Sealoch anemone (*Protanthea simplex*)

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

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

Please note. This MarESA report is a dated version of the online review. Please refer to the website for the most up-to-date version [https://www.marlin.ac.uk/species/detail/1345]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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Protanthea simplex.
Photographer: Sue Scott
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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	Angus Jackson	**Refereed by**	Dr Ib Svane
Authority	Carlgren, 1891		
Other common names	-	**Synonyms**	-

Summary

Description

A small delicate sea anemone, usually found with outstretched tentacles. The column of the anemone reaches lengths of up to 2 cm. There are numerous translucent tentacles up to 1.5 cm long, which may span 7 cm. The column of the anemone may be salmon pink with the tentacles a little paler or white, especially near the tips. Deep orange-pink gonads may be visible through the column wall when ripe.

Recorded distribution in Britain and Ireland

From the northern Firth of Clyde all along the west coast of Scotland, particularly in sea lochs. Not recorded in Orkney or Shetland. Recently (June 2006) found in Killary Harbour, Connemara.

Global distribution

Killary Harbour (Connermara, Galway), Western Scotland out to Rockall Bank, round the coasts of the Skagerrak and northern Kattegat, Norway.

Habitat

Occurs characteristically on deep rock in sea lochs, particularly on vertical walls in landward basins. Often found growing on rock or on other species such as tube worms. Otherwise recorded in deep waters down to at least 500 m.

Depth range
9 -500 m deep

Identifying features

- A small delicate sea anemone up to 2 cm high.
- Column is smooth and broader distally (1.5 cm) than proximally (1 cm).
- 100-160 tentacles arranged in 5 or 6 cycles.
- Inner tentacles up to 1.5 cm, outer tentacles shorter.
- There is no sphincter.
- Eight perfect mesenteries present.

Additional information
No text entered

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Biology review

Taxonomy

Phylum	Cnidaria	Sea anemones, corals, sea firs & jellyfish
Class	Anthozoa	Sea anemones, soft & cup corals, sea pens & sea pansies
Order	Actiniaria	
Family	Gonactiniidae	
Genus	Protanthea	
Authority	Carlgren, 1891	
Recent Synonyms	-	

Biology

Typical abundance	Moderate density
Male size range	Up to 2cm
Male size at maturity	
Female size range	Small(1-2cm)
Female size at maturity	
Growth form	Cylindrical
Growth rate	Data deficient
Body flexibility	
Mobility	
Characteristic feeding method	Non-feeding, Passive suspension feeder
Diet/food source	
Typically feeds on	Data deficient
Sociability	
Environmental position	Epifaunal
Dependency	No information found.
Supports	No information
Is the species harmful?	Data deficient

Biology information

This species exhibits an unusual collapse behaviour, where at intervals, muscle tone is rapidly lost and the animals hangs limply from its disk attachment. This is considered to be an egestion process rather than a feeding, alarm or escape response. Despite the primitive musculature, *Protanthea simplex* is capable of active movement.

In Sweden *Protanthea simplex* has been recorded historically at densities of up to 2000 per square metre. Svane & Gröndal (1988) reported that the species was abundant below the algal belt in semi-sheltered and sheltered sites in the Gullmarsfjorden, Sweden (10.7 % and 4.5 % cover per 0.25 square metre respectively). This contrasted with earlier work by Gislén, undertaken between 1926-29, where the species was not recorded in the semi-sheltered sites and only made up a small proportion of the total wet weight of species in the sheltered sites (Svane & Gröndal, 1988).

Habitat preferences

Physiographic preferences	Offshore seabed, Strait / sound, Sea loch / Sea lough
Biological zone preferences	Lower circalittoral, Lower infralittoral, Upper circalittoral
Substratum / habitat preferences	Bedrock, Biogenic reef, Large to very large boulders, Small boulders
Tidal strength preferences	Very Weak (negligible), Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Extremely sheltered, Sheltered, Ultra sheltered, Very sheltered
Salinity preferences	Full (30-40 psu), Variable (18-40 psu)
Depth range	9 -500 m deep
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)	No information
Generation time	Insufficient information
Age at maturity	Insufficient information
Season	September - October
Life span	Insufficient information

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Oviparous
Duration of larval stage	11-30 days
Larval dispersal potential	Greater than 10 km
Larval settlement period	Insufficient information

Life history information

At 10-12 °C the larvae spend 15-20 days in the plankton before settling. In Sweden breeding occurs in September and October. Breeding terminates earlier in shallower water. Fertilization of the eggs occurs in the water column. The reproductive organs are white or orange- pink.
Fragments of tissue in this species (except the tentacles) are capable of regenerating into complete anemones, a form of vegetative, asexual reproduction (Manuel, 1988).
Apart from *Protanthea simplex*, the only other species in the family Gonactinidae is *Gonactinia prolifera*. *Gonactinia prolifera* is unique in that the planula larva carries 'collar cells' similar in structure to the choanocyes of sponges and it is possible that *Protanthea simplex* has similar cells (I.

