



# MarLIN

## Marine Information Network

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

# Fireworks anemone (*Pachycerianthus multiplicatus*)

MarLIN – Marine Life Information Network  
Marine Evidence-based Sensitivity Assessment (MarESA) Review

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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/1272>]. All terms and the MarESA methodology are outlined on the website (<https://www.marlin.ac.uk>)

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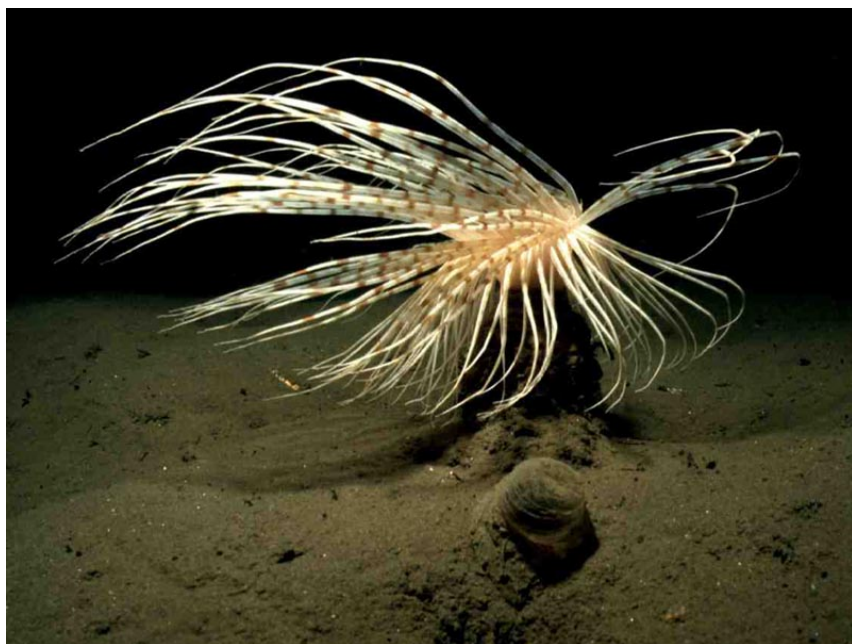
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Individual with out-stretched tentacles.  
 Photographer: Chris Lumb  
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See online review for  
 distribution map

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

<b>Researched by</b>	Catherine Wilding & Emily Wilson	<b>Refereed by</b>	This information is not refereed.
<b>Authority</b>	Carlgren, 1912	<b>Synonyms</b>	-
<b>Other common names</b>	-		

## Summary

### 🔍 Description

*Pachycerianthus multiplicatus* is a large burrowing anemone, occupying a tube-like burrow that may exceed one metre in length. Both the length of the column and the breadth of the tentacles can reach 30 cm. The tentacles are long and occur in two cycles, with up to 200 tentacles in the marginal cycle. The tentacles are incapable of retraction but may coil spirally on disturbance. The colour of the inner tentacles is pale buff or chestnut and the marginal tentacles are whitish with fine brown bands, or plain white.

### 📍 Recorded distribution in Britain and Ireland

Recorded from Kenmare River and Kilkieran Bay (western Ireland) and from sea-lochs on the western coast of Scotland, notably Lochs Duich and Fynne.

### 📍 Global distribution

Outside of the UK, the species has been recorded from the middle of the northern North Sea, due

east of Aberdeenshire, and in Scandinavia from Læsø Island in Denmark, Hakefjorden in Sweden and the Trondheim fjord in Norway.

## Habitat

Lives in a long thick tube, often over 1 m long, in mud or muddy sand, from about 10-130 m depth. Found only in very sheltered conditions around the head of fjordic sea lochs.

## ↓ Depth range

10 - 130 m

## Q Identifying features

- Column relatively stout, usually broadest distally, provided with an aboral pore.
- Marginal tentacles arranged in four pseudocycles, up to about 180, very long, even in contraction much longer than disc diameter.
- Attains a very large size.

## Additional information

*Pachycerianthus multiplicatus* is similar to *Cerianthus lloydii*, but is much longer and has a broader column.

