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Research Article

Confirmed records of Japanese blunthorn lobster *Palinustus waguensis* (Decapoda: Palinuridae) from the northern coastal waters of Oman

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Abstract

The Japanese blunthorn lobster *Palinustus waguensis* was recorded in the coastal waters of Oman in April and May 2015, and November 2018. The total length of lobsters ranged from 11.4 to 14.0 cm, weight was 48-109 g. The present report represents the first record of this rare species from the Gulf of Oman and expands its known range to the north-west of the Indian Ocean. Descriptions, illustrations, and morphometric data for specimens caught in 2015 are presented.

Keywords: Lobster, *Palinustus waguensis*, Morphometrics, Oman

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Introduction

Spiny lobsters of genus *Palinustus* have five recognized species including one species *P. truncatus* known from the Caribbean Island of the western Atlantic, and four Indo-West Pacific species: *P. holthuisi* (Taiwan and Japan), *P. mossambicus* (Mozambique, Somalia), *P. unicornutus* (South Africa to Îles Glorieuses, Comoro Islands, Japan, Indonesia, and New Caledonia), and *P. waguensis* which is widely distributed from Japan to Taiwan, Philippines, Indonesia, Thailand, India, and Madagascar (Chan and Yu, 1995).

Along the Oman coast in the Gulf of Oman (Sea of Oman), the first specimen of blunthorn lobster, *Palinustus waguensis* was caught by a local fisherman using a bottom set gillnet at about 80 m depth in April 2015. We captured three more individuals at the same place using the same fishing gear in May 2015. In November 2018, a fisherman caught several more specimens in a fishing cage at the depth of 70–85 metres off Muscat (Seeb area). This finding was about 130 km to the southeast from the first records. The total length of these lobsters ranged from 11.5 to 14.0 cm, and weight varied between 48–109 grams. The information about the second group of lobsters was published in the "Times of Oman" and "Muscat Daily" newspapers.

The present paper describes the morphology and morphometrics of *P. waguensis* based on the measurements of four specimens, which were collected for the first time in the Omani waters.

Materials and methods

On 27 April 2015 an unusual lobster specimen was caught by a local fisherman from the Omani waters near Shinas (Fig. 1) and transferred to the Fisheries Research Center in Salalah for identification. On 7 May 2015, three more specimens were collected by the second author (NMA) in the same place off Shinas (24°41´17 N, 56°32´6 E) by a bottom gillnet which was set at about 80 m depth on a rocky and sandy bottom.

These four lobsters were measured in the laboratory using an electronic vernier calliper to the nearest 0.01 mm and weighed using electronic balance to the nearest 0.01 g.

Terminology and description generally follow Chan and Yu (1995). Morphometric measurements were taken based on the picture of Chan (1998), on the general shape of a spiny lobster, which we are slightly modified (Fig. 2), as follows: total length mid-dorsally from the anterior margin of the carapace between the frontal horns to the posterior margin of telson; carapace length from the anterior margin to the posterior carapace edge; carapace width as the maximum width; abdominal length as total abdominal length excluding the telson; first to six abdominal segment width dorsally as dimension between margin spines; antennular length; length of antenna and separately antennal peduncle and

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antennal flagellum lengths; lengths of 1–5 walking legs. All measurements were calculated as a percentage of carapace length (CL). Meristic characters were counted as the number of spines between horns on anterior margin of the carapace, the number of spines on anterior margin of frontal horn and the number of spinules on the anteromedian margin of epistome.

