A red seaweed (*Ahnfeltia plicata*)

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

Will Rayment

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

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Bushy specimen of *Ahnfeltia plicata* in shallow sandy lower shore pool.
Photographer: Francis Bunker
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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	Will Rayment	**Refereed by**	Dr Fabio Rindi
Authority	(Hudson) E.M.Fries, 1836		
Other common names	-	**Synonyms**	-

Summary

Description

A perennial red seaweed which forms dense, tangled tufts. The fronds are very fine, tough and wiry with irregular or dichotomous branching and up to 21 cm in length. The holdfast is disc-like or encrusting, 0.5 to 2 cm in diameter. The fronds are dark brown when moist and appear almost black when dry. The uppermost branches are often green.

Recorded distribution in Britain and Ireland

Occurs on all coasts of Britain and Ireland. There is a paucity of records from south east England, reflecting a lack of suitable substrata.

Global distribution

Occurs in Europe from northern Russia to southern Portugal and in the Baltic Sea. Occurs in the Americas from arctic Canada to Mexico and is widely distributed in the Indian and Pacific Oceans.

Habitat

Ahnfeltia plicata forms turfs on shallow sublittoral bedrock and in rockpools on the lower shore, often partly buried by sand. It may form part of the turf on soft or friable rocks which are too unstable for large fucoids. The tetrasporophyte phase is common on pebbles, whereas the mature gametophytes only occur on more stable substrata.

Depth range

lower shore to 22 m

Identifying features

- Gametangial thallus consists of discoid holdfast up to 10 mm in diameter, producing erect fronds.
- Fronds are terete, of horn-like consistency, uniformly 0.5 mm in diameter.
- Apices very blunt, axils usually rounded.
- Branching highly variable, from dichotomous to completely irregular.
- Male plants form spermatangial sori, visible as thickenings of mature axes, but absent from basal and apical regions of plant.
- Female plants form gametangial sori, up to 5 mm long and 70 µm high, usually on one side of the mature axes. Individual mature carposporophytes are hemispherical and about 300 µm wide. They may be discrete but are usually coalesced into elongate clusters up to 5 mm long.
- Tetrasporangial plants are crustose. Tetrasporangia occur in mucilaginous superficial sori with zonately arranged tetraspores.

Additional information

-none-

Listed by

Further information sources

Search on:

NBN WoRMS

Biology review

Taxonomy

Phylum	Rhodophyta	Red seaweeds
Class	Florideophyceae	
Order	Ahnfeltiales	
Family	Ahnfeltiaceae	
Genus	Ahnfeltia	
Authority	(Hudson) E.M.Fries, 1836	
Recent Synonyms	-	

Biology

Typical abundance	High density
Male size range	3 - 21cm
Male size at maturity	3cm
Female size range	3cm
Female size at maturity	
Growth form	Foliose
Growth rate	See additional information
Body flexibility	High (greater than 45 degrees)
Mobility	
Characteristic feeding method	Autotroph
Diet/food source	
Typically feeds on	
Sociability	
Environmental position	Epilithic
Dependency	No information found.
Supports	Independent
Is the species harmful?	No

Biology information

Growth rate

Maggs & Pueschel (1989) recorded observations on growth of *Ahnfeltia plicata* from Nova Scotia. 4 months after germination of carpospores, tetrasporophyte crusts had grown up to 2.6 mm in diameter. 2 months after germination of tetraspores, the basal holdfast had reached 1.1 mm in diameter, with numerous hair like fronds emerging. After 14 months the axes had grown up to 50 mm in length.

In a continuous spray culture with water at 8-11°C and light intensities of 40-60 µE/m²/s, mean apical growth of *Ahnfeltia plicata* was 17.2 µm/day over 19 days (Indergaard *et al.*, 1986). Permanently immersed plants under the same conditions grew at approximately 7 µm/day. Conversely, percentage biomass increase was greater under the permanent immersion regime; 0.57% increase in mass/day vs. 0.20% for the plants in spray culture (Indergaard *et al.*, 1986).

