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# *Ampelisca lusitanica* (Crustacea: Amphipoda): new species for the Atlantic coast of Morocco

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## Abstract

**Background:** This study reports for the first time the presence of the Lusitanian ampeliscid amphipod *Ampelisca lusitanica* Bellan-Santini & Marques, 1986 in the northwestern Atlantic coast of Morocco.

**Methods:** Specimens were collected in January 2015 from intertidal rock pools along the El Jadida shoreline associated with the brown algae *Bifurcaria bifurcata* and *Sargassum muticum*.

**Results:** Systematic description of the species is presented, as well as a discussion of its ecological and geographical distribution.

**Conclusion:** This new finding extends the geographical distribution from the Lusitanian (Europe) to the Mauritanian (Africa) region and increases knowledge of the ecology and the global distribution of *A. lusitanica* found, previously, only on Portuguese and Spanish coasts.

**Keywords:** *Ampelisca lusitanica*, Amphipoda, epifauna, Atlantic coast, Morocco

## Introduction

Crustacean amphipods are distributed in all ecosystems worldwide including terrestrial, freshwater and marine aquatic environments (Mosbahi et al. 2015). They often play a critical role in aquatic food webs, acting as conduits of nutrients and energy to higher trophic levels (Vainola et al. 2008). The Ampeliscidae is one of the most diversified amphipod families in the ocean (Barnard and Karaman 1991). This family is commonly found in a variety of habitats from shallow to deep waters although some species are restricted to limited bathymetric ranges and sediment types (Dauvin et al. 2012). Ampeliscid communities are generally composed of several species belonging to three dominant genera: *Ampelisca*, *Byblis*, and *Haploops*. The genus *Ampelisca* Krøyer, 1842 is a diverse benthic genus of marine amphipods, containing approximately 236 species (WORMS 2017) mainly reported from shallow waters with a worldwide distribution (Dauvin 1988; Dauvin and Bellan-Santini 1988; Filhoa et al. 2009; Dauvin et al. 2012). In the

northeastern Atlantic region between the northern coast of Norway and the Gulf of Guinea, *Ampelisca* is represented by more than 52 valid species (Dauvin and Bellan-Santini 1988). *Ampelisca* species are found from the intertidal zone to abyssal depths, but most of them live on the continental shelf (Bellan-Santini and Dauvin 1988a; Dauvin 1988; Dauvin and Bellan-Santini 1988). Among *Ampelisca* species, the Lusitanian marine amphipod *Ampelisca lusitanica* Bellan-Santini and Marques, 1986 was reported first from the Atlantic coast of Portugal (Bellan-Santini and Marques 1986) and later from the northeastern Atlantic coast of Spain (Martínez et al. 2007).

The present paper reports the first discovery of *A. lusitanica* in North African Atlantic marine waters (littoral of El Jadida, NW Morocco). Some data on the external morphology, ecology and distribution of the species are provided.

## Material and methods

Samples were collected as a part of a study on macroalgae-associated epifauna in the northwestern Atlantic coast of Morocco. Seaweed species were carefully removed from the intertidal substratum, and

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placed in plastic bags with 5% formalin. In the laboratory, macroalgae were washed in fresh water to collect the majority of the associated fauna. Specimens were sieved (0.5 mm mesh size), sorted and preserved (70% ethanol) for later identification and counting. *Ampelisca lusitanica* specimens were conserved separately, examined and identified according to descriptions provided by Bellan-Santini and Marques (1986), and Dauvin and Bellan-Santini (1988).

