MarLIN
Marine Information Network
Information on the species and habitats around the coasts and sea of the British Isles

An encrusting coralline alga (*Lithophyllum incrustans*)

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

Dr Keith Hiscock

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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/1395]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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***Lithophyllum incrustans*.**
Photographer: Francis Bunker

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	Dr Keith Hiscock	**Refereed by**	Dr Yvonne Chamberlain
Authority	Philippi, 1837		
Other common names	-	**Synonyms**	-

Summary

Description

Calcified smooth pink or greyish pink crusts on rock, shells and holdfasts. Convoluted ridges present where neighbouring crusts meet. May become bleached when exposed to strong sunlight.

Recorded distribution in Britain and Ireland

Present all around the British Isles but rarer on the east coast between Yorkshire and east Kent. Encrusting coralline species are difficult to distinguish and few surveys record to species level. Its distribution is probably under recorded.

Global distribution

Present in the Faroes, Norway at least south from Trondheimfjord to Spain and the Mediterranean. May also be present in Morocco and Mauritania. Recorded in South Africa (Chamberlain 1996)

Habitat

Found on a wide range of hard rock substrata but may be unable to settle and grow well on soft rocks such as chalk, which is a major substratum type in the southeast of England. Present in rockpools and under algae in the littoral and usually covering rocks on the lower shore and sublittoral fringe. More rarely present in the sublittoral although only recorded in the sublittoral on the Sussex and Kent coast (Y. Chamberlain, pers. comm..).

Depth range
Mid-littoral to at least 8m.

Identifying features

- Crusts pale, greyish pink, thick and smooth but convoluted ridges often occur where adjacent crusts meet.
- Microscopic features include non-aligned thallus cells.
- Secondary growth extensive, often coaxial
- Margin thick.
- Tetra/bisporangial conceptacles with conspicuous calcified columella, pore canal of equal width throughout and not tapering.
- Old conceptacles are dumbbell-shaped and buried but can be seen if the thallus is snapped.

Additional information

Difficult to identify with certainty in the field and often recorded as 'lithothamnia' or 'encrusting Rhodophycota (indet.)' in surveys.

Listed by

Further information sources

Search on:

NBN WoRMS

Biology review

Taxonomy

Phylum	Rhodophyta	Red seaweeds
Class	Florideophyceae	
Order	Corallinales	
Family	Corallinaceae	
Genus	Lithophyllum	
Authority	Philippi, 1837	
Recent Synonyms	-	

Biology

Typical abundance	High density
Male size range	>30cm
Male size at maturity	
Female size range	Medium-large(21-50cm)
Female size at maturity	
Growth form	Crustose hard
Growth rate	<7mm/year
Body flexibility	None (less than 10 degrees)
Mobility	Sessile
Characteristic feeding method	Autotroph
Diet/food source	
Typically feeds on	Not relevant
Sociability	Colonial
Environmental position	Epilithic
Dependency	Independent.
Supports	None
Is the species harmful?	No

Biology information

Dominant in rockpools and over much of the lower shore and sublittoral fringe at least. Covers the surface of rocks under canopies of algae.

Habitat preferences

Physiographic preferences	Open coast, Offshore seabed, Strait / sound, Sea loch / Sea lough, Ria / Voe
Biological zone preferences	Lower eulittoral, Mid eulittoral, Sublittoral fringe, Upper infralittoral
Substratum / habitat preferences	Rockpools

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 Strong > 6 knots (>3 m/sec.), Very Weak (negligible), Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Exposed, Extremely exposed, Moderately exposed, Sheltered, Very exposed, Very sheltered
Salinity preferences	Full (30-40 psu), Variable (18-40 psu)
Depth range	Mid-littoral to at least 8m.
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

No text entered

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	Annual episodic
Fecundity (number of eggs)	>1,000,000
Generation time	Insufficient information
Age at maturity	Insufficient information
Season	October - April
Life span	20-100 years

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Spores (sexual / asexual)
Duration of larval stage	No information
Larval dispersal potential	Greater than 10 km
Larval settlement period	Insufficient information

