A sea squirt (*Ascidiella scabra*)

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

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2006-04-24

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/1823]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

This review can be cited as:
Hiscock, K. 2006. *Ascidiella scabra* A sea squirt. In Tyler-Walters H. and Hiscock K. (eds) *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. DOI https://dx.doi.org/10.17031/marlinsp.1823.2

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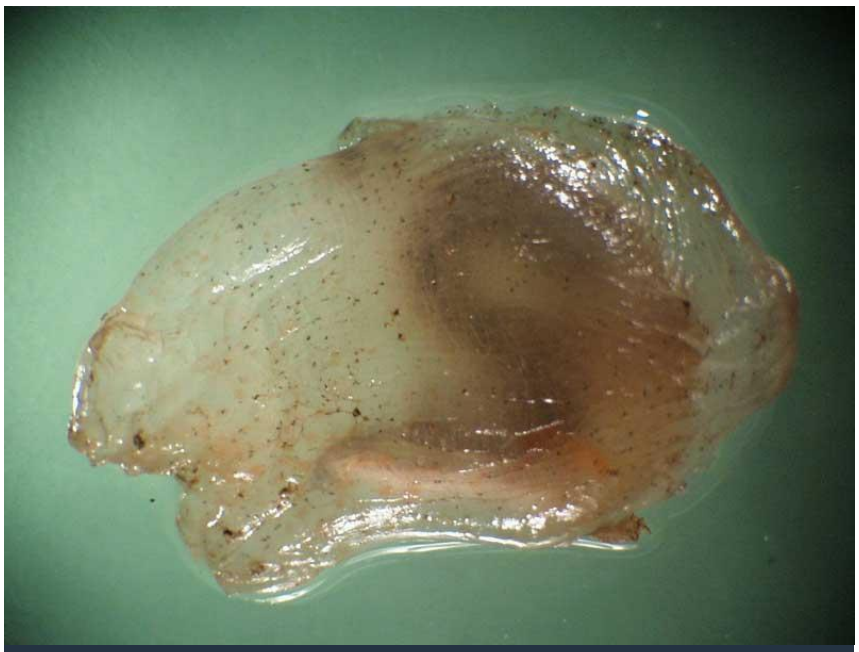

Ascidiella scabra.
Photographer: Hilmar Hinz
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See online review for distribution map

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

Researched by	Dr Keith Hiscock	**Refereed by**	This information is not refereed.
Authority	(Müller, 1776)		
Other common names	-	**Synonyms**	-

Summary

Description

Ascidiella scabra is a small solitary ascidian (usually <4cm long) with an ovate body and anterior siphons separated by a distance about one quarter the body length. The test is semi-transparent and usually tinged red.

Recorded distribution in Britain and Ireland

Present all around Britain and Ireland.

Global distribution

Present from the Faeroe Islands and Trondheimfjord in the north, occurring in the Kattegat and extending into the Mediterranean.

Habitat

Present attached to natural and artificial hard substrata. Also present attached to algae such as *Fucus serratus* and on kelp stipes. Lindsay and Thompson (1930) suggested a depth range of 5-300 m although records from fucoid algae indicate intertidal occurrence.

Depth range

+2-300 m

Identifying features

- Solitary but may occur in tightly packed groups.
- Body ovate or elliptical up to 4 cm long.
- Siphons anterior and separated from each other by about one quarter the body length.
- Test semi-transparent and usually tinged red.
- The internal structure includes 30-110 tentacles, the number always exceeding the number of inner longitudinal vessels of the branchial sac.

Additional information

Specimens as large as 7.5 cm have been sampled from the Dogger Bank. Almost colourless examples can be found.