## Results

### Systematics

Order AMPHIPODA Latreille, 1816

Suborder GAMMARIDEA Latreille, 1802

Family AMPELISCIDAE Krøyer, 1842

Genus *Ampelisca* Krøyer, 1842

*Ampelisca lusitanica* Bellan-Santini and Marques, 1986

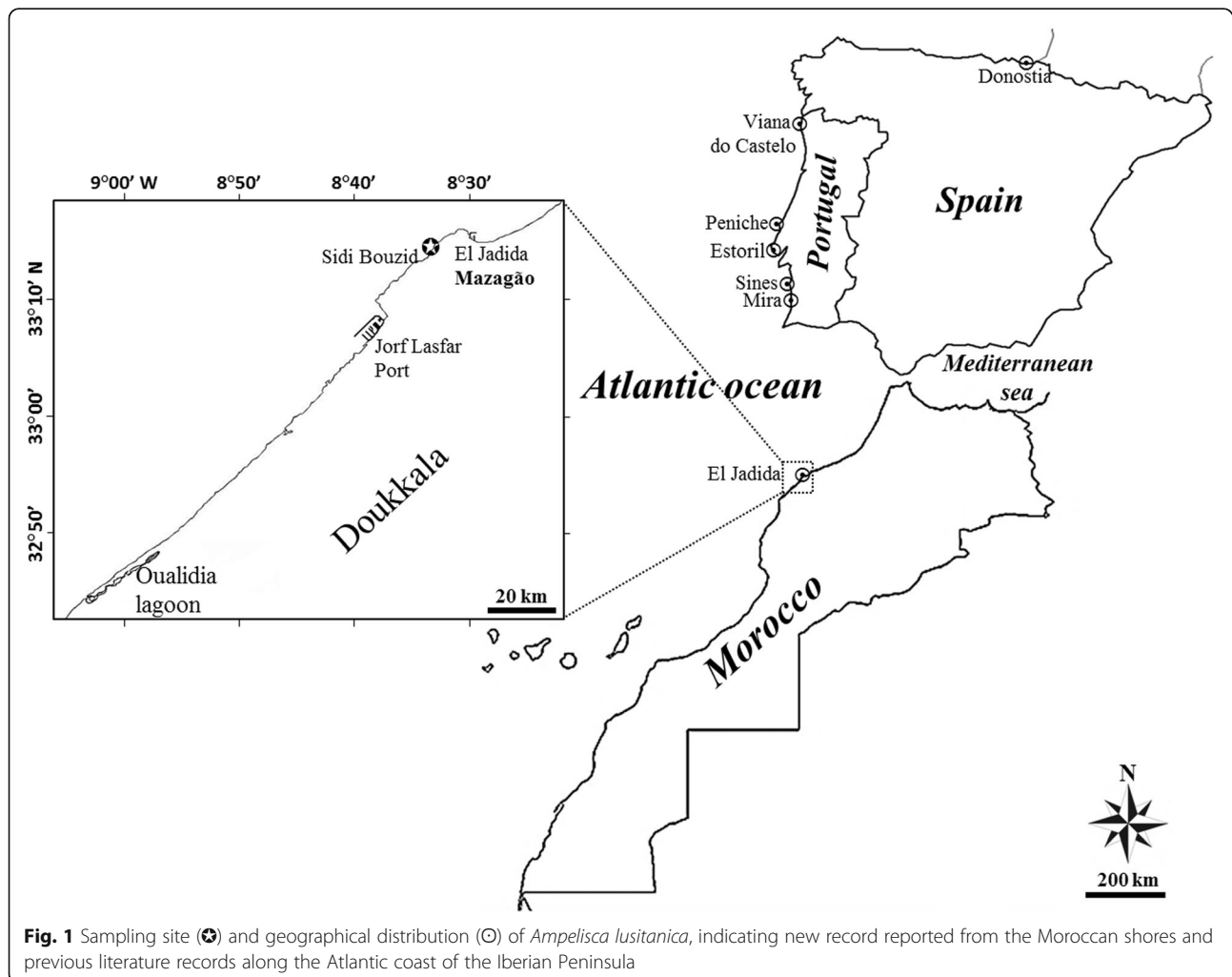
### Material examined

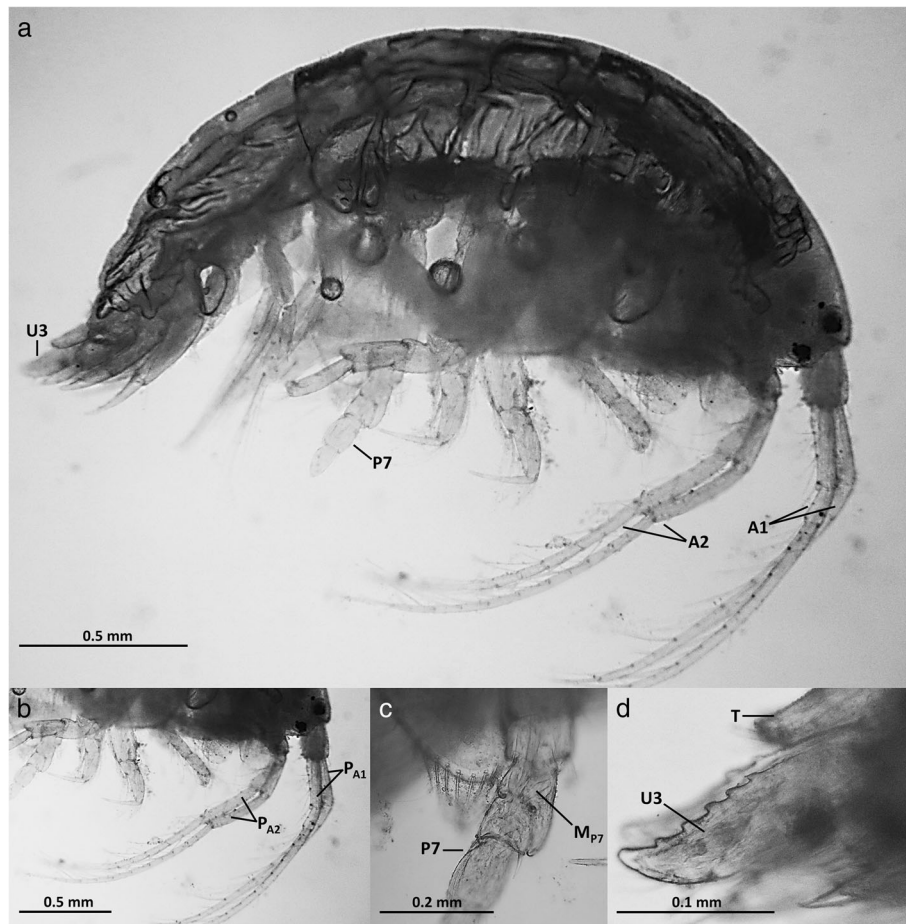
A total of 6 individuals of the amphipod *A. lusitanica* with size ranging between 1 and 4 mm, were found associated

to the brown algae *Bifurcaria bifurcata* and *Sargassum muticum* collected from the intertidal areas of El Jadida shorelines (33° 10' 50.2" N - 8° 36' 56.5" W) in January 2015 (Fig. 1). Among the collected individuals, two specimens were juveniles and four were adults.

### Description

*A. lusitanica* can be distinguished from other *Ampelisca* species by the following characters (Fig. 2): The head is obliquely truncated, shorter than the three first segments of the pereon. The lower pair of eyes set at lower front corners of the head. The first antenna is shorter than A2 reaching the middle of its flagellum. The latter is about half the length of the body (Fig. 2a, b). The third epimeral plate is rounded-quadrate at the postero-distal corner. Pereopod 7 has the basis distally rounded; the merus (without a large posterior lobe) is shorter than the carpus with an anterior peg-like process projecting beyond the proximal end of the carpus but not reaching its distal end; the dactylus is rounded and slightly curved in its terminal part (Fig. 2c). The first and second uropods have spinous





**Fig. 2** Specimens of *Ampelisca lusitanica* from northwestern Atlantic coast of Morocco collected during winter 2015. **a** Body shape with indication of the main morphological characters; **b** Antenna 1 (A1) shorter than antenna 2 (A2) showing antennal peduncle 2 ( $P_{A2}$ ) < A1; **c** Pereopod 7 (P7) showing the merus ( $M_{P7}$ ) with an anterior peg-like process projected beyond the proximal end of the carpus; and **d** Uropod 3 (U3) with inner ramus denticulate

inner and outer rami. The inner ramus of the uropod 3 is longer than the outer ramus, with its inner margin denticulate (10–12 denticulations). *A. lusitanica* can be confused with *A. unidentata* Schellenberg, 1936 (Bellan-Santini and Marques 1986) but the latter differs from the former by antenna formula (A1 sub-equal to A2) and the epimeral plate 3 which has postero-distal corner quadrate.

