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Tentacled lagoon worm (*Alkmaria romijni*)

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

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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/1200]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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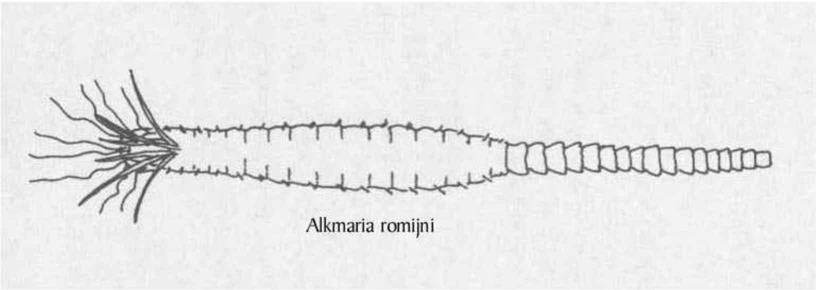

Line drawing of *Alkmaria romijni*.
Photographer:
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See online review for distribution map

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

Researched by	Dr Harvey Tyler-Walters & Nicola White	**Refereed by**	Dr Paul M. Gilliland
Authority	Horst, 1919		
Other common names	-	**Synonyms**	-

Summary

Description

A small worm, up to 5 mm long, with eight tentacles that are thread-like and slimy. It has six gills that are banded by rings of greenish-grey pigment.

Recorded distribution in Britain and Ireland

Recorded on the southern shores of the North Sea as far north as the Humber, along the English Channel and round into Pembrokeshire.

Global distribution

Recorded from Sweden and the western Baltic, the coasts of Denmark and German Bight, south to Portugal and Morocco.

Habitat

Lagoons and sheltered estuarine sites, where it inhabits a mud tube in muddy sediments.

Depth range
Low intertidal to shallow sublittoral

Identifying features

- Very small, less than 5 mm long.
- Three pairs of gills.
- 16 thoracic and 13-19 abdominal chaeta-bearing segments.

Additional information

No text entered

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Further information sources

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Biology review

Taxonomy

Phylum	Annelida	Segmented worms e.g. ragworms, tubeworms, fanworms and spoon worms
Order	Terebellida	
Family	Ampharetidae	
Genus	Alkmaria	
Authority	Horst, 1919	
Recent Synonyms	-	

Biology

Typical abundance	Moderate density
Male size range	3-5 mm
Male size at maturity	
Female size range	3-5 mm
Female size at maturity	
Growth form	Vermiform segmented
Growth rate	Data deficient
Body flexibility	High (greater than 45 degrees)
Mobility	Burrower
Characteristic feeding method	Surface deposit feeder
Diet/food source	Detritivore
Typically feeds on	Detritus
Sociability	Not relevant
Environmental position	Infaunal
Dependency	None.
Supports	Host Asymphylodora demeli
Is the species harmful?	No

Biology information

Adults live within the sediment in durable mud tubes, the top of which protrude above the sediment surface. The tubes are two to three centimetres long and glued together by a rust-coloured paste. A large part of the tube is covered by large faecal pellets (Thorson, 1946). No information is available on adult growth rate, however, larval stages grow at approximately 0.15 mm/week (Cazaux, 1982).

Habitat preferences

Physiographic preferences	Estuary, Isolated saline water (Lagoon), Ria / Voe
Biological zone preferences	Lower eulittoral, Sublittoral fringe

Substratum / habitat preferences	Mud, Muddy gravel, Muddy sand
Tidal strength preferences	Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Extremely sheltered, Sheltered, Ultra sheltered, Very sheltered
Salinity preferences	Low (<18 psu), Variable (18-40 psu)
Depth range	Low intertidal to shallow sublittoral
Other preferences	Apparently intolerant of long periods of emersion (Gilliland & sanderson, 2000).
Migration Pattern	Non-migratory / resident

Habitat Information

Alkmaria romijni has been recorded from 27 sites around the UK (Gilliland & Sanderson, 2000; Thomas & Thorp, 1994). The majority of these are estuaries and the remainder lagoons. The species may be under-recorded due to it's small size. *Alkmaria romijni* is known from salinities of 5 to 48 ppt, but it's preferred range is thought to be 5 to 20 ppt (Gilliland & Sanderson, 2000).

