A brown seaweed (*Fucus distichus*)

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/1350]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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***Fucus distichus* on rocky shore.**
Photographer: Keith Hiscock

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, 1767		
Other common names	-	**Synonyms**	*Fucus distichus distichus* Powell 1957a, *Fucus distichus anceps* Linnaeus, 1767

Summary

Description

A small tufted brown alga. It has narrow fronds without airbladders and short receptacles. The species has a lifespan of 3 years and grows up to 30 cm long.

Recorded distribution in Britain and Ireland

Restricted to northern shores of Scotland and north and west Ireland.

Global distribution

Norway, northern Scotland, Iceland, Greenland, eastern North America from Labrador to Maine and the Pacific coast of America discontinuously from Alaska to California

Habitat

Occurs in rock pools and on rock faces in the upper eulittoral at wave exposed locations in Scotland & Ireland.

Depth range

Not relevant

Identifying features

- Narrow frond without airbladders.
- Caecostomata rare.
- Receptacles short, typically 18 mm, max. 40 mm.
- Plants small, typically 10 cm long at maturity (max. 30 cm).

Additional information

No text entered

Listed by

UKBAP FOCI

Further information sources

Search on:

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Biology review

Taxonomy

Phylum	Ochrophyta	Brown and yellow-green seaweeds
Class	Phaeophyceae	
Order	Fucales	
Family	Fucaceae	
Genus	Fucus	
Authority	Linnaeus, 1767	
Recent Synonyms	Fucus distichus distichus Powell 1957aFucus distichus anceps Linnaeus, 1767	

Biology

Typical abundance	Moderate density
Male size range	Up to 30cm
Male size at maturity	10cm
Female size range	10cm
Female size at maturity	
Growth form	Foliose
Growth rate	10cm/year
Body flexibility	
Mobility	
Characteristic feeding method	Autotroph
Diet/food source	
Typically feeds on	
Sociability	
Environmental position	Epifloral
Dependency	Independent.
Supports	No information
Is the species harmful?	Data deficient

Biology information

The morphology of *Fucus distichus* is remarkably varied. Powell (1957a) recognised four subspecies, which were later separated into two distinct species (*Fucus distichus* and *Fucus evanescens*) by Rice and Chapman (1985). In its rock pool habit on the east coast of North America *Fucus distichus* is considered by Pearson & Davison (1994) to be slow growing, a poor competitor and stress intolerant. Adults of *Fucus distichus* are very tolerant of grazing due to a high content of phlorotannin, but germlings do not have any protection and are susceptible to grazing by littorinids.

Habitat preferences

Physiographic preferences	Open coast

Biological zone preferences	Upper eulittoral
Substratum / habitat preferences	Bedrock, Large to very large 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	Extremely exposed, Very exposed
Salinity preferences	Full (30-40 psu), Variable (18-40 psu)
Depth range	Not relevant
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

In Britain and Ireland, *Fucus distichus* has only been recorded attached to bedrock in the mid to upper eulittoral zone on exposed rocky shores in northern Scotland and Ireland. It is thought to be prevented from growing further south due to its poor tolerance of desiccation and inability to compete with plants growing further down the shore. However, on the east coast of North America, *Fucus distichus* is only found in rock pools and is incapable of growing on emergent rock surfaces in the mid to upper eulittoral.

Life history

Adult characteristics

Reproductive type	Permanent (synchronous) hermaphrodite
Reproductive frequency	Annual protracted
Fecundity (number of eggs)	
Generation time	1-2 years
Age at maturity	2
Season	April - 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

- Receptacles of *Fucus distichus* are initiated in December, they become ripe in April and gametes are released from April to August. Plants usually become mature when 100mm long. The whole plant dies back after reproducing and is removed from the rock by wave

action during its third winter. Most plants live for 2 to 3 years (Powell, 1957b).

- *Fucus distichus* produces gametes of both sexes within each conceptacle. When released, ova can survive and disperse for several days. Antherozoids can only live for several hours. Self-fertilisation is thought to be high in the species and once a zygote is formed it can only be dispersed over limited distances (Rice *et al*., 1985).

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	High	Moderate	Moderate

Fucus distichus lives permanently attached to rock so would be removed upon substratum loss. The species has been observed to readily recruit to cleared areas (Ang, 1991) and has fast growth rates, so recovery rates should be high.

Smothering	High	High	Moderate	Moderate

The effect of smothering depends on the state of the tide when the factor occurred. If smothering happened while the plant was emersed the whole plant would be buried underneath the sediment preventing photosynthesis. If smothering occurred while the plant was immersed the impact of smothering would be lessened because some of the fronds would escape burial. The species has been observed to readily recruit to cleared areas (Ang, 1991) and has fast growth rates, so recovery rates should be high.

Increase in suspended sediment	Low	Very high	Very Low	Moderate

Silt may cover some of the frond surfaces reducing light available for photosynthesis and lowering growth rates. On return to normal siltation levels the normal growth rate would be quickly restored.

