An amphipod (*Jassa falcata*)

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/1391]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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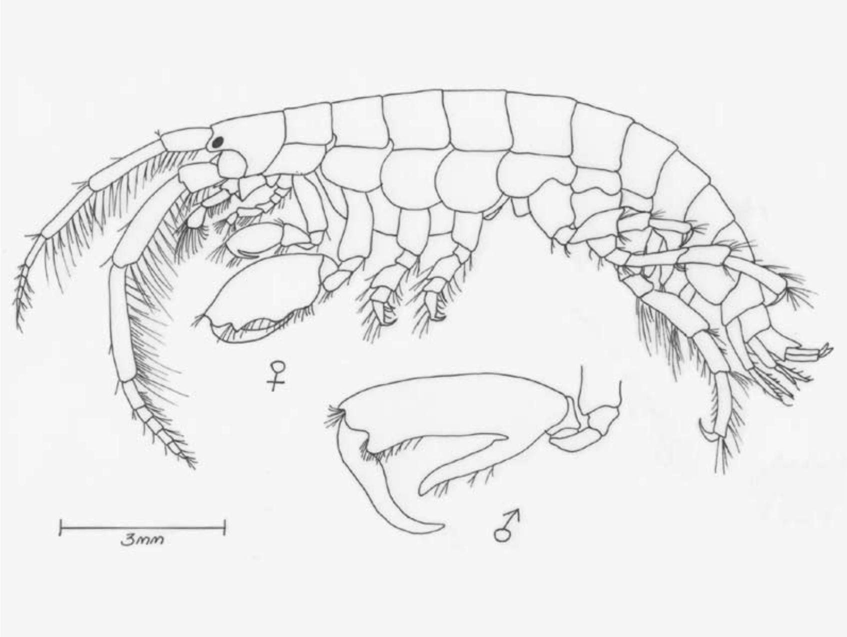

Jassa falcata **redrawn after Sars, 1890.**
Photographer:

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	Jacqueline Hill	**Refereed by**	Prof. P. Geoff Moore
Authority	(Montagu, 1808)		
Other common names	-	**Synonyms**	-

Summary

Description

A tube dwelling amphipod, elongate and rather flattened up to 13 mm in length. Colour varied, often yellow-grey with brown, red or black patches depending the colour of the surrounding habitat. Eyes small, round and dark.

Recorded distribution in Britain and Ireland

Found on all British coasts. Reported from several sites around the coast of Ireland.

Global distribution

Cosmopolitan in temperate and warm-temperate waters; widespread and frequently recorded in Atlantic, Pacific and Indian Oceans, both north and south of the equator. Reported from most coastal regions of North East Atlantic, and often locally abundant.

Habitat

Jassa falcata constructs tubes from debris amongst algae, hydroid growths and on solid surfaces in sediment and areas of strong water currents such as pilings, buoys, rafts or the hulls of ships. It is an important fouling organism because the tubes of *Jassa falcata* often form dense mats or 'nests'. Also found in *Laminaria* spp. holdfasts and similar habitats.

Depth range

See additional information.

Identifying features

- Antennae 1 bears a two segmented accessory flagella and is shorter and more slender than antennae 2.
- Gnathopod 2 larger than gnathopod 1, terminating in characteristic claw which differs in size and form between sexes.
- In adult males, gnathopod 2 propodus is greatly enlarged, with a stout thumb opposing the dactylus.
- Uropod 3 biramous, outer ramus with hooked spine and 1-3 small teeth.
- Telson small, triangular, with two setae on each side of apex.

Additional information

- *Jassa falcata* shows marked variation in shape and relative proportions of the taxonomically useful characteristics vary with growth stage.
- Therefore, the taxonomy of *Jassa falcata* has proved to be problematic.
- The species *Jassa marmorata* and *Jassa herdmani* are easily confused with *Jassa falcata* so that some of the literature on *Jassa falcata* may refer to these species or a mixture of *Jassa* species (Conlan, 1990).