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	No information
Fecundity (number of eggs)	11-100
Generation time	Insufficient information
Age at maturity	Insufficient information
Season	June - july
Life span	Insufficient information

Larval characteristics

Larval/propagule type	Trochophore
Larval/juvenile development	Lecithotrophic, See additional information
Duration of larval stage	Not relevant
Larval dispersal potential	10 -100 m
Larval settlement period	Not relevant

Life history information

In Danish waters (Ringkøbing Fjord), Thorson (1946) noted that *Alkmaria romijni* was a protandrous hermaphodite, developing male gametes and then female eggs. All specimens contined ripe gametes in June and July but were smaller and empty in November. Development is not pelagic. The number of eggs per adult varied between 5 and 95 (an average of 57) ,and several speciments had 20 to 30 junveniles attached to the motuth of thier tubes (Thorson, 1946). Larval development lasts 3 months (Cazaux, 1982). Larvae reside within the tubes of the female for up to the first twelve days. They then become free-living on the surface of the sediment and develop their own tube at about 20 days (Cazaux, 1982).

Sensitivity review

Resilience and recovery rates

Alkmaria romijni is a small (3-5 mm when adult) polychaete that lives on the surface of the sediment. It is a protandrous hermaphrodite that broods its larvae within the tube of the adult. Fecundity is relatively low and larval development takes three months. There is no pelagic phase and development is benthic in the proximity of the adult. Juveniles become free-living and develop their own tubes after 20 days (Thorson, 1946; Cazaux, 1982). Nevertheless, *Alkmaria romijni* is considered an opportunistic species (Borja *et al*., 2000; Cardoso *et al*., 2004b, 2007; Teixeira *et al*., 2009) probably due to its small size, short life cycle and ability to reach high densities in favourable conditions such as organic enrichment.

Other opportunistic polychaetes also show benthic development, e.g. *Pygospio*. Shull (1997) demonstrated that *Pygospio elagans* (and other polychaetes) was able to colonize sediments by burrowing, and bed load transport in mobilized sediment. It is possible that the small size of *Alkmaria romijni* would facilitate bed load transport and it may be capable of swimming as both juvenile and adult, although no evidence was found. For example, experimental defaunation studies have shown an increase in *Pygospio elegans*, higher than background abundances within 2 months, reaching maximum abundance within 100 days (Van Colen *et al*. 2008). Following a period of anoxia in the Bay of Somme (north France) that removed cockles, *Pygospio elegans* increased rapidly but then decreased as cockle abundance recovered and sediments were disturbed by cockle movement (Desprez *et al*., 1992). Re-colonization of *Pygospio elegans* was observed in 2 weeks by Dittmann *et al*. (1999) following a one month long defaunation of the sediment. However, McLusky *et al*. (1983) found that *Pygospio elegans* were significantly depleted for >100 days after harvesting (surpassing the study monitoring timeline). Ferns *et al*. (2000) found that tractor towed cockle harvesting removed 83% of *Pygospio elegans* (initial density 1850 per m^2). In muddy sand habitats, *Pygospio elegans* had not recovered their original abundance after 174 days (Ferns *et al*., 2000). These results are supported by work by Moore (1991) who also found that cockle dredging can result in reduced densities of some polychaete species, including *Pygospio elegans*. Rostron (1995) undertook experimental dredging of sandflats with a mechanical cockle dredger, including a site comprised of stable, poorly sorted fine sands with small pools and *Arenicola marina* casts with some algal growths. At this site, post-dredging, there was a decreased number of *Pygospio elegans* with no recovery to pre-dredging numbers after six months.