Habitat preferences

Physiographic preferences	Open coast, Strait / sound, Enclosed coast / Embayment
Biological zone preferences	Lower eulittoral, Lower infralittoral, Sublittoral fringe, Upper infralittoral
Substratum / habitat preferences	Bedrock, Coarse clean sand, Cobbles, Pebbles
Tidal strength preferences	Moderately Strong 1 to 3 knots (0.5-1.5 m/sec.), Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Exposed, Moderately exposed, Sheltered
Salinity preferences	Full (30-40 psu), Reduced (18-30 psu), Variable (18-40 psu)
Depth range	lower shore to 22 m
Other preferences	
Migration Pattern	Non-migratory / resident

Habitat Information

Lüning (1990) suggested that *Ahnfeltia plicata* typically occurs as an understory algae beneath *Laminaria* sp. at depths of 1.5 to 4 m.

Life history

Adult characteristics

Reproductive type	See additional information
Reproductive frequency	Annual protracted
Fecundity (number of eggs)	No information
Generation time	Insufficient information
Age at maturity	see additional information
Season	July - January
Life span	See additional information

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Spores (sexual / asexual)
Duration of larval stage	No information
Larval dispersal potential	No information
Larval settlement period	

Life history information

Lifespan

No information was found concerning the longevity of *Ahnfeltia plicata*. However, it is a slow maturing perennial (Dickinson, 1963) and the thallus survives several years without considerable losses (Lüning, 1990). It likely to have a lifespan of 5-10 years, similar to other red seaweeds, such as *Furcellaria lumbricalis*.

Age at maturity

No definitive information was found concerning age at maturity. However, Maggs & Pueschel (1989) made observations of *Ahnfeltia plicata* from Nova Scotia. Tetrasporophyte crusts matured and released tetraspores after 15 months. Gametangial plants had produced abundant monosporangia after 14 months but no other reproductive structures were formed during this time.

Reproductive type

Ahnfeltia plicata has a heteromorphic life history (Maggs & Pueschel, 1989). Carpospores formed on the female thallus as a result of sexual reproduction give rise to the tetrasporophyte encrusting form. In turn, the tetraspores formed on the tetrasporophyte phase give rise to the erect, gametophyte plants. However, male gametophytes also give rise to monosporangia, producing monospores which also develop into gametophytes. Maggs & Pueschel (1989) suggest that the recycling of erect male gametophytes may be important in habitats which are unsuitable for the encrusting phase.

Timing of reproduction

Maggs & Pueschel (1989) recorded observations of reproduction by *Ahnfeltia plicata* in Nova Scotia. Spermatangia were present on male gametophytes between July and January. Carpogonia were present on female gametophytes between July and November, carposporophytes began development between September and November, and were mature between October and July. Monosporangia, which were only found on male plants in the intertidal, were present from November to January.

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	High

Removal of the substratum would also remove the entire population of *Ahnfeltia plicata* growing on it. Intolerance is therefore assessed as high. Recoverability is recorded as high (see additional information below) but may be delayed if the hydrodynamic regime does not allow a supply of spores from distant populations.

	Intolerance	Recoverability	Sensitivity	Confidence
Smothering	Intermediate	High	Low	Low

Ahnfeltia plicata is an erect species which grows up to 20 cm in length and is tolerant of sand cover (Dixon & Irvine, 1977). Larger plants are therefore likely to tolerate smothering. However, developing propagules and the encrusting tetrasporophyte phase of *Ahnfeltia plicata* are likely to be buried by 5 cm of sediment and would be unable to photosynthesize. For example, Vadas *et al.* (1992) stated that algal spores and propagules are adversely affected by a layer of sediment, which can exclude up to 98% of light. There is therefore likely to be some mortality of the population and intolerance is assessed as intermediate. Recoverability is recorded as high (see additional information below).

