MarLIN
Marine Information Network
Information on the species and habitats around the coasts and sea of the British Isles

Harbour crab (*Liocarcinus depurator*)

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/1175]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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Dorsal view of male and female.
Photographer: Keith Hiscock
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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	Jacqueline Hill	**Refereed by**	This information is not refereed.
Authority	(Linnaeus, 1758)		
Other common names	-	**Synonyms**	-

Summary

Description

The carapace of *Liocarcinus depurator* is wider than long, about 51 mm wide and 40 mm long. The species is immediately recognised by the violet-tinted paddle of the fifth leg in larger crabs. The rest of the body is pale reddish-brown with transverse rows of hairs on the carapace, most conspicuous towards the rear.

Recorded distribution in Britain and Ireland

All British and Irish coasts.

Global distribution

Distributed from Norway to West Africa including the Mediterranean.

Habitat

Found on the lower shore and sublittoral on fine, muddy sand and gravel.

Depth range

-5m to -300m+

Identifying features

- Carapace broader than long, relatively flat, with numerous transverse, hairy, crenulations.
- The antero-lateral margins of the carapace have 5 pointed teeth.
- Wide orbits and three similar-sized rounded lobes between eyes.
- Front of carapace with a median lobe slightly more prominent than two similar flanking lobes.
- Chelipeds equal and stout.
- Pereopods 2-4 of slight build, pereopod 5 with violet tinted strongly paddled dactylus.

Additional information

Other common names include the 'swimming crab'.

Listed by

Further information sources

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Biology review

Taxonomy

Family	Polybiidae
Genus	Liocarcinus
Authority	(Linnaeus, 1758)
Recent Synonyms	-

Biology

Typical abundance	Moderate density
Male size range	Carapace width up to 56mm
Male size at maturity	Carapace width 30mm
Female size range	Carapace width 24mm
Female size at maturity	
Growth form	Articulate
Growth rate	
Body flexibility	None (less than 10 degrees)
Mobility	
Characteristic feeding method	Predator, Scavenger
Diet/food source	
Typically feeds on	Polychaetes, crustaceans, molluscs, ophiuroids and fishes constitute most of the diet (Freire, 1996).
Sociability	
Environmental position	Demersal
Dependency	Independent. None
Supports	Host The polychaete worm *Iphitime cuenoti* and the parasitic nemertean *Carcinonemertes carcinophila* that live in the branchial chambers of some individuals.
Is the species harmful?	No The species is edible. It is frequently found in fish markets in the Mediterranean (Mori & Zunino, 1987).

Biology information

- **Size range and size at maturity:** values given are for Mediterranean individuals (Muino *et al*., 1999).
- **Feeding:** Swimming crabs may exploit a wide range of dietary items including algae, sponges and many small invertebrates and may be considered omnivorous. However, *Liocarcinus depurator* is typically a scavenger and a carnivore. Freire *et al*. (1996) suggest the high diversity of food items in the diet of *Liocarcinus depurator* is due to the versatile functional structure of the chelipeds.
- **Host for:** Abelló *et al*., (1988) found 5% of individuals in the northwestern Mediterranean infested with the polychaete *Iphitime cuenoti*. No evidence of disease in the branchial

chamber was found and the authors suggest a commensal relationship between the crab and the polychaete. However, the relationship may involve some degree of parasitism. In the Firth of Lorne the parasitic nemertean *Carcinonemertes carcinophila* was found the gills of over 90% of *Liocarcinus depurator* sampled (Comely & Ansell, 1989(b)).

Habitat preferences

Physiographic preferences	Open coast, Offshore seabed, Strait / sound, Ria / Voe
Biological zone preferences	Circalittoral offshore, Lower circalittoral, Lower infralittoral, Sublittoral fringe, Upper circalittoral, Upper infralittoral
Substratum / habitat preferences	Coarse clean sand, Fine clean sand, Muddy gravel, Muddy sand
Tidal strength preferences	Moderately Strong 1 to 3 knots (0.5-1.5 m/sec.), Very Weak (negligible), Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	
Salinity preferences	Full (30-40 psu)
Depth range	-5m to -300m+
Other preferences	No text entered
Migration Pattern	No information found

Habitat Information

Salinity: *Liocarcinus depurator* is essentially a marine species although a few individuals were found at the lower reaches of the Forth estuary where salinity varied between 24-35 psu (Mathieson & Berry, 1997).

