Horned wrack (*Fucus ceranoides*)

MarLIN – Marine Life Information Network
Biology and Sensitivity Key Information Review

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A report from:
The Marine Life Information Network, Marine Biological Association of the United Kingdom.

Please note. This MarESA report is a dated version of the online review. Please refer to the website for the most up-to-date version [https://www.marlin.ac.uk/species/detail/1333]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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Fucus ceranoides.
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See online review for distribution map

Distribution data supplied by the Ocean Biogeographic Information System (OBIS). To interrogate UK data visit the NBN Atlas.

Researched by	Nicola White	**Refereed by**	Dr Graham Scott
Authority	Linnaeus, 1753		
Other common names	-	**Synonyms**	-

Summary

Description

A large brown intertidal seaweed, restricted to growing in estuaries or near freshwater streams on the shore. *Fucus ceranoides* does not have airbladders, but the side of the fronds are often inflated.

Recorded distribution in Britain and Ireland

All coasts of Britain and Ireland

Global distribution

Spitsbergen, Iceland, Norway, Heligoland, Netherlands, Ireland, Britain, N. France, Portugal and Azores.

Habitat

Fucus ceranoides is widely distributed in north-west Europe but is only common in brackish water. It is characteristic of estuaries and is often abundant where freshwater streams run onto the shore. The species is found on the middle part of the shore, where it attaches to stones, rocks or gravel.

Depth range

Not relevant

Identifying features

- Frond thin with smooth margin.
- Frond fan shaped with prominent midrib.
- Without air bladders but frond on either side may be inflated.
- Reproductive bodies narrow, pointed fronds at ends of branches.

Additional information

No text entered

Listed by

Further information sources

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Biology review

Taxonomy

Phylum	Ochrophyta	Brown and yellow-green seaweeds
Class	Phaeophyceae	
Order	Fucales	
Family	Fucaceae	
Genus	Fucus	
Authority	Linnaeus, 1753	
Recent Synonyms	-	

Biology

Typical abundance	High density
Male size range	Up to 60cm
Male size at maturity	
Female size range	Large(>50cm)
Female size at maturity	
Growth form	Foliose
Growth rate	Data deficient
Body flexibility	
Mobility	Not relevant
Characteristic feeding method	Autotroph
Diet/food source	
Typically feeds on	Not relevant
Sociability	No information
Environmental position	Epifloral
Dependency	Independent.
Supports	No information
Is the species harmful?	Data deficient

Biology information

Fucus ceranoides is physiologically adapted to brackish conditions. Suryono & Hardy (1997) found that growth rate was highest between 5 and 25 psu and growth was depressed at 0 and 35 psu. When cultured in high salinity they found that plant tissue decayed within 5 to 6 weeks. Khjafi & Norton (1979) recorded similar results but Baeck *et al.* (1992) found that *Fucus ceranoides* grew at full salinity for 11 weeks.

Habitat preferences

Physiographic preferences	Open coast, Strait / sound, Sea loch / Sea lough, Ria / Voe, Estuary
Biological zone preferences	Mid eulittoral, Upper eulittoral

Substratum / habitat preferences	Bedrock, Cobbles, Gravel / shingle, Large to very large boulders, Pebbles, Small boulders
Tidal strength preferences	Moderately Strong 1 to 3 knots (0.5-1.5 m/sec.), Strong 3 to 6 knots (1.5-3 m/sec.), Very Weak (negligible), Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Sheltered, Very sheltered
Salinity preferences	Low (<18 psu), Reduced (18-30 psu)
Depth range	Not relevant
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

The species is commonly found in the upper reaches of estuaries. It appears to be physiologically adapted to living in reduced salinity and exhibits its maximum growth rate at 11 psu. It is thought to be absent from fully saline sites due to an inability to compete with the faster growing fucoids, such as *Fucus vesiculosus* and a physiological intolerance of fully saline conditions. In areas of estuaries where salinity varies between 11 and 25 psu, *Fucus ceranoides* and *Fucus vesiculosus* can be found living together.

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	Annual episodic
Fecundity (number of eggs)	No information
Generation time	Insufficient information
Age at maturity	Insufficient information
Season	May - August
Life span	2-5 years

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Not relevant
Duration of larval stage	No information
Larval dispersal potential	No information
Larval settlement period	Not relevant

Life history information

The species is usually dioecious but monoecious plants have been recorded, although it has been suggested that these are hybrids. Well developed gametangia are present on plants in southern Norway from the end of May to December. Gametes are released on daytime high tides at about full and new moon. Germlings are found from the end of May to the beginning of August.

Receptacles usually drop off by October or November.

Sensitivity review

This MarLIN sensitivity assessment has been superseded by the MarESA approach to sensitivity assessment. MarLIN assessments used an approach that has now been modified to reflect the most recent conservation imperatives and terminology and are due to be updated by 2016/17.

Physical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Substratum Loss	High	Moderate	Moderate	Low

Fucus ceranoides is permanently attached to the substratum, so would be removed upon substratum loss. In general, fucoids recruit rapidly to cleared areas, but populations of this species are restricted to brackish waters so new individuals may have to recruit in from some distance.

Smothering	High	Moderate	Moderate	Moderate

If smothering occurred when the tide was out, the whole plant would be buried underneath the sediment, preventing photosynthesis and killing the plant. If smothering occurred when the plant was immersed, some of the frond may protrude above the sediment and not be affected. In general, fucoids recruit rapidly to cleared areas, but populations of this species are restricted to brackish waters so new individuals may have to recruit in from some distance.