	Intolerance	Recoverability	Sensitivity	Confidence
Increase in suspended sediment	Intermediate	High	Low	Low

Ahnfeltia plicata is not likely to be affected directly by an increase in suspended sediment. However, increased suspended sediment will decrease light attenuation (considered in 'turbidity') and increase siltation. As discussed above in 'smothering', increased rate of siltation may inhibit development of algal spores and propagules resulting in some mortality. Intolerance is therefore assessed as intermediate. Recoverability is recorded as high (see additional information below).

	Intolerance	Recoverability	Sensitivity	Confidence
Decrease in suspended sediment	Tolerant	Not relevant	Not sensitive	Low

Ahnfeltia plicata is unlikely to be affected directly by a decrease in suspended sediment. The consequent effect of decreased turbidity is discussed below.

	Intolerance	Recoverability	Sensitivity	Confidence
Dessication	Low	Immediate	Not sensitive	Very low

No information was found directly relating to the tolerance of *Ahnfeltia plicata* to desiccation. The species occurs predominantly in the subtidal, but also in rockpools in the lower intertidal (Fish & Fish, 1996), suggesting that it would be intolerant of desiccation to some degree. However, the thallus is robust with a horn-like consistency (Dixon & Irvine, 1977) and the species would be unlikely to dehydrate sufficiently during the benchmark emersion period of 1 hour to cause mortality. Photosynthesis is likely to be inhibited however and so intolerance is recorded as low. Photosynthesis is likely to return to normal very quickly following immersion and so recoverability is recorded as immediate.

	Intolerance	Recoverability	Sensitivity	Confidence
Increase in emergence regime	Intermediate	High	Low	Low

Ahnfeltia plicata is predominantly a subtidal species, but also occurs in rockpools in the lower intertidal (Fish & Fish, 1996). The benchmark increase in emergence would result in the individuals furthest up the shore experiencing greater risk of desiccation and greater fluctuations in temperature and salinity. Some mortality is likely and therefore intolerance is assessed as intermediate. Recoverability is recorded as high (see additional information below).

Decrease in emergence regime Tolerant Not relevant Not sensitive High

Ahnfeltia plicata occurs predominantly in the subtidal and could potentially benefit from a decrease in emergence regime.

Increase in water flow rate Intermediate High Low Low

Ahnfeltia plicata occurs in biotopes in areas with 'moderately strong' or 'weak' water flow (Connor *et al.*, 1997a). Moderate water movement is beneficial to seaweeds as it carries a supply of nutrients and gases to the plants, removes waste products, and prevents settling of silt. However, if flow becomes too strong, plants may be damaged and growth stunted. Additionally, an increase to stronger flows may inhibit settlement of spores and remove adults or germlings. It is likely therefore that the benchmark increase in water flow rate to 'strong' or 'very strong' flow would result in some mortality, particularly of older individuals or those attached to the least stable substrata. Intolerance is therefore assessed as intermediate. Recoverability is recorded as high (see additional information below). Low growing forms, such as the encrusting tetrasporophyte phase of *Ahnfeltia plicata*, are least likely to be intolerant of increases in flow rate.

Decrease in water flow rate Intermediate High Low Low

Ahnfeltia plicata occurs in biotopes in areas with 'moderately strong' or 'weak' water flow (Connor *et al.*, 1997a). The benchmark decrease in water flow would place the species in areas of 'weak' water flow. Seaweeds in still water rapidly deplete the nutrients in the immediate vicinity (Kain & Norton, 1990) and are likely to be more vulnerable to depletion of essential dissolved gases and accumulation of waste products. Furthermore, decreased water flow would result in deposition of fine sediments and possible smothering of low growing forms, such as the encrusting tetrasporophyte phase. Some mortality is likely to result and so intolerance is assessed as intermediate. Recoverability is recorded as high (see additional information below).

