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RESEARCH

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# First recorded occurrence of *Cheirocratus robustus* Sars, 1894 in the British Isles

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## Abstract

**Background:** Collections of the amphipod genus *Cheirocratus* from the North Sea and Ireland proved to include *C. robustus* Sars a species previously known only from Norway and Sweden.

**Results:** Material of *C. robustus* is described and figured from the Humber and Ireland together with the closely related species *C. sundevalli* (Rathke). A key to males of the *Cheirocratus* species of the North East Atlantic and Mediterranean is provided.

**Conclusions:** *C. robustus* is shown to be widespread in the eastern North Atlantic where it was previously overlooked.

**Keywords:** Amphipoda, *Cheirocratus robustus*, British Isles, New record

## Background

Collections of *Cheirocratus* from the Humber region of the North Sea and from several localities on the West Coast of Ireland, proved to include specimens of *C. robustus* Sars, a species previously recorded only from Norway and Sweden and probably overlooked elsewhere.

## Methods

Specimens were preserved in 70% ethanol. Dissection was made under a Wild stereomicroscope and body parts were mounted on microscope slides in glycerine for drawing with a drawing tube on a Nikon compound microscope. In the diagnoses, character states that distinguish *C. robustus* from *C. sundevalli* are listed in bold.

Material is deposited in the National Museum of Ireland, Natural History. (NMINH) and Goteborgs Naturhistoriska Museum (GNM) Sweden.

## Results

### Systematics

Order Amphipoda Latreille, (Latreille 1816)  
Suborder Senticaudata Lowry & Myers, (Lowry & Myers 2013)

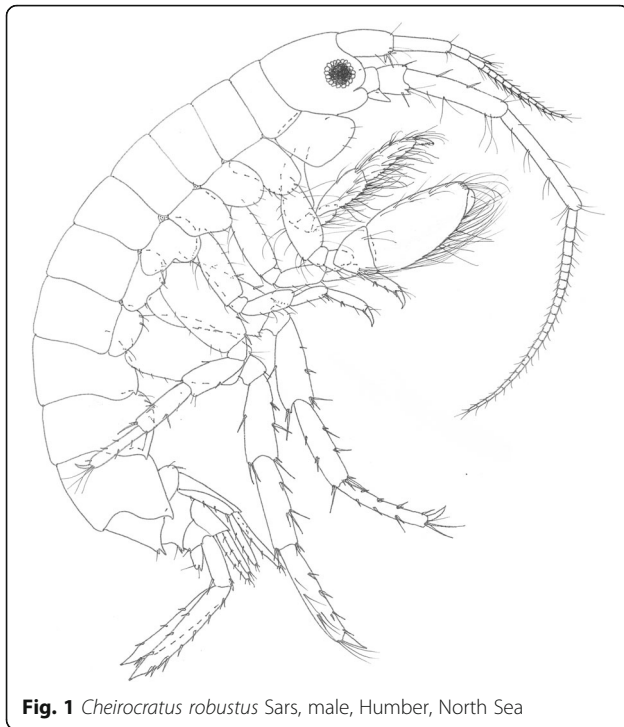
Infraorder Hadziida S. Karaman, (Karaman 1932)  
Superfamily Calliopoidea Sars, (Sars 1893)  
Family Cheirocratidae d'Udekem d'Acoz, (D'Udekem d'Acoz 2010)  
*Cheirocratus robustus* Sars.  
(Figs. 1, 2 and 3)  
*Cheirocratus robustus* Sars, (Sars 1894): 526, pl. 185, fig. 2.—Oldevig, (Oldevig 1932): 186, pl.2, fig. 2.