Life history information

Gametangial and tetrasporangial plants occur commonly on some shores in Devon and Cornwall but are rare in the north. The 'Time of first and last gamete' refers to the time when reproductive types occur however, some conceptacles are present throughout the year. (Irvine & Chamberlain 1994.) Assuming one layer of conceptacles is produced each year, plants up to 30 years old are reported (Edyvean pers. comm.. in Irvine & Chamberlain 1994). Reproductive types occur from October to April but tail-off into summer. It has been calculated that 1 mm x 1mm of reproductive thallus produces 17.5 million bispores per year with average settlement of only 55 sporelings/year (Edyvean & Ford 1984)

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	Low	High	High

Lithophyllum incrustans is permanently attached to the substratum. Therefore, loss of substratum will entail loss of this species. Spores will settle and new colonies will arise rapidly on bare substratum but growth rate is slow (2-7 mm per annum - see Irvine & Chamberlain 1994). Colonies may be up to 30 years old (Edyvean in Irvine & Chamberlain 1994).

	Intolerance	Recoverability	Sensitivity	Confidence
Smothering	Low	Very high	Very Low	Moderate

Encrusting coralline algae are frequently subject to cover by sediment and appear to survive well.

	Intolerance	Recoverability	Sensitivity	Confidence
Increase in suspended sediment	Low	Very high	Very Low	Moderate

Silt settling onto encrusting coralline algae may be removed by production of mucus. Reduction in light penetration may reduce or prevent photosynthesis but, in the situation where the increased siltation is for a short period, colonies are likely to survive. If death occurred, recoverability would be low (see additional information).

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

Encrusting coralline algae are likely to benefit from a decrease in siltation.

	Intolerance	Recoverability	Sensitivity	Confidence
Dessication	High	Low	High	High

Occurrence of encrusting coralline algae seems to be critically determined by exposure to air and sunlight. Colonies survive in damp conditions under algal canopies or in pools but not on open rock where desiccation effects are important. Harkins & Hartnoll (1985) noted that the presence of fucoid canopies allowed encrusting corallines to extend their upper limit higher on the shore. Canopy removal experiments in the Isle of Man, noted that encrusting corallines died within a week of removal of the protection canopy of *Fucus serratus* (Hawkins & Harkin, 1985). Removal of the *Laminaria digitata* canopy lower on the shore resulted in bleaching of encrusting corallines (Hawkins & Harkin, 1985) probably due to increased light intensity (see turbidity). Hawkins & Hartnoll (1985) reported extensive damage to encrusting and articulate corallines during the hot summer of 1983 at several sites in Britain. Therefore, desiccation is an important factor limiting the distribution of encrusting coralline algae on the shore, and an intolerance of high has been recorded. Recovery is likely to be slow (see additional information, below).

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

Occurrence of encrusting calcareous algae seems to be critically determined by exposure to air and sunlight. Colonies survive in damp conditions under algae or in pools but not on open rock where desiccation effects are important. Increased emergence will increase the risk of desiccation (see above). If killed recovery will be slow (see additional information below).

Decrease in emergence regime Tolerant Not relevant Not sensitive Moderate

There may be less light reaching the seabed for photosynthesis but it is not expected that established colonies of *Lithophyllum incrustans* will be adversely affected.

Increase in water flow rate Low Very high Very Low Moderate

Colonies of *Lithophyllum incrustans* appear to thrive especially in conditions exposed to strong water movement, including very strong wave action. Increase in the strength of tidal flow over colonies in therefore unlikely to have an adverse impact and may remove silt so that there will be a favourable effect.

Decrease in water flow rate Low Very high Very Low Moderate

Lithophyllum incrustans tolerates a wide range of water flow conditions. However, where wave action is not the primary source of water movement, a marked decrease in water flow may have an adverse effect especially if it allows siltation to occur. In the situation where increased siltation is for a short period, colonies are likely to survive. However, if water flow is reduced over a long period or permanently, there may be mortality and loss.