Alkmaria romijni was thought to be a lagoonal specialist (Arndt, 1989) but Gilliland & Sanderson (2000) concluded that it was probably a brackish water species based on its distribution in both lagoons and estuaries in the UK. It is also recorded in estuarine, lagoonal and other transitional water bodies in the German Bight, Denmark, the Baltic and Portugal, where is can reach high densities. Gilliland & Sanderson (2000) suggested that it was under-recorded in the UK due to its small size and the need for specialist identification. Therefore, it is not limited to lagoons and may be more widespread than current records suggest (authors comment).

Alkmaria romijni was reported in the Russian part of the Vistula Lagoon (south-east Baltic) after 1996, an area in which it had not been recorded previously in extensive studies in the first three decades of the twentieth century, the 1950s and 1960s, probably due to increases in eutrophication (Ezhova *et al*., 2005). However, no information on possible routes of colonization was suggested. Thomas & Thorp (1994) reproted considerable variation in the abundance of the mud infauna withn the Emsworth millpond complex (Chichester Harbour) probably due to fluctuations in slainity. They noted that *Alkmaria romijni* exhibted moderate abundance in 1982 and 1987 samples, disappeared from 1989 samples and returned at high abundance in 1991.

Resilience assessment. It is possible that *Alkmaria romijni* could recover from disturbance rapidly in areas it occurs and, using *Pygospio* as an example and the observations of Thomas & Thorpe (1994), probably with 1 to 2 years. However, where it occurs in isolated lagoons, and the population is removed or lost, then recovery would probably depend on random, unpredictable events, such as storms that transport sediment bearing the species to the affected location. Therefore, where the species experiences significant disturbance (e.g. resistance is 'Medium' or 'Low') then resilience is probably **'High'**. Where the population is severely affected (e.g. resistance is 'None') and habitat recovery is also required then resilience is probably **'Medium'** (2-10 years). Similarly, where the population is severely affected (e.g. resistance is 'None') and occurs in an isolated lagoonal location then resilience is probably **'Medium'** (2-10 years). However, the confidence in the assessment is recorded as 'Low' due to the scarcity of direct evidence.

Hydrological Pressures

	Resistance	Resilience	Sensitivity
Temperature increase (local)	High Q: High A: High C: Medium	High Q: High A: High C: High	Not sensitive Q: High A: High C: Medium

Arndt (1989) suggested that *Alkmaria romijni* was a thermophilic species. Arndt (1989) reported an LT50 (the lethal temperature at which 50% of specimens die) after 24 hrs of 38.4°C at 5‰ 38.9°C at 10‰ and 40.45°C at 20‰, based on Nausch (1985, Fig. 3). Thermal tolerance increased with increasing salinity (Nausch, 1984; Arndt, 1989). *Alkmaria romijni* also tolerated low temperature conditions and had a freezing LT50 of 4.4 min at -10°C (and 10‰) when acclimated at 10°C or 4.7 min when acclimated at 5°C (Nausch, 1984; Arndt, 1989). In comparison, Arndt (1989) also suggested that *Streblospio shrubsoli* (a species that often coexists with, and competes with, *Alkmaria romijni*) as also thermophilic as their tolerances were very similar (Nausch, 1984) while *Hediste diversicolor* and *Fabricia stellaris* were more thermophobic.

Sensitivity assessment. The above evidence suggests that *Alkmaria romijni* is thermophilic with a wide tolerance of temperatures, which coupled with a distribution from the North Sea and the Baltic to Morocco, suggests that it is resistant of a change in temperate of 2°C for a year in UK waters. Similarly, it lives on the surface of sediment, in the lower intertidal and shallow subtidal, so may be exposed to warm summers and cold winters throughout its range, and a change in 5°C for a month may result in stress. Mortality may result where a thermal discharge coincides with the warmest months of the year, or from extreme winter events but no direct evidence was available. Therefore, a resistance of **'High'** is suggested. Hence, resilience is **'High'** and the species is recorded as **'Not sensitive'** at the benchmark level.

