A bristleworm (*Cirratulus cirratus*)

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

Ken Neal & Susie Ballerstedt

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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/1786]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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***Cirratulus* spp.**
Photographer: Teresa Darbyshire

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	Ken Neal & Susie Ballerstedt	**Refereed by**	This information is not refereed.
Authority	(O. F. Müller, 1776)		
Other common names	-	**Synonyms**	-

Summary

Description

Cirratulus cirratus has a long, slender, orange, pinkish or brownish-red body, with 75 to 130 segments, and can reach 12 cm in length. The head is a blunt cone with a row of 4 to 8 large black eyes either side that may meet on top of the head. There are two groups of up to 8 feeding tentacles on the first segment. Pairs of long slender gills arise at intervals from the whole length of the body and these appear as a mass of reddish threads when the worm is buried.

Recorded distribution in Britain and Ireland

Found in suitable habitats all round the coast of Britain and Ireland.

Global distribution

Most north west European coasts and also in the south Atlantic.

Habitat

Occurs on the lower shore in mud or muddy sand beneath or between rocks.

Depth range

Mainly intertidal but may be circalittoral.

Identifying features

- Long, slender body with 75 to 130 segments.
- Up to 12 cm in length.
- Blunt head with 4 to 8 large, black eyes.
- Body is orange, pinkish or brownish red.
- Two pairs of up to 8 feeding tentacles near the head.
- Paired, thread-like gills present along most of the body.

Additional information

Cirratulus cirratus is usually found in aggregations of up to 200 individuals. During the breeding season their colour changes, the females become bright yellow and the males white.

Listed by

Further information sources

Search on:

NBN WoRMS

Biology review

Taxonomy

Phylum	Annelida	Segmented worms e.g. ragworms, tubeworms, fanworms and spoon worms
Class	Polychaeta	Bristleworms, e.g. ragworms, scaleworms, paddleworms, fanworms, tubeworms and spoon worms
Order	Terebellida	
Family	Cirratulidae	
Genus	Cirratulus	
Authority	(O. F. Müller, 1776)	
Recent Synonyms	-	

Biology

Typical abundance	Moderate density
Male size range	5 - 130mm
Male size at maturity	20mm
Female size range	Medium(11-20 cm)
Female size at maturity	
Growth form	Cylindrical
Growth rate	See additional information.
Body flexibility	High (greater than 45 degrees)
Mobility	
Characteristic feeding method	Non-feeding, Surface deposit feeder, Surface deposit feeder
Diet/food source	
Typically feeds on	Diatoms and algal detritus.
Sociability	
Environmental position	Infaunal
Dependency	No information found.
Supports	No information
Is the species harmful?	No

Biology information

Little information on the general biology or life history characteristics of this species was found. *Cirratulus cirratus* is regarded as a generally tolerant species and can be found in moderate densities in areas of high environmental disturbance (e.g. 120 per m^2 500 m away from an oil platform) (Levell *et al*., 1989). Once larvae and juveniles settle, they remain in their burrow and adults do not move. It can grow up to 2 cm between reproductive episodes, which occur every 1-2 years (Olive, 1970).

Habitat preferences

Physiographic preferences	Open coast, Offshore seabed, Strait / sound

Biological zone preferences	Lower circalittoral, Lower eulittoral, Lower infralittoral, Mid eulittoral, Sublittoral fringe, Upper circalittoral, Upper eulittoral
Substratum / habitat preferences	Mud, Muddy gravel, Under boulders
Tidal strength preferences	Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Extremely sheltered, Sheltered, Very sheltered
Salinity preferences	Full (30-40 psu), Reduced (18-30 psu), Variable (18-40 psu)
Depth range	Mainly intertidal but may be circalittoral.
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

In Northumberland it is the dominant crevice organism on rocky shores between low and high water neaps (Olive, 1970). *Cirratulus cirratus* has been described as an opportunistic deposit feeder that is characteristic of areas of organic enrichment (Penry & Jumars, 1990). *Cirratulus cirratus* is mostly intertidal but is sometimes found subtidally (up to 50 m depth off the Devon coast) (Garwood, 1982; Olive, 1970).

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	Biannual episodic
Fecundity (number of eggs)	No information
Generation time	1-2 years
Age at maturity	1-2 years
Season	See additional text
Life span	5-10 years

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Lecithotrophic
Duration of larval stage	< 1 day
Larval dispersal potential	No information
Larval settlement period	Insufficient information

Life history information

Reproduction in *Cirratulus cirratus* is asynchronous i.e. it is not entrained to any of the seasons and members of the population are at different stages of reproductive development at any one time (Garwood, 1982; Gibbs, 1971). Oocytes are 150 µm in diameter and once fertilized are deposited in a jelly mass on the surface of rocks (Petersen, 1999). The eggs hatch as a ciliated post-trochophore after 6 days. The larvae are entirely benthic for the duration of their development, living off yolk for around 24 days after hatching and then commence adult style deposit feeding (Olive, 1970). Females can spawn 2-3 times in their lifetime and it takes 1-2 years after each spawning to mature a new clutch of oocytes (Olive, 1970). There are separate sexes, the males are white, females are lemon-yellow due to the colour of coelomic oocytes (Gibbs, 1971). Sex ratios vary and have been recorded as 1:1 (Olive, 1970) 1:1.7 and 1:2.8 (Gibbs, 1971).

