Cah. Biol. Mar. (1995) 36 : 9-13

A new species of *Urothoe* (Amphipoda, Gammaridea) from the Iberian peninsula.

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Abstract: During a study of the amphipod fauna from the coast of the Strait of Gibraltar some specimens of the genus *Urothoe* were collected in sand from the infralittoral mediterranean zone. A careful examination of these amphipods revealed that they were morphologically close to *Urothoe intermedia* but represented an undescribed species. The new species *Urothoe hesperiae* is described and compared with the other congeneric species. Diagnostic characters are: 1. the large size of adults, 2. the lengths of the first antenna and accessory flagellum, 3. the inner plate of the first maxilla with four apical plumose setae, 4. the pereopod 5 with carpus wider than merus and dactylus nodulate, 5. the specific armature of the pereopods, coxal plates and telson.

Résumé : Au cours de l'étude des amphipodes du détroit de Gibraltar plusieurs spécimens d'*Urothoe* ont été récoltés dans du sable infralittoral. Un examen précis de ces amphipodes révéla qu'ils étaient proches d'*Urothoe intermedia* mais qu'ils constituaient une espèce nouvelle, *Urothoe hesperiae* sp. nov.. Cette espèce est décrite et comparée aux autres espèces du genre. Les caractères essentiels qui la distinguent sont : 1. la grande taille des adultes ; 2. la longueur de l'antenne 1 et du flagelle accessoire ; 3. le lobe interne de la maxille 1 avec quatre soies plumeuses distales ; 4. sur le péréiopode 5 le carpus plus large que le merus et le dactyle nodulé ; 5. l'armature particulière des péréiopodes, des plaques coxales et du telson.

Keywords: amphipod, *Urothoe*, Mediterranean, taxonomy.

Introduction

The genus *Urothoe* Dana, 1852 comprises more than thirty species (Barnard & Karaman, 1991, Bellan-Santini & Ruffo, 1986). Six have been reported from the Mediterranean (Bellan-Santini, 1989). Only two of these species, *Urothoe poseidonis* (Reibisch, 1905) and *U. pulchella* (Costa, 1853) were found along the mediterranean coast of the Iberian Peninsula, the others *Urothoe* species recorded from this region (a total of 6 species) have been collected in the Atlantic Ocean (Jimeno, 1993). During the study of the amphipods from the coast of the Strait of Gibraltar some specimens of the genus *Urothoe* were collected from infralittoral coarse sand. A close examination of these amphipods revealed that they were morphologically similar to *Urothoe intermedia* Bellan-Santini & Ruffo, 1986 but represented an unknown species.

In this paper, the new species is described and compared with congeneric species.

Reçu le 13 janvier 1995 ; received January 13 1995
Accepté le 10 mars 1995 ; accepted March 10 1995.

Material and methods

In July 1993 benthic samples were collected in the infralittoral zone at El Saladillo, Algeciras Bay (Southern Iberian Peninsula) (Fig. 1) with a Van Veen grab (0.046 m^2). The samples were sieved through a 0.5 mm sieve and infauna was preserved in 5 % buffered formalin containing Rose

Bengal solution to ease sorting. The amphipods were dissected under a stereomicroscope. All figures have been drawn with the aid of a camera lucida. The letter after the explanation of each figure refers to the scale at which it was drawn. Particle size analysis was performed by a combination of dry sieving and sedimentation techniques (Buchanan & Kain, 1971). Sediment organic matter was estimated as the loss in weight of dried samples (100 C, 24 h) after combustion (500 C, 24 h).