### Material examined

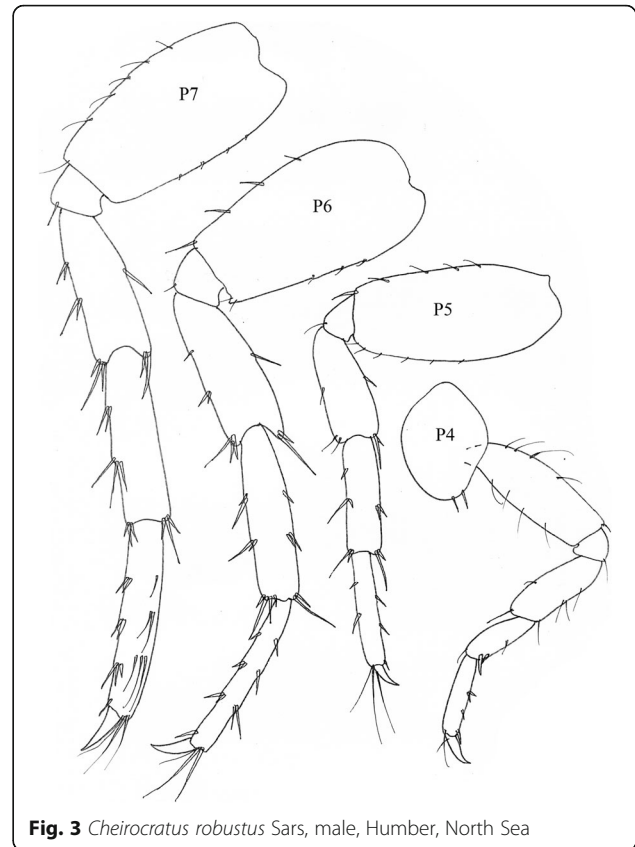
Three males, six females (NMINH 2016.16.1), RSMP H 0205 Baseline (53.431843°N, 0.38073°E), Humber region of North Sea, 10 m depth, gravel, 23.09.2014, IECS (collected by MESL) one male, one female (NMINH 2016.16.2) RSMP H 0293 Baseline (53.414395°N, 0.52727°E), Humber region of North Sea, 12 m depth, gravel, 23.09.2014, IECS (collected by MESL); one female (NMINH 2016.16.3), RSMP H 0211 Baseline (53.437086°N, 0.398443°E), Humber region of North Sea, 11 m depth, gravel, 23.09.2014, IECS (collected by MESL); one male (NMINH 2016.16.4), Marine Harvest salmon farm, Inishdoonver, Clew Bay, Co Galway, Ireland, 21.5 m depth, current 17 cm/sec, 50 m from edge of salmon cage, 07.08.2013; one male (NMINH 2016.16.5), JN1067, Rutland Island, 01.09.2010, RUG38; three males, eight females, two immature (NMINH 2016.16.6), JN1006, Kilkieran, 14.10.2010, KKG 17; two males, three females (NMINH 2016.16.7), JN1066, Valentia 16.9.2010, VAG 14; three males, (NMINH 2016.16.8) Hum Agg, 2014, sample

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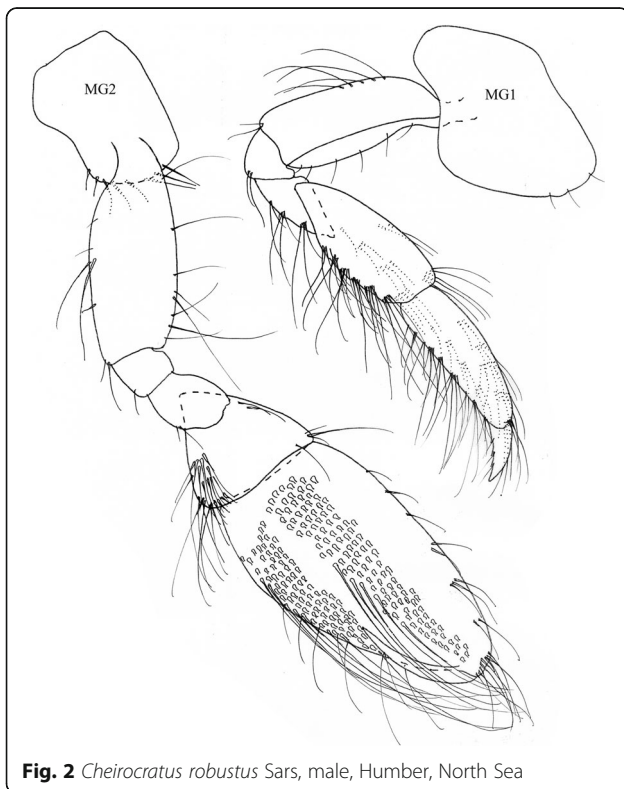
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**Fig. 1** *Cheirocratus robustus* Sars, male, Humber, North Sea



**Fig. 3** *Cheirocratus robustus* Sars, male, Humber, North Sea



**Fig. 2** *Cheirocratus robustus* Sars, male, Humber, North Sea

523; 11 males, seven females, (GNM 9907), Gullmarfjord, Gullmar strömmar, Sweden, 58°15'10"N 11°30'00"E, 15 m, stone, gravel and sand, living and dead algae, 31.07.1921, Hugo Oldevis; two males, three females, (GNM 9908) Gullmarfjord, Gullmar strömmar, Sweden, 58°15'10"N 11°30'00"E, 6–10 m, dead algae, gravel. 31.07.1921, Hugo Oldevis.