## ✓ Listed by



## Further information sources

Search on:



## Biology review

### ☰ Taxonomy

Phylum	Cnidaria	Sea anemones, corals, sea fans & jellyfish
Class	Anthozoa	Sea anemones, soft & cup corals, sea pens & sea pansies
Order	Spirularia	
Family	Cerianthidae	
Genus	Pachycerianthus	
Authority	Carlgren, 1912	
Recent Synonyms	-	

### 🌸 Biology

Typical abundance	Moderate density
Male size range	
Male size at maturity	30cm
Female size range	30cm
Female size at maturity	
Growth form	Radial, Unitary
Growth rate	See additional information
Body flexibility	High (greater than 45 degrees)
Mobility	Burrower
Characteristic feeding method	Passive suspension feeder
Diet/food source	Carnivore
Typically feeds on	Plankton i.e. <i>Sagitta</i> spp.
Sociability	Solitary
Environmental position	Infaunal
Dependency	No information found.
Supports	No information
Is the species harmful?	No information

### 🏛️ Biology information

**Body flexibility.** Tentacles are highly flexible and are usually held upright at the base and allowed to flow with the current at the tips. Although they are not retractile, the tentacles may be curled up against the disc if disturbed. The column is comparatively inflexible, although may still lean slightly with the direction of water movement. The tube, into which the whole animal can withdraw, is composed of discharged nematocysts, mucus, and foreign particles, and is soft with a slippery lining.

**Growth rate.** The growth rate of the species is unknown, but it is thought to be slow, taking several years to reach its full size (Hughes, 1998a).

**Larva.** Larvae have not yet been identified but are thought to be demersal and short-lived (Molodtsova, 2004), thus larval distribution is likely to be limited. Hughes (1998a) hypothesised

that populations were self seeding.

**Feeding.** The anemone is thought to feed on plankton such as *Sagitta* spp., and may have weak nematocysts which exclude it from catching larger prey (Jonsson *et al.*, 2001).

## Habitat preferences

### Physiographic preferences

**Biological zone preferences** Circalittoral

**Substratum / habitat preferences** Mud, Mud and sandy mud, Muddy sand

**Tidal strength preferences** Weak < 1 knot (<0.5 m/sec.)

**Wave exposure preferences** Extremely sheltered, Ultra sheltered, Very sheltered

**Salinity preferences** Full (30-40 psu)

**Depth range** 10 - 130 m

**Other preferences** No text entered

**Migration Pattern**

## Habitat Information

Lives in a long thick tube, often over 1 m long, in mud or muddy sand, from about 10-130 m depth. Found only in very sheltered conditions around the head of fjordic sea lochs.

## Life history

### Adult characteristics

**Reproductive type** Gonochoristic (dioecious)

**Reproductive frequency** No information

**Fecundity (number of eggs)** No information

**Generation time** Insufficient information

**Age at maturity** Unknown

**Season** No information found

**Life span** See additional information

### Larval characteristics

**Larval/propagule type** -

**Larval/juvenile development** Lecithotrophic

**Duration of larval stage** No information

**Larval dispersal potential** See additional information

**Larval settlement period** No information

## Life history information

**Longevity.** Longevity of this species is unknown, but it is thought to be several years (Hughes, 1998a).

**Reproduction.** The larvae of *Pachycerianthus multiplicatus* have not yet been identified but are thought to be demersal and short-lived (Molodtsova, 2004) with limited dispersal potential, while most other Ceriantharia larvae are free swimming planktonic carnivores (Manuel, 1988). Unlike most other Anthozoa, *Pachycerianthus multiplicatus* does not reproduce asexually. When spawning, the male gametes are released first, which stimulates the release of eggs in females (Thorson, 1950).

## 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 low / none	Very High	Very low

*Pachycerianthus multiplicatus* will be removed by removal of the substrata, so intolerance is assessed as high. Due to the fragmented nature of populations, and the assumed limited potential for larval dispersal, recovery is unlikely if the entire population is removed. If mature viable individuals remain in nearby areas to provide larval supply, recovery may be possible, but is likely to take several years. No information was found on larval dispersal or recruitment, and longevity of the species is unknown. As such recoverability is recorded as very low, resulting in a sensitivity assessment of very high.

Smothering	Low	Immediate	Not sensitive	Very low
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*Pachycerianthus multiplicatus* occurs in muddy sediments, so is likely to be tolerant of some smothering by suspended sediment. Further, the anemone extends up to 30 cm above the surface of the sediment, so a change at the level of the benchmark is unlikely to cause mortality. Additionally, it is plausible that the anemone may be able to extend its tube upwards to adjust to a higher surface level of sediment, although this would incur an energetic cost. Therefore, intolerance is recorded as low. Recoverability is recorded as immediate, resulting in a sensitivity assessment not sensitive.