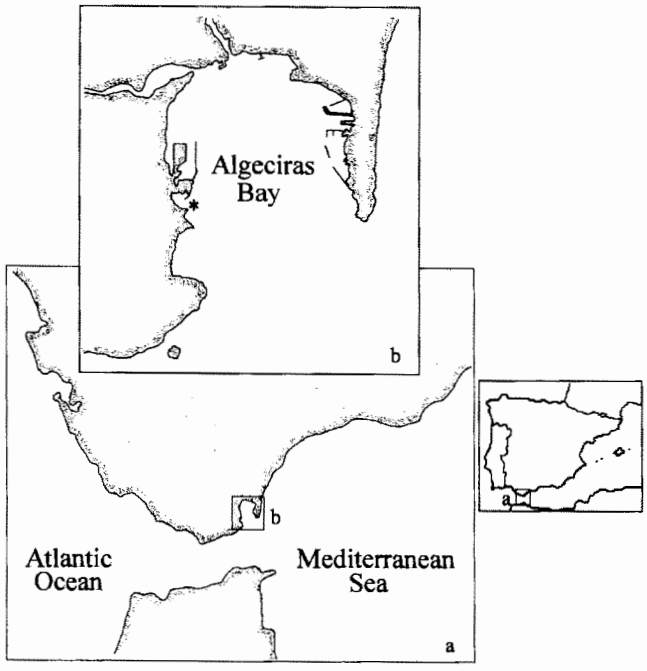

Figure 1. Study area, a: Strait of Gibraltar; b: Algeciras Bay.

Urothoe hesperiae n. sp. (Figs. 2, 3, 4)

Material examined: Nineteen females and six juveniles from infralittoral fine and medium sand (at a depth of 4-5 m) at El Saladillo (36°7'10"N; 5°26'10"W), Algeciras Bay, Cádiz (Southern Spain), 20 July 1993. The holotype and three paratypes have been deposited in the Museo Nacional de Ciencias Naturales de Madrid (Spain) (MNCNM 20.04/3505). Other paratypes are in the collection of D. Bellan-Santini, in the Museo Civico di Storia naturale di Verona collection and in the junior author's collection.

Description: Length adult females 6-9.2 mm, juveniles 2.8-3.5 mm. Colour white. Eyes oval.

Antenna 1 longer than head, articles of peduncle subequal in size; articles 1 and 2 with few setae, some plumose; article 3 more slender than the others; flagellum shorter than peduncle, with eight articles; accessory flagellum with five articles.

Antenna 2 flagellum biarticulate, first article with two spines on the outer margin and two setae distal to spines; last article smallest with two apical setae.

Mandible with molar rounded and well developed, incisor slightly nodulate; right mandible with lacinia mobilis styliform, left dentated; palp strong, first article about three times longer than wide, unarmed; second and third articles long, subequal in size and with several setae.

Maxilla 1 with palp biarticulate, first article longest, unarmed, second rectangular with three apical plumose setae; outer plate with spines, three of them smooth, the two distal stronger, the remaining spines dentated or bifid. Inner plate elongated with four apical plumose setae.

Maxilla 2 with the two plumose plates subequal in size.

Maxilliped with inner plate elongate bearing nine setae and two short spines; outer plate suboval, with several spines and setae; palp 4-articulate, first article with a single seta, second article the widest, strongly setose on the inner margin; third article piriform, with some rows of setae on inner margin and several setae on the outer margin; fourth

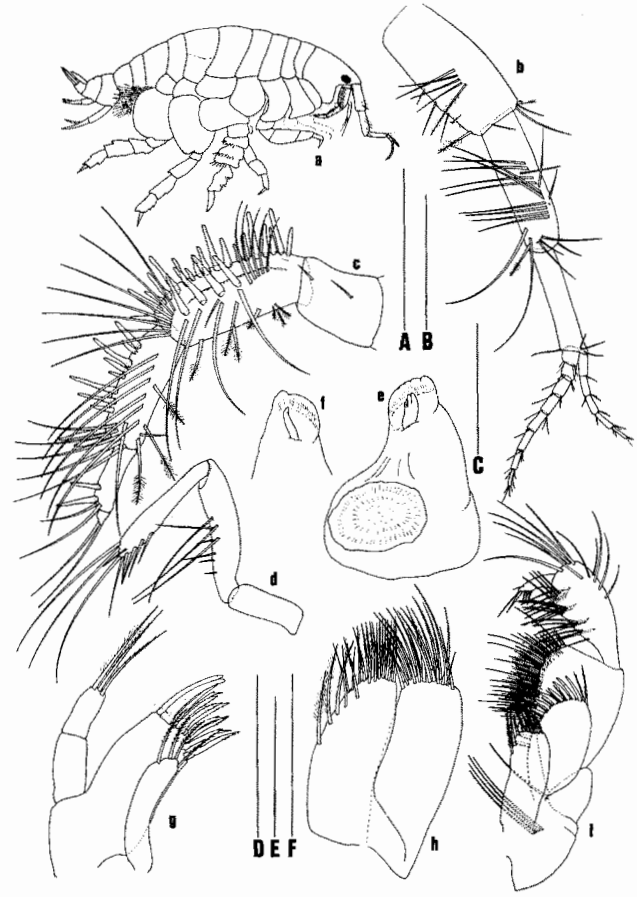

Figure 2. *Urothoe hesperiae* n. sp., female: a, habitus (A); b, antenna 1 (B); c, antenna 2 (B); d, palp of mandible (B); e, left mandible (C); f, rigth mandible (C); g, maxilla 1 (D); h, maxilla 2 (E); i, maxilliped (F). Scale: A, 3 mm, B: 450 µm, C: 300 µm; D: 300 µm; E: 200 µm; F: 600 µm.