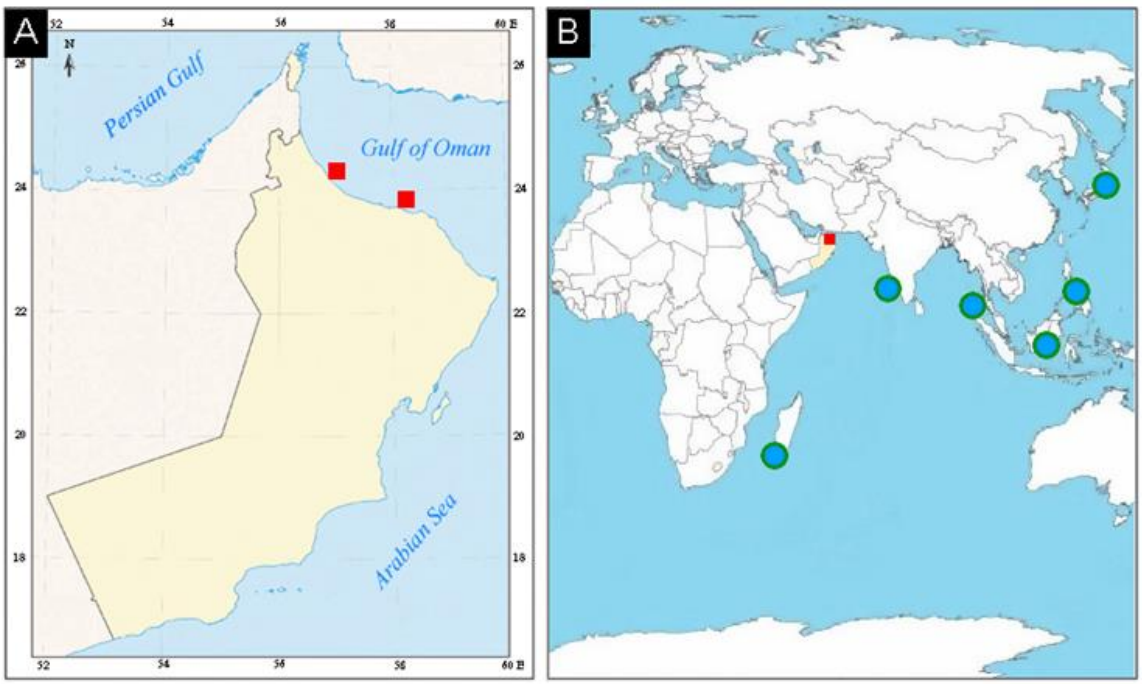


Figure 1: Map showing the new records of *Palinustus waguensis* in the waters of Oman (A, squares) and the modified map of its previous records (B, circles) from Chan and Yu (1995).

All measurements were calculated as percentage of standard length (SL) and head length (HL). The specimens are deposited in the Fisheries Research Center-Dhofar, Oman.

Results

Four specimens found in the coastal waters of Oman in May-April 2015 were males, measured from 39.7 to 43.1 mm in carapace length, 113.9–126.2 mm in total length and 55.5-76.2 g in weight (Fig. 3).

We identified this species following Holthuis (1991) and Chan and Yu (1995) as Japanese blunthorn lobster, *Palinustus waguensis* Kubo, 1963 and this identification was confirmed by Dr. T.Y. Chan.