Svane, pers. comm.). These secretory cells contain yolk granules and are undoubtedly involved in the formation of the fibrous coating of the planula which is again a unique feature of its planula (Chia *et al*, 1989).

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	Moderate	Moderate	High

The species is attached to the substratum so substratum loss will mean loss of the population. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.

Smothering	High	Moderate	Moderate	Low

The species is delicate and soft bodied. Smothering with 5 cm of sediment is likely to cause physical damage to the anemone as well as restricting respiration and preventing feeding. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.

Increase in suspended sediment	Low	Very high	Very Low	Low

Increased siltation may clog the anemone's tentacles and interfere with feeding. Clearing the sediment will require increased energetic expenditure. Loss of condition may result. It may take a few weeks or months for condition to be regained once energy expenditure returns to normal.

Decrease in suspended sediment

Dessication	High	Moderate	Moderate	Low

The anemone is small and soft bodied, existing entirely sub-tidally. On removal from the water the animals turn into shapeless blobs of tissue. Exposure to desiccating influences is highly likely to cause death. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.

Increase in emergence regime	High	Moderate	Moderate	Low

The anemone is small and soft bodied, existing entirely sub-tidally. On removal from the water the animals turn into shapeless blobs of jelly. Emergence is highly likely to cause death. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.

Decrease in emergence regime

Increase in water flow rate	Intermediate	High	Low	Low

Decreases in water flow are unlikely to have any effect but increases in flow rate above weak may prevent the animals from maintaining posture and interfere with feeding. Increased flow rates may also sweep individuals off the substratum. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential. No information is available about asexual reproduction.

Decrease in water flow rate

Increase in temperature	High	Moderate	Moderate	Very low

No information is available about the temperature preferences of *Protanthea simplex*. However, the species reaches its southern-most geographical distribution in coastal waters on the west coast of Scotland. Long-term chronic increases in temperature may cause the distribution range of shallow water populations to retreat northwards. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.

Decrease in temperature

Increase in turbidity	Tolerant	Not relevant	Not sensitive	Low

The species probably has very poor facility for visual perception and has no great requirement for light. The species may be found as deep as 400 m where light availability is very limited. Changes in light attenuation are not likely to have any effect.

Decrease in turbidity

Increase in wave exposure	High	Moderate	Moderate	Low

The species typically inhabits sheltered waters so decreases in wave exposure are unlikely to have any effect. Increases above moderately exposed are likely to cause damage to the species, as well as interfering with posture and feeding. Deep water populations are unlikely to be affected by changes in wave exposure.

Decrease in wave exposure

Noise	Tolerant	Not relevant	Not sensitive	Very low

Protanthea simplex probably has limited facility for detection of noise vibrations. It is unlikely to be sensitive to noise.

Visual Presence	Tolerant	Not relevant	Not sensitive	High

Protanthea simplex probably has limited facility for visual perception. It is unlikely to be sensitive to visual disturbance.

Abrasion & physical disturbance	High	Moderate	Moderate	Low

The anemone is delicate and soft bodied. Abrasion is highly likely to cause death. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.

Displacement	Low	Very high	Very Low	Low

Protanthea simplex only forms a temporary attachment with the substratum and is capable of active movement. Displacement may cause inconvenience for the animals and possibly slight damage to the body but is not likely to cause death. It may take a few weeks or months for regeneration and repair of damage to occur.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination				Not relevant
Insufficient information				
Heavy metal contamination				Not relevant
Insufficient information				
Hydrocarbon contamination				Not relevant
Insufficient information				
Radionuclide contamination				Not relevant
Insufficient information				
Changes in nutrient levels				Not relevant
Insufficient information				
Increase in salinity	Intermediate	High	Low	Low
The species probably only inhabits fully saline waters but this is not certain. Longer term decreases in salinity may cause some of the population to die. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential. No information is available about asexual reproduction.				
Decrease in salinity				
Changes in oxygenation	Intermediate	High	Low	Very low
Cole *et al*. (1999) suggest possible adverse effects on marine species below 4 mg/l and probable adverse effects below 2mg/l. There is no information about *Protanthea simplex* tolerance to changes in oxygenation. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.				

Biological Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Introduction of microbial pathogens/parasites				Not relevant
Insufficient information				
Introduction of non-native species				Not relevant
Insufficient information				
Extraction of this species	Not relevant	Not relevant	Not relevant	Low

It is extremely unlikely that this species would be subject to extraction.

Extraction of other species Intermediate High Low Moderate

Some individual *Protanthea simplex* use other species such as *Ascidia* sp., *Serpula* sp., and *Chaetopterus* sp. as substrata. Removal of these species may also mean incidental removal of the anemone. It is unlikely that available habitat will be greatly reduced as *Protanthea simplex* also inhabits rock. Although capable of active movement, this is not over long distances making adult immigration highly unlikely. No information is available about growth rate, longevity or fecundity. Larvae remain in the plankton for up to three weeks and so potentially have considerable dispersal potential.

Additional information

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

-none-

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