Listed by

Further information sources

Search on:

Google Google NBN WoRMS

Biology review

Taxonomy

Phylum	Chordata	Sea squirts, fish, reptiles, birds and mammals
Class	Ascidiacea	Sea squirts
Order	Phlebobranchia	
Family	Ascidiidae	
Genus	Ascidiella	
Authority	(Müller, 1776)	
Recent Synonyms	-	

Biology

Typical abundance	Moderate density
Male size range	< 4cm
Male size at maturity	
Female size range	Small-medium(3-10cm)
Female size at maturity	
Growth form	Bullate / Saccate
Growth rate	
Body flexibility	
Mobility	
Characteristic feeding method	Active suspension feeder, Non-feeding
Diet/food source	
Typically feeds on	Suspended particles including phytoplankton
Sociability	
Environmental position	Epibenthic
Dependency	Independent.
Supports	None
Is the species harmful?	No

Biology information

Ascidiella scabra is usually about 2-3 cm in length although specimens from the Dogger Bank have been recorded at 7.5 cm in length (Lindsay & Thompson, 1930)

Habitat preferences

Physiographic preferences	Open coast, Offshore seabed, Strait / sound, Sea loch / Sea lough, Ria / Voe, Estuary, Enclosed coast / Embayment
Biological zone preferences	Lower circalittoral, Lower infralittoral, Sublittoral fringe, Upper circalittoral, Upper infralittoral

Substratum / habitat preferences	Macroalgae, Artificial (man-made), Bedrock, Biogenic reef, Cobbles, Large to very large boulders, 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	Extremely sheltered, Moderately exposed, Sheltered, Very sheltered
Salinity preferences	Full (30-40 psu), Variable (18-40 psu)
Depth range	+2-300 m
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

-

Life history

Adult characteristics

Reproductive type	
Reproductive frequency	Annual protracted
Fecundity (number of eggs)	
Generation time	<1 year
Age at maturity	Not known. Probably <6months.
Season	March - Insufficient information
Life span	2-5 years

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	
Duration of larval stage	2-10 days
Larval dispersal potential	1 km -10 km
Larval settlement period	

Life history information

Lindsay & Thompson (1930) noted the great fecundity of *Ascidiella scabra* and that eggs were produced (in the laboratory) from March onwards. Berrill (1950) notes that the species is oviparous, that the eggs are small (0.16 mm diameter) and sink in still water. Tadpole larvae emerge from eggs.

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	Very high	Low	High

The species is permanently attached to the substratum so substratum loss will result in loss of the population. Therefore an intolerance of high has been reported. For recoverability, see additional information below.

Smothering	Low	Immediate	Not sensitive	Moderate

The species is permanently attached to the substratum and is an active suspension feeder so that some clearance of smothering silt may occur. The species can extend its siphons to a small extent above silt. It can also most likely maintain a passage through the silt to the siphons.*Ascidiella scabra* also attaches to other erect biota and, in such situations, may escape smothering effects. Intolerance is likely to be low. Recovery of condition is likely to be very high.

Increase in suspended sediment	Low	Immediate	Not sensitive	Moderate

Ascidiella scabra frequently occurs in habitats with high levels of suspended matter. Robbins (1985b) undertook experiments to establish the possible effects of high inorganic particulate concentrations on *Ascidiella scabra*. He concluded that growth rate was likely to be reduced and mortality was possible in high levels of suspended sediment. Therefore an intolerance of low has been recorded. On resumption of normal conditions, energy expenditure and feeding should be restored rapidly.

Decrease in suspended sediment	Tolerant	Not relevant	Not sensitive	Moderate

Although there may be some reliance on the organic material associated with suspended silt for nutrition, the reduced need for energy expenditure to remove silt may be beneficial. On balance, the species is most likely tolerant.

Dessication	Intermediate	Very high	Low	Moderate

The species occurs in the intertidal near to low water level and so is exposed to some desiccation. Nevertheless, it has a soft body and may be easily subject to drying-up. Exposure to desiccating influences for one hour will probably kill a proportion of the population. Therefore, an intolerance of intermediate has been recorded. For recoverability, see additional information below.

Increase in emergence regime	Intermediate	Very high	Low	Moderate

The species occurs in the intertidal near to low water level and so is exposed to some emergence. Nevertheless, it has a soft body and may be easily subject to drying-up. Exposure to desiccating influences as a result of increased emergence will probably kill a proportion of the population. Therefore, an intolerance of intermediate has been recorded. For recoverability, see additional information below.

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

As a predominantly sublittoral species, increase in emergence may benefit populations found on the lower shore by providing additional substratum for colonization.