Increase in temperature Low Very high Very Low High

Ahnfeltia plicata has a very wide geographic range, occurring from northern Russia to Portugal. The species is therefore likely to be tolerant of higher temperatures than it experiences in Britain and Ireland. Lüning & Freshwater (1988) incubated *Ahnfeltia plicata* from British Columbia at a range of temperatures for 1 week and tested their survivability by ability to photosynthesize at the end of the incubation period. The species survived from the coldest temperature tested (-1.5°C) to 28°C. Total mortality occurred at 30°C. Lüning & Freshwater (1988) suggested that *Ahnfeltia plicata* was therefore amongst the group of most eurythermal heat tolerant algae. Haglund *et al.* (1987) incubated *Ahnfeltia plicata* from the subtidal in Sweden at a range of temperatures and measured photosynthetic rate. There were no significant results, but photosynthetic rate appeared to be optimal at 15°C and decreased either side of this temperature.
Considering that maximum sea surface temperatures around the British Isles rarely exceed 20C (Hiscock, 1998), the benchmark temperature increase is unlikely to cause mortality of *Ahnfeltia plicata*, but photosynthesis and growth may be compromised, so intolerance is recorded as low. Physiological processes should quickly return to normal when temperatures return to their original levels so recoverability is recorded as very high.

Decrease in temperature	Low	Very high	Very Low	High

Ahnfeltia plicata has a very wide geographic range, occurring from northern Russia to Portugal. The species is therefore likely to be tolerant of lower temperatures than it experiences in Britain and Ireland. Lüning & Freshwater (1988) incubated *Ahnfeltia plicata* from British Columbia at a range of temperatures for 1 week and tested their survivability by ability to photosynthesize at the end of the incubation period. The species survived from the coldest temperature tested (-1.5°C) to 28°C. Haglund *et al.* (1987) incubated *Ahnfeltia plicata* from the subtidal in Sweden at a range of temperatures and measured photosynthetic rate. There were no significant results, but photosynthetic rate appeared to be optimal at 15°C and decreased either side of this temperature.
Minimum surface seawater temperatures rarely fall below 5C around the British Isles (Hiscock, 1998) so it is unlikely that the benchmark decrease in temperature would cause mortality of *Ahnfeltia plicata*. However, low temperatures would result in sub-optimal photosynthesis and growth rate so intolerance is assessed as low. Physiological processes should quickly return to normal when temperatures return to their original levels so recoverability is recorded as very high.

Increase in turbidity	Intermediate	High	Low	Very low

In general, subtidal red algae are able to exist at relatively low light levels (Gantt, 1990). *Ahnfeltia plicata* typically occurs as an understory alga beneath *Laminaria* sp. (Lüning, 1990) and so is presumably well adapted to growth in low light conditions. An increase in turbidity would reduce the amount of light reaching the understory. Over the course of a year, this may result in mortality of the *Ahnfeltia plicata* individuals at the limit of their depth range. Intolerance is therefore assessed as intermediate. Recoverability is recorded as high (see additional information below).

Decrease in turbidity	Tolerant*	Not relevant	Not sensitive*	Moderate

A decrease in turbidity would result in greater light availability for *Ahnfeltia plicata*. Haglund *et al.* (1987) reported no inhibition of photosynthesis up to 500 $\mu E/m^2/s$ and suggested that *Ahnfeltia plicata* had a high potential for growth provided no other factors were limiting. *Ahnfeltia plicata* is therefore assessed as being tolerant to decrease in turbidity, with the potential to benefit from the factor.

Increase in wave exposure	Intermediate	High	Low	Low

Ahnfeltia plicata occurs in biotopes in 'exposed' or 'moderately exposed' locations (Connor *et al.*, 1997a). The erect thallus has flexible, cylindrical fronds growing in compact, wiry clumps (Dixon & Irvine, 1977; Daly & Mathieson, 1977) and would be expected to be relatively resistant to wave action. However, the benchmark increase in wave exposure would place a portion of the population in the 'extremely exposed' category. Strong wave action is likely to cause some damage to fronds resulting in reduced photosynthesis and compromised growth. Furthermore, individuals may be damaged or dislodged by scouring from sand and gravel mobilized by increased wave action (Hiscock, 1983). The deepest living individuals are likely to avoid the worst impact of wave exposure and the encrusting tetrasporophyte phase is likely to be most resistant. Some mortality is likely due to increased wave exposure and so intolerance is assessed as intermediate. Recoverability is recorded as high (see additional information below).