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	Annual protracted
Fecundity (number of eggs)	100,000-1,000,000
Generation time	
Age at maturity	1 year
Season	See additional text
Life span	Insufficient information

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Planktotrophic
Duration of larval stage	Not relevant
Larval dispersal potential	-
Larval settlement period	Insufficient information

Life history information

- **Time of gametes:** In the northwestern Mediterranean female moult and copulation takes place between May and July (Abelló, 1989a).
- **Spawning:** Females with eggs occur all year (Ingle, 1997) although a maximum proportion of ovigerous females has been observed indicating the existence of an annual reproductive cycle. In Plymouth, ovigerous females are reported from March to October, from April to May in Bristol, January to June in the Clyde and Argyll and from January to May in Galway (Ingle, 1997). In the warmer waters of the northwestern Mediterranean numbers of ovigerous females peak in the winter months from November to February and males were found to be sexually mature throughout the year (Abelló, 1989a). In Plymouth, *Liocarcinus depurator* was found to incubate three or more batches of eggs over the spring and summer breeding season (Wear, 1974).
- **Fecundity:** The number of eggs carried by ovigerous females in the north western Mediterranean ranged from about 30,000 to 230,000 clearly increasing with the size of the female (Abelló, 1989a). However, a maximum of 140,000 eggs for the largest females was estimated in the Ligurian Sea (Mori & Zunino, 1987).
- **Age at maturity:** In the Gulf of Genoa in the Ligurian Sea *Liocarcinus depurator* females attain sexual maturity, are fertilized and bear eggs within the first year (Mori & Zunino, 1987).
- **Larvae:** in the plankton during spring and summer in British and North Sea waters (Ingle, 1980).

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	High	Low	High

Although a swimming crab, *Liocarcinus depurator* normally crawls on the seabed. The species only really swims *in extremis*. Therefore, substratum loss, such as caused by dredging, is likely to result in the loss of some individuals whilst others may be able to escape. Intolerance is therefore, assessed as intermediate. Recovery should be good because *Liocarcinus depurator* has planktonic larvae and is able to reproduce several times a year (Wear, 1974).

Smothering	Tolerant	Not relevant	Not sensitive	High

Liocarcinus depurator is a mobile crab, able to crawl and also swim when necessary, and therefore unlikely to be affected by any smothering as it would be able to move up through the sediment or to an unaffected area.

Increase in suspended sediment	Tolerant	Not relevant	Not sensitive	Moderate

Liocarcinus depurator is tolerant of changes in suspended sediment because it is a demersal species and feeds by predation and scavenging. The species is also able to move to more suitable conditions if necessary.

Decrease in suspended sediment

Dessication	Not relevant	Not relevant	Not relevant	High

Liocarcinus depurator is a sub-littoral species and so desiccation is not relevant.

Increase in emergence regime	Not relevant	Not relevant	Not relevant	High

Emergence is not likely to occur in the species' preferred zone.

Decrease in emergence regime

Increase in water flow rate	Intermediate	High	Low	Low

It is likely that the species is unable to keep its position on the benthos to feed and copulate in strong water flow and so intolerance has been assessed as intermediate. In laboratory experiments *Liocarcinus depurator* was unable to make progress towards bait in currents of 0.3m/s (0.6 knots) and 63% of animals were washed away (Nickell & Moore, 1992). However, the crab will drift in the water column or tumble along the seabed until quicker conditions occur.

Decrease in water flow rate

Increase in temperature	Intermediate	High	Low	High

Liocarcinus depurator is likely to be tolerant of a range of temperatures consistent with a distribution north and south of Britain and Ireland populations and so will not be very intolerant of long term changes in temperature. Experiments with the species showed that a

threefold decrease in egg incubation time of eggs can occur naturally in successive batches of eggs incubated during the early spring to mid-summer breeding season (Wear, 1974). At 13.1°C incubation time was 31.5 days and at 15.0 °C was 25.5 days. However, a rapid rise in water temperature of as little as 3°C can disrupt the natural sequence in the spawning and incubation of successive egg batches and also reduce fecundity by more than 90% (Wear, 1974) so that the viability of the population will be reduced. Intolerance is therefore assessed as intermediate. Very low water temperatures can cause mass mortalities of *Liocarcinus* spp.. During the severe winter of 1962-63 where water temperatures fell to 0°C for several weeks, many dead crabs were caught in research vessel trawls from the Dutch coast (Crisp, 1964). Recovery should be good because *Liocarcinus depurator* has planktonic larvae and is able to reproduce several times a year (Wear, 1974).

Decrease in temperature

Increase in turbidity	Tolerant	Not relevant	Not sensitive	Moderate

Liocarcinus depurator lives at depths of 300 m plus, is most active at night (Abelló *et al*., 1991), feeds by predation and scavenging on other invertebrates and is therefore, unlikely to be sensitive to changes in light brought about by increases in turbidity. The crab is commonly found in turbid conditions in harbours.

Decrease in turbidity

Increase in wave exposure	Intermediate	Very high	Low	Low

Liocarcinus depurator is a swimming crab and so is likely to be tolerant of some changes in wave exposure. However, it is likely that the species is unable to keep its position in areas of strong wave action so intolerance has been assessed as intermediate. The species also inhabits deep waters where wave action will have little impact.