### Discussion

The amphipod *A. lusitanica* was considered as an uncommon to rare species for Portuguese coasts and the Lusitanian region (Bellan-Santini and Dauvin 1988a,b; Marques and Bellan-Santini 1990), and southeast of the Bay of Biscay, Spain (Martínez et al. 2007). This species is known as typical of coastal warm temperate waters and occurs in various habitats. It was found on deep rocky bottoms (between 8 and 37 m) (Bellan-Santini and Marques 1986; Bellan-Santini and Dauvin 1988a,b) covered with sand or silt and on intertidal rocky substrates with algal communities such as *Corallina elongata*, *Jania*

*rubens* and *Cystoseira* sp. (Bellan-Santini and Marques 1986). The species was also reported from muddy bottoms at 7.5 km upstream from the mouth river of the Mira estuary where the salinity is lower than in open coastal waters (Marques and Bellan-Santini 1987) and from sandy sediments of continental shelf of Guipúzcoa at 41 m depth from Basque Country, Spain (Martínez et al. 2007). However, in the present investigation, *A. lusitanica* was found associated to the brown seaweeds *Bifurcaria bifurcata* and *Sargassum muticum* on protected rocky intertidal pools of 1–4 m depth where surface seawater temperature ranged between 16 and 20 °C and salinity varied from 33 to 37‰. According to Bellan-Santini and Marques (1986), the ecology of *A. lusitanica* seems to be similar to that of *A. rubra* Chevreux, 1925 (accepted name *Ampelisca heterodactyla* Schellenberg, 1925), *A. serraticaudata* Chevreux, 1888 and especially *A. unidentata* Schellenberg, 1936.

Based on the literature data, the geographical distribution of this species (Fig. 1) would seem to be currently

limited to the North-east Atlantic region particularly to the Portuguese coast (Marques and Bellan-Santini 1987; Bellan-Santini and Dauvin 1988a; Marques and Bellan-Santini 1990; Bellan-Santini and Costello 2001) and the Basque Country, Spain (Martínez et al. 2007). Like most *Ampelisca* species, *A. lusitanica* is restricted to small geographical areas. It had previously only been reported thrice inside the Lusitanian region; twice from coastal waters of Portugal (Bellan-Santini and Marques 1986; Marques and Bellan-Santini 1987) and once from south-east of the Bay of Biscay, Spain (Martínez et al. 2007). The species was not found in the Azores archipelago (Portugal), located in the middle north Atlantic region (Rosa Lopes et al. 1993) nor in the eastern side of the Iberian Peninsula, western Mediterranean (Conradi and López-González 1999; de-la-Ossa-Carretero et al. 2010, 2016). Also the species was not reported from the Portuguese continental shelf during a comprehensive sampling of the soft-bottom macrofauna (Martins et al. 2013). This is the first record of the species outside its native geographical area (Lusitanian region) and the third one at the regional scale (NE Atlantic).

Due to the presence of *A. lusitanica* in a wide range of habitats and its ability to support varying environmental conditions in intertidal and in subtidal deeper areas, we assume that the species could occur in other coastal localities away from its previously recorded biogeographic region (Lusitanian). Wherever encountered it is always a rare species with low abundances.

The lack of previous records in Morocco and North Africa might be due to the small size of individuals, the low abundance of local populations, or its misidentification (including a possible confusion with its congeneric species *Ampelisca unidentata*). Also, the limited distribution of the species might be due to an insufficient investigation effort.