Systematics

Order DECAPODA Latreille, 1802

Infraorder ACHELATA Scholtz and Richter, 1995

Family PALINURIDAE Latreille, 1802

Genus *Palinustus* A. Milne-Edwards, 1880

Species: *Palinustus waguensis* Kubo, 1963

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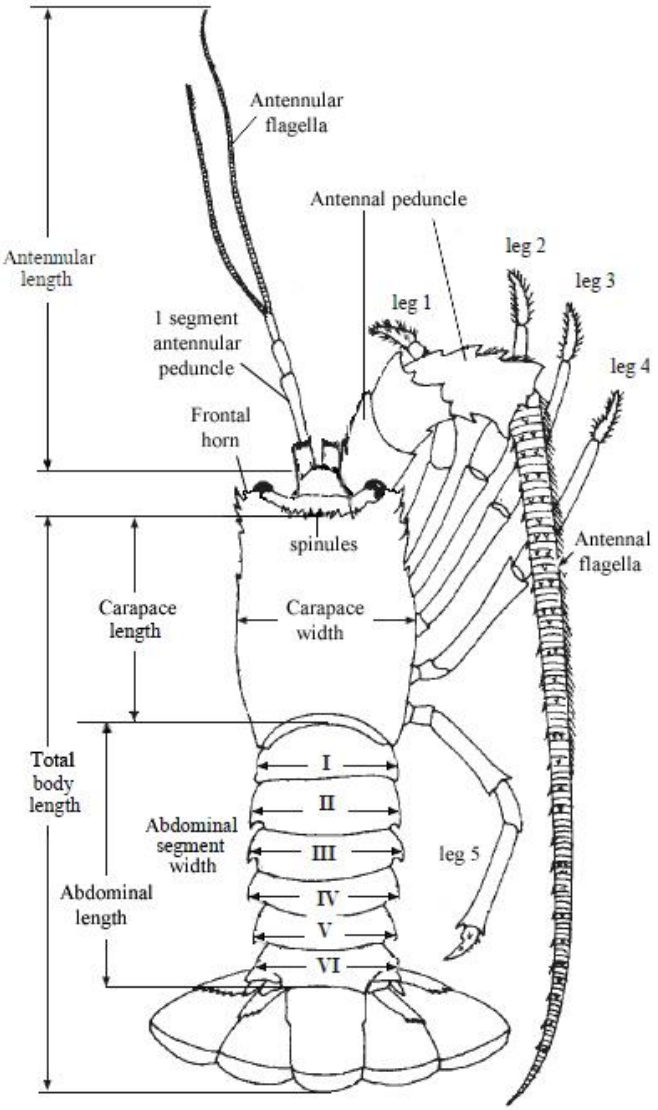


Figure 2: Scheme of measurements and general shape of a spiny lobster, modified from Chan (1998).

Description

Morphometric measurements and counts of *Palinustus waguensis* from Omani waters are presented in Table 1. Total body length was about 3 times longer than carapace length (295±2.5% CL). Antenna long, antennal flagellum was longer than total body length. Proximal (1st) segment of antennular peduncle was approximately 1.4 times longer than antennal peduncle that is distinguished characteristic for the genus *Palinustus* (Holthuis, 1991; Chan, 1998). Antennular flagellum was shorter than the last segment of the antennular peduncle. The second abdominal segment was the widest, then the abdomen narrowed to the 5th segment. Second and third pairs of walking legs were almost equal in length, the longest was third pair with about 265% CL.

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Figure 3: ***Palinustus waguensis*****, adult male, 43.1 mm CL, from the coastal waters of Oman.**

Anterior margin of carapace between frontal horns bearing 5−7 spines (Fig. 4). Frontal horns truncated, with 5−7 distinct spines on inner margins. According to Holthuis (1991), the presence of several distinct spines on anterior margin of carapace as well as inner margin of the frontal horns are distinguished features of the species, while following Chan and Yu (1995) anterior margin of carapace between frontal horns provided with 0 to 8 spines and inner margin of supraorbital horn armed with 0−5 spines. Epistome armed with 3 to 5 spinules on the anteromedian margin. Antennal peduncle armed with many spines with one distinctly long spine on distal part. Carapace was heavily pubescent with rows of regular spines along lateral edges. Postorbital spine is shorter than antennal and branchiostegal spines. Anterior margin of abdominal pleurons are spinous, pleuron of II−VI somites having 2 spines. Margin of abdominal sternites distinctly serrated. Abdominal sternite VI with medial spine and 7−9 spinules, while from Chan and Yu (1995), sternite VI armed with strong median tooth and 8−12 other teeth. Dactylus of walking legs was simple.

Coloration

Body was generally reddish. Antennular flagellum, antennal flagellum and walking legs were with broad pale bands. Eyes were dark brown. Maxillipeds were covered with red bands. Hinges between carapace and abdomen, as well as inner bases of endopods of uropods, were with a pair of large white spots.

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Table 1: Morphometric data for specimens of *Palinustus waguensis* collected in the coastal waters of Oman, with average (± S.D.), minimum and maximum values in percent of carapace length.