Decrease in wave exposure	Low	Very high	Very Low	Low

A decrease in wave exposure is unlikely to affect *Ahnfeltia plicata* directly. The consequent effects of decreased wave action are likely to include increased deposition of fine material and increased risk of stagnation. Species more tolerant of these factors, e.g. *Polyides rotundus* and *Furcellaria lumbricalis*, are more likely to proliferate in these conditions, eventually at the expense of *Ahnfeltia plicata*. However, over the course of a year, no mortality of *Ahnfeltia plicata* is expected so intolerance is assessed as low. Growth and reproduction should quickly return to normal when wave exposure returns to typical levels so recoverability is assessed as very high.

Noise	Tolerant	Not relevant	Not sensitive	High

Algae have no mechanisms for detection of sound and therefore would be not sensitive to disturbance by noise.

Visual Presence	Tolerant	Not relevant	Not sensitive	High

Algae have no visual acuity and therefore would not be affected by visual disturbance.

Abrasion & physical disturbance	Intermediate	High	Low	Very low

No information was found concerning the intolerance of *Ahnfeltia plicata* to physical abrasion. The erect thallus has flexible, cylindrical fronds growing in compact, wiry clumps (Dixon & Irvine, 1977; Daly & Mathieson, 1977). It would be expected to be relatively resistant to physical impacts. Physical abrasion equivalent to a passing scallop dredge (see benchmark) or a dragging anchor would be likely to snag in the fronds and result in some damage or detachment of the thallus. The holdfast is similar in form to the encrusting phase (Dickinson, 1963) and would be unlikely to be damaged by physical abrasion. Daly & Mathieson (1977) noted that regeneration of upright fronds occurred from the holdfast. Physical abrasion would therefore probably result in some mortality and so intolerance is assessed as intermediate. Full recovery would occur, but may take several months so recoverability is assessed as high.

Displacement	High	High	Moderate	Low

The holdfast of *Ahnfeltia plicata* is a thin crust which grows epilithically (Dickinson, 1963). It is unlikely that the holdfast, or the encrusting tetrasporophyte phase, would survive removal from the substratum and be able to reattach to a new substratum. Intolerance is therefore assessed as high. Recoverability is recorded as high (see additional information below).

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination	High	High	Moderate	Low

No evidence was found specifically relating to the intolerance of *Ahnfeltia plicata* to synthetic chemicals. However, inferences may be drawn from the sensitivities of red algal species generally. O'Brien & Dixon (1976) suggested that red algae were the most sensitive group of algae to oil or dispersant contamination, possibly due to the susceptibility of phycoerythrins to destruction. They also report that red algae are effective indicators of detergent damage since they undergo colour changes when exposed to relatively low concentration of detergent. Smith (1968) reported that 10 ppm of the detergent BP 1002 killed the majority of specimens in 24hrs in toxicity tests, although *Ahnfeltia plicata* was amongst the algal species least affected by the detergent used to clean up the *Torrey Canyon* oil spill. Laboratory studies of the effects of oil and dispersants on several red algal species concluded that they were all sensitive to oil/dispersant mixtures, with little difference between adults, sporelings, diploid or haploid life stages (Grandy, 1984, cited in Holt *et al*., 1995). Cole *et al*. (1999) suggested that herbicides , such as simazine and atrazine were very toxic to macrophytes. The evidence suggests that in general red algae are very sensitive to synthetic chemicals. Intolerance of *Ahnfeltia plicata* is therefore recorded as high. Recoverability is recorded as high (see additional information below) but may be delayed if the hydrodynamic regime does not allow a supply of spores from distant populations.