Temperature decrease (local)	High Q: High A: High C: Medium	High Q: High A: High C: High	Not sensitive Q: High A: High C: Medium

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Salinity increase (local)	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

Ruso *et al*. (2007) reported that changes in the community structure of soft sediment communities due to desalinization plant effluent in Alicante, Spain. In particular, in close vicinity to the effluent, where the salinity reached 39 psu, the community of polychaetes, crustaceans and molluscs was lost and replaced by one dominated by nematodes. Roberts *et al.* (2010b) suggested that hypersaline effluent dispersed quickly (within 10s of metres of the outfall) but was more of a concern at the seabed and in areas of low energy where widespread alternations in the community of soft sediments were observed. In several studies, echinoderms and ascidians were amongst the most sensitive groups examined (Roberts *et al.*, 2010b). *Alkmaria romijni* has been recorded form salinities of 5 to 48 psu but it's preferred range is thought to be 5 to 20 ppt since most records and the highest abundances are recorded in the latter range (Gilliland & Sanderson, 2000).

Sensitivity assessment. An increase in salinity from full to >40 psu is may result in a reduction in the abundance *Alkmaria romijni* of over a period of a year (the benchmark). However, no direct no direct evidence of the effects of hypersaline conditions or effluent on the species was found. Therefore, **'No evidence'** was recorded.

Salinity decrease (local)	High Q: High A: High C: Medium	High Q: High A: High C: High	Not sensitive Q: High A: High C: Medium

Alkmaria romijni is considered to be a brackish water species Arndt (1989). It is known from salinities of 5 to 48 ppt, but it's preferred range is thought to be 5 to 20 ppt since most records and the highest abundances are recorded in the latter range (Gilliland & Sanderson, 2000). In the Ria de Avereiro (Portugal) *Alkmaria romijni* reached its highest abundances in areas of low salinity (18-30 or 5-18, Fig 3) close to freshwater input (Rodrigues *et al.*, 2011). In the Arade river estuary (Portugal) (Silva *et al.*, 2012), it was also found close to freshwater input but was ubiquitous throughout the estuary and not a good indicator of the influence of groundwater in the system.

Resilience assessment. *Alkmaria romijni* has a wide salinity tolerance (Gilliland & Sanderson, 2000). Therefore, it would probably be resistant of a change from 'full' or 'variable' salinity to 'reduced', or from 'reduced' to 'low' salinity regimes for a year, and may even benefit and increase in abundance due to loss of competition, and a resistance of **'High'** is recorded. Hence, resilience is **'High'** and the species is recorded as **'Not sensitive'** at the benchmark level. However, a change to freshwater conditions may result in loss of species.

Water flow (tidal current) changes (local)	Low Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

Alkmaria romijni is only recorded from muddy sediments in lagoons, estuaries and other transitional waters that are sheltered from wave action and with weak tidal streams (e.g. <0.5 m/s). A further decrease in water flow is unlikely. However, an increase in water flow may result in mobilization of the sediment surface and removal of the species from the sediment surface. It is likely to result in modification of the sediment over a period of a year to more sandy and coarse sediments that are less suitable for the species. Therefore, while a 0.1-0.2 m/s change is small, the resultant change in the sediment, removal of fines, and potentially a proportion of the species' population, suggests a resistance of **'Low'**. Resilience is probably **'High'** and sensitivity of **'Low'** is recorded.

Emergence regime changes	Low Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

Gilliland and Sanderson (2000) suggest that *Alkmaria romijni* is intolerant of long periods of emersion based on its preference for the lower littoral and shallow sublittoral. Therefore, a decrease in emergence (an increase in the time covered by the tide) would probably allow the species to colonize sediments further up thee shore and expand its range. However, an increase in emergence is likely to reduce the upper limit of the species on the shore and, hence, reduce its range. Therefore, a resistance of **'Low'** is suggested. Resilience is probably **'High'** and sensitivity of **'Low'** is recorded.

