Short Communication

SARGASSUM MUTICUM BEGINS TO INVade THE MEDITERRANEAN

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ABSTRACT


In the Mediterranean, the Japanese brown alga Sargassum muticum (Yendo) Fensholt is no longer confined to the relatively closed Thau lagoon (France), but is spreading along the Languedoc open-sea coasts: 11 new localities, from Grau du Roi (Gard) to Port-la-Nouvelle (Aude), are mentioned.

The spread of the Japanese brown alga Sargassum muticum (Yendo) Fensholt, within European Atlantic waters, is well documented by Critchley et al. (1983). The earliest known record of attached plants is at Bembridge (Isle of Wight, U.K.), in 1973 (Farnham et al., 1973), but S. muticum may have been present in the area since 1970, or even the late 1960s (Critchley et al., 1983), probably as a result of the importation of the Japanese oyster Crassostrea gigas (Thunberg) into French oyster beds. At the present time, this alga is well established along the Atlantic coasts of England, The Netherlands and France; only cast-ashore specimens were recorded in Belgium (Coppejans et al., 1980).

In the Mediterranean, the occurrence of S. muticum has been reported from Etang de Thau (a lagoon near Montpellier) since 1981 (Noepfler and Pérez in Critchley et al., 1983), but the alga was already present in 1980 (specimens in herbarium Michel Lauret, see Belsher et al., 1985). Note that Critchley et al. (1983) mislocated Thau lagoon, almost 150 km from its actual position, on their map. The subsequent spread of S. muticum within Thau lagoon, where it now constitutes very luxuriant stands and its extension

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through the channels of Sète and Piso Saumo to the open-sea Sète and Marseillan-plage harbors, is chronicled by Belsher et al. (1985).

Until now, *S. muticum* seemed to be confined to the Sète region (Etang de Thau and the corresponding open-sea harbors); the prevailing westward currents, together with the scarcity of suitable hard bottoms along the sandy Languedoc shoreline (essentially piers, breakwaters and harbors), can explain the relative lag of its Mediterranean expansion, when compared with the rapid spreading in the Atlantic area.

In early 1985 (February to April), attached populations of *S. muticum* were observed from numerous new sites along the French Mediterranean coast (explored sites are numbered according to their location on Fig. 1):

1. Grau du Roi: two individuals on the outward side of a breakwater protecting the seaward mouth of the "grau" (in Languedoc, a grau is a channel joining a lagoon to the sea, or the estuary of a short coastal river);
2. Palavas: a few individuals on the sheltered side of harbor piers;
3. Grau du Prévost: numerous individuals on the outward side of a breakwater protecting the seaward mouth of the grau;
4. Frontignan-plage: large and numerous individuals in the harbor;

![Fig. 1. The spreading of *Sargassum muticum* along the French Mediterranean coast. Open circles: unsuccessfully explored localities. Solid circles: new localities. Solid triangles: previously known localities. Solid squares: main towns. For locality names corresponding to numbers, see text.](image-url)
(8) Ingrid lagoon (this lagoon communicates with the sea through Frontignan-plage harbor): a few individuals on wharfs;

(9) Canal des Quilles (a new channel, open since July 1984, connecting Thau lagoon with the open sea): very numerous individuals, on both sides of the channel, including its seaward mouth;

(10) Port-Ambonne (between Marseillan-Plage and Cap d’Agde): dense stands in the harbor, especially in the vicinity of its exit;

(11) Cap d’Agde (the place called Le Môle): two individuals on in situ basalt rocks;

(14) Port de Brossollette (between Saint-Pierre sur Mer and Narbonne-Plage): isolated individuals;

(16) Gruissan-plage: at the mouth of the channel running from Gruissan lagoon to the sea: isolated individuals on the inward sides of breakwaters protecting the mouth of the channel.

(17) Port-la-Nouvelle: channel running from Bages-Sigean lagoon to the open sea, both northern and southern sides, 250–1250 m from the open sea; very dense stands (up to 2.5 m long individuals) on the southern side, 1000 m from the open sea.

Additional localities were unsuccessfully explored: (2) La Grande Motte, (3) Carnon, (4) Mauguio lagoon, (12) Grau d’Agde, (13) Valras plage, (15) Les Aygades (between Gruissan-plage and Narbonne-plage), (18) Salce-Leucate lagoon, (19) Grau of La Franqui (connecting Lapalme lagoon with the sea), (20) Leucate cape, (21) Grau des pêcheurs (Port-Leucate), (22) Grau Saint-Ange (connecting Salce-Leucate lagoon with the sea), (23) Sainte Catherine (between Bear cape and Banyuls-sur-mer), (24) Banyuls-sur-mer (lle Grosse, lle Petite and the harbor). Nevertheless, it is not unlikely that single plants, although present, could have been overlooked at these localities.

This may be the first year that *S. muticum* was present on the southern side of Port-la-Nouvelle channel, near its open sea mouth, as the area had been thoroughly searched the previous year, in connection with the study of a newly established population of another introduced alga, *Undaria pinnatifida* (Harvey) Suringar (Boudouresque et al., 1985). Some other localities, with scattered and relatively small plants, seem to be recently colonized, perhaps for the first year, e.g., Grau du Roi, Palavas and Cap d’Agde. In contrast, large individuals (with a well developed perennial base and 3–6 lateral branches, see Jepsson and Gray, 1977), forming dense stands at Port-la-Nouvelle, Grau du Prévost and Frontignan-plage, can be considered to have been present for 1 or 2 years as well.

In the explored area, *S. muticum* was found attached mainly to artificial substrata (piers, breakwaters, wharfs), in sheltered to moderately exposed conditions, from sea level down to a depth of 1.2 m.

As suggested for Atlantic populations, the establishment of *S. muticum* in the Mediterranean, i.e., Thau lagoon, an important area for oyster culture, is clearly associated with the direct importation of *Crassostrea gigas* spat.
from Japan. As far as its way of expansion along the open-sea shoreline is concerned, it is noteworthy to point out that:

(i) distributional gaps are important;
(ii) floating or cast-ashore drift material was very rarely sighted along the Languedoc coastline, despite the fact that local authorities and the public were made aware of the presence of this Japanese alga by coverage in the media and distribution of an enquiry form; perhaps drift material was transported offshore by southward prevailing winds ("tramontane");
(iii) *S. muticum* is absent from the Salse-Leucate lagoon, where oyster beds are also present;
(iv) the spread of *S. muticum*, from its initial Thau lagoon locality, is both southwestward and eastward, whereas the prevailing surface current runs from east to west or south-west.

Accordingly, it is suggested that germlings, growing on fishing or pleasure boat hulls, then shed before harbours, could be the main mechanism of expansion for this species in the studied area. In the same way, it is thought that *S. muticum* was introduced to Jersey (English Channel) by shipping traffic (Critchley and Morrell, 1982).

These new sites represent a significant increase in distribution; furthermore, the alga is no longer confined to a well colonized but almost closed lagoon, surrounded by relatively unsuitable sandy shores; as a result, we can consider that the spread of *S. muticum* in the Mediterranean is now initiated and that its continued rapid expansion, especially to the Spanish coast, can be predicted.

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REFERENCES