Heavy metal contamination Not relevant

Bryan (1984) suggested that the general order for heavy metal toxicity in seaweeds is: Organic Hg > inorganic Hg > Cu > Ag > Zn > Cd > Pb. Cole *et al.* (1999) reported that Hg was very toxic to macrophytes. The sub-lethal effects of Hg (organic and inorganic) on the sporelings of an intertidal red algae, *Plumaria elegans*, were reported by Boney (1971). 100% growth inhibition was caused by 1 ppm Hg. No information was found concerning the effects of heavy metals on *Ahnfeltia plicata* specifically, and therefore an intolerance assessment has not been attempted.

Hydrocarbon contamination High High Moderate Low

No evidence was found specifically relating to the intolerance of *Ahnfeltia plicata* to hydrocarbon contamination. However, inferences may be drawn from the sensitivities of red algal species generally. O'Brien & Dixon (1976) suggested that red algae were the most sensitive group of algae to oil or dispersant contamination, possibly due to the susceptibility of phycoerythrins to destruction. Laboratory studies of the effects of oil and dispersants on several red algal species concluded that they were all sensitive to oil/dispersant mixtures, with little difference between adults, sporelings, diploid or haploid life stages (Grandy, 1984, cited in Holt *et al.*, 1995). Intolerance is therefore assessed as high. Recoverability is recorded as high (see additional information below) but may be delayed if the hydrodynamic regime does not allow a supply of spores from distant populations.

Radionuclide contamination Not relevant

No evidence was found concerning the intolerance of *Ahnfeltia plicata* to radionuclide contamination.

Changes in nutrient levels Intermediate High Low Low

As a result of increased nutrient levels, it has been suggested that slow growing perennials, such as *Ahnfeltia plicata*, are likely to be out-competed by rapid growing, ephemeral annual species (Johansson *et al.*, 1998). Altered depth distributions of algal species caused by decreased light penetration and/or increased sedimentation through higher pelagic production have been reported in the Baltic Sea (Kautsky *et al.*, 1986; Vogt & Schramm, 1991). Johansson *et al.* (1998) studied changes in the benthic algal community of the Swedish Skagerrak coast, an area heavily affected by eutrophication, but did not detect any change in abundance of *Ahnfeltia plicata*. Haglund *et al.* (1987) reported no inhibition of photosynthesis up to 500 µE/m^2/s and suggested that *Ahnfeltia plicata* had a high potential for growth provided no other factors were limiting. A moderate increase in nutrient levels may therefore enhance growth of *Ahnfeltia plicata*. However, excessive eutrophication would probably result in the species being out-competed by ephemeral species with rapid growth rates, such as filamentous green and brown algae. Intolerance is therefore assessed as intermediate. Recoverability is recorded as high (see additional information below).

Increase in salinity Not relevant Not relevant Not relevant Not relevant

Ahnfeltia plicata occurs in areas of full salinity (Connor *et al.*, 1997a) and therefore increase in salinity is not a relevant factor. No information was found concerning reaction to hypersaline conditions. Haglund *et al.* (1987) studied photosynthetic rate of *Ahnfeltia plicata* from the subtidal in Sweden and found that, at constant temperature, rate increased up to the maximum salinity tested (33 psu).

Decrease in salinity Low Very high Very Low High

Ahnfeltia plicata occurs over a very wide range of salinities. The species penetrates almost to the innermost part of Hardanger Fjord in Norway where it experiences very low salinity values and large salinity fluctuations due to the influence of snowmelt in spring (Jorde & Klavestad, 1963). *Ahnfeltia plicata* penetrates further than the euryhaline species, *Polyides rotundus*, and probably has a similar salinity tolerance to *Furcellaria lumbricalis*, which is limited only by the 4 psu isohaline (see review by Bird *et al*., 1991). Haglund *et al.* (1987) studied photosynthetic rate of *Ahnfeltia plicata* from the subtidal in Sweden and found that, at constant temperature, photosynthesis was positively correlated with salinity between 15 and 33 psu. It is likely therefore that the benchmark decrease in salinity would not result in mortality, but photosynthesis would not be optimal and so growth and reproduction may be compromised. Intolerance is therefore assessed as low. Physiological processes should quickly return to normal when salinity returns to original levels, so recoverability is recorded as very high.

