



MarLIN

Marine Information Network

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

A sea mat (*Electra pilosa*)

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

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Electra pilosa on macroalgae.
Photographer: Keith Hiscock
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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	Dr Harvey Tyler-Walters	Refereed by	Dr Peter J. Hayward
Authority	(Linnaeus, 1767)		
Other common names	-	Synonyms	-

Summary

🔍 Description

Electra pilosa may form star shaped or broad sheet colonies on the fronds of large algae (e.g. *Laminaria* and fucoids), small irregular patches on stones and shells, narrow tufts (independent of the substratum), or cylindrical incrustations around the fronds of small red algae (e.g. *Mastocarpus stellatus*). The zooids are ovate-oblong in shape, typically 0.5-0.6 by 0.25-0.35 mm. About half the front of the zooid is calcified but translucent, perforated by large pores, leaving an oval, membranous, frontal area distally, surrounded by 4-12 (often 9) spines. Spines vary in length but the median, proximal spine is always present and usually larger than the rest, although in some cases it may become well developed and longer than the zooid giving the colony a hairy appearance.

📍 Recorded distribution in Britain and Ireland

Common on all coasts of the British Isles, although under recorded on parts of the east coast.

📍 Global distribution

Common in all temperate seas.

🏠 Habitat

Colonizes a variety of substrata in marine habitats from low water into the shallow sublittoral, particularly macroalgae such as *Fucus serratus* and laminarians.

↓ Depth range

Intertidal to at least 50m

Q Identifying features

- Ooecia, avicularia and vibracula absent.
- About half the front of the zooid calcified (the gymnocyst) and perforated by large pores.
- Autozooids oval-oblong, 0.5-0.6 by 0.25-0.35 mm.
- Zooids arranged in a quincunx pattern, i.e. four zooids surrounding a central one, however, zooids may lie side by side in extended linear growth.
- Four to twelve but usually nine spines present.
- Median proximal spine prominent and often of great length.
- Operculum simple and transparent.
- Polypide with 11 to 15 tentacles.
- Larvae free swimming (cyphonautes), not brooded.

🏛️ Additional information

Colonies of *Electra pilosa* growing on erect substrata (e.g. a hydroid) may continue to grow lengthways once they have used up the available substratum, forming narrow, bilaminar fronds of zooids side by side, once described as *Electra verticillata*. Colonies growing on small pieces of substratum (e.g. a shell) occasionally enclose the substratum forming an unattached spherical colony, 3-7cm in diameter (Hayward & Ryland, 1998).

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Biology review

☰ Taxonomy

Phylum	Bryozoa	Sea mats, horn wrack & lace corals
Class	Gymnolaemata	
Order	Cheilostomatida	
Family	Electridae	
Genus	Electra	
Authority	(Linnaeus, 1767)	
Recent Synonyms	-	

🌿 Biology

Typical abundance	Moderate density
Male size range	
Male size at maturity	
Female size range	Small-medium(3-10cm)
Female size at maturity	
Growth form	Crustose hard
Growth rate	See additional information
Body flexibility	None (less than 10 degrees)
Mobility	
Characteristic feeding method	Active suspension feeder
Diet/food source	
Typically feeds on	Phytoplankton, algal spores.
Sociability	
Environmental position	Epifaunal
Dependency	Independent.
Supports	None
Is the species harmful?	See additional information

🏛️ Biology information

Growth form

Electra pilosa displays a variety of growth forms, such as, stellate patches on flat substrata, cylindrical growths around algae to narrow tufts, and narrow bilaminar fronds or occasionally as spherical masses around small substrata, described earlier (see Ryland, 1967, 1976; and Silén, 1987 for reviews).

The median proximal spine may become greatly elongated in response to overgrowth by colonies of other bryozoans (Stebbing, 1973; Ryland, 1976) or in response to wave related abrasion by algae (Bayer *et al.*, 1997). The extended spine may protect the feeding polypide from physical or mechanical disturbance (Bayer *et al.*, 1997).