Listed by

Further information sources

Search on:

G G NBN WoRMS

Biology review

Taxonomy

Family	Ischyroceridae
Genus	Jassa
Authority	(Montagu, 1808)
Recent Synonyms	-

Biology

Typical abundance	High density
Male size range	7-13mm
Male size at maturity	3.11-11.6mm
Female size range	3.8-6.6mm
Female size at maturity	
Growth form	Articulate
Growth rate	0.07mm/day
Body flexibility	High (greater than 45 degrees)
Mobility	
Characteristic feeding method	Active suspension feeder, Predator, See additional information
Diet/food source	See additional information
Typically feeds on	Unselective suspension feeder of detritus and small organisms.
Sociability	
Environmental position	Epibenthic
Dependency	No information found.
Supports	No information
Is the species harmful?	No

Biology information

- *Jassa falcata* builds tubes, from debris, among algae and hydroids, and on solid surfaces and structures. Males and females live in separate tubes constructed of pieces of debris cemented together, the tubes often forming dense mats.
- This species is essentially a benthic tube dwelling amphipod although intermittent swimming and crawling is common.
- *Jassa falcata* is generally a suspension feeder, however, large specimens have also been seen to capture and feed upon other smaller amphipods and ostracods to supplement their diet.
- Growth rate is given as maximum growth rate observed in laboratory investigations at varying temperatures. Maximum growth took place at 20 °C (Nair & Anger, 1979).

Habitat preferences

Physiographic preferences	Open coast, Strait / sound, Enclosed coast / Embayment
Biological zone preferences	Lower eulittoral, Sublittoral fringe, Upper infralittoral

Substratum / habitat preferences	Macroalgae, Artificial (man-made), Bedrock, Other species
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.)
Wave exposure preferences	Exposed, Moderately exposed, Sheltered, Very exposed
Salinity preferences	Full (30-40 psu)
Depth range	See additional information.
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

This species is an important fouling organism. The animals construct tubes from pieces of debris and sediment cemented together, often forming dense mats, particularly in warm water discharge pipes from power stations (Fish & Fish, 1996).

Reported to depths of 5m in Japan (Kamenskaya, 1977). *Jassa falcata* is often found inhabiting *Laminaria* holdfasts and so may be found at the greater depths inhabited by some kelps. *Jassa falcata* appears to be out-competed by *Parajassa pelagica* or unable to survive in very strong wave action at shallow depths (K. Hiscock personal communication).

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	Annual protracted
Fecundity (number of eggs)	11-100
Generation time	<1 year
Age at maturity	2-6 months
Season	See additional text
Life span	<1 year

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Direct development
Duration of larval stage	Not relevant
Larval dispersal potential	No information
Larval settlement period	Not relevant

Life history information

- Reproduction, and therefore production of gametes, occurs throughout the year although some seasonal peaks of reproduction have been observed. In Helgoland waters, for example, two peaks were observed, the main one in summer and another smaller peak in winter (Nair & Anger, 1980).

- The mating system is polygynous. Several broods of offspring are produced, each potentially fertilised by a different male. Males are believed to seek out mature females attracted by female pheromones.
- There is no sperm storage, and fertilisation is external.
- There is no larval stage. Embryos are brooded in a marsupium, beneath the thorax, formed by the oostegites (a series of flattened plates projecting from basal segments). Embryos are released as subjuveniles with incompletely developed eighth thoracopods and certain differences in body proportions and pigmentation.
- In laboratory investigations, lifespan, time to maturity and fecundity were strongly influenced by temperature (Nair & Anger, 1979). At 20 °C the time to reach maturity is 2 months, about half the value observed at 10 °C. Field investigations in Helgoland observed age at maturity to be 6 months for new generations produced in low winter temperatures of 7-8 °C (Nair & Anger, 1980).
- Growth rate also increases with increasing temperature but lifespan is shorter and individuals are smaller at higher temperatures (Nair & Anger, 1979).

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	Intermediate	Moderate	Moderate	Very low

Substratum loss will remove the tubes in which *Jassa falcata* lives. Although the species is mobile it is a weak swimmer and so likely that only some individuals would escape and rebuild tubes elsewhere. However, *Jassa falcata* does not have a larval stage so dispersal potential is limited (Hughes, 1979) although rafting on algal debris is probably important in extending the species range (Moore, P.G., pers. comm.). In a New England sub-tidal zone for example, *Jassa falcata* recolonized areas of cleared rock within 4 months (Sebens, 1986).

Smothering	Intermediate	Moderate	Moderate	Very low

Smothering of the population by sediment to a depth of 5cm above the substratum may completely cover *Jassa falcata* tubes and prevent suspension feeding. The species is likely to be able to crawl away from the sediment but as a poor swimmer and with the absence of a larval stage it has limited dispersal potential (Hughes, 1979). However, recolonization from adjacent populations can take place in less than a year and rafting on algal debris is probably important in extending the species range (Moore, P.G., pers. comm.). In a New England sub-tidal zone for example, *Jassa falcata* recolonized areas of cleared rock within 4 months (Sebens, 1986).