Increase in suspended sediment	Low	Immediate	Not sensitive	Very low
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*Pachycerianthus multiplicatus* occurs in muddy sediments, so is likely to be tolerant of some level of suspended sediment. However, there may be an energetic cost of removing mud particles. Therefore, intolerance is recorded as low. Recoverability is recorded as immediate, resulting in a sensitivity assessment not sensitive.

Decrease in suspended sediment	Low	Immediate	Not sensitive	Very low
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*Pachycerianthus multiplicatus* occurs in muddy sediments, so is likely to be tolerant of some level of suspended sediment. However, there may be an energetic cost of removing mud particles. A supply of suspended sediment for feeding is probably important to *Pachycerianthus multiplicatus*, however at the benchmark level of a one month long change, this is thought unlikely to affect the population. Therefore, intolerance is recorded as low. Recoverability is recorded as immediate on return to normal conditions, resulting in a sensitivity assessment not sensitive.





**Decrease in temperature**      **Intermediate**      **Moderate**      **Moderate**      **Very low**

No information was found of the upper or lower thermal tolerance limits of *Pachycerianthus multiplicatus*. *Pachycerianthus multiplicatus* occurs in thermally stable conditions. This species is subtidal where wide variations in temperature are not common, so may be intolerant of short term changes in temperature. Therefore, intolerance has been recorded as intermediate. A recoverability of moderate has been recorded, resulting in a sensitivity value of moderate (see additional information below).

**Increase in turbidity**      **Tolerant**      **Not relevant**      **Not sensitive**      **Very low**

No information was found in the literature on the turbidity tolerance of this species. An increase in phytoplankton abundance may be beneficial to the species as it is thought to feed on phytoplankton. As the anemone is not dependent on light, a reduction in light penetration is unlikely to have any effect. Therefore, the species is assessed as tolerant, and not sensitive to this factor.

**Decrease in turbidity**      **Low**      **Very high**      **Very Low**      **Very low**

No information was found in the literature on the turbidity tolerance of this species. At the upper depth limit of *Pachycerianthus multiplicatus*, a decrease in turbidity may possibly facilitate the growth of algae, due to increased light penetration. However this is unlikely to have an effect on muddy substrata, which lacks suitable attachment sites for algal holdfasts. Also, deeper populations are likely to remain unaffected by changes in turbidity. As the species is highly sensitive to the light from photographic strobes, it may possibly be sensitive to increased light penetration, but this is not likely to have a lethal effect. Therefore intolerance is assessed as low. Recoverability is likely to be very high, resulting in a sensitivity record of very low.

**Increase in wave exposure**      **Not relevant**      **Not relevant**      **Not relevant**      **Not relevant**

Changes in wave exposure are unlikely to affect sea lochs, which are areas with little or no wave exposure. A change in wave exposure is highly unlikely, except over geological time-scales, therefore, the sensitivity is not relevant.

**Decrease in wave exposure**      **Not relevant**      **Not relevant**      **Not relevant**      **Not relevant**

See above.

**Noise**      **Tolerant**      **Not relevant**      **Not sensitive**      **Very low**

*Pachycerianthus multiplicatus* has no known facility for detection of noise vibrations, therefore, is recorded as tolerant.

**Visual Presence**      **Tolerant**      **Not relevant**      **Not sensitive**      **Very low**

*Pachycerianthus multiplicatus* probably has a very limited if any ability for visual perception. It is unlikely the anemone will be sensitive to visual presence, however it is thought to be photosensitive as torch light from SCUBA divers causes it to coil its tentacles. This may result in a slight reduction in viability, but is not likely to be significant at the level of the benchmark. Therefore tolerant has been recorded. Recovery may involve small energy losses in extending tentacles, so is assessed to be very high, therefore the species is not sensitive to this factor.

#### Abrasion & physical disturbance

High

Very low /  
none

Very High

Very low

The species can coil its tentacles and withdraw into its tube to avoid physical disturbance. It is unclear whether *Pachycerianthus multiplicatus* would be removed or severely damaged by *Nephrops* trawling. The anemone does burrow deeply into the mud, however on muddy substrata trawls will dig to a lower depth. So it is likely that at least the upper part of the anemone will come into contact with approaching trawls. Therefore, intolerance is assessed as high. If the anemone was removed or killed, recovery would be very low, resulting in a very high sensitivity assessment.