Growth rates

Growth rates in bryozoans have been shown to vary with environmental conditions, especially

water flow, food supply, temperature, competition for food and space, and genotype. For example:

- Best & Thorpe (1986) reported that feeding rate increased with increasing food concentration;
- Bayer *et al.* (1994) noted that variation in growth rates between colonies due to genotype was greater than that due to food ration;
- Okamura (1988) reported that in epiphytic communities, feeding rate increased with increasing flow (from 0.01-0.02 m/sec to 0.1-0.12m/s) but was reduced by competing bryozoan communities (*Alcyonidium* sp. or *Flustrellidra hispida*) in slow flow but enhanced by them in fast flow conditions; and
- bryozoans studied (inc. *Electra pilosa*) in natural currents in the Menai Strait, fed adequately and maintained growth even in very high current flows (Hermansen, *et al.*, 2001).
- Although growth rates increased with temperature, zooid size decreased, which may be due to increased metabolic costs at higher temperature (Menon, 1972; Ryland, 1976; Hunter & Hughes, 1994). In the Menai Straits larger zooids are produced in spring at times of peak phytoplankton primary productivity but mean zooid size decreased as temperatures increased in summer (Okamura, 1987 cited in Hunter & Hughes, 1994).

Growth rates of 0.1-0.12 μ /day were reported, irrespective of flow regime, and genotype, while natural population were reported to grow at ca 0.08 μ / day (Hermansen *et al.*, 2001).

Feeding

The structure and function of the bryozoan lophophore was reviewed by Ryland (1976), Winston, (1977) and Hayward & Ryland (1998). Best & Thorpe (1994) suggested that intertidal Bryozoa would probably be able to feed on small flagellates, bacteria, algal spores and small pieces of abraded macroalgae.

Allergenic response

Electra pilosa and other bryozoans have been reported to cause dermatitis and occupational eczema in fishermen (Ryland, 1967; Jeanmougin *et al.*, 1987 summary only).



Habitat preferences

Physiographic preferences	Open coast, Strait / sound, Sea loch / Sea lough, Ria / Voe, Estuary, Enclosed coast / Embayment
Biological zone preferences	Lower eulittoral, Lower infralittoral, Mid eulittoral, Sublittoral fringe, Upper infralittoral
Substratum / habitat preferences	Macroalgae, Artificial (man-made), Bedrock, Caves, Cobbles, Large to very large boulders, Other species (see additional information), Overhangs, Small boulders, Under 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.), Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Moderately exposed, Sheltered
Salinity preferences	Full (30-40 psu)
Depth range	Intertidal to at least 50m
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

Electra pilosa may be found on most substrata, and is part of the epiphytic fauna of macroalgae such as *Fucus serratus* in the intertidal and the stipes or holdfasts of laminarians in the subtidal. *Electra pilosa* may also be found encrusting the shells of shellfish such as mussels. It is also a common member of the fouling community (Ryland, 1967). The abundance of bryozoans is positively correlated with supply of hard substrata and hence with current strength (Eggleston, 1972b; Ryland, 1976). Similarly, the abundance of *Electra pilosa* increased with increasing fucoid density and surface area (O'Connor *et al.*, 1979).

Life history

Adult characteristics

Reproductive type	Permanent (synchronous) hermaphrodite
Reproductive frequency	Annual episodic
Fecundity (number of eggs)	
Generation time	<1 year
Age at maturity	Insufficient information
Season	August - September
Life span	Insufficient information

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Planktotrophic
Duration of larval stage	See additional information
Larval dispersal potential	Greater than 10 km
Larval settlement period	

Life history information

Reproduction

Bryozoan colonies are hermaphrodite, however, zooids may be monoecious, dioecious, protandrous or protogynous, depending on species (Hayward & Ryland, 1998). Sperm are shed from pores in the polypide tentacles of male zooids (Hayward & Ryland, 1998). In *Electra pilosa* maternal lophophores may actively collect sperm (Temkin, 1996). The ovaries produce up to 31 oocytes of 121-145 µm in diameter, which are released into the coelomic cavity. Temkin (1996) has shown recently that fertilization is internal, rather than external as thought previously (see Reed, 1991). Eggs come into contact with sperm (either as aggregates or singly) in the coelomic cavity, fertilization occurring at or near ovulation (Temkin, 1996). Embryos are shed into the water column and develop into planktonic cyphonautes larvae (Ryland, 1976; Reed, 1991; Hayward & Ryland, 1998). Entrainment of released sperm by the tentacles of feeding polypides in bryozoans, may reduce dispersal, resulting in self-fertilization (Temkin, 1996).