Decrease in suspended sediment

Dessication	High	High	Moderate	Moderate

Fucus distichus is intolerant of desiccation, but the critical water content is not known. Increases in desiccation would cause the upper limit of the species distribution to become depressed. Decreases in desiccation may allow the upper limit of the species to extend up the shore. The species has been observed to readily recruit to cleared areas of the shore (Ang, 1991) and has fast growth rates, so recovery rates should be high.

Increase in emergence regime	High	High	Moderate	Moderate

Fucus distichus would suffer desiccation, nutrient stress and extremes of temperature when exposed to air. Increases in the period of emergence would cause the upper limit of the species distribution to become depressed. Decreases in the period of emergence may cause the species to extend further up the shore. The species has been observed to readily recruit to cleared areas (Ang, 1991) and has fast growth rates, so recovery rates should be high.

Decrease in emergence regime

Increase in water flow rate	Low	High	Low	Low

Increased water flow rate may cause plants to be torn off the substratum. However, *Fucus distichus* appears to attach very strongly to the substratum because it lives in areas exposed to very high wave action and strong water currents.

Decrease in water flow rate

Increase in temperature	High	High	Moderate	Moderate

Fucus distichus reaches the southern limit of its distribution in the British Isles, so would probably be very intolerant of increases in temperature. Decreases in temperature would probably have little effect and may allow the species to colonize further south. The species has been found to tolerate freezing in small rock pools in Maine (Pearson & Davison, 1994).

Decrease in temperature

Increase in turbidity	Low	Very high	Very Low	Moderate

Turbidity would reduce light available for photosynthesis and so lower growth rates. On return to normal turbidity levels the normal growth rate would be restored.

Decrease in turbidity

Increase in wave exposure	Intermediate	High	Low	Low

Fucus distichus has been recorded worldwide from very sheltered to very exposed conditions, but in Britain & Ireland it is mainly found on very exposed shores. A shift to more sheltered conditions may allow other fucoid species to inhabit the shore which are faster growing and would out-compete *Fucus distichus*. An increase in the level of wave exposure may result in plants being torn off the substratum. Provided nearby *Fucus distichus* populations are maintained, recovery rates should be high because the species has been observed to rapidly recruit to cleared areas (Ang, 1991).

Decrease in wave exposure

Noise	Tolerant	Not relevant	Not sensitive	Not relevant

Seaweeds have no known mechanism for sound perception.

Visual Presence	Tolerant	Not relevant	Not sensitive	Not relevant

Seaweeds have no known mechanism for visual perception.

Abrasion & physical disturbance	Intermediate	High	Low	Low

Abrasion may damage the fronds of established seaweeds and kill germlings of *Fucus distichus*. Human trampling has been shown to significantly reduce the cover of fucoids on a shore (Holt *et al.*, 1997) but trampling is unlikely to occur on the very exposed shores on which *Fucus distichus* lives. The species has been observed to readily recruit to cleared areas (Ang, 1991) and has fast growth rates, so recovery rates should be high.

Displacement	High	High	Moderate	Moderate

Fucus distichus lives permanently attached to the substratum and upon removal it cannot re-establish an attachment. The species has been observed to readily recruit to cleared areas (Ang, 1991) and has fast growth rates, so recovery rates should be high.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination		Not relevant		Not relevant

Fucoids are generally robust in the face of chemical pollution (Holt *et al.*, 1997), but no studies have been carried out on this particular species.

Heavy metal contamination	Low	Very high	Very Low	Very low

No studies have been carried out on this particular species. However, fucoids are generally robust in the face of chemical pollution and do not appear to be harmed by heavy metals (Holt *et al.*, 1997). Intolerance is therefore, reported to be low.

Hydrocarbon contamination		Not relevant		Not relevant

Fucoids are generally robust in the face of chemical pollution (Holt *et al.*, 1997), but no studies have been carried out on this particular species.

Radionuclide contamination		Not relevant		Not relevant

Insufficient information

Changes in nutrient levels		Not relevant		Not relevant

Insufficient information

Increase in salinity	Low	High	Low	Low

Fucus distichus lives on shores where it is frequently drenched in rain water, so it must be able to withstand variations in salinity. The species also extends into estuaries on the coast of North America.

Decrease in salinity

Changes in oxygenation		Not relevant		Not relevant

Fucus distichus is unlikely to be affected by a reduction in oxygen levels because it can generate its own oxygen by photosynthesis. However, no studies have been found to support this.

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	Intermediate	High	Low	Moderate

Fucus distichus would be able to recover within five years if 50 percent of the area was cleared. The species has been observed to recruit readily to cleared areas (Ang, 1991) and has a reasonably fast growth rate.

Extraction of other species		Not relevant		Not relevant

Insufficient information

Additional information

Importance review

Policy/legislation

UK Biodiversity Action Plan Priority	☑
Features of Conservation Importance (England & Wales)	☑

Status

National (GB) importance	Not rare/scarce	**Global red list (IUCN) category**	-

Non-native

Native	Native		
Origin	Eastern Canada, Northeastern U.S.A., Northern Europe	**Date Arrived**	1951

Importance information

-none-

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