#### Diagnosis

Head with cheek notch; antenna 2 much longer than antenna 1; male gnathopod 2 much larger than gnathopod 1; **male gnathopod 1 robust**, basis subovoid, **without anterodistal spine**, carpus and propodus subequal in length, dactylus stout; **male gnathopod 2 propodus inner face heavily clothed in long setae**, inner face without medial ridge, spine or robust setae, but with **small bifid protubance distally**; pereopods 5–7 robust, pleon segment 1 with three strong dorsal spines; uropod 3 biramous, rami long, subequal in length, distally acute.

#### Discussion

This is the first record of *C. robustus* Sars from the British Isles. It was previously known only from Norway, Sars, (Sars 1894) (59°91'23"N, 10°74'92"E to 63°43'05"N, 10°39'51"E) and Sweden (see material examined). It can be distinguished in general from its close congener *C. sundevallii* by its much more

robust appendages. The male gnathopod 1 lacks an anterodistal spine on the basis, has the carpus and propodus subequal in length, and has a stout dactylus (*C. sundevallii* male gnathopod 1 has anterodistal spine, carpus much longer than propodus and a slender dactylus). In *C. robustus*, the gnathopod 2 has dense setae over much of the inner face of the propodus that lacks ridges, spine or robust setae medially on the inner face. It does have a small protrubence on the distal end of the inner face but this cannot be viewed without removal of some of the dense setation (*C. sundevallii* has dense setae restricted to the outer margin of the inner face of the propodus and has a ridge on the inner face bearing medially a spine and two robust setae and distally a blunt irregular spine bearing a robust seta). The absence of *C. robustus* from the diagnostic key to Irish and British marine Amphipoda in Lincoln (Lincoln 1979) and the superficial similarity of *C. robustus* to *C. sundevallii* probably explains why *C. robustus* was overlooked in the past and confused with *C. sundevallii*. All previous records of *C. sundevallii* in British and Irish waters must be regarded with caution.

*Cheirocratus sundevallii* (Rathke)

(Fig. 4)

*Gammarus sundevallii* Rathke, (Rathke 1843): 65.

*Cheirocratus sundevallii*: Stebbing, (Stebbing 1888): 204.– Stebbing, (Stebbing 1906): 418.– Chevreux & Fage, (Chevreux & Fage 1925): 223.– Lincoln, (Lincoln 1979): 308, fig. 144.– Karaman, (Karaman 1982): 267, fig. 182.

*Cheirocratus sundevallii*: Sars, (Sars 1894): 524, pl. 184, 185.

*Liljeborgia shetlandica* Bate & Westwood, (Bate & Westwood 1863): 206.

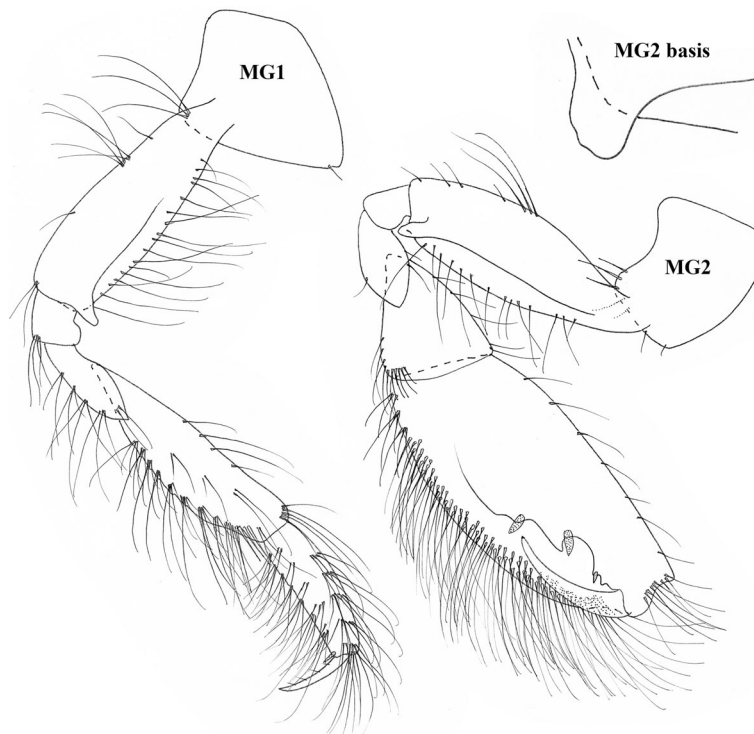
*Protomedeia whitei* Bate, (Bate 1862): 169.