Asexual reproduction by epitoky (clones growing from the posterior end of the worm) may occur in *Cirratulus cirratus*. However, the taxonomic status of *Cirratulus* is in constant review and epitokes may be formed by another species that has been erroneously identified as *Cirratulus cirratus* (Petersen, 1999).

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	Very low

Cirratulus cirratus needs stones to live under in a muddy environment and if these were to be removed, mortality is likely to be very high due to desiccation and predation and an intolerance of high has been recorded. For recoverability see additional information.

	Intolerance	Recoverability	Sensitivity	Confidence
Smothering	High	Low	High	Very low

Cirratulus cirratus lives in mud under stones with its feeding tentacles spread out on the mud surface. A sudden influx of sediment would probably interfere with feeding and gas exchange and cause high mortality. Therefore, an intolerance of high has been recorded. For recoverability see additional information.

	Intolerance	Recoverability	Sensitivity	Confidence
Increase in suspended sediment	Tolerant*	Not relevant	Not sensitive*	Very low

Cirratulus cirratus is often found in estuaries (Clay, 1967g), which are areas of high suspended sediment and it is likely that it is tolerant to an increase in suspended sediment. *Cirratulus cirratus* feeds on precipitating particles and is likely to benefit from an increase in suspended organic matter. Therefore tolerant* has been recorded.

	Intolerance	Recoverability	Sensitivity	Confidence
Decrease in suspended sediment	Low	Very high	Very Low	

A decrease in suspended sediment is unlikely to make *Cirratulus cirratus* more vulnerable to predation. *Cirratulus cirratus* relies on particulate organic matter precipitating onto the substratum for food, so that a decrease in suspended particulates may reduce its food supply. However, the reduced turbidity may increase benthic primary productivity, which would be of benefit to *Cirratulus cirratus*. Overall, its food supply may be reduced and an intolerance of low has been recorded.

	Intolerance	Recoverability	Sensitivity	Confidence
Dessication	Not relevant	Not relevant	Not relevant	Not relevant

Cirratulus cirratus lives in mud under stones and is therefore unlikely to be subject to desiccation. Not relevant has been recorded.

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

Cirratulus cirratus is found from the subtidal up to the high water of neap tide level and an increase in emergence time is likely to exclude worms from the upper limit of their range. There would probably be some mortality near high water neap tide level and a shift of the population down to the new high water neaps level. Therefore, an intolerance of intermediate has been recorded.

	Intolerance	Recoverability	Sensitivity	Confidence
Decrease in emergence regime	Tolerant*	Not relevant	Not sensitive*	

A decrease in emergence is likely to have the opposite effect of an increase and extend the range of the population up the shore to the new high water neaps level. Therefore, tolerant* has been recorded.

Increase in water flow rate	Intermediate	High	Low	Very low

Cirratulus cirratus feeds by laying its tentacles out on the surface of the mud and passing food particles to the mouth by ciliary movements. An increase in water flow rate may affect the ability of *Cirratulus cirratus* to collect food particles. Also, an increase in water flow rate may change sediment characteristics and remove the preferred sediment type of *Cirratulus cirratus*. In increase in water flow, e.g. from weak to strong (see benchmark) is likely to significantly affect the substratum, removing fine muddy deposits, and reducing the area of suitable habitat for *Cirratulus cirratus*. Therefore, an intolerance of intermediate has been recorded.

Decrease in water flow rate	Not relevant	Not relevant	Not relevant	

Cirratulus cirratus is found in estuaries and on muddy shores, where the water flow rate is slow so a decrease in water flow rate is unlikely to affect this species and this factor has been assessed as not relevant.

Increase in temperature	Tolerant	Not relevant	Not sensitive	Moderate

Cirratulus cirratus probably has wide temperature tolerances (7-25°C (Gibbs, 1971). *Cirratulus cirratus* is probably tolerant of temperature changes at the benchmark level.

Decrease in temperature	Low	High	Low	High

Cirratulus cirratus probably has wide temperature tolerances (7-25°C (Gibbs, 1971). During the extremely cold winter in the United Kingdom in 1962-63, the distribution of *Cirratulus cirratus* did not change (George, 1968). *Cirratulus cirratus* survived temperatures as low as -2°C for long periods but was killed after a few hours in -4°C due to ice crystals forming in its tissues (George, 1968). At the benchmark level, *Cirratulus cirratus* will probably not be adversely affected by a decrease in temperature and an in tolerance of low has been recorded.

Increase in turbidity	Tolerant	Not relevant	Not sensitive	Very low

Reduced illumination due to turbidity may reduce the productivity of the microalgae that *Cirratulus cirratus* feeds upon. However, it also feeds on particulate organic matter and, therefore, is not likely to be adversely affected.