Increase in suspended sediment	Low	High	Low	Very low

Jassa falcata is tolerant of high turbidity (Moore, 1973(b)) and uses debris in the construction of its tube and so is likely to be tolerant of siltation at the level of the benchmark, 100mg/l for a month. In investigations in France all *Jassa falcata* tubes on hydroids and algae were open at both ends (Conlan, 1989) and Moore (1977) speculates that this may be adaptive in avoiding siltation.

Decrease in suspended sediment

Dessication	Intermediate	High	Low	Very low

Bousfield (1973) suggests the tolerance of amphipods to desiccation is generally quite low. *Jassa falcata* has been observed fully exposed to air at low tide, though normally remaining within its tube (Conlan, 1989). *Jassa falcata* is a sub-tidal and lower shore species so an increase in desiccation at the level of the benchmark is likely to reduce the extent of the population.

Increase in emergence regime	Low	High	Low	Very low

Jassa falcata has been observed amongst red algae fully exposed to the air and so can tolerate some emergence. Some individuals were crawling amongst the tubes, but most remained within (Conlan, 1989). Increased emergence may decrease the upper limit of *Jassa falcata* populations, whereas decreases in emergence may allow the species to colonize further up the shore.

Decrease in emergence regime

Increase in water flow rate	Low	High	Low	Moderate

Jassa falcata is morphologically adapted to rough hydrodynamic environments since it is able to remain within its tube and its stout gnathopods can hold tightly to algae. Ebling *et al.* (1948) investigated the fauna of the *Saccorhiza polyschides* canopy at Lough Ine, Ireland with reference to water currents. *Jassa falcata* was abundant at all stations where current was strong (4-6 knots), occurred in small quantities in moderate current (2-3 knots) and was absent from all stations where current was weak (1 knot). Weak currents interfere with feeding and *Jassa falcata* is sometimes outcompeted in weak currents by another tube dwelling amphipod, *Corophium insidiosum* that is able to switch from suspension feeding to deposit feeding in low flow water rates. (Nair & Anger, 1980).

Decrease in water flow rate

Increase in temperature	Intermediate	Moderate	Moderate	Moderate

Jassa falcata occurs in temperatures from 1.5-27 °C in the Sea of Japan (Kamenskaya, 1977). Bousfield (1973), however, reports that amphipod tolerance to extremes of temperature is low. Life span, growth rates, size at maturity and fecundity are all affected by temperature. In Helgoland, hardly any individual growth was observed at temperatures of 2.5-4.4 °C and growth was rapid at maximal temperatures of about 17°C. Peak reproduction occurred at temperatures of 10-14 °C and egg numbers per gravid females were higher, 92-100 in summer months compared to about 10 eggs in winter (Nair & Anger, 1980). In laboratory investigation *Jassa falcata* showed a slow, long-continued growth at 10°C resulting in a prolonged life span and a larger final body size (Nair & Anger, 1979). Although growth and reproduction are influenced by temperature no information on upper or lower lethal temperature limit was found.

Decrease in temperature

Increase in turbidity	Low	High	Low	Very low

In a study of kelp holdfast fauna in north east Britain, Moore (1973(b)) found *Jassa falcata* a ubiquitous species but with higher abundances in turbid waters. This species was also found to favour waters with high turbidity in Los Angeles - Long Beach harbours (Barnard, 1958) and was absent from clear waters. Mills (1967) suggested that turbidity of the water might be responsible for initiating feeding in some tube-dwelling amphipods.

Decrease in turbidity

Increase in wave exposure	Low	High	Low	Low

Although found on most coasts around the UK, the density of *Jassa falcata* increases with greater wave exposure (Moore, 1985). With stout gnathopods *Jassa falcata* is adapted for rough hydrodynamic environments.

Decrease in wave exposure

Noise	Tolerant	Not relevant	Not sensitive	Very low

Jassa falcata often inhabits areas such as buoys and pilings in harbours where noise and vibration levels are likely to be high. It is likely therefore, that the species is tolerant of noise.

Visual Presence	Tolerant	Not relevant	Not sensitive	Very low

Jassa falcata often inhabits areas such as buoys and pilings in harbours where visual disturbance at the level of the benchmark, continuous presence for one month of moving objects such as boats, commonly occurs and its visual acuity is probably low. It is likely therefore, that the species is not sensitive to visual disturbance.

Abrasion & physical disturbance	Intermediate	High	Low	Very low

Abrasion at the level of the benchmark would be likely to kill or displace some individuals. However, since *Jassa falcata* lives in colonies the whole population may not be destroyed and so intolerance is assessed as intermediate. Recovery is good because recolonization from adjacent populations can take place within 4 months (Sebens, 1986).