Significant numbers of individuals of *A. lusitanica* were found with *B. bifurcata* (5 individuals), whereas only one individual was found on *S. muticum*. It can be suggested that the complexity of the algal habitat was not an important factor affecting the abundance of *A. lusitanica*. Previous studies showed that the structural complexity of algae was not a consistent predictor of the number of individuals and species of amphipods (Russo 1990; Schreider et al. 2003; Engelen et al. 2013). Conversely, Taylor and Cole (1994) and Wernberg et al. (2004) reported a higher abundance of small crustaceans in more structurally complex algal habitats. The number of individuals found associated with intertidal algal samples in the present investigation corroborates results obtained by Bellan-Santini and Marques (1986) on the Portuguese coast, where the lower number of specimens ranging from 2 to 5 individuals, was reported from intertidal habitats and the higher number (up to 28 individuals) was

recorded from the deeper areas (37 m depth) where a more stable environment accounted for higher species abundances.

This study reported on the first record of *A. lusitanica* in Moroccan waters (i) suggests that *A. lusitanica* may also be present in other localities of Moroccan shores, (ii) extends the geographical range of the species *A. lusitanica* into the northeastern Atlantic (species shifting from the Lusitanian region), (iii) adds a new contribution to the macrofauna diversity thriving in seaweed beds and (iv) yields a contribution to the growing body of knowledge of the Moroccan and North African Atlantic biodiversity.

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#### Availability of data and material

All data generated or analysed during this study are included in this published article.

#### Authors' contributions

BS, ZB and AE conceived the study and carried out the field work. MM, ES and AR provided logistic support during the study and did the taxonomic analysis of the specimens. BS, ZB and AC drafted the manuscript. All authors read and approved the final manuscript.

#### Competing interests

The authors declare that they have no competing interests.

#### Consent for publication

Not applicable

#### Ethics approval and consent to participate

Not applicable

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#### References

- Barnard JL, Karaman G. The families and genera of marine gammaridean Amphipoda (except marine gammaroids). *Rec Aust Mus.* 1991;13:1–866.
- Bellan-Santini D, Costello MJ. Amphipoda. In: Costello MJ, Emblow CS, White R, editors. *European Register of Marine Species. A check-list of the marine species in Europe and a bibliography of guides to their identification*, Collection Patrimoines Naturels, vol. 50. Paris: Muséum National d'Histoire Naturelle; 2001. p. 295–308.
- Bellan-Santini D, Dauvin JC. Éléments de synthèse sur les *Ampelisca* du Nord-Est Atlantique. *Crustaceana.* 1988a;13:20–60. Suppl.
- Bellan-Santini D, Dauvin JC. Actualisation des données sur l'écologie, la biogéographie et la phylogénie des Ampeliscidae (Crustacés - Amphipodes) atlantiques après la révision des collections d'E. In: IFREMER, editor. *Chevreux, Aspects récents de la biologie des crustacés*, Actes de Colloques, vol. 8. 1988b. p. 207–16.
- Bellan-Santini D, Marques JC. Une nouvelle espèce d'*Ampelisca* (Crustacea - Amphipoda) des côtes du Portugal (Atlantique Nord-Est): *Ampelisca lusitanica* n.sp. *Cah Biol Mar.* 1986;27(2):153–62.
- Conradi M, López-González PJ. The benthic Gammaridea (Crustacea, Amphipoda) fauna of Algeciras Bay (Strait of Gibraltar): distributional ecology and some biogeographical considerations. *Helgol Mar Res.* 1999;53:2–8.