#### Material examined

Three males, five females (NMINH 2016.16.9), JN1066, Valentia, 16.9.2010, VAG 13; one male (NMINH 2016.16.10), JN1066, Valentia, 16.9.2010, VAG 16; two males, one female (NMINH 2016.16.11), JN1066, Valentia, 16.9.2010, VAG 14; one male, one female (NMINH 2016.16.12), Carnsore point, C72 52.267 N 6.213 W in 29 m, 1977, Gravel, D. McGrath.

#### Diagnosis

Head with cheek notch; antenna 2 much longer than antenna 1; male gnathopod 2 much larger than gnathopod 1; **male gnathopod 1 very slender, basis subovoid, with strong anterodistal spine, carpus much longer than propodus, dactylus slender; male gnathopod 2 basis with small anterodistal spine, propodus heavily clothed in long setae on the posterior margin of the**



**Fig. 4** *Cheirocratus sundevallii* (Rathke), male, Valentia, Ireland

inner face, lacking long setae on the centre of the inner face, but with scalloped ridge bearing a spine and two (Lincoln (1979) figures three) robust setae medially and a small, blunt, irregular spine distally that bears a robust seta; pereopods 5–7 relatively feeble, pleon segment 1 with three strong dorsal spines; uropod 3 biramous, rami long, subequal in length, distally acute.

## Discussion

*C. sundevalli* is widespread in the North East Atlantic and Mediterranean. For differences between *C. sundevalli* and *C. robustus*, see the remarks for that species.

Key to the male *Cheirocratus* of the N.E. Atlantic and Mediterranean

1. Urosome segment 1 with median dorsal spine.....*C. monodontus*  
Urosome segment 1 with three dorsal spines.....2
2. Gnathopod 2 propodus palm with multiple spines.....*C. assimilis*  
Gnathopod 2 propodus palm without spines.....3
3. Gnathopod 2 propodus broadest proximally, dactylus not folding across face of propodus.....*C. intermedius*  
Gnathopod 2 propodus sub-ovoid, dactylus folding across face of propodus .....4
4. Gnathopod 1 basis without anterodistal spine, propodus equal to carpus; gnathopod 2 basis without anterodistal spine, propodus inner face clothed in dense and very long setae and lacking medial spine or robust setae.....*C. robustus*  
Gnathopod 1 basis with anterodistal spine, propodus half the length of carpus; gnathopod 2 basis with anterodistal spine, propodus with dense very long setae on posterior margin of inner face only and with a medial ridge bearing a spine and 2–3 robust setae.....*C. sundevallii*

## Conclusions

*Cheirocratus robustus* Sars previously known only from Norway and Sweden is now shown to be widespread in the British Isles, occurring in the North Sea and along the west coast of Ireland.

## Abbreviations

G1–2: Gnathopod 1–2; M: Male; P3–7: Pereopods 3–7

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## Availability of data and materials

Material is stored in the National Museum of Ireland Natural History, Dublin and Goteborgs Naturhistoriska Museum (GNM) Sweden.

## Authors' contributions

Taxonomic expertise, descriptions and illustrations of taxa AM, Taxonomic expertise DMcG, collection and ecological input WM. All authors read and approved the final manuscript.

## Competing interests

The authors declare that they have no competing interests.

## Consent for publication

Consent to publication has been granted by the British Marine Aggregate Producers Association, Tarmac Marine Ltd and Hanson Aggregates Marine Ltd.

## Ethics approval and consent to participate

There are no ethical considerations.

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