Fecundity

Individual zooids may produce up to 31 eggs and potentially the same number of embryos (with a fertilization efficiency of 83-100%) (Temkin, 1994), although Hyman (1959) reported a maximum of 17 eggs being released. However, while each individual zooid is not prolific, the fecundity of the

colony is probably directly proportional to the number of functional zooids (Bayer *et al.*, 1994).

Reproductive season

Colonies containing eggs and sperm are present in August and September and cyphonautes larvae are present in the plankton throughout the year (Hayward & Ryland, 1998). *Electra pilosa* was reported to settle between April and the end of November, with peaks in May/June and July to August (Ryland, 1967).

Longevity

Bayer *et al.* (1994) reported that colonies of *Electra pilosa* maintained in the laboratory died from the inside out, i.e. after several months the central part of the colony generally began to die. They noted that longevity data for *Electra pilosa* colonies was not available. However, although *Electra pilosa* colonies could probably survive for several years, it is probably adapted to ephemeral habitats, capable of rapid growth and reproduction of numerous offspring (*r*-selected).

Recruitment

Bryozoan larvae are probably sensitive to surface contour, chemistry and the proximity of conspecific colonies. However, Hayward & Ryland (1998) suggested that larval behaviour at settlement is only of prime importance to species occupying ephemeral habitats. For example, *Electra pilosa* larvae tend to orientate themselves with water flow along *Fucus serratus* fronds (the trend increasing with wave action) (Ryland, 1977), prefer to settle at the distal ends of the fronds and on the concave surfaces of the seaweed (Seed, 1985). (Eggleston, 1972b) demonstrated that the number and abundance of species of bryozoan increased with increased current strength, primarily due to a resultant increase in the availability of stable, hard substrata (Eggleston, 1972b; Ryland, 1976). Ryland (1976) reported that significant settlement in bryozoans was only found near a reservoir of breeding colonies. Ryland (1977) suggested that marine bryozoan larvae tend to settle on the underside of submerged structures or in shaded habitats, possibly due to avoidance of accumulated sediment or competition from algae. However, *Electra pilosa* larvae have an extended planktonic life and this species is a common member of fouling communities, and occurs on buoys where many other species of bryozoa are unable to colonize (Ryland, 1967). Therefore, *Electra pilosa* probably exhibits good dispersal and potentially very rapid recruitment.

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.

A Physical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Substratum Loss	High	Very high	Low	High

Removal of the substratum, be it shell, rock, or macroalgae will result in removal of the attached colonies of *Electra pilosa*. Therefore, an intolerance of high has been recorded. Recoverability is likely to be very high (see additional information below).

Smothering	High	Very high	Low	Moderate
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Smothering by 5 cm of sediment is likely to prevent feeding, and hence growth and reproduction, as well as respiration. In addition, associated sediment abrasion may remove the bryozoan colonies or the macroalgae on which they grow. A layer of sediment will probably also interfere with larval settlement. Therefore, an intolerance of high has been recorded. Recoverability has been assessed as very high (see additional information below).

Increase in suspended sediment	Low	Immediate	Not sensitive	Moderate
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The abundance of most bryozoan species declines with increasing suspended sediment loads. However, Moore (1973c; 1977) regarded *Electra pilosa* to be ubiquitous with respect to turbidity in subtidal kelp holdfasts in north east England. Seed (1985) also suggested that *Electra pilosa* was relatively tolerant of silt-laden habitats, although O'Connor *et al.* (1979) noted that the abundance of *Electra pilosa* in epiphytic communities on *Fucus serratus* in Strangford Lough, northern Ireland, was reduced slightly in response to increasing suspended sediment levels. Its abundance tended to increase at the distal ends of fronds exposed to increased sediment loads, presumably since the distal portions of fronds were held further above the substratum when immersed. However, the abundance of the competing bryozoan *Flustrellidra hispida* decreased markedly with increased sediment load. Overall, *Electra pilosa* is a relatively silt tolerant bryozoan and an intolerance of low has been recorded at the benchmark level. Recoverability is probably immediate. However, in highly turbid estuaries *Electra pilosa* may be excluded. In addition, epiphytic communities may be more intolerant since the macroalgae on which they live are likely to be excluded by high suspended sediment loads due to the increased turbidity.