Wave exposure changes (local)	Medium Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

Alkmaria romijni is only recorded from muddy sediments in lagoons, estuaries and other transitional waters that are sheltered to extremely sheltered from wave action and with weak tidal streams (e.g. <0.5 m/s). A further decrease in wave action is unlikely. However, an increase in wave action may result in mobilization of the sediment surface and removal of the species from the sediment surface. It is likely to result in modification of the sediment over a period of a year to more sandy and coarse sediments that are less suitable for the species. Although a 3-5% change in significant wave height is small, the resultant change in the sediment, removal of fines, and potentially a proportion of the species' population, suggests a resistance of **'Medium'**. Resilience is probably **'High'** and sensitivity of **'Low'** is recorded.

Chemical Pressures

	Resistance	Resilience	Sensitivity
Transition elements & organo-metal contamination	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed.**

Hydrocarbon & PAH contamination	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed**.

Synthetic compound contamination	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed**.

Radionuclide contamination	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

No evidence was found

Introduction of other substances	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

This pressure is **Not assessed**.

De-oxygenation	High Q: High A: Medium C: Medium	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Medium

Nausch (1984) reported an LT50 (50% mortality) after 50 hours in anoxic conditions (oxygen free water) at 5°C but 32 hrs at 10°C. The addition of hydrogen sulphide reduced the LT50 to 33.2 hrs and 17.2 hrs respectively (Nausch, 1984). Cardoso *et al.* (2004) noted that algal mats of *Ulva* (as *Enteromorpha*) *intestinalis* resulted in a slight decline in the abundance of *Alkmaria romijni*, and that algal mats reduced the redox potential of the sediment (a sign of increased anoxia) but suggested that the decline in abundance of the species was due to the algal mats' interference with feeding. In several studies, *Alkmaria romijni* is associated with organically enriched sediments and eutrophic conditions (Borja *et al.*, 2000; Cardoso *et al.*, 2004b, 2007; Teixeira *et al.*, 2009; Rodrigues *et al.*, 2011). Organic-rich sediments tend to be hypoxic, although the species lives at the sediment surface exposed to passing water flow. In the Ria de Aveiro (Portugal) *Alkmaria romijni* reached its highest abundances in areas with a redox potential of 47.7 mV (Rodrigues *et al.*, 2011).

Sensitivity assessment. *Alkmaria romijni* achieves high abundances in organic-rich sediments, and in areas subject to eutrophication, and is probably exposed to low oxygen levels in the sediment. Therefore, it is probably resistant of a short-term reduction in oxygen levels below 2 mg/l (see benchmark) and a resistance of **'High'** is recorded. Hence, resilience is **'High'** and the species is probably **'Not sensitive'** at the benchmark level.

Nutrient enrichment	High Q: High A: Medium C: Medium	High Q: High A: High C: High	Not sensitive Q: High A: Medium C: Medium