Character	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Average ± S.D. (%)	Min. (%)	Max. (%)
Total length (mm)	126.2	117.4	113.9	122.9	294.7 ± 2.5	293	298
Carapace length (mm)	43.1	39.7	38.9	41.3	100.0	–	–
Carapace width (mm)	37.3	34.2	33.9	35.9	86.7 ± 0.5	86	87
Abdominal length (mm)	53.9	51.1	48.1	51.5	125.5 ± 2.1	124	129
1st abdominal segment width (mm)	28.7	26.6	25.2	26.5	65.6 ± 1.3	64	67
2nd abdominal segment width (mm)	29.8	28.3	27.3	29.0	70.2 ± 0.9	69	71
3d abdominal segment width (mm)	28.6	27.4	25.4	27.8	66.9 ± 1.6	65	69
4th abdominal segment width (mm)	27.5	25.7	25.0	26.5	64.3 ± 0.4	64	65
5th abdominal segment width (mm)	26.6	24.8	23.8	25.2	61.6 ± 0.6	61	62
6th abdominal segment width (mm)	27.9	26.6	25.0	26.4	65.0 ± 1.4	64	67
Antenna length (mm)	176.0	170.0	164.0	–	419.2 ± 10.0	408	428
Antennal peduncle length (mm)	33.3	31.4	29.2	33.82	78.3 ± 2.9	75	82
Antennal flagellum length (mm)	143.2	138.9	134.6	–	342.5 ± 9.3	332	350
Antennula length (mm)	99.8	93.3	88.6	95.4	231.3 ± 2.9	228	235
1st segment of antennular peduncle (mm)	47.2	43.7	41.7	46.3	109.8 ± 2.1	107	112
1st walking leg length	95.9	89.9	86.0	87.8	220.7 ± 5.7	213	227
2nd walking leg length	111.5	106.0	103.3	107.2	262.7 ± 4.0	259	267
3d walking leg length	113.4	106.8	102.5	–	264.9 ± 3.3	263	269
4th walking leg length	100.9	99.2	94.4	97.0	240.4 ± 7.3	234	250
5th walking leg length	90.1	88.4	85.1	–	216.7 ± 6.9	209	223
No. spines between horns of carapace	5	7	5	7	6.0 ± 1.2	5	7
No. spinules on inner margin of frontal horn	4	6	7	5	6.0 ± 0.8	4	7
No. spinules on margin of epistome	5	4	3	4	4.0 ± 0.8	3	5
Total weight (g)	76.16	59.92	55.48	62.71	63.6 ± 8.9	55.48	76.16

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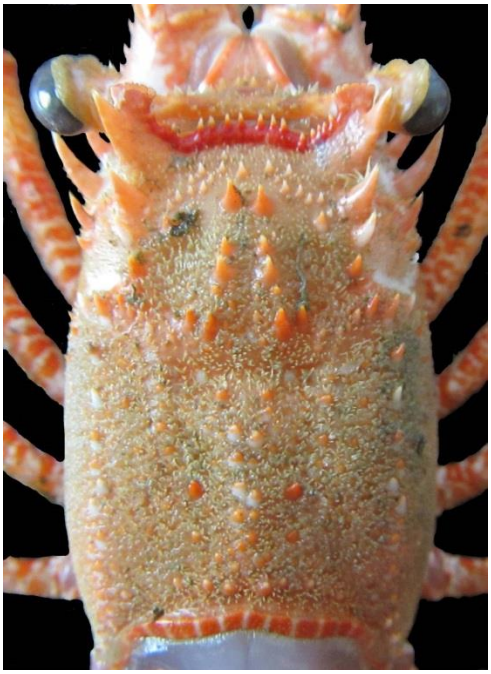


Figure 4: Dorsal view of carapace of *P. waguensis* from Oman.