Decrease in wave exposure

Noise	Tolerant	Not relevant	Not sensitive	Moderate

Liocarcinus depurator is not likely to be sensitive to noise disturbance.

Visual Presence	Tolerant	Not relevant	Not sensitive	Moderate

Crabs have well developed visual acuity and are likely to respond to movement in order to avoid predators. However, it is likely that the species will be little affected by visual disturbance caused by the continuous presence for one month of moving objects not naturally found in the marine environment (e.g., boats, machinery, and humans). Therefore, the species is assessed as not sensitive.

Abrasion & physical disturbance	High	High	Moderate	High

Liocarcinus depurator was observed to be frequently injured and killed as a result of capture in a commercial 4m beam trawl (Kaiser & Spencer, 1995) and so an intolerance high has been recorded. Recovery should be good because *Liocarcinus depurator* has planktonic larvae and is able to reproduce several times a year (Wear, 1974).

Displacement	Tolerant	Not relevant	Not sensitive	High

The species is highly mobile and probably not sensitive to displacement to another area.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence

Synthetic compound contamination		Not relevant		Not relevant

Bryan & Gibbs (1991) report that crabs appear to be relatively resistant to TBT although some deformity of regenerated limbs has been observed.

Heavy metal contamination	Intermediate	High	Low	Moderate

Crompton (1997) reports that the concentrations above which mortality of crustaceans can occur is 0.01-0.1mg/l for mercury, copper and cadmium, 0.1-1mg/l for zinc, arsenic and nickel and 1-10mg/l for lead and chromium. Crustaceans are generally regarded as being more intolerant of cadmium than other groups (McLusky, 1986). However, crustaceans in general are less intolerant of most heavy metals than annelid worms and so intolerance has been assessed as intermediate. On return to normal conditions, recovery should be good because *Liocarcinus depurator* has planktonic larvae and reproduces several times a year.

Hydrocarbon contamination				Not relevant

Insufficient information.

Radionuclide contamination				Not relevant

Insufficient information.

Changes in nutrient levels				Not relevant

Insufficient information.

Increase in salinity	Intermediate	High	Low	Moderate

Liocarcinus depurator is essentially a marine species although a few individuals were found at the lower reaches of the Forth estuary where salinity varied between 24-35psu (Mathieson & Berry, 1997) and so intolerance is assessed as intermediate. Although the species is mobile and some individuals will be able to avoid unfavourable salinity changes, individuals are likely to be affected if salinity changes are widespread. On return to normal conditions, recovery should be good because *Liocarcinus depurator* has planktonic larvae and reproduces several times a year.

Decrease in salinity

Changes in oxygenation	High	High	Moderate	Moderate

Cole *et al.* (1999) suggest possible adverse effects on marine species below 4 mg/l and probable adverse effects below 2mg/l. Crustaceans are generally less tolerant of hypoxia than polychaetes and bivalves and are rarely described from hypoxia stressed environments (Diaz & Rosenberg, 1995). Experiments looking at the resistance of marine invertebrates from the Baltic Sea, where temperature was 10°C and salinity 15psu, crustaceans had the shortest LD_{50} times (between 2 and 48 hours) at 0.15ml 0_2 (Theede *et al.*, 1969). Therefore, a reduction in oxygen concentration to the benchmark level of 2mg/l for a week is expected to cause some individuals to die. Although the species is mobile and some individuals will be able to avoid hypoxic conditions changes individuals are likely to be affected if oxygen changes are widespread. On return to normal conditions recovery should be good because *Liocarcinus depurator* has planktonic larvae and reproduces several times a year.

Biological Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Introduction of microbial pathogens/parasites	Intermediate	High	Low	Moderate

The incidence of black necrotic disease has been recorded for *Liocarcinus depurator* from sites on the west coast of Scotland (Comely & Ansell, 1989). The disease, which is believed to be caused by one or more of the chitinoclastic bacteria with secondary invasion by fungi, was found in the gills of almost 90% of *Liocarcinus depurator*. In the most extreme cases the gill lamellae were completely missing, only the blackened gill rachi being left. Intolerance has therefore, been assessed as intermediate. On return to normal conditions recovery should be good because the species has high fecundity and pelagic larvae.

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

There are no known non-native species competing with *Liocarcinus depurator*.

Extraction of this species Intermediate High Low High

Liocarcinus depurator is often extracted as a by-catch species in benthic trawling. The species produces eggs several times a year which develop into planktonic larvae so recovery should be high.

Extraction of other species Tolerant Not relevant Not sensitive Moderate

Liocarcinus depurator has no known obligate relationships.

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

- *Liocarcinus depurator* is one of the most important by-catches of the Mediterranean demersal fishery (Abelló, 1989a).
- Enclosure experiments in a sea loch in Ireland have shown that high densities of this decapod led to a significant decline in infaunal organisms (Thrush, 1986).

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