Alkmaria romijni is associated with organically enriched sediments and eutrophic conditions (Borja *et al.*, 2000; Cardoso *et al.*, 2004b, 2007; Teixeira *et al.*, 2009; Rodrigues *et al.*, 2011). Rodrigues *et al.* (2011) noted that *Alkmaria romijni* reached high abundance in the assemblage associated with increased organic content, increased fines and reduced hydrodynamic characteristics. Cardoso *et al.* (2004) noted that algal mats of *Ulva* (as *Enteromorpha*) *intestinalis* resulted in a slight decline in the abundance of *Alkmaria romijni*, and that algal mats reduced the redox potential of the sediment (a sign of increased anoxia) but suggested that the decline in abundance of the species was due to the algal mats' interference with feeding. Borja *et al.* (2000) placed *Alkmaria romijni* in AMBI category III, "species tolerant of excess organic matter enrichment; that occur under normal conditions but their populations are stimulated by enrichment". Teixeira *et al.* (2009) noted that the changes in ecological quality and recovery in Mondego estuary were better represented by the AMBI when *Alkmaria romijni* was classified in AMBI category IV, "second order opportunistic species". Cardoso *et al.* (2007) noted that *Alkmaria romijni* and *Capitella capitata* were indicators of organically enriched habitats and reached their highest abundances in the eutrophic areas of the estuary. Cardoso *et al.* (2007) noted that both species decreased in abundance after management was put in place in the 1990s to reduce eutrophication of the Mondego estuary.

Resilience assessment. Several studies suggest that *Alkmaria romijni* occurs and benefits from eutrophic conditions. Excessive growth of algal mats may reduce its abundance slightly (Cardoso *et al.*, 2004). The benchmark is relatively protective and is not set at a level that would allow blooms of green algae on the sediment, hence, resistance is assessed as **'High**' and resilience as **'High'** (by default) so that the biotope is assessed as **'Not sensitive'** at the benchmark level.

Organic enrichment	High Q: High A: High C: Medium	High Q: High A: High C: High	Not sensitive Q: High A: High C: Medium

Alkmaria romijni is associated with organically enriched sediments and eutrophic conditions (Borja *et al.*, 2000; Cardoso *et al.*, 2004b, 2007; Teixeira *et al.*, 2009; Rodrigues *et al.*, 2011). Rodrigues *et al.* (2011) noted that *Alkmaria romijni* reached high abundance in the assemblage associated with increased organic content, increased fines and reduced hydrodynamic characteristics. Borja *et al.* (2000) placed *Alkmaria romijni* in AMBI category III, "species tolerant of excess organic matter enrichment; that occur under normal conditions but their populations are stimulated by enrichment". Teixeira *et al.* (2009) noted that the changes in ecological quality and recovery in Mondego estuary were better represented by the AMBI when *Alkmaria romijni* was classified in AMBI category IV, "second order opportunistic species". Cardoso *et al.* (2007) noted that *Alkmaria romijni* and *Capitella capitata* were indicators of organically enriched habitats and reached their highest abundances in the eutrophic areas of the estuary. Cardoso *et al.* (2007) noted that both species decreased in abundance after management was put in place in the 1990s to reduce eutrophication of the Mondego estuary.

Resilience assessment. *Alkmaria romijni* is associated with naturally organic-rich sediments, benefits as a result of organic enrichment, and is an indicator of organic enrichment. Therefore, a resistance of **'High'** is recorded with a resilience of 'High' and the species is recorded as **'Not sensitive'.**

Physical Pressures

	Resistance	Resilience	Sensitivity
Physical loss (to land or freshwater habitat)	None Q: High A: High C: High	Very Low Q: High A: High C: High	High Q: High A: High C: High

All marine habitats and benthic species are considered to have a resistance of 'None' to this pressure and to be unable to recover from a permanent loss of habitat (resilience is **'Very low'**). Sensitivity within the direct spatial footprint of this pressure is therefore **'High'**. Although no specific evidence is described, confidence in this assessment is 'High' due to the incontrovertible nature of this pressure.

Physical change (to another seabed type)	None Q: High A: High C: High	Very Low Q: High A: High C: High	High Q: High A: High C: High

The species lives in sediment so a change to an artificial or rock substratum would result in the loss of its habitat. Based on the loss of species habitat (substratum), resistance is assessed as **'None',** resilience is assessed as **'Very low'** (as the change at the pressure benchmark is permanent), and sensitivity is assessed as **'High'.** Although no specific evidence is described, confidence in this assessment is 'High' due to the incontrovertible nature of this pressure.