Decrease in suspended sediment	Tolerant*	Not relevant	Not sensitive*	Moderate
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A decrease in suspended sediment may reduce the availability of organic particulates. However, a decrease in particulates is likely to encourage the settlement and growth of bryozoans including *Electra pilosa*. Therefore, tolerant* has been recorded. A decrease in sediment load is also likely to allow competitors such as other bryozoans and ascidians to colonize the habitat.

Desiccation	Intermediate	Very high	Low	High
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Colonies epiphytic on macroalgae are probably protected from desiccation by the humid environment provided by the algal fronds. However, Wood & Seed (1980) noted a marked decrease in abundance of *Electra pilosa* on *Fucus serratus* with increasing shore height.

Therefore, an increase in desiccation is likely to reduce the extent and abundance of the population and an intolerance of intermediate has been recorded. Recoverability is likely to be very high. Subtidal populations are unlikely to experience desiccation.

Increase in emergence regime Intermediate Very high Low Moderate

Increased emergence will expose populations to increased risk of desiccation (above), increased extremes of temperature, and decrease the length of time available for feeding. Wood & Seed (1980) noted a marked decrease in abundance of *Electra pilosa* on *Fucus serratus* with increasing shore height, although colonies were reported on fucoids exposed for 5hrs on spring tides or ca 6hrs on neap tides in their shaded study site (reduced desiccation). Therefore, an increase in emergence is likely to result in a decrease in the abundance and extent of intertidal populations of *Electra pilosa* and an intolerance of intermediate has been reported. Recoverability is likely to be rapid. Subtidal populations are unlikely to be exposed to this factor.

Decrease in emergence regime Tolerant* Not relevant Not sensitive* Moderate

A decrease in emersion will decrease the risk of desiccation and effectively provide additional habitat for colonization, potentially allowing the *Electra pilosa* population, and its macroalgal substrata, to increase in extent. Therefore tolerant* has been recorded.

Increase in water flow rate Low Immediate Not sensitive Low

Water flow has been shown to be important for the development of bryozoan communities and the provision of suitable hard substrata for colonization (Eggleston, 1972b; Ryland, 1976). In addition, areas subject to high mass transport of water such as the Menai Strait, Norwegian fjords or tidal rapids generally support large numbers of bryozoan species. Although, active suspension feeders, their feeding currents are probably fairly localized and they are dependant on water flow to bring adequate food supplies within reach. Hermansen *et al.* (2001) grew colonies of *Electra pilosa* colonies on rafts exposed to currents of 0.01-0.15m/sec. O'Connor *et al.* (1979) reported that the abundance of *Electra pilosa* on *Fucus serratus* declined with increasing current speed (up to 0.5m/sec), however, the observed trend may be due to an increase in abundance of competing bryozoans as current speed increased. Ryland (1970) noted that in turbulent regions of tidal rapids in Lough Ine, Ireland, the bryozoan species present were typical of wave exposed coasts and included *Electra pilosa*. An increase of water flow from weak to strong will probably have little adverse effects, however if water flow increased to very strong, feeding efficiency, and hence growth, would probably be reduced. Therefore, an intolerance of low has been reported. Recoverability has been assessed as immediate.

Decrease in water flow rate Intermediate Very high Low Low

A decrease in water flow is likely to increase siltation and potentially decrease food availability. Increased siltation may result in increased smothering of surfaces, and a reduction in settlement by bryozoan larvae (see above). Okamura (1988) reported that water flow stimulated feeding in *Electra pilosa*, so that feeding rates were reduced in slow water flow. Although, *Electra pilosa* is tolerant of silt-laden conditions, it is still probably dependant on water flow to bring an adequate supply of food within range of their feeding currents. Therefore, a reduction in water flow from moderately strong to very weak will probably result in a reduction in the abundance of *Electra pilosa* colonies and an intolerance of intermediate has been recorded. Recoverability has been assessed as very high.

