevisan), so the epithet of Forsskål cannot be used.

*Conferva littoralis* Forsskål (= *Bonnemaisonia asparagoides* (Woodward) C. Agardh) the binominal with *Conferva littoralis* Linnaeus (1753) (= *Fylaeella littoralis* (Linnaeus) Kjellman), thus the epithet of Forsskål is illegitimate.

*Conferva dichotoma* Forsskål, the binominal with *Conferva dichotoma* Linnaeus (1753) (= *Vaucheria dichotoma* (Linnaeus) Martius). Forsskål's description agrees with *Griffithsia* (Silva, 2007).

## CONCLUSIONS

*Ulva intestinalis* "intestinal" Forsskål, *Ulva flava* Forsskål, *Ulva viridis* Forsskål, *Fucus pavonicus* Forsskål, *Fucus botryoid* Forsskål, *Fucus viscidus* Forsskål and *Conferva dichotoma* Forsskål have been lost.

There is no general knowledge on Forsskål's collections from Turkey except a few species mentioned by Athanasiadis (1987) and repeated by Taşkın and Öztürk (2007). *Jania rubens* and *Polysiphonia* cf. *breviarticulata* have not previously been identified in Forsskål's collections. They were identified on the sheets of *Fucus muscoides*. *Laurencia uvifera* was reported only from Turkey (Børgesen, 1932) and Yemen (Lipkin and Silva, 2002).

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