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](https://www.marlin.ac.uk/species/detail/1333). All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

This review can be cited as:

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**Fucus ceranoides**

**Photographer:** Keith Hiscock  
**Copyright:** Dr Keith Hiscock

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**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**

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

Search on:

NBN WoRMS
Biology review

Taxonomy

- Phylum: Ochrophyta
- 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: Not relevant
- Mobility: Not relevant
- Characteristic feeding method: Autotroph
- Diet/food source: Not relevant
- 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
Horned wrack (*Fucus ceranoides*) - Marine Life Information Network

**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.

https://www.marlin.ac.uk/habitats/detail/1333
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

<table>
<thead>
<tr>
<th>Substratum Loss</th>
<th>Intolerance</th>
<th>Recoverability</th>
<th>Sensitivity</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Smothering</th>
<th>Intolerance</th>
<th>Recoverability</th>
<th>Sensitivity</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Increase in suspended sediment</th>
<th>Intolerance</th>
<th>Recoverability</th>
<th>Sensitivity</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tolerant</td>
<td>Not relevant</td>
<td>Not sensitive</td>
<td>Moderate</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Decrease in suspended sediment</th>
<th>Intolerance</th>
<th>Recoverability</th>
<th>Sensitivity</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
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<td>Moderate</td>
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<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Increase in emergence regime</th>
<th>Intolerance</th>
<th>Recoverability</th>
<th>Sensitivity</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Decrease in emergence regime</th>
<th>Intolerance</th>
<th>Recoverability</th>
<th>Sensitivity</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Decrease in temperature</th>
<th>Low</th>
<th>Moderate</th>
<th>Low</th>
<th>Moderate</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Decrease in turbidity</th>
<th>Low</th>
<th>Immediate</th>
<th>Not sensitive</th>
<th>Moderate</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Decrease in wave exposure</th>
<th>Intermediate</th>
<th>Moderate</th>
<th>Moderate</th>
<th>Low</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Noise</th>
<th>Not relevant</th>
<th>Not relevant</th>
<th>Not relevant</th>
<th>Not relevant</th>
</tr>
</thead>
</table>

Seaweeds have no known mechanism for noise perception

Visual Presence

<table>
<thead>
<tr>
<th>Visual Presence</th>
<th>Not relevant</th>
<th>Not relevant</th>
<th>Not relevant</th>
<th>Not relevant</th>
</tr>
</thead>
</table>

Seaweeds have no known mechanism for visual perception

Abrasion & physical disturbance

<table>
<thead>
<tr>
<th>Abrasion &amp; physical disturbance</th>
<th>Intermediate</th>
<th>Moderate</th>
<th>Moderate</th>
<th>Low</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Displacement</th>
<th>High</th>
<th>Moderate</th>
<th>Moderate</th>
<th>Moderate</th>
</tr>
</thead>
</table>

*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

<table>
<thead>
<tr>
<th>Chemical Pressures</th>
<th>Intolerance</th>
<th>Recoverability</th>
<th>Sensitivity</th>
<th>Confidence</th>
</tr>
</thead>
</table>

Synthetic compound contamination

<table>
<thead>
<tr>
<th>Insufficient information</th>
<th>Not relevant</th>
<th>Not relevant</th>
</tr>
</thead>
</table>

Insufficient information
Heavy metal contamination

*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
Insufficient information

Radionuclide contamination
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
Insufficient information

Biological Pressures

**Intolerance**

**Recoverability**

**Sensitivity**

**Confidence**

Introduction of microbial pathogens/parasites
Not relevant
Insufficient information

Introduction of non-native species
Not relevant
Insufficient information

Extraction of this species
Not relevant
Insufficient information

Extraction of other species
Not relevant
Insufficient information

Additional information
Importance review

🔗 Policy/legislation

- no data -

🌟 Status

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

🚫 Non-native

Native -

Origin - Date Arrived -

Ⓛ Importance information

- none -
Bibliography


Fish, J.D. & Fish, S., 1996. *A student’s guide to the seashore*. Cambridge: Cambridge University Press.


Datasets