- Dauvin JC. Biologie, dynamique, et production de populations de crustacés amphipodes de la Manche occidentale. 1. *Ampelisca tenuicornis* Liljeborg. *J Exp Mar Biol Ecol.* 1988;118:55–84.
- Dauvin JC, Bellan-Santini D. Illustrated key to *Ampelisca* species from the north-Eastern Atlantic. *J Mar Biol.* 1988;68:659–76.
- Dauvin JC, Alizier S, Weppe A, Gujmundsson G. Diversity and zoogeography of Icelandic deep-sea Ampeliscidae (Crustacea: Amphipoda). *Deep-Sea Res I.* 2012;68:2–23.
- de-la-Ossa-Carretero JA, Dauvin JC, Del-Pilar-Ruso Y, Giménez-Casaldueiro F, Sánchez-Lizaso JL. Inventory of benthic amphipods from fine sand community of the Iberian Peninsula east coast (Spain), western Mediterranean, with new records. *Mar Biodivers Rec.* 2010;3:1–10.
- de-la-Ossa-Carretero JA, Del-Pilar-Ruso Y, Giménez-Casaldueiro F, Sánchez-Lizaso JL. Amphipoda assemblages in a disturbed area (Alicante, Spain, Western Mediterranean). *Mar Ecol.* 2016;37:503–17.
- Engelen AH, Primo AL, Cruz T, Santos R. Faunal differences between the invasive brown macroalga *Sargassum muticum* and competing native macroalgae. *Biol Invasions.* 2013;15:171–83.
- Filhoa JFS, Souza AMT, Valério-Berardo MT. Description of four new species of the genus *Ampelisca* (Amphipoda, Ampeliscidae) from the northeastern and southeastern coasts of Brazil and designation of a neotype for *Ampelisca soleata* Oliveira, 1954. *J Nat Hist.* 2009;43:2391–423.
- Marques JC, Bellan-Santini D. Crustacés Amphipodes des côtes du Portugal: faune de l'estuaire du Mira (Alentejo, côte sud-ouest). *Cah Biol Mar.* 1987; 28(3):465–80.
- Marques JC, Bellan-Santini D. Benthic amphipod fauna (Crustacea) of the Portuguese coast: Biogeographical considerations. *Mar Nat.* 1990;3:43–51.
- Martínez J, Adarraga I, Ruiz JM. Tipificación de poblaciones bentónicas de los fondos blandos de la plataforma continental de Guipúzcoa (Sureste del golfo de Vizcaya). *Bol Inst Esp Oceanogr.* 2007;23(1–4):85–110.
- Martins R, Quintino V, Rodrigues AM. Diversity and spatial distribution patterns of the soft-bottom macrofauna communities on the Portuguese continental shelf. *J Sea Res.* 2013;83:173–86.
- Mosbahi N, Dauvin JC, Neifar L. First record of the amphipods *Leucothoe incisa* (Robertson, 1892) and *Lysianassa pilicornis* (Heller, 1866) from Tunisian waters (central Mediterranean Sea). *Vie Milieu.* 2015;65(3):175–9.
- Rosa Lopes MF, Marques JC, Bellan-Santini D. The benthic amphipod fauna of the Azores (Portugal): an up-to-date annotated list of species, and some biogeographic considerations. *Proceedings of the First European Crustacean Conference, 1992. Crustaceana.* 1993;65(2):204–17.
- Russo AR. The role of seaweed complexity in structuring Hawaiian epiphytal amphipod communities. *Hydrobiologia.* 1990;194:1–12.
- Schneider MJ, Glasby TM, Underwood A. Effects of height on the shore and complexity of habitat on abundances of amphipods on rocky shores in New South Wales, Australia. *J Exp Mar Biol Ecol.* 2003;293:7–71.
- Taylor RB, Cole RG. Mobile epifauna on subtidal brown seaweeds in northeastern New Zealand. *Mar Ecol Prog Ser.* 1994;115:271–82.
- Vainola R, Witt JDS, Grabowski M, Bradbury JH, Jazdzewski K, Sket B. Global diversity of amphipods (Amphipoda; Crustacea) in freshwater. *Hydrobiologia.* 2008;595:241–55.
- Wernberg T, Thomsen MS, Staehr PA, Pedersen MF. Epibiota communities of the introduced and indigenous macroalgal relatives *Sargassum muticum* and *Halidrys siliquosa* in Limfjorden (Denmark). *Helgol Mar Res.* 2004;58:154–61.
- World Register of Marine Species (WoRMS). Available at: <http://www.marinespecies.org>. Accessed 24 Jan 2017.

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