

The capture of the Indo-Pacific crab *Charybdis feriata* (Linnaeus, 1758) (Brachyura: Portunidae) in the Mediterranean Sea

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Abstract

The Indo-Pacific portunid crab *Charybdis feriata* (Linnaeus, 1758) was recorded for the first time from the Mediterranean Sea, based on a single adult female caught in a gillnet off Barcelona at a depth of 60-70 m on the 13th December 2004. Its most probable introduction vector was a merchant ship.

Key words: *Charybdis feriata*, invasive species, first record, Mediterranean Sea, shipping

Introduction

Charybdis feriata (Linnaeus, 1758) is a portunid crab species widely distributed in the Indo-Pacific region from Japan and China to Australia in the east, to eastern and southern Africa, Gulf of Oman and Arabian Gulf in the west, encompassing Pakistan, India, Sri Lanka and Indonesia (Stephenson et al. 1957; Stephenson 1972; Ng 1998; Apel and Spiridonov 1998). It usually occurs sublittorally on muddy and sandy bottoms, as well as on rocky and stony coasts including coral reef flats, at depths of approximately 10-60 m (Ng 1998; Yan et al. 2004). This species of *Charybdis* has a high commercial value being caught in trawl nets, traps and fixed nets, and it is usually sold frozen. However with the recent expansion of live fish markets, this species is now maintained in aquaria and hold-tanks, and exported throughout eastern Asia (Ng 1998). The crab has a maximum carapace width of 20 cm (Ng 1998) with females weighing 150-350 g compared to males, which may reach 1 kg (Parado-Estépa et al. 2002). Its size and quality of meat makes this species a valuable target for aquaculture practices (Parado-Estépa et al. 2002).

The purpose of this report is to record the capture of *Charybdis feriata* from the Catalan coast,

off Barcelona (Spain) as the first record from the Mediterranean Sea and present a discussion on its possible origin and introduction vector.

Material Examined

All measurements have been taken in mm with a digital calliper of 0.1 mm accuracy. Measurements: carapace width (CW), from tip to tip of the last anterolateral teeth; carapace length (CL), from tip of the frontal teeth to the posterior end of the carapace and short carapace length (SCL), from rostral notch to the posterior end of the carapace. Right propodus cheliped length (RCL), from tip of the propodus to the posterior ventral end of the propodus, Right propodus cheliped height (RCH), from dorsal anterior end (excluding dorsal spine) perpendicularly to ventral propodus side. Maximum abdominal width (AW).

Charybdis feriata (Linnaeus, 1758)

(Figure 1)

Locality: Barcelona, off Montjuïc Mountain; approximate position: 41°20'N; 2°13'E (Figure 2); depth 60-70 m, 13 December 2004, captured in gillnets. The specimen has been deposited in the Reference Biological Collections of the Institut de Ciències del Mar (CSIC) in Barcelona, under the access code ICMD 16/2005.



Figure 1. *Charybdis feriata* (Linnaeus, 1758). Collected near Barcelona, western Mediterranean Sea. Adult female (Carapace width: 125.0 mm; Carapace length: 81.3 mm) (ICMD 16/2005).

Size: One adult female CW 125.0 mm, CL 81.3 mm, SCL 79.7 mm; cheliped handedness: right-handed, RCL 95.1 mm, RCH 32.3 mm; AW 59.9 mm; fresh weight: 285 g.

Epibionts: Serpulid polychaetes were found, i.e. *Pomatoceros triqueter* (Linnaeus, 1758) on the anterior dorsal carapace (3 individuals), left cheliped carpus (1 individual), right cheliped propodus (1 individual), ventral anterior carapace (1 individual). One individual of *Serpula* sp. was identified on the ventral merus of the fifth pereopod.

Discussion

The identification of the species was based on the morphological descriptions provided by Ng (1998) and Apel and Spiridonov (1998). However this species can also be identified by its typical colouration pattern (Stephenson et al. 1957; Parado-Esteba et al. 2002; see Figure 1).

Most of the exotic introductions in the Mediterranean are considered to have a Lessepsian origin (Galil et al. 2002; Galil and Zenetos 2002). Since the known distribution area of *C. feriata* does not include the Red Sea, the occurrence of this portunid in the western Mediterranean cannot be considered as a Lessepsian migration via the Suez Canal opened in 1869, especially as this crab has not been recorded from the eastern Mediterranean Sea. However, shipping is also one of the major sources of introduction of exotic species. In fact Gollasch

(2002) has previously identified a juvenile specimen of *C. feriata* collected from the sediment of ballast water tanks while a ship was docked in Germany. Consequently it is suggested that the finding of just one single adult individual close to an important international commercial harbour, such as Barcelona, was probably an accidental escape from holding tanks of live specimens for human consumption carried by a commercial ship arriving from the Far East. Ballast water as the introduction vector cannot be completely ruled out, but given the large size of the crab the most feasible explanation for the introduction appears to be the former. This assumption is based upon the large number of ocean-going ships calling for the Port of Barcelona, and also the absence (so far) of new records in the area. According to the 2004 Barcelona harbour statistic (<http://www.apb.es/>), over 5.5 million tonnes of cargo was handled from countries where *C. feriata* is native.

The occurrence of native Mediterranean serpulid polychaete epibionts on the carapace of the individual examined (D. Martín, pers. comm.) indicates that it had spent at least some weeks in Mediterranean waters. No epibiont species from its native range was found.

Two other species of the genus *Charybdis* (*Charybdis hellerii* and *Charybdis longicollis*) are known to have been introduced as Lessepsian migrants into the Mediterranean Sea and occur in self-sustaining populations with a distribution area stretching from Egypt to Turkey (Galil et al.