Increase in temperature Tolerant Not relevant Not sensitive Moderate

Lithophyllum incrustans occurs in a wide geographical range in temperatures that are much warmer (air and water) than in Britain and Ireland. It is therefore, probalby tolerant of an increase in temperature. However, increased temperature may result in an increased risk of desiccation (see above).

Decrease in temperature Tolerant Not relevant Not sensitive Moderate

Lithophyllum incrustans occurs in a wide geographical range in temperatures that are much colder (air and water) than in Britain and Ireland. It is therefore likely to tolerate a decrease in temperature, at the benchmark level.

Increase in turbidity Low Very high Very Low Low

Reduction in light penetration may reduce or prevent photosynthesis but, colonies are likely to survive. However, at the lower limit of its range, colonies will most likely be adversely affected by long-term (< one year) change. Removal of the protective canopy of *Laminaria digitata* in the Isle of Man (Hawkins & Harkin, 1985) resulted in bleaching of encrusting corallines, suggesting that *Lithophyllum incrustans* may be intolerant of high light intensities. As a shade tolerant species, increased light due to decreased turbidity in the absence of shading algae may have adverse affects.

Decrease in turbidity Tolerant* Not relevant Not sensitive* Moderate

The major effect is likely to be increased light penetration which will have a favourable effect on colonies of *Lithophyllum incrustans*.

Increase in wave exposure Tolerant Not relevant Not sensitive Moderate

Colonies of *Lithophyllum incrustans* appear to thrive in conditions exposed to strong water movement. Irvine & Chamberlain (1994) observe that the species is best developed on wave exposed shores. In some situations where water movement has been low, increased exposure to wave action may be beneficial but in many situations, an assessment of 'tolerant' is appropriate.

Decrease in wave exposure Low Immediate Not sensitive Moderate

A marked decrease in wave exposure may have an adverse effect on growth especially if it allows siltation to occur. However, mortality would only be expected if the decrease in wave exposure was for a long period. Therefore intolerance is assessed as low.

Noise	Tolerant	Not relevant	Not sensitive	High

Lithophyllum incrustans has no known sound receptors.

Visual Presence	Tolerant	Not relevant	Not sensitive	High

Lithophyllum incrustans has no known visual receptors.

Abrasion & physical disturbance	Intermediate	High	Low	Moderate

Littler & Kauker (1984) suggested that crustose algal forms were resistant to predation, sand scour and wave shear. Colonies on rock may be completely removed over part of the area affected but recolonize from parts protected in crevices or unaffected parts. Remaining parts of the crust will expand once the source of abrasion is removed.
Schiel & Taylor (1999) reported the death of encrusting corallines one month after trampling due to removal of their protective canopy of fucoids by trampling (10 -200 tramples where one trample equals one transect walked by one person). A higher proportion of corallines died back in spring treatments presumably due to the higher levels of desiccation stress expected at this time of year (see desiccation). However, encrusting corallines increased within the following year and cover returned to control levels within 21 months (Schiel & Taylor, 1999).

Spores will settle and new colonies will arise rapidly on bare substratum but growth rate is slow (2-7 mm per annum - see Irvine & Chamberlain 1994). Colonies are up to 30 years old (Edyvean in Irvine & Chamberlain 1994)

Displacement	Low	Very high	Very Low	Moderate

Removal from the substratum for such an encrusting species is unlikely and it is more likely that the substratum (e.g. cobbles or boulders) with the organism attached will be moved. Providing that the move is to a similar habitat, the effect is likely to be minimal.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination	High	Low	High	Low

Little information has been found. Hoare & Hiscock (1974) recorded that 'lithothamnia' was absent from the rocky shore up to 150 m distant from an acidified halogenated effluent. Once the impact is removed, spores will settle and new colonies will arise rapidly on bare substratum but growth rate is slow (see additional information below).

