A bristleworm (*Spio filicornis*)

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/1698]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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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	Olwen Ager	**Refereed by**	This information is not refereed.
Authority	(Müller, 1776)		
Other common names	-	**Synonyms**	-

Summary

Description

Spio filicornis is a small bristleworm up to 3 cm long. Its body is divided into between 80 and 90 segments. *Spio filicornis* has a short, stout, pointed prostomium with short palps. It is pink in colour, with a brown gut and cream flecks laterally.

Recorded distribution in Britain and Ireland

Spio filicornis is found on most British coasts.

Global distribution

Spio filicornis is found in the Arctic, Baltic, north-east Atlantic, Mediterranean and north Pacific.

Habitat

Spio filicornis is found in clean sand, from the low water mark into the shallow sublittoral. It inhabits

a tube made of sediment grains and detritus stuck together with mucus.

Depth range

Intertidal to shallow sublittoral

Identifying features

- Up to 3 cm long, 0.2 cm across.
- 80-90 chaetae bearing segments.
- Short, stout pointed prostomium.
- Short palps.
- Pink in colour.

Additional information

-none-

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	Spionida	
Family	Spionidae	
Genus	Spio	
Authority	(Müller, 1776)	
Recent Synonyms	-	

Biology

Typical abundance	
Male size range	2-3cm
Male size at maturity	
Female size range	Small-medium(3-10cm)
Female size at maturity	
Growth form	Vermiform segmented
Growth rate	
Body flexibility	High (greater than 45 degrees)
Mobility	
Characteristic feeding method	Surface deposit feeder
Diet/food source	
Typically feeds on	Detritus
Sociability	
Environmental position	Infaunal
Dependency	Independent.
Supports	No information found
Is the species harmful?	

Biology information

-none-

Habitat preferences

Physiographic preferences	Open coast, Strait / sound, Enclosed coast / Embayment
Biological zone preferences	Lower eulittoral, Lower infralittoral, Sublittoral fringe, Upper infralittoral
Substratum / habitat preferences	Coarse clean sand, Fine clean sand, Mud, Muddy sand
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	Intertidal to shallow sublittoral
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

-

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	Annual protracted
Fecundity (number of eggs)	100-1,000
Generation time	<1 year
Age at maturity	2-3 months
Season	January - September
Life span	<1 year

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Planktotrophic
Duration of larval stage	2-10 days
Larval dispersal potential	Greater than 10 km
Larval settlement period	Insufficient information

Life history information

Reproduction

Srikrishnadhas & Ramamoorthi (1981) investigated the life history of *Spio filicornis* in the laboratory. Their findings are summarised below:

- The spindle shaped egg mass was laid inside the worm's tube, stuck to the side of the tube with mucus produced by the female.
- Within 12 hours, the eggs metamorphosed into trochophores (larvae) which were retained inside the egg mass.
- After 36 hours three segments were faintly marked.
- After thee days the larvae broke free of the egg mass and became pelagic.
- Once the juvenile worm had 18-22 chaetigers (segments) it settled, metamorphosed, and burrowed into the sand where it built a tube of sand and detritus bound together with mucus.
- Worms were sexually mature 2 months after metamorphosis.

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	High	Moderate	Low

Spio filicornis lives in the sediment and a loss of substratum would cause a loss of population. Therefore, an intolerance of high has been recorded. Recoverability has been recorded as high (see additional information below).

Smothering	Low	Very high	Very Low	Low

Spio filicornis lives in the sediment and uses sediment grains to make its tube. It is likely that *Spio filicornis* will be able to move up through any extra sediment, therefore intolerance, has been recorded as low. Recoverability will probably be very high (see additional information below). However, smothering by impermeable material is likely to result in anoxic conditions and have a greater impact.

Increase in suspended sediment	Tolerant*	Not relevant	Not sensitive*	Low

Spio filicornis lives in the sediment and is unlikely to be perturbed by an increase in suspended sediment. There may be an increase in the amount of food avaliable therefore, tolerant* has been recorded.