Increase in suspended sediment	Tolerant	Not relevant	Not sensitive	Moderate

Fucus ceranoides is a resident of estuaries, where high levels of siltation naturally occur, so is likely to be tolerant of this factor.

Decrease in suspended sediment

Dessication	High	Moderate	Moderate	Low

An increase in the level desiccation may result in the upper limit of the species distribution on the shore becoming depressed. A decrease in the level of desiccation may allow the species to grow further up the shore. In general, fucoids recruit rapidly to cleared areas, but populations of this species are restricted to brackish waters so new individuals may have to recruit in from some distance.

Increase in emergence regime	High	Moderate	Moderate	Low

Fucus ceranoides would suffer desiccation and nutrient stress on increased exposure to air. An increase in the period of emersion would cause the upper limit of the population to be depressed. Reduced exposure to air would enable *Fucus ceranoides* to extend further up the shore.

Decrease in emergence regime

Increase in water flow rate	Intermediate	Moderate	Moderate	Moderate

An increase in water flow rate may tear plants of the substratum or mobilise the substratum with the plants attached. The plants with substratum may be washed away to conditions unsuitable for the growth of the species. In general, fucoids recruit rapidly to cleared areas, but populations of this species are restricted to brackish waters so new individuals may have to recruit in from some distance.

Decrease in water flow rate

Increase in temperature	Low	Moderate	Low	Moderate

Decreases in temperature are unlikely to have any effect as the species extends to Northern Norway where temperatures are much cooler. *Fucus vesiculosus*, a similar species, can withstand temperatures of up to 30 degrees C, so the species is also likely to be tolerant of increases in temperature.

Decrease in temperature

Increase in turbidity	Low	Immediate	Not sensitive	Moderate

The growth rate of *Fucus ceranoides* may be lowered due to a reduction in the light available for photosynthesis. On return to previous turbidity levels, the growth rate would quickly return to normal.

Decrease in turbidity

Increase in wave exposure	Intermediate	Moderate	Moderate	Low

An increase in wave exposure could cause the plants to be torn off the substratum or mobilise the substratum with the plants attached. The plants with substratum may be washed away to conditions unsuitable for the growth of the species. Increased exposure would also batter the fronds against the substratum subjecting them to abrasion. In general, fucoids recruit rapidly to cleared areas, but populations of this species are restricted to brackish waters so new individuals may have to recruit in from quite far away.

Decrease in wave exposure

Noise	Not relevant	Not relevant	Not relevant	Not relevant

Seaweeds have no known mechanism for noise perception

Visual Presence	Not relevant	Not relevant	Not relevant	Not relevant

Seaweeds have no known mechanism for visual perception

Abrasion & physical disturbance	Intermediate	Moderate	Moderate	Low

Abrasion may damage and remove fronds and germlings. Abrasion may result from human trampling which can significantly reduce the cover of fucoid algae on a shore (Holt *et al.*, 1997). In general, fucoids recruit rapidly to cleared areas but populations of this species are restricted to brackish waters. Where populations are restricted to the affected area, new individuals may have to recruit in from some distance.

Displacement	High	Moderate	Moderate	Moderate

Fucus ceranoides is permanently attached to the substratum so once removed a plant cannot re-establish itself. In general, fucoids recruit rapidly to cleared areas, but populations of this species are restricted to brackish waters so new individuals may have to recruit in from some distance.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination		Not relevant		Not relevant

Insufficient information

Heavy metal contamination	Low	Very high	Very Low	Low

Fucus ceranoides accumulates heavy metals in its tissues (Barreiro *et al.*, 1993). However, little is known of how heavy metals affect the species although fucoids are generally quite robust to chemical pollution and do not appear to be harmed by heavy metals (Holt *et al.*, 1997). Intolerance is therefore, reported to be low. Recovery will be rapid as growth returns to normal.

Hydrocarbon contamination		Not relevant		Not relevant

Insufficient information

Radionuclide contamination		Not relevant		Not relevant

Insufficient information

Changes in nutrient levels	High	Moderate	Moderate	Moderate

Fucus ceranoides was found to be absent from areas of high nutrient pollution in the Tyne estuary by Suryono & Hardy (1997). In low concentrations nutrients enhance the growth rate of the alga but in high concentrations growth is stopped. In general, fucoids recruit rapidly to cleared areas, but populations of this species are restricted to brackish waters so new individuals may have to recruit in from some distance.

Increase in salinity	Intermediate	Moderate	Moderate	Moderate

Fucus ceranoides is adapted to living in brackish waters. It grows fastest at 11 psu and will die when exposed to freshwater for several weeks. Suryono & Hardy (1997) and Khfaji & Norton (1979) both found that vegetative branches of *Fucus ceranoides* died within 5-6 weeks when grown in fully saline water. However, Baeck *et al.*, (1992) found that *Fucus ceranoides* survived and grew for 11 weeks in salinities of up to 45 psu.

Decrease in salinity

Changes in oxygenation		Not relevant		Not relevant

Insufficient information

Biological Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Introduction of microbial pathogens/parasites		Not relevant		Not relevant

Insufficient information

Introduction of non-native species		Not relevant		Not relevant

Insufficient information

Extraction of this species		Not relevant		Not relevant

Insufficient information

Extraction of other species		Not relevant		Not relevant

Insufficient information

Additional information

Importance review

Policy/legislation

- no data -

Status

National (GB) importance	-	**Global red list (IUCN) category**	-

Non-native

Native	-		
Origin	-	**Date Arrived**	-

Importance information

-none-

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