2002). *Charybdis helleri* has also been successfully introduced in the central western Atlantic Ocean (e.g. Lemaitre 1995; Dineen et al. 2001).

Another species of the genus, *Charybdis japonica*, has also spread to New Zealand and South Australian waters (Smith et al. 2003).

Concerning the nomenclature of the species, the binomial *Charybdis feriata* (Linnaeus, 1758) has been used in this note, versus *Charybdis*

feriatus (Linnaeus, 1758), also widely used. The genus *Charybdis* should be considered as belonging to the feminine gender, in accordance with Greek mythology and to the International Code of Zoological Nomenclature (articles 30.1.2, 34.2, and 48). Another synonym often used for the species is the name *Charybdis cruciata* (see Apel and Spiridonov 1998 for further details).

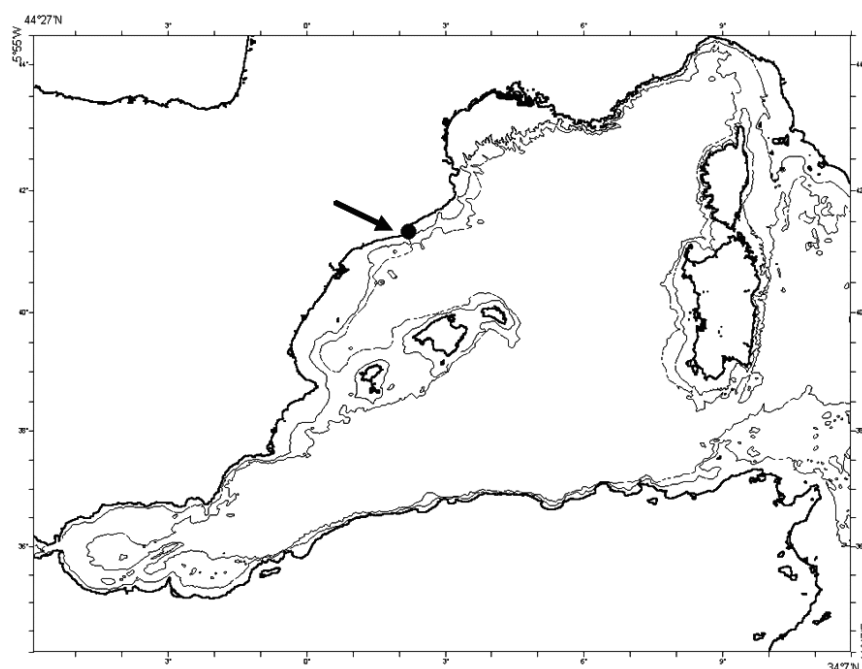


Figure 2. Location of the present record of *Charybdis feriata* (Linnaeus, 1758) off Barcelona in the western Mediterranean (black arrow). 200 and 1000 m isobaths are shown.

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References

- Apel M and Spiridonov VA (1998) Taxonomy and zoogeography of the portunid crabs (Crustacea: Decapoda: Brachyura: Portunidae) of the Arabian Gulf and adjacent waters. *Fauna of Arabia* 17: 159-331
- Dineen JF, Clark PF, Anson HH, Reed SH and Walton HP (2001) Life history, larval description, and natural history of *Charybdis hellerii* (Decapoda, Brachyura, Portunidae), an invasive crab in the western Atlantic. *Journal of Crustacean Biology* 21: 774-805
- Galil BS, Frogliia C and Noël P (2002). CIESM Atlas of exotic species in the Mediterranean. 2. Crustaceans. CIESM Publishers, Monaco, 192pp
- Galil BS and Zenetos A (2002) A sea change - Exotics in the eastern Mediterranean. In: Leppäkoski E, Olenin S and Gollasch S (eds) *Invasive aquatic species of Europe: Distributions, impacts and management*, pp 325-336. Kluwer Academic Publishers, Dordrecht

- Gollasch S (2002) The importance of ship hull fouling as a vector of species introductions into the North Sea. *Biofouling* 18(2): 105-121
- Lemaitre R (1995) *Charybdis hellerii* (Milne Edwards, 1867), a nonindigenous portunid crab (Crustacea: Decapoda: Brachyura) discovered in the Indian River Lagoon system of Florida. *Proceedings of the Biological Society of Washington* 108: 643-648
- Linnaeus C (1758). *Systema Naturae per Regna Tria Naturae, Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis Synonymis, Locis*. Edition 10. Holmiae. 1: iii + 1-824
- Ng PKL (1998) Crabs. In: Carpenter KE and Niem VH (eds) *The living marine resources of the Western Central Pacific*. Vol. 2, pp 1046-1155. Food and Agriculture Organization of the United Nations, Rome
- Parado-Esteva FD, Quinitio ET and Rodriguez EM (2002). Seed production of the Crucifix Crab *Charybdis feriatus*. *Aqua KE Government Documents* 7(3): 37
- Smith PJ, Webber WR, McVeagh SM, Inglis GJ and Gust N (2003) DNA and morphological identification of an invasive swimming crab, *Charybdis japonica*, in New Zealand waters. *New Zealand Journal of Marine and Freshwater Research* 37: 753-762
- Stephenson W (1972) An annotated check-list and key to the Indo-west-Pacific swimming crabs (Crustacea: Decapoda: Portunidae). *Bulletin of the Royal Society of New Zealand* 10: 1-64
- Stephenson W, Hudson JJ and Campbell B (1957) The Australian portunids (Crustacea: Portunidae) II. The genus *Charybdis*. *Australian Journal of Marine and Freshwater Research* 8(4): 491-507
- Yan Y, Huang L and Miao S (2004) Occurrence of the epizoic barnacle *Octolasmis angulata* on the crab *Charybdis feriatus* from Daya Bay, China. *Journal of the Marine Biological Association of the United Kingdom* 84: 619-620