Increase in water flow rate Low Immediate Not sensitive High

As a general rule, ascidians require a reasonable water flow rate in order to ensure sufficient food availability. High water flow rates may also be detrimental to feeding ability and posture. Hiscock (1983) found that, for the solitary ascidian *Ascidia mentula*, siphons closed when the current velocity rose above about 15 cm/sec. It seems likely therefore that some reduction in feeding would occur with increased water flow rate although that would result in slower growth and loss of condition but not mortality. Intolerance has therefore been assessed as low. On resumption of normal energy expenditure and feeding, condition should be restored rapidly.

Decrease in water flow rate Low Immediate Not sensitive Moderate

As a general rule, ascidians require a reasonable water flow rate in order to ensure sufficient food availability and oxygen supply. However, ascidians are active suspension feeders and can thrive in conditions of very little flow. Whilst food availability may be reduced in comparison with areas with higher flow rates, on resumption of normal energy expenditure and feeding, condition should be restored rapidly.

Increase in temperature Tolerant Not relevant Not sensitive High

In the North Atlantic and Mediterranean where *Ascidiella scabra* occurs, temperatures may be higher by several degrees than in Britain and Ireland. It is not therefore expected that increased temperatures at the level of the benchmark will adversely affect populations.

Decrease in temperature Tolerant Not relevant Not sensitive High

Ascidiella scabra occurs north to Trondheim in Norway and the Faroe Islands, where temperatures may be lower by several degrees than in Britain and Ireland. Crisp (1964) indicates that no certain mortality was observed in ascidians following the severe 1962-63 winter. It is not expected therefore that decreased temperatures at the level of the benchmark will adversely affect populations.

Increase in turbidity Tolerant Not relevant Not sensitive Moderate

Ascidiella scabra lives in estuaries and other enclosed areas where turbidity may increase to high levels. It is not expected that increase in turbidity at the level of the benchmark will adversely affect *Ascidiella scabra*.

Decrease in turbidity Tolerant* Not relevant Not sensitive* Moderate

Although there may be some reliance on the organic material associated with turbidity for nutrition, the reduced need for energy expenditure to clear any silt that may be causing turbidity may be beneficial and an intolerance of tolerant* has been recorded.

Increase in wave exposure Intermediate Very high Low Low

As a general rule, ascidians require a reasonable water flow rate in order to ensure sufficient food availability and oxygen supply. However, high water flow rates may be detrimental to feeding ability and posture. Hiscock (1983) found that, for the solitary ascidian *Ascidia mentula*, siphons closed when current velocity rose above about 15 cm/sec. It seems likely therefore that some reduction in feeding would occur with increased oscillatory water movement although that would result in slower growth and loss of condition but not mortality. On resumption of normal energy expenditure and feeding, condition should be restored rapidly.

Although individuals are firmly attached, there is a possibility that wave action may displace large numbers. Intermediate intolerance but with low confidence is recorded. Recovery is likely to be very high (see additional information below).

Decrease in wave exposure Tolerant* Not relevant Not sensitive* High

As a general rule, ascidians require a reasonable water flow rate in order to ensure sufficient food availability and oxygen supply and maintain surfaces clean of silt. If decrease in wave action occurs where tidal flow continues to provide favourable conditions, the species may benefit because of reduction in the likelihood of displacement. Whilst food availability may be reduced by reduction in wave action, on resumption of normal energy expenditure and feeding, condition should be restored rapidly. Overall, bearing in mind that the favoured location for *Ascidiella scabra* is in wave sheltered habitats, the species might benefit from decrease in wave exposure.

Noise Tolerant Not relevant Not sensitive High

Tunicates are not known to have organs sensitive to noise.

Visual Presence Tolerant Not relevant Not sensitive High

Tunicates are not known to respond to visual presence.