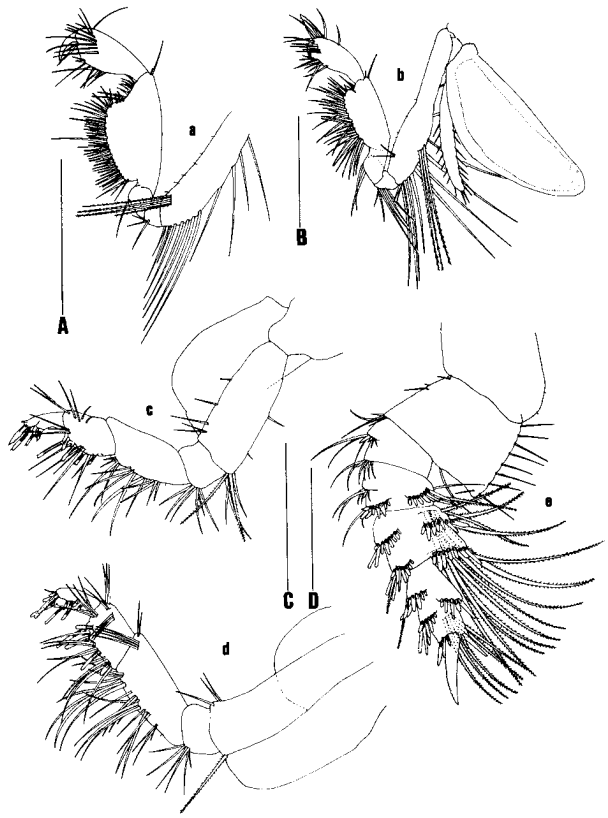

Figure 3. *Urothoe hesperiae* n. sp., female: a, gnathopod 1 (A); b, gnathopod 2 (B); c, pereopod 3 (C); d, pereopod 4 (C); e, pereopod 5 (D). Scale : A. 1 mm, B: 1 mm, C : 1 mm, D : 1 mm.

article small and slender, with one subapical small seta and five apical setae. Four scarcely plumose setae at the basis of the palp.

Coxa 1, small, rectangular with two or three setae on the anterior angle and one setule on ventral margin. Coxae 2 and 3 subquadrate, coxa 2 bearing five setae and two setules on posterior ventral corner, coxa 3 with four setae and one setule on the same corner. Coxa 4, subquadrate with two setules on ventral margin. Coxae 5, 6 and 7 suboval, coxa 5 with five setules, two on ventral margin and three on posterolateral margin. Coxa 6 bearing eigth setules, four on ventral margin and four on posterolateral margin. Coxa 7 with six setules on posterior ventral corner.

Epimeron 1 small, anterior margin convex and posterior corner pointed, with eight setules on posterior margin. Epimeron 2 more pronounced by pointed posterior corner than epimeron 1, with 16 plumose setae on the ventral surface and five additional setules on the posterior margin. Epimeron 3 subquadrate, with rounded posterior corner and eigth setules on posterior margin.

Gnathopod 1, basis with setules on anterior margin, long setae on posterior margin, and four scarcely plumose setae distally; ischium with setae on posterior ventral angle; merus with a single seta, carpus, twice longer than wide, posterior margin strongly setose; propodus suboval with a well defined palm, bearing one spine and setae; dactylus as long as margin of palm.

Gnathopod 2 similar but slightly longer than gnathopod 1, basis elongate with setules and two small setae on anterior margin, long setae on posterior margin, three of them scarcely plumose; ischium with posterodistal brush; merus with two setae; carpus narrower than in gnathopod 1, with posterior margin strongly setose; propodus piriform with well defined palm, bearing one spine and setae; dactylus as long as margin of palm.