Displacement	Low	High	Low	Very low

Displacement may result in the death of loss of individuals, however if physically removed from their original position onto a suitable substratum *Jassa falcata* would be able to construct a new tube. In the absence of a larval stage dispersal of *Jassa falcata* normally occurs by short distance dispersal by juveniles so recolonization should be rapid. In a New England sublittoral community, for example, *Jassa falcata* recolonized areas of cleared rock within 4 months (Sebens, 1986). However, after the last moult silk spinning glands in males are reduced in size limiting the tube building ability of sexually mature adult males.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination	Intermediate	Moderate	Moderate	Very low

intolerance to some chemicals has been observed in amphipods. Gammaridean amphipods have been reported to be intolerant of TBT with 10 day LC_{50} (the concentration which produces 50% mortality) values of 1-48ng/l (Meador *et al.*, 1993). *Jassa falcata* was absent from sites close to a bromide extraction plant releasing acidified halogenated effluent (Hoare & Hiscock, 1974).

Heavy metal contamination	Intermediate	Moderate	Moderate	Very low

Crustaceans are generally regarded to be sensitive to cadmium (McLusky *et al.*, 1986). In laboratory investigations Hong & Reish (1987) observed 96hour LC_{50} (the concentration which produces 50% mortality) water column concentrations of between 0.19 and 1.83 mg/l for several species of amphipod.

Hydrocarbon contamination	High		Very High	High

Amphipods in general are highly sensitive to oil pollution (Suchanek, 1983). After the *Amoco Cadiz* oil spill, for example, there was a reduction in both the number of amphipod species and the number of individuals (Cabioch *et al.*, 1978). Eight years after the oil spill amphipod numbers had still not fully recovered (Dauvin, 1987). Analysis of kelp holfast fauna after the *Sea Empress* oil spill in Milford Haven showed an almost complete lack of any amphipods at the badly oiled sites, while large numbers of *Jassa falcata* were present at unaffected sites (SEEEC, 1998).

Radionuclide contamination				Not relevant

Insufficient information.

Changes in nutrient levels				Not relevant

In a study of amphipods in north east Britain *Jassa falcata* was found to prefer turbid waters, in particular those unpolluted by industrial and domestic waste including sewage (Moore, 1973(b)). However, in other studies of sites polluted with industrial and sewage waste *Jassa falcata* was more abundant (Bellan-Santini, 1980). Information about the exact nature of the pollution is not available and so an assessment of intolerance to nutrients is not possible.

	Intolerance	Recoverability	Sensitivity	Confidence
Increase in salinity				Not relevant

At moorings, buoys and piers in the Sea of Japan *Jassa falcata* was the dominant species at salinities of 30-33psu but at lower salinities Corophiidae were more abundant (Kamenskaya, 1977). Therefore, at lower salinities there may be increased risk of competition from other tube-building amphipods.

	Intolerance	Recoverability	Sensitivity	Confidence
Decrease in salinity				
Changes in oxygenation	High	High	Moderate	Moderate

In a survey of Los Angeles to Long Beach harbours *Jassa falcata* was absent from areas of low oxygen concentration (0-2.5mg/l). However, recovery was rapid with recolonization taking place within 6-9 months (Barnard, 1958).

Biological Pressures

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

Insufficient information.

	Intolerance	Recoverability	Sensitivity	Confidence
Introduction of non-native species				Not relevant

Insufficient information.

	Intolerance	Recoverability	Sensitivity	Confidence
Extraction of this species	Intermediate	High	Low	Very low

Recovery from extraction of 50% of individuals is likely to be good because *Jassa falcata* reproduces all year round. Recolonization from existing individuals in the same area can take place within less than one year (Barnard, 1958). In New England, *Jassa falcata* had recolonized areas of cleared subtidal rock within 1-4 months (Sebens, 1986).

	Intolerance	Recoverability	Sensitivity	Confidence
Extraction of other species	Intermediate	High	Low	Very low

Laminaria spp. used by the amphipod as substratum may be harvested for commercial use. Epiphytic or holdfast populations may be lost or displaced. However, a protracted reproductive period means that successful recruitment and recolonization from adjacent populations is likely. In New England, for example, *Jassa falcata* recolonized areas of cleared rock within 4 months (Sebens, 1986).

Additional information

Importance review

Policy/legislation

- no data -

Status

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

Non-native

Native	-		
Origin	-	**Date Arrived**	-

Importance information

Jassa falcata populations can form dense tube mats, particularly on solid surfaces such as harbour structures and ships hulls, that may exclude other species. Tube mats may provide refugia for other small invertebrates.

The colonies or 'nests' of *Jassa falcata* become very large and can cause congestion of water pipes and ducts which run into the sea from power stations or similar installations (Lincoln, 1979).

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