Discussion

As reported by SeaLifeBase (Palomares and Pauly, 2019) the lobster fauna of Oman consists 13 species, including five species of spiny lobsters (*Panulirus homarus*, *P. ornatus*, *P. penicillatus*, *P. versicolor*, *Puerulus sewelli*), five slipper lobsters (*Acantharctus ornatus*, *Eduarctus martensii*, *Scammarctus batei*, *Scyllarides squammosus*, *Thenus orientalis*), two clawed lobsters (*Nephropsis stewarti*, *N. suhmi*), and a blind lobster (*Pentacheles gibbus*) However, common and known lobsters in Oman represented by only four species: scalloped spiny lobster *P. homarus*, painted spiny lobster *P. versicolor*, blunt slipper lobster *S. squammosus* and flathead lobster *Thenus orientalis* (Al-Abdessalaam, 1995). One more spiny lobster species as Arabian whip lobster *P. sewelli* was found recently (Al-Nahdi *et al*., 2008). Therefore, the present records of *Palinustus waguensi* improve knowledge about biodiversity and marine carcinofauna of Oman.

Recently, several papers reported findings of *P. waguensis* in the Indian Ocean along the southeast coast of India (Kizhakudan and Thirumilu, 2006; Kizhakudan *et al*., 2012) and in the Arabian Sea along the southwest and central west coast of India (Chakraborty *et al*., 2014; Purushottama and Saravanan, 2014). The several findings of *P. waguensis* in the Omani waters are the first and confirmed record of the species in the Gulf of Oman that extending knowledge on its distributional range to the north-west of the Indian Ocean.

According to Chan and Yu (1995), the large variations in the distinguishing characteristics of *P. waguensis* have caused some confusion in the taxonomy of *Palinustus*. Actually, a full revision of the genus is needed using modern

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biochemical and molecular genetic methods.

The lobsters of genus *Palinustus* mainly inhabit deep reef slopes, generally considered to be very rare and are difficult to collect (Chan and Yu, 1995). The specimens of *P. waguensis* from India and Philippines were taken in depths of 72−84 meters, and juveniles from Ambiona (Indonesia) were collected from a depth of about 180 m (Holthuis, 1991). Records of *P. waguensis* along the southeast coast of India were from trawler landings operating in the depths ranging of 300−450 meters (Kizhakudan and Thirumilu, 2006). The lobsters caught in the Arabian Sea along the coast of India were among the trawl landings from a depth of 150−250 m (Chakraborty *et al*., 2014), and also from 80 m depth (Purushottama and Saravanan, 2014). The specimens from the Omani waters were caught by a bottom set gillnet at about 80 m depth. Hence, *P. waguensis*, which was recorded in depths between 72 and 450 meters, maybe considered as a deep-sea species inhabiting mainly the mid and outer continental shelf, and continental slope.

P. waguensis is a relatively small-size spiny lobster. According to Chan (1998), maximum total body length is about 140 mm. A single specimen caught off the Mangalore coast had 150 mm of total length and 70 g (Purushottama and Saravanan, 2014). Holthuis (1991) reported the largest carapace length as 32 mm and Chan and Yu (1995) 45.4 mm. The specimens landed from the southeast coast of India off Cuddalore measured 40−52 mm CL (Kizhakudan *et al*., 2012). The larger lobsters were found in trawler landings at Chennai, where the specimens' size ranged 53−75 mm CL in August (Kizhakudan and Thirumilu, 2006). The specimens from Omani waters have size close to a maximum known for the species, reaching 43.1 mm CL or 126 mm TL in 2015 and 140 mm TL in 2018.

Currently, there is no commercial fishery for this relatively rare species in any country, although some lobster catches in India were abundant (Kizhakudan and Thirumilu, 2006). In Japan when the fishermen, capture this lobster in their nets, they sell them to the public aquaria (Holthuis, 1991). The present findings of *P. waguensis* in the Omani coastal waters for the first time during a long history of the intensive lobster fishery indicate that this lobster is unlikely to become a target species for the fishery.

As mentioned above, 13 species of lobsters reported in fauna of Oman, however only five species, including *P. waguensis*, was actually found. Sultana *et al.* (2009) reviewed lobsters of Pakistan and reported a total of 16 species assigned to eight genera. The current list of known lobsters from Indian coast includes 30 species from 16 genera (Radhakrishnan, 2015). In view of the fact that the lobster fauna in Oman is poorer studied than in the neighbouring countries, it seems likely

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that new distribution and confirmation records of lobsters await discovery.

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