Decrease in turbidity	Tolerant	Not relevant	Not sensitive	Not relevant

A decrease in turbidity is likely to increase benthic microalgal productivity, which could potentially benefit *Cirratulus cirratus*. However, the relative contribution of benthic microalgae and organic matter to its diet is unknown. Therefore, tolerant has been recorded.

Increase in wave exposure	Intermediate	High	Low	Low

Increasing wave exposure increases the incidence of turnover of rocks on the shore and will also increase the size of rocks disturbed (Osman, 1977). If the rocks on the shore are turned over, anything underneath is likely to be washed out of the sediment by subsequent waves and suffer increased predation. *Cirratulus cirratus* is not a very motile species and if it were revealed by loss of a protecting rock, mortality is likely to be high and an intolerance of intermediate has been recorded to account for this.

Decrease in wave exposure	Not relevant	Not relevant	Not relevant	

Cirratulus cirratus is found from sheltered to extremely sheltered shores and therefore a decrease in wave exposure is not relevant.

Noise	Tolerant	Not relevant	Not sensitive	High

At most, *Cirratulus cirratus* will have only a limited ability to detect sound or vibration and therefore is unlikely to be sensitive to noise.

Visual Presence Tolerant | Not relevant | Not sensitive | High

Cirratulus cirratus does have eyes but it lives under rocks with only the deposit feeding tentacles exposed and so is probably tolerant to visual presence at the benchmark level.

Abrasion & physical disturbance Intermediate | High | Low | Very low

At the benchmark level, abrasion is likely to cause some mortality by moving stones and unearthing the worms. Disturbing rocks may also affect the survivorship of embryos in eggs attached to the rock surface. Therefore an intolerance of intermediate has been recorded.

Displacement Not relevant

Cirratulus cirratus establishes under rocks in mud as a larva and there was no information on whether adults reburrow if disturbed. There is insufficient information to assess the intolerance of *Cirratulus cirratus* to displacement.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination	High	Low	High	High

After a spill of fuel oil in Southampton Water, dispersants were used to clean certain areas and high mortalities of *Cirratulus cirratus* were observed (George, 1971). Three dispersants were tested for their effects on *Cirratulus cirratus* survivorship, BP 1002, Essolvene (which was used in Southampton Water) and Corexit 7664. BP 1002 and Essolvene become toxic at 100 ppm. BP 1002 caused 50% mortality at 129 ppm and 100% mortality at 144 ppm. Essolvene was slightly less toxic, causing 50% mortality at 162 ppm and 100% mortality at 200 ppm. Corexit was far less toxic than either BP 1002 or Essolvene. It took a concentration of 100,000 ppm of Corexit 7664 to cause 50% to *Cirratulus cirratus*. Longer exposure to sublethal concentrations of BP 1002 or Essolvene completely prevented the maturation of oocytes (George, 1971). The evidence presented above suggests an intolerance of high to synthetic chemicals. For recoverability, see additional information below.

Heavy metal contamination Not relevant

Insufficient information.

Hydrocarbon contamination Low | High | Low | High

A spill of fuel oil in Southampton water lead to widespread oiling of intertidal mud but this had very little effect on *Cirratulus cirratus* abundance. The thickness of the oil was not sufficient to prevent oxygen reaching the sediment and at high tide, the oil refloated so that *Cirratulus cirratus* could feed as normal. Embryo development was also unaffected by oil (George, 1971) and an intolerance of low has been recorded.

Radionuclide contamination Not relevant

Insufficient information.

Changes in nutrient levels Tolerant* | Not relevant | Not sensitive* | Moderate

Cirratulus cirratus is characteristic of areas of organic enrichment (Penry & Jumars, 1990) and therefore is probably tolerant* of an increase in nutrient levels.

Increase in salinity Not relevant

No information on hypersaline conditions was found.

Decrease in salinity Low | High | Low

Cirratulus cirratus can tolerate salinities down to 17 psu (Gibbs, 1971) and so is likely to survive the benchmark chronic change as it is normally found intertidally at full salinity. An acute change will probably stress a population of *Cirratulus cirratus* but not cause high mortality and an intolerance of low has been recorded.

Changes in oxygenation	Low	High	Low	Very low

Cirratulus cirratus is characteristic of areas of organic enrichment (Penry & Jumars, 1990), although no further information was found. Therefore, an intolerance of low has been recorded, albeit with very low confidence.

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

Cirratulus cirratus is not targeted for extraction.

Extraction of other species	Not relevant	Not relevant	Not relevant	Not relevant

No co-occurring species to *Cirratulus cirratus* are known to be extracted.

Additional information

Recoverability

The fecundity of *Cirratulus cirratus* is unknown but the larvae are entirely benthic throughout their development (Olive, 1970) and, if an area is completely defaunated, recolonization by *Cirratulus cirratus* may be slow (George, 1968). Recovery by populations that suffer partial mortality could take up to 2 years. However, populations that are completely wiped out may not recover at all due to the limited dispersal capability of the larvae of *Cirratulus cirratus* (George, 1968).

Importance review

Policy/legislation

- no data -

Status

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

Non-native

Native	-		
Origin	-	**Date Arrived**	-

Importance information

-none-

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