Increase in temperature Low Immediate Not sensitive Low

Growth rates were reported to increase with temperature, however, zooid size decreased,

which may be due to increased metabolic costs at higher temperature (Menon, 1972; Ryland, 1976; Hunter & Hughes, 1994). The final size of the colony after prolonged exposure also declines at higher temperature (Menon, 1972). In the Menai Straits larger zooids are produced in spring at times of peak phytoplankton primary productivity but mean zooid size decreased as temperatures increased in summer (Okamura, 1987 cited in Hunter & Hughes, 1994). Menon (1972) reported that the upper lethal temperature and median lethal temperature varied significantly with acclimation temperature but found no obvious correlation with season, e.g. 24hr upper lethal temperature was ca 25 °C in colonies acclimated to 5 °C but ca 29 °C when acclimated to 22 °C (Menon, 1972). *Electra pilosa* is widely distributed in temperate seas both north and south of the British Isles and is probably tolerant to chronic long term change in temperature in British waters. However, acute temperature change may affect growth, feeding and hence reproduction, and an intolerance of low has been recorded.

Decrease in temperature **Low** Immediate **Not sensitive** **Moderate**

Intertidal populations may be exposed to low temperatures and frost but would probably receive some protection amongst the fronds of their macroalgal host. *Electra pilosa* is widely distributed in temperate seas, occurring as far north as the Barents Sea within the Arctic Circle (Gontar & Denisenko, 1989). Menon (1972) reported that individual zooids on the growing rim of colonies survived when kept at -4 °C for 14 days, although the inner zooids died. Menon (1972) demonstrated that all the zooids on the rim of colonies acclimated to 6 °C for 6 months before being kept in ice at -4 °C for 14 days, although apparently killed regenerated when returned to 6 °C. Therefore, *Electra pilosa* is unlikely to be adversely affected by long term temperature change in British waters. Hyman (1959) reported that a reduction in temperature of only 3 °C was enough to interrupt feeding, and that *Electra pilosa* colonies became un-responsive at 4 °C. Therefore, acute short term decreases in temperature may interfere with feeding and hence reproduction and an intolerance of low has been recorded.

Increase in turbidity **Low** Immediate **Not sensitive** **Low**

An increase in turbidity is likely to result in a decrease in phytoplankton and macroalgal primary production, which may reduce food available to *Electra pilosa*. Therefore, an intolerance of low has been recorded.

Decrease in turbidity **Tolerant** Not relevant **Not sensitive** **Moderate**

An decrease in turbidity may increase primary productivity and food available for *Electra pilosa*. However, it is unlikely to be adversely affected, so tolerant has been recorded.

Increase in wave exposure **Intermediate** **Very high** **Low** **Moderate**

Electra pilosa is probably tolerant of wave exposure and is probably capable of occupying niches, overhangs and underboulder habits on even the most exposed shores. However, it reaches its highest abundance on macroalgal hosts within the intertidal, e.g. *Fucus serratus* which are likely to be lost from wave exposed shores. Populations on the holdfasts of laminarians will probably be unaffected by increases of wave action, until very or extremely exposed conditions, at which point the abundance of kelps would decline. Therefore, an intolerance of intermediate has been recorded to represent reduced population abundance with increasing wave action. Recoverability has been assessed as very high (see additional information below). Increased wave action will also increase the degree of abrasion from algae or sediment (see below).

Decrease in wave exposure **Low** Immediate **Not sensitive** **Low**

A decrease in wave exposure from, for example, moderately exposed to very sheltered is likely

to increase the availability of macroalgae for colonization by *Electra pilosa*. However, increased shelter may also increase siltation (see above). Decreased wave action is likely to reduce abrasion by algae or sediment (see below). Overall, in areas subject to tidal streams or currents a decrease in wave action may not adversely affect the population. However, in areas where the main source of water flow over the substratum (rock or macroalgae) is caused by wave action a reduction in wave exposure to for example very sheltered may be detrimental, due to reduced food availability. Therefore, an intolerance of low has been recorded. Recoverability is likely to be immediate.

Noise Tolerant Not relevant Not sensitive High

The species is unlikely to be sensitive to changes in noise vibrations.

Visual Presence Tolerant Not relevant Not sensitive High

The species is unlikely to be sensitive to changes in visual perception.