Changes in oxygenation Not relevant

The effects of reduced oxygenation on algae are not well studied. Plants require oxygen for respiration, but this may be provided by production of oxygen during periods of photosynthesis. Lack of oxygen may impair both respiration and photosynthesis (see review by Vidaver, 1972). A study of the effects of anoxia on another red alga, *Delesseria sanguinea*, revealed that specimens died after 24 hours at 15°C but that some survived at 5°C (Hammer, 1972). Insufficient information is available to make an intolerance assessment for *Ahnfeltia plicata*.

Biological Pressures

Intolerance Recoverability Sensitivity Confidence

Introduction of microbial pathogens/parasites Not relevant

Little information was found concerning the infection of *Ahnfeltia plicata* by microbial pathogens. Dixon & Irvine (1977) noted that galls, probably formed as a reaction to bacterial infection, were common in older plants.

Introduction of non-native species Not relevant

The habitat preferences of *Sargassum muticum* and *Ahnfeltia plicata* are likely to overlap and competition could potentially occur, with the vigorous *Sargassum muticum* likely to proliferate. However, no evidence of displacement of *Ahnfeltia plicata* was found.

Extraction of this species Not relevant Not relevant Not relevant Not relevant

Ahnfeltia plicata is one of the world's principal commercial agarophytes. It is harvested mainly on the Russian coast of the White Sea as a source of high quality, low sulphate agar (Chapman & Chapman, 1980). In Britain and Ireland, however, *Ahnfeltia plicata* does not occur in sufficient quantities to harvest on a commercial scale (Dickinson, 1963).

Extraction of other species Not relevant

No information was found concerning effects of harvesting other species on *Ahnfeltia plicata*.

Additional information

Little information was found concerning the recoverability of *Ahnfeltia plicata*. Recoverability potential must therefore be estimated from the species' life history. Maggs & Pueschel (1989)

reported that mature gametophytes in Nova Scotia varied in size from 3-21 cm, and that 14 months after germination, gametophyte fronds had reached up to 5 cm in length. It is expected therefore that *Ahnfeltia plicata* would reach maturity within a year. Red algae are typically highly fecund, but their spores are non-motile (Norton, 1992) and therefore entirely reliant on the hydrographic regime for dispersal. Norton (1992) reviewed dispersal by macroalgae and concluded that dispersal potential is highly variable. Spores of *Ulva* sp. (as *Enteromorpha*) have been reported to travel 35 km, *%Phycodrys rubens%* 5 km and *%Sargassum muticum%* up to 1 km. However, the point is made that reach of the furthest propagule and useful dispersal range are not the same thing and recruitment usually occurs on a much more local scale, typically within 10 m of the parent plant. Hence, it is expected that *Ahnfeltia plicata* would normally only recruit from local populations and that recovery of remote populations would be much more protracted.
Ahnfeltia plicata has a heteromorphic life history (Maggs & Pueschel, 1989) and is therefore able to respond to local environmental conditions. For example, development of monosporangia may occur on male gametophytes in areas unsuitable for the growth of the encrusting tetrasporophyte phase.
The life history characteristics of *Ahnfeltia plicata* suggest that the species is likely to recover within 5 years if local populations exist, but that recovery of remote populations will be more protracted and dependent upon hydrodynamic regime. Recoverability is therefore assessed as high.

Importance review

Policy/legislation

- no data -

Status

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

Non-native

Native	-		
Origin	-	**Date Arrived**	-

Importance information

Ahnfeltia plicata is one of the world's principal commercial agarophytes. It is harvested mainly on the Russian coast of the White Sea as a source of high quality, low sulphate agar (Chapman & Chapman, 1980). The most important property of agar is the considerable strength of the gel, even at extremely low concentrations. It is used as a gelling and thickening agent in the food industry, as a carrier for drug products where slow release is required, as a stabilizer for emulsions, as a constituent of cosmetics, ointments and lotions and as a stiffening agent in growth media for bacteriology and mycology (see review by Dixon, 1973).

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