

Caulerpa taxifolia (M. Vahl) C. Agardh

Relevant synonym

Fucus taxifolius
M. Vahl

Misidentification

Caulerpa mexicana
Sonder ex Kützinger

a. Dried specimen.
b. *Posidonia oceanica* beds invaded by
Caulerpa taxifolia.
Bar = 1 cm.



Photo a: S. Ruffon (Mediterranean, Balearic Islands);
b: A. Weis (Mediterranean, France).

Short description

Large (stolons to 1 m long), with a branched horizontal axis (stolon) attached by spaced long rhizoidal outgrowths (pillars), and bearing erect photosynthetic axes (fronds), compressed, 20-25 (65) cm high and 10-13 mm broad, which are pinnately branched as feathers; midrib narrow (< length of ramuli) and oval in transverse section; branchlets (ramuli) distichous, firm, upcurved, tapering at both tip and base, constricted at point of attachment; coenocytic throughout but with slender cylindrical and branched wall ingrowths (trabeculae) crossing the lumen; chloroplasts without pyrenoids; amyloplasts present; holocarpic reproduction.

Distinguishing characteristics

The spaced long rhizoidal pillars, the fronds 10-13 mm broad, and the ramuli firm and constricted at base are distinctive; confusion possible with the other feather-like *Caulerpa* species:

- *C. mexicana* Sonder ex Kützinger: numerous short rhizoidal pillars, fronds 10-15 mm broad, midrib narrow (< length of ramuli) and flattened in section, ramuli membranous and few constricted at base;
- *C. scalpelliformis* (R. Brown ex Turner) C. Agardh: fronds 10-20 mm broad, midrib broad (= length of ramuli) and flat in section, ramuli flat and broadest at base;
- *C. taxifolia* var. *distichophylla* (Sonder) Verlaque, Huisman & Procaccini: short rhizoidal pillars, fronds 2-4 mm broad, midrib narrow (< length of ramuli) and oval in section.

Biology / Ecology / Habitat

Subtidal communities, 0 – 50 (90) m depth, on all kind of substrata with the exception of dense *Posidonia oceanica* beds and unstable sandy substrata; perennial.

Distribution

Worldwide: widespread in warmer seas; records may in some instances be referable to *C. Mexicana*, which was for a time regarded as a synonym of this entity; western Atlantic, described from Virgin Islands (Vahl, 1802), Caribbean, Bermuda, Mexico, Colombia, Brazil; eastern Atlantic, from Mauritania to Gabon; Red Sea; Indian Ocean, widely distributed; Pacific, China, Japan, Vietnam, Philippines; western Pacific, Papua New Guinea; Australia; Pacific Islands, Hawaiian Islands, Fiji, French Polynesia; north-eastern Pacific, USA, California (introduced). *Caulerpa taxifolia* might be a complex of cryptic species. **Mediterranean:** recorded first in 1984 from Monaco (Meinesz and Hesse, 1991); successively recorded in France, Menton (Meinesz and Hesse, 1991), Pyrénées-Orientales, St Cyprien, Var and Alpes-Maritimes (Meinesz *et al.*, 2001); Italy, Imperia (Relini and Torchia, 1992), Liguria and Tuscany, Livorno (Morucci *et al.*, 1994), Island of Elba (Cinelli and Lavelli, 1994), Sicily (Fradà Orestano *et al.*, 1994), Calabria (Cinelli *et al.*, 1998), Sardinia (Cossu *et al.*, 2004); Balearic Islands (Pou *et al.*, 1993); Croatia (Zavodnik, 1995); Tunisia (Langar *et al.*, 2000); Turkey, Izmir (Turan *et al.*, 2011). The last two reports correspond to different introduction events into the Mediterranean Sea.

Mode of introduction

Escaped from an aquarium at Monaco; the geographical origin of the first introduced strain is south-eastern Australia (Meusnier *et al.*, 2001). The other introduced strains also originate from Tropical SW Pacific (Australia) but the vectors of introduction are not identified.

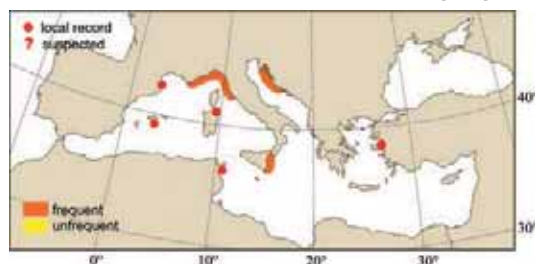
Establishment

Well established.

Importance to humans

Invasive species that successfully competes many benthic species and develops large and uniform meadows, which means a smoothing and an impoverishment of the Mediterranean subtidal communities; *C. taxifolia* can be a nuisance to commercial fishermen, clogging their nets.

1st Mediterranean record
Monaco, 1991 [1984].



Key references

- Meinesz A. and Hesse B., 1991. Introduction et invasion de l'algue tropicale *Caulerpa taxifolia* en Méditerranée Nord-Occidentale. *Oceanologica Acta*, 14: 415-426.
- Meinesz A., Belsher T., Thibaut T., Antolic B., Ben Mustapha K., Boudouresque C.F., Chiaverini D., Cinelli F., Cottalorda J.M., Djellouli A., El Abed A., Orestano C., Grau A.M., Ivesa L., Jaklin A., Langar H., Massuti-Pascual E., Peirano A., Tunesi L., Vaugelas J. de, Zavodnik N., Žuljević A., 2001. The introduced green alga *Caulerpa taxifolia* continues to spread in the Mediterranean. *Biological Invasions*, 3: 201-210.
- Meusnier I., Olsen J.L., Stam W.T., Destombe C. and Valero M., 2001. Phylogenetic analyses of *Caulerpa taxifolia* (Chlorophyta) and of its associated bacterial microflora provide clues to the origin of the Mediterranean introduction. *Molecular Ecology*, 10: 931-946.
- Vahl M., 1802. Endeel kryptogamiske Planter fra St.-Croix. *Skrifter af Naturhistorie-Selskabet, København*, 5(2): 29-47.