Abrasion & physical disturbance Low Very high Very Low Moderate

Bayer *et al.* (1997) demonstrated that abrasion by seaweeds, rather than wave crash itself, induced the formation of extended median proximal spines in *Electra pilosa*, presumably to protect the lophophore from physical damage. As a major epiphyte of macroalgae, *Electra pilosa* is probably tolerant of seaweed abrasion. However, abrasion or physical disturbance by an anchor would probably destroy the colonies. In addition, physical disturbance by an anchor or passing scallop dredge is likely to remove a proportion of large macroalgae, such as fucoids and laminarians. However, even though the colonies eventually die as the substratum rots, over a few weeks at sea they are likely to shed thousands of larvae, and seaweed rafts are now seen as important dispersal agents (P. Hayward, pers. comm.). Overall, a low intolerance has been suggested. Recoverability is likely to be very high (see additional information below).

Displacement High Very high Low High

Removal of a colony from its substratum would probably be fatal, and encrusting bryozoa are not known to be able to reattach. Therefore, an intolerance of high has been recorded. Recoverability is likely to be very high.

Chemical Pressures

Synthetic compound contamination Intolerance Recoverability Sensitivity Confidence
Intermediate Very high Low Low

Bryozoans are common members of the fouling community, and amongst those organisms most resistant to antifouling measures, such as copper-containing anti-fouling paints (Soule & Soule, 1977; Holt *et al.*, 1995). Bryan & Gibbs (1991) reported that there was little evidence regarding TBT toxicity in bryozoa with the exception of the encrusting *Schizoporella errata*, which suffered 50% mortality when exposed for 63 days to 100ng/l TBT. Rees *et al.* (2001) reported that the abundance of epifauna (including bryozoans) had increased in the Crouch estuary in the five years since TBT was banned from use on small vessels. This last report suggests that bryozoans may be at least inhibited by the presence of TBT. Hoare & Hiscock (1974) suggested that polyzoa were amongst the most sensitive species to acidified halogenated effluents in Amlwch Bay, Anglesey. *Electra pilosa* occurred at low abundance on laminarian holdfasts within the bay, compared to sites outside the affected area. Therefore, an intolerance of intermediate has been recorded. Recoverability is probably very high (see additional information below).

Heavy metal contamination Low Immediate Not sensitive Low

Bryozoans are common members of the fouling community, and amongst those organisms most resistant to antifouling measures, such as copper-containing anti-fouling paints (Soule & Soule, 1977; Holt *et al.*, 1995). Bryozoans were shown to bioaccumulate heavy metals to a certain extent (Holt *et al.*, 1995). For example *Bowerbankia gracilis* and *Nolella pusilla* accumulated Cd, exhibiting sublethal effects (reduced sexual reproduction and inhibited resting spore formation) between 10-100 µg Cd/l and fatality above 500 µg Cd/l (Kayser, 1990). However, given the tolerance of bryozoans to copper based anti-fouling treatments, and assuming similar physiology between species, an intolerance of low has been recorded albeit with very low confidence.

Hydrocarbon contamination

Intermediate

Very high

Low

Very low

Little information on the effects of hydrocarbons on bryozoans was found. Ryland & de Putron (1998) did not detect adverse effects of oil contamination on the bryozoan *Alcyonidium* spp. or other sessile fauna in Milford Haven or St. Catherine's Island, south Pembrokeshire. Houghton *et al.* (1996) reported a reduction in the abundance of intertidal encrusting bryozoa (no species given) at oiled sites after the *Exxon Valdez* oil spill. Soule & Soule (1979) reported that the encrusting bryozoan *Membranipora villosa* was not found in the impacted area for 7 months after the December 1976 Bunker C oil spill in Los Angeles Harbour. Of the eight species of bryozoan recorded on the nearby breakwater two weeks after the incident, only three were present in April and by June all had been replaced by dense growths of the erect bryozoan *Scrupocellaria diegensis*. Mohammad (1974) reported that *Bugula* spp. and *Membranipora* spp. were excluded from settlement panels near a Kuwait Oil terminal subject to minor but frequent oil spills. Encrusting bryozoans are also probably intolerant of the smothering effects of oil pollution, resulting in suffocation of colonies. Therefore, given the above evidence of intolerance in other Membraniporidae, a intolerance of high has been recorded, albeit at low confidence. Recoverability is probably very high (see additional information below).