Physical change (to another sediment type)	None Q: High A: High C: High	Very Low Q: High A: High C: High	High Q: High A: High C: High

Alkmaria romijni is recorded from muddy sediments, including muddy sands and muddy gravels. A change in sediment type from to sands or coarse sediments would result in loss of suitable habitat for the species. Therefore, a resistance of **'None'** is recorded. Resilience is assessed as **'Very low'** (as the change at the pressure benchmark is permanent), and sensitivity is assessed as **'High'.** Although no specific evidence is described, confidence in this assessment is 'High' due to the incontrovertible nature of this pressure.

Habitat structure changes - removal of substratum (extraction)	None Q: Low A: NR C: NR	Medium Q: Low A: NR C: NR	Medium Q: Low A: Low C: Low

Alkmaria romijni lives at the sediment surface in a tube of only two to three centimetres in length. Removal of 30 cm of the sediment would remove the entire population in the affected area. Therefore, a resistance of **'None'** is recorded. Recovery will depend on the recovery of the sediment itself and subsequent colonisation. Therefore a resilience of **'Medium'** is recorded and sensitivity is assessed as **'Medium'**.

Abrasion/disturbance of the surface of the substratum or seabed	Low Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

Alkmaria romijni lives at the sediment surface in a tube of only two to three centimetres in length. It is soft-bodied but small (3-5 mm in length). Physical disturbance via abrasion to the sediment surface, or via penetrative gear or activities is likely to damage and kill a proportion of the population depending on the size of the footprint of the activity. Therefore, a resistance of **'Low'** is suggested, although no direct evidence was found. The resilience is probably **'High'** and a sensitivity of **'Low'** is recorded.

Penetration or disturbance of the substratum subsurface	Low Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

Alkmaria romijni lives at the sediment surface in a tube of only two to three centimetres in length. It is soft-bodied but small (3-5 mm in length). Physical disturbance via abrasion to the sediment surface, or via penetrative gear or activities is likely to damage and kill a proportion of the population depending on the size of the footprint of the activity. Therefore, a resistance of **'Low'** is suggested, although no direct evidence was found. The resilience is probably **'High'** and a sensitivity of **'Low'** is recorded.

Changes in suspended solids (water clarity)	High Q: Low A: NR C: NR	High Q: High A: High C: High	Not sensitive Q: Low A: Low C: Low

Alkmaria romijni is found at the surface of muddy sediments in low energy environments with low water flow, sheltered from wave action. It is also considered an indicator of organically enriched sediments and occurs in eutrophic habitats and in estuaries where turbidity can be high (Cole *et al.*, 1999). Therefore, an increase in suspended sediment at the benchmark level is unlikely to be detrimental. A decrease in turbidity might be detrimental, as Cardoso *et al.* (2007) reported that the density of *Alkmaria romijni* decreased after mitigation measures were implemented in the Mondego estuary to reduce eutrophication and hence turbidity and organic loads. However, a decrease in turbidity alone was not the cause of the decline but rather the reduction in the organic content of the sediment and competition from larger polychaetes (Cardoso *et al.*, 2007). In naturally organic-rich sediments, and changes in suspended sediment loads is unlikely to be detrimental. Therefore, resistance is assessed as **'High',** resilience as **'High'** and sensitivity recorded as **'Not sensitive'** at the benchmark level.

Smothering and siltation rate changes (light)	Medium Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

Alkmaria romijni lives at the sediment surface in a tube of only two to three centimetres in length. It is soft-bodied but small (3-5 mm in length). It is found in low energy environments (low water flow, sheltered from wave action) so any deposited sediment is likely to remain for many tidal cycles. No information on its ability to burrow was found. However, Maurer *et al.* (1986) noted that mucous tube feeders and labial palp deposit feeders (such as *Alkmaria romijni*) were the most susceptible to the killing effects of burial. Therefore, burial by 5 cm of fine deposit (the benchmark) is likely to result in at least some mortality and a resistance of **'Medium'** is recorded, albeit with low confidence. Resilience is probably **'High'** so that sensitivity is assessed as '**Low'.**