Heavy metal contamination		Not relevant		Not relevant

Insufficient information

Hydrocarbon contamination	High	High	Moderate	Moderate

Where exposed to direct contact with fresh hydrocarbons, encrusting coralline algae appear to have a high intolerance. Crump *et al.* (1999) describe "dramatic and extensive bleaching" of 'Lithothamnia' following the *Sea Empress* oil spill. Observations following the Don Marika oil spill (K. Hiscock, own observations) were of rockpools with completely bleached coralline algae. However, Chamberlain (1996) observed that although *Lithophyllum incrustans* was quickly affected by oil during the Sea Empress spill, recovery occurred within about a year. The oil was found to have destroyed about one third of the thallus thickness but regeneration occurred from thallus filaments below the damaged area. A recoverability of high is therefore suggested. If colonies were completely destroyed new growth would be slow and, because of low growth rates, recoverability would be low (see additional information below).

	Intolerance	Recoverability	Sensitivity	Confidence
Radionuclide contamination		Not relevant		Not relevant

Insufficient information

	Intolerance	Recoverability	Sensitivity	Confidence
Changes in nutrient levels	Low	High	Low	Low

Sewage pollution (as a source of nutrients) appears to have little or no effect. In the case of erect coralline algae, numbers might increase (reviewed in Fletcher 1996). Increased nutrients may result in overgrowth by other algae. Where mortality occurs, spores will settle and new colonies will arise rapidly on bare substratum but growth rate is slow (see additional information below).

	Intolerance	Recoverability	Sensitivity	Confidence
Increase in salinity		Not relevant		Not relevant

Lithophyllum incrustans lives in full salinity seawater. Increase in salinity may occur if evaporation in intertidal pools occurred. However, no information has been found on tolerance to hypersaline conditions.

	Intolerance	Recoverability	Sensitivity	Confidence
Decrease in salinity	Intermediate	High	Low	Low

Little direct information on the effect of salinity change on encrusting coralline algae was found but red seaweeds are generally more intolerant of reduced salinity conditions than brown or green algae (Kain & Norton 1990). However, in the case of short-term change, encrusting coralline algae must be able to withstand the effects of heavy rain in diluting seawater in pools and in run-off as entirely freshwater over exposed corallines. Recovery is likely to be fairly rapid if, as in the impact of oil spills (see above), only the cell layers near the surface are adversely affected. If colonies were completely destroyed new growth would be slow and, because of low growth rates, recoverability would be low (see additional information below).

	Intolerance	Recoverability	Sensitivity	Confidence
Changes in oxygenation		Not relevant		Not relevant

No information concerning the effects of oxygen levels on encrusting corallines were found.

Biological Pressures

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

Insufficient information

	Intolerance	Recoverability	Sensitivity	Confidence
Introduction of non-native species		Not relevant		Not relevant

Currently, there appear to be no non-native species in Britain that adversely affect encrusting coralline algae. However, aggressive invasive species could out-compete *Lithophyllum incrustans* and over-grow it.

	Intolerance	Recoverability	Sensitivity	Confidence
Extraction of this species	Not relevant	Not relevant	Not relevant	Not relevant

It is not believed that this species would be extracted.

	Intolerance	Recoverability	Sensitivity	Confidence
Extraction of other species	Intermediate	High	Low	Moderate

Extraction of species such as kelps, where encrusting coralline algae grow on holdfasts, may have a small localised adverse effect but growth from surrounding crusts would fill any gaps in cover and re-growth of encrusting corallines occurs on re-growth of kelps.

Additional information

Recoverability:
If death occurred, recoverability will be slow. Spores will settle and new colonies will arise rapidly on bare substratum but growth rate is slow (2-7 mm per annum - see Irvine & Chamberlain 1994). Colonies are up to 30 years old (Edyvean pers. comm., in Irvine & Chamberlain 1994).

Importance review

Policy/legislation

- no data -

Status

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

Non-native

Native	-		
Origin	-	Date Arrived	Not relevant

Importance information

Lithophyllum incrustans is a key structuring species that dominates extensive rocky areas to the exclusion of other encrusting species.

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