Radionuclide contamination

Not relevant

Not relevant

Insufficient information

Changes in nutrient levels

Not relevant

Not relevant

A moderate increase in nutrient levels may increase the food available to *Electra pilosa*, either in the form of phytoplankton or detritus. However, no effects of nutrient enrichment on bryozoans were found.

Increase in salinity

Not relevant

Not relevant

Not relevant

Not relevant

Ryland (1970) stated that, with a few exceptions, the Gymnolaemata were fairly stenohaline and restricted to full salinity (ca 35 psu). Subtidal populations are unlikely to be exposed to hypersaline effluents or conditions within British waters. Intertidal populations may be exposed to increased salinities due to evaporation during emersion. However, *Electra pilosa* is found predominately on the lower shore and is unlikely to encounter an increase in salinity at the benchmark level.

Decrease in salinity

Intermediate

Very high

Low

Moderate

Ryland (1970) stated that, with a few exceptions, the Gymnolaemata were fairly stenohaline and restricted to full salinity (ca 35 psu) and noted that reduced salinities result in an impoverished bryozoan fauna. However, Hyman (1959) reported that *Membranipora membranacea*, *Electra pilosa* and *Acanthodesia tenuis* were found in the upper parts of Chesapeake Bay, in variable salinities. In addition, Hyman (1959) reported that *Electra pilosa* retracted its lophophores when exposed to 31psu, adjusted to 20psu but died after 'some sojourn' at 17.5psu. Intertidal populations may be exposed to freshwater runoff or rainfall, and

may be expected to demonstrate some level of tolerance. Therefore, *Electra pilosa* may survive a long term decrease in salinity from full to variable but colonies would probably die if exposed to reduced or low salinities, even in the short term. Therefore, a salinity of intermediate has been recorded at the benchmark level. Recoverability is probably very high (see additional information below).

Changes in oxygenation Not relevant Not relevant

No information on the tolerance of *Electra pilosa* to changes in oxygenation was found.

Biological Pressures

Intolerance Recoverability Sensitivity Confidence

Introduction of microbial pathogens/parasites Not relevant Not relevant

No information found.

Introduction of non-native species Not relevant Not relevant

No information found.

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

Electra pilosa is unlikely to be subject to specific extraction.

Extraction of other species Intermediate Very high Low Moderate

Electra pilosa is a common epiphyte on fucoids, especially *Fucus serratus* and laminarian holdfasts, e.g. *Laminaria hyperborea*, which are subject to extraction (see individual species reviews for details). Therefore, a proportion of the *Electra pilosa* population is likely to be removed with their host algae, and an intolerance of intermediate has been recorded. Recoverability is likely to be very high (see additional information below).

Additional information

Recoverability

Electra pilosa has a planktonic larvae with a protracted life in the plankton, potentially extended dispersal, and larvae settle between April and November (with peaks in May-June and July - October). *Electra pilosa* can also colonize a wide variety of substrata and is a common member of fouling communities. Therefore, it is likely to be able to colonize new habitats or free space rapidly, probably in 6 months or less. It grows and probably matures quickly, within a year or less, and subsequent expansion of the population and recovery of abundance, aided by the proximity of breeding colonies is also likely to occur rapidly, possibly within a few years at most.

Importance review

Policy/legislation

- no data -

★ Status

National (GB)
importance -

Global red list
(IUCN) category -

Non-native

Native -

Origin -

Date Arrived -

Importance information

Electra pilosa is the preferred prey for several species of sea slugs, [Limacia clavigera](#), [Polycera quadrilineata](#), [Onchidoris muricata](#) and [Adalaria proxima](#). *Adalaria proxima* is almost entirely dependant on *Electra pilosa* and its veligers will only metamorphose in the presence of *Electra pilosa* (Ryland, 1976; Picton & Morrow, 1994). Bryozoans, including *Electra pilosa* are also preyed on by pycnogonids (sea spiders) such as *Pycnogonum littorale* or *Achelia* spp. and sea urchins such as [Echinus esculentus](#) and [Psammechinus miliaris](#) (Ryland, 1976). Moore (1973c) noted that the hairy form of *Electra pilosa* on kelp holdfasts in north east England acted as a substratum for the settlement of mussel spat.

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