Abrasion & physical disturbance High Very high Low High

Epifaunal species have been found to be particularly adversely affected by trawling or dredging activities, either due to direct damage or modification of the substratum (Jennings & Kaiser, 1998). However, some epifaunal species have been reported to exhibit increased abundances on high fishing effort areas, probably due to their ability to colonize and grow rapidly (Bradshaw *et al.*, 2000). In a study of the long term effects of scallop dredging, Bradshaw *et al.* (2002) reported that *Ascidiella* species had become more abundant and suggested that they were probably able to survive by regeneration of damage and budding. Individuals are easily ripped from the substratum and are unlikely to re-attach and will die. Intolerance is therefore high. For recoverability, see additional information.

Displacement High Very high Low High

The colonies are attached permanently to the substratum and will not re-attach so that displacement, even if to a suitable habitat, would most likely result in mortality. An assessment of high intolerance is therefore made. For recoverability, see additional information below.

Chemical Pressures

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

Ascidians may be intolerant of synthetic chemicals such as tri-butyl-tin anti-foulants. Rees *et al.* (2001), working in the Crouch estuary, observed that six ascidian species were recorded at one station in 1997 compared with only two at the same station in 1987, shortly following the banning of TBT in antifouling paints. Also, there was a marked increase in the abundance of ascidians especially *Ascidiella aspersa* and *Ascidia conchilega* in the estuary. No evidence has been found for sublethal effects from which recovery would be likely to be rapid. Overall, an intolerance of intermediate is suggested but with a low confidence.

Heavy metal contamination Not relevant Not relevant

No information has been found.

Hydrocarbon contamination		Not relevant		Not relevant

No information has been found.

Radionuclide contamination		Not relevant		Not relevant

No information has been found.

Changes in nutrient levels		Not relevant		Not relevant

No information has been found.

Increase in salinity	Tolerant	Not relevant	Not sensitive	Moderate

Ascidiella scabra occurs in full salinity although it may be abundant in variable salinity or reduced salinity (for instance in the biotope ECR.HbowEud (*Halichondria (Halichondria) bowerbanki*, *Eudendrium arbusculum* and *Eucratea loricata* on reduced salinity tide-swept circalittoral mixed substrata). Therefore, it is not expected that increase in salinity will have an adverse effect except in the possibility of allowing other species to out-complete *Ascidiella scabra*.

Decrease in salinity	Intermediate	Very high	Low	Moderate

A fall in salinity from full to reduced would not be expected to have an adverse effect as *Ascidiella scabra* occurs in reduced salinity conditions. However, in situations where salinity is already variable or reduced, a further lowering is likely to result in mortality. Intolerance is indicated as intermediate but may be high. For recoverability, see additional information.

Changes in oxygenation	Low	Immediate	Not sensitive	Very low

Ascidians are active suspension feeders that pump water. It seems likely that the effects of lowered oxygenation will be reduced as stagnation can be avoided. An intolerance of low is therefore suggested but with very low confidence. Recovery is likely to be immediate.

Biological Pressures

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

No information has been found.

Introduction of non-native species	Tolerant	Not relevant	Not sensitive	Moderate

There are no non-native species currently known to displace or adversely affect *Ascidiella scabra* although the ascidian *Perophora japonica* may occur in similar habitats.

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

There is no known extraction of this species.

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

There are no species with which *Ascidiella scabra* is associated that may be extracted.

Additional information

Ascidiella scabra has a high fecundity and settles readily, probably for an extended period from spring to autumn. Svane (1988) describes it as "an annual ascidian" and demonstrated recruitment onto artificial and scraped natural substrata. Eggs and larvae are free-living for only a few hours and so recolonization would have to be from existing individuals no more than a few km away. It is

also likely that *Ascidiella scabra* larvae are attracted by existing populations and settle near to adults (Svane *et al.*, 1987) . Fast growth means that a dense cover could be established within about 2 months. However, if mortality and the consequent establishment of free space available occurs at a time when larvae are not being produced, other species may settle and dominate. Therefore a recoverability of 'very high' is for when larvae are available to settle. If another species colonizes and dominates the substratum, recolonization by *Ascidiella scabra* may take several years.

Importance review

Policy/legislation

- no data -

Status

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

Non-native

Native	-		
Origin	-	**Date Arrived**	-

Importance information

Ascidiella scabra is a fast colonizing species and may be a fouling organism.

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