Smothering and siltation rate changes (heavy)	Low Q: Low A: NR C: NR	High Q: Low A: NR C: NR	Low Q: Low A: Low C: Low

Alkmaria romijni lives at the sediment surface in a tube of only two to three centimetres in length. It is soft-bodied but small (3-5 mm in length). It is found in low energy environments (low water flow, sheltered from wave action) so any deposited sediment is likely to remain for many tidal cycles. No information on its ability to burrow was found. However, Maurer *et al.* (1986) noted that mucous tube feeders and labial palp deposit feeders (such as *Alkmaria romijni*) were the most susceptible to the killing effects of burial. Therefore, burial by 30 cm of fine deposit (the benchmark) is likely to result in at least significant mortality and a resistance of **'Low'** is recorded, albeit with low confidence. Resilience is probably **'High'** so that sensitivity is assessed as '**Low'.**

Litter	Not Assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR	Not assessed (NA) Q: NR A: NR C: NR

Not assessed

Electromagnetic changes	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

No evidence was found

Underwater noise changes	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant

Introduction of light or shading	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant

Barrier to species movement	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant. This pressure is considered applicable to mobile species, e.g. fish and marine mammals rather than seabed habitats. Physical and hydrographic barriers may limit the dispersal of spores, larvae and other propagules. But propagule dispersal is not considered under the pressure definition and benchmarks,

Death or injury by collision	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant' to seabed habitats. NB. Collision by grounding vessels is addressed under 'surface abrasion.

Visual disturbance	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant

Biological Pressures

	Resistance	Resilience	Sensitivity
Genetic modification & translocation of indigenous species	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

No evidence on the translocation, breeding or species hybridization was found.

Introduction or spread of invasive non-indigenous species	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

Thomas & Thorpe (1994) recorded *Alkmaria romijni*, *Nematostella vectensis* and other benthic infauna in the vicinty of aggregations of the non-native polychaete *Ficopomatus enigmaticus*, in the

Emsworth millpond complex, Chichester Harbour. However, the variation in abundance of *Alkmaria romijni* in their 10-year study was not explained by the presense of aggregations of *Ficopomatus enigmaticus.*

No evidence was found to suggest a positive or negative interaction between non-indigenous invasive species and *Alkmaria romijni.*

Introduction of microbial pathogens	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

No evidence of microbial pathogens was found. *Alkmaria romijni* was reported to host the trematode parasite *Asymphylodora demeli* (Margolis, 1971) but no information on its effect, if any, at the population level was found.

Removal of target species	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR

Not relevant. This species is not subject to a targetted commercial or recreational fishery.

Removal of non-target species	No evidence (NEv) Q: NR A: NR C: NR	Not relevant (NR) Q: NR A: NR C: NR	No evidence (NEv) Q: NR A: NR C: NR

No evidence was found on the effects, if any, of commercial or recreational fishing on this species. However, it occurs in estuaries and transitional water bodies where it may be exposed to physical disturbance from a range of activities including, but not limited to, trawling, dredging, trampling and vehicular access, bait digging etc. The sensitivity to such activities is addressed under the 'abrasion' and 'penetration' pressure above. *Alkmaria romijni* can reach high abundances in estuaries, lagoons and transitional waters, but no biological interactions are known. It has been reported to compete with *Streblospio shrubsoli* where they coexist (Arndt, 1989) but no evidence on the biological effects of its removal from the ecosystem was found.

Importance review

Policy/legislation

Wildlife & Countryside Act	Schedule 5, section 9
Species of principal importance (Wales)	✓
Features of Conservation Importance (England & Wales)	✓

Status

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

Non-native

Native	Native		
Origin	Not relevant	**Date Arrived**	Not relevant

Importance information

No text entered

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