#### Displacement

It is unknown whether *Pachycerianthus multiplicatus* can re-bury itself if displaced, although if it can, energy will be expended in forming a new tube, and the anemone may be vulnerable to predation when exposed.

### Chemical Pressures

Intolerance

Recoverability Sensitivity

Confidence

#### Synthetic compound contamination

Insufficient information.

#### Heavy metal contamination

Insufficient information.

#### Hydrocarbon contamination

Insufficient information.

#### Radionuclide contamination

Insufficient information.

#### Changes in nutrient levels

No information could be found on the effects of nutrient enrichment on *Pachygerianthus multiplicatus*. It is possible that an increase in nutrients will result in greater food availability as the anemone feeds on plankton. However, any deoxygenation associated with the decomposition of organic material is likely to kill *Pachygerianthus multiplicatus* (Hughes 1998a) (see 'Changes in oxygenation', below).

**Increase in salinity**                      **Not relevant**    **Not relevant**    **Not relevant**    **Not relevant**

*Pachygerianthus multiplicatus* is found in fully saline conditions and it is unlikely that it would be exposed to hypersaline conditions, therefore, not relevant has been recorded.

**Decrease in salinity**                      **High**                      **Low**                      **High**                      **Very low**

*Pachygerianthus multiplicatus* is found only in fully saline conditions so it is likely that the sea pen would be intolerant of a decrease in salinity. Therefore, an intolerance of high has been recorded. A recoverability of low has been recorded, resulting in a high sensitivity value.

**Changes in oxygenation**                      **High**                      **Moderate**                      **Moderate**                      **Very low**

There is no evidence was found on the tolerance of *Pachygerianthus multiplicatus* to deoxygenation. Jones *et al.*, (2000) found that burrowing infaunal species generally require well oxygenated conditions. Burrowing megafauna were absent from de-oxygenated areas which are characterised by nutrient enrichment resulting in a hypoxia bacterial community, so aquaculture wastes are likely to affect burrowing megafauna. Additionally, the removal of oxygenating bioturbators by trawling may result in eutrophication and deoxygenation (Ball *et al.*, 2000). Therefore, intolerance has been recorded as high. A recoverability of moderate has been recorded, resulting in a moderate sensitivity assessment.

## Biological Pressures

Intolerance    Recoverability    Sensitivity    Confidence

### Introduction of microbial pathogens/parasites

Insufficient information.

### Introduction of non-native species

Insufficient information.

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

*Pachygerianthus multiplicatus* is not known to be harvested, although due to the fragmented and localized distribution of populations, the species is likely to be highly sensitive to this factor.

**Extraction of other species****High****Very low /  
none****Very High****Very low**

In Loch nam Madadh *Pachycerianthus multiplicatus* has been recorded from the same biotope as *Nephrops norvegicus*, (Entec 1996; Howson & Davies, 1991). It is unclear whether *Pachycerianthus multiplicatus* would be removed or severely damaged by *Nephrops* trawling. The anemone does burrow deeply into the mud, however on muddy substrata trawls will dig down to a lower depth. So it is likely that at least the upper part of the anemone will come into contact with approaching trawls. Additionally, the removal of oxygenating bioturbators by trawling may result in eutrophication and deoxygenation (Ball *et al.*, 2000a). Therefore, intolerance is assessed as high. If the anemone was removed or killed, recovery would be very low, resulting in a very high sensitivity assessment.

**Additional information**

Due to a deficit of available information, this sensitivity assessment has been made based on available life history information.

**Recoverability**

Although no conclusive literature was found, it is thought that the species has a very limited capacity for larval dispersal and recolonization, and populations are likely to be self-seeding (Hughes, 1998a). Hughes (1998a) suggested slow growth and a long life span. Due to the fragmented nature of populations, the species is likely to be highly vulnerable to localised extinction. Recoverability is dependent on recolonization from other populations, therefore if the entire population is destroyed, it is unlikely to ever recover.

## 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	-
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### Non-native

Native	-		
Origin	-	Date Arrived	-

### Importance information

*Pachycerianthus multiplicatus* was listed in the UK Biodiversity Action Plan as a species of conservation concern (Biodiversity Steering Group, 1995). The species is also nationally rare, and due to its limited, fragmented distribution, British populations are also likely to be of global importance.

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## Datasets

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