Decrease in suspended sediment	Low	Immediate	Not sensitive	Low

Spio filicornis is a surface deposit feeder and relies on a supply of nutrients at the sediment surface. A decrease in suspended sediment is likely to lead to a reduction in the amount of available food. A reduction in food availability may impair growth and reproduction but is unlikely to cause mortality. Intolerance has, therefore, been recorded as low. The benchmark states the decrease in siltation would only happen for a month, once the level of suspended sediment increases normal feeding could resume, recoverability has therefore been recorded as immediate.

Dessication	Intermediate	Very high	Low	Low

Spio filicornis lives infaunally so is protected from desiccation stress. Some individuals live in the intertidal so may be tolerant to some emersion of the substratum. Individuals living in coarser sands are more likely to be affected due to increased porosity of the sand and increased exposure to desiccation. Intolerance has, therefore, been recorded as intermediate. Recoverability has been recorded as very high (see additional information below).

Increase in emergence regime	Intermediate	Very high	Low	Low

Spio filicornis is found in the intertidal so may be tolerant to some emersion of the substratum. *Spio filicornis* lives infaunally so may be able to retract into its tube to reduce desiccation stress. Individuals in coarser sands are more likely to be affected. Intolerance has, therefore been recorded as intermediate. A recoverability of very high has been recorded (see additional information below).

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

Spio filicornis thrives in the sublittoral zone and therefore could potentially benefit from a decrease in emergence. It is possible that decreased emergence would allow the species to colonize further up the shore. Hence tolerant* has been recorded.

Increase in water flow rate Intermediate Very high Low Low

A change in water flow rate will change sediment characteristics. Increased water flow will increase deposits of coarser sediments. Changes in water flow are likely to change the distribution and extent of the population due to changes in the preferred substratum of *Spio filicornis*. Therefore, intolerance has been recorded as intermediate. A recoverability of very high has been recorded (see additional information below).

Decrease in water flow rate Intermediate Very high Low Low

A change in water flow rate will change sediment characteristics. A decrease in water flow rate will lead to deposits of finer sediments. The distribution and extent of the population is likely to alter due to changes in the preferred substratum of *Spio filicornis*. Therefore, an intolerance of intermediate has been recorded. A recoverability of ver high has been recorded (see additional information below).

Increase in temperature Low Very high Very Low Low

No information was found regarding the intolerance of *Spio filicornis* to temperature. However, inferences can be made from its geographical distribution. *Spio filicornis* is found in the Mediterranean (Hayward & Ryland, 1995) and therfore surviving higher seawater temperatures than in Britain and Ireland. Chronic temperature change is likely to have little, or no effect. An acute change in temperature may cause physiological stress but is unlikely to lead to mortality. Intolerance has, therefore, been recorded as low. A recoverability of very high has been recorded (see additional information below).

Decrease in temperature Low Very high Very Low Low

No information was found regarding the intolerance of *Spio filicornis* to temperature. However, inferences can be made from its geographical distribution. *Spio filicornis* is found in the Arctic and Baltic (Hayward & Ryland, 1995) and therefore surviving colder temperatures than occur in Britain and Ireland. these water. Chronic temperature change is likely to have little, or no effect. An acute change in temperature may result in physiological stress but is unlikely to lead to mortality. Intolerance has, therefore, been recorded as low. A recoverability of very high has been recorded (see additional information below).

Increase in turbidity Tolerant Not relevant Not sensitive Low

Spio filicornis is found in estuarine regions which experience high levels of turbidity. An increase in turbidity will lead to reduced light penetration of the water column. *Spio filicornis* is not affected by light availability, therefore, tolerant has been recorded.

Decrease in turbidity Tolerant Not relevant Not sensitive Low

Spio filicornis is not affected by light availability, therefore, tolerant has been recorded.

Increase in wave exposure Intermediate High Low Moderate

Tamaki (1987) reported that adult *Spio filicornis* could burrow 5-10 cm into the sediment and so are unlikely to be affected by an increase in wave exposure. Juvenile *Spio filicornis* could only burrow into the top 2 cm of the sediment and so may be affected by wave action. A change from sheltered to moderately exposed is likely to remove all but coarse sand, reducing the amount of preferred substratum for *Spio filicornis*. Intolerance has therefore been

recorded as high. A recoverability of very high has been recorded (see additional information below).

Decrease in wave exposure Tolerant Not relevant Not sensitive Low

Spio filicornis occurs from sheltered to ultra sheltered habitats and a decrease in wave exposure is unlikely to have adverse effects. Therefore, tolerant has been recorded.

Noise Tolerant Not relevant Not sensitive High

No information was found concerning intolerance of *Spio filicornis* to noise. However, it is unlikely to be affected by noise and vibrations at the level of the benchmark.

Visual Presence Tolerant Not relevant Not sensitive High

Spio filicornis inhabits a tube and its visual range is probably very limited. Not sensitive has, therefore, been recorded.

Abrasion & physical disturbance Intermediate Very high Low Low

Spio filicornis is a soft bodied organism that exposes its palps at the surface while feeding. It lives infaunally in sandy sediment and any physical disturbance that penetrates the sediment, for example dredging or dragging an anchor, would lead to physical damage of *Spio filicornis*. However, adult worms can burrow up to 10 cm down and may escape the disturbance. Juveniles can only burrow up to 2 cm into the sediment and are likely to be affected. However, individuals are likely to pass through a passing scallop dredge due to their small size. Bergman & Hup (1992) reported that the total density of spionids actually increased with increased fishing disturbance., presumably due to their ability to colonize newly exposed substratum. Hall *et al.* (1990) investigated the impact of hydraulic dredging for razor clams. They reported that any effects only persist for a short time, with the community restored after approximately 40 days in stormy conditions. The population density of *Spio filicornis* was slightly reduced in the dredged site relative to the control site but its abundance had increased over that of the control site ater 40 days. However, the control site showed a similar level of variation in abundance. An intolerance of intermediate has therefore been recorded. Recoverability has been recorded as very high (see additional information below).

Displacement Low Very high Very Low Low

If *Spio filicornis* is displaced from the substratum it is likely that it could burrow back into the sediment and rebuild it tube. It would, however, be more susceptible to predation whilst exposed and there would be significant energy expenditure rebuilding the tube. Therefore, intolerance has been recorded as low. A recoverability of very high has been recorded (see additional information below).

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination	High	High	Moderate	Low

No information was found directly relating to the effects of synthetic chemicals on *Spio filicornis*. However, there is evidence from other polychaete species. Collier & Pinn (1998) investigated the effect on the benthos of Ivermectin, treatment for infestations of sea-lice on farmed salmonids. The ragworm *Hediste diversicolor* exhibited 100% mortality after 14 days when exposed to 8mg/m^2 of invermectin in a microcosm. The blow lug, *Arenicola marina*, was also intolerant of invermectin through ingestion of contaminated sediment (Thain *et al.*, 1998; cited in Collier & Pinn 1998) and it was suggested that deposit feeding was an important route for exposure to toxins. Beaumont *et al.* (1989) investigated the effects of tri-butyl tin (TBT) on

benthic organisms. At concentrations of 1-3µg/l there was no significant effect on the abundance of *Hediste diversicolor* or *Cirratulus cirratus* after 9 weeks in a microcosm. However, no juvenile polychaetes were retrieved from the substratum so TBT may have had an effect on the larval and/or juvenile stages of these polychaetes. The high mortality rate of polychaetes due to exposure to invermectin suggests a high intolerance to synthetic chemicals. An intolerance of high has been inferred, but with a very low confidence level. Recoverability has been recorded as high (see additional information below).

Heavy metal contamination Low Very high Very Low Moderate

Diaz-Castaneda *et al*. (1989) looked at colonization of defaunated and polluted sediments in Dunkerque harbour. The sediment was polluted with both heavy metals and oil. *Capitella capitata* was generally the first polychaete to colonize the polluted sediment. *Spio filicornis* took between 7 weeks and 3 months to appear in the sediment suggesting that it is tolerant of heavy metal pollution. Intolerance has therefore been recorded as low. A recoverability of very high has been recorded (see additional information below).

Hydrocarbon contamination Low Very high Very Low Moderate

Diaz-Castaneda *et al*. (1989) looked at colonization of defaunated and polluted sediments in Dunkerque harbour. The sediment was polluted with both heavy metals and oil. *Capitella capitata* was generally the first polychaete to colonize the polluted sediment. *Spio filicornis* took between 7 weeks and 3 months to appear in the sediment suggesting it is tolerant of oil pollution. Intolerance has therefore been recorded as low. A recoverability of very high has been recorded (see additional information below).

Radionuclide contamination Not relevant Not relevant

No evidence was found regarding the intolerance of *Spio filicornis* to radionuclide contamination.

Changes in nutrient levels Low Very high Very Low Moderate

Spio filicornis is often found in environments subject to high levels of nutrients, for example, it was found in areas of the Firth of Forth exposed to high levels of sewage pollution (Read *et al*.1983). *Spio filicornis* is also found in nutrient poor areas (Diaz-Castaneda, *et al*., 1989). Therefore, an intolerance of low has been recorded. A recoverability of very high has been recorded (see additional information below).

Increase in salinity Not relevant Not relevant Not relevant Not relevant

Spio filicornis lives in fully saline conditions, an increase in salinity would be to hypersaline conditions. No information was found concerning the reaction of *Spio filicornis* to hypersaline conditions (>40 psu). It is unlikely that *Spio filicornis* would experience hypersaline conditions, therefore, not relevant has been recorded.

Decrease in salinity Low Very high Very Low Moderate

Spio filicornis is a euryhaline species (Gosner, 1971), inhabiting fully saline and estuarine habitats. However, populations in estuaries would be intolerant of further reductions in salinity. Intolerance has, therefore, been recorded low at the benchmark level.

Changes in oxygenation Intermediate Very high Low Low

No information was found on the tolerance of *Spio filicornis* to changes in oxygenation. Cole *et al*. (1999) suggest adverse effects on marine species at oxygen concentrations below 4 mg/l and probable adverse effects occur below 2 mg/l. *Capitella capitata* survived for 13 days at 0.8-0.9 ml/l and more than 24 days at oxygen levels of 1.5 ml/l. In hypoxic conditions it

stopped burrowing and feeding so mortality is likely indirectly through starvation (Pearson & Rosenberg, 1978). Intolerance has, therefore, been recorded as intermediate. A recoverability of very high has been recorded (see additional information below).

Biological Pressures

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

No information was found on diseases of *Spio filicornis*.

Introduction of non-native species		Not relevant		Not relevant

No information was found on non-native species that may compete with *Spio filicornis*.

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

No information was found that *Spio filicornis* is extracted deliberately therefore not relevant has been recorded.

Extraction of other species	Low	Very high	Very Low	Moderate

Hall *et al.* (1990) investigated the impact of hydraulic dredging for razor clams on an infaunal community. They found that any effects only persist for a short time, with the community restored after approximately 40 days. Bergman & Hup (1992) reported that the total density of spionids actually increased with increased fishing disturbance. Intolerance has therefore been recorded as low. A recoverability of very high has been recorded (see additional information below).

Additional information

Recoverability

Spio filicornis is a highly opportunistic polychaete with a short life span (Diaz-Castaneda *et al.*, 1989). It reproduces throughout the year and reportedly thrives in regularly disturbed environments (Kröncke, 1990; Niermann *et al.*, 1990). It reaches maturity quickly, and has good local recruitment since eggs and larve are retained witin the egg mass. Therefore, recoverability has been recorded as very high. There is no pelagic larval stage, suggesting that where the population is removed, recovery may take longer. However, adults and juveniles may recruit to an area due to bedload transport and recoverability is likely to be high.

Importance review

Policy/legislation

- no data -

Status

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

Non-native

Native	-		
Origin	-	**Date Arrived**	-

Importance information

Structure

Tube building worms, including *Spio filicornis*, modify the sediment making it suitable for later colonization and succession (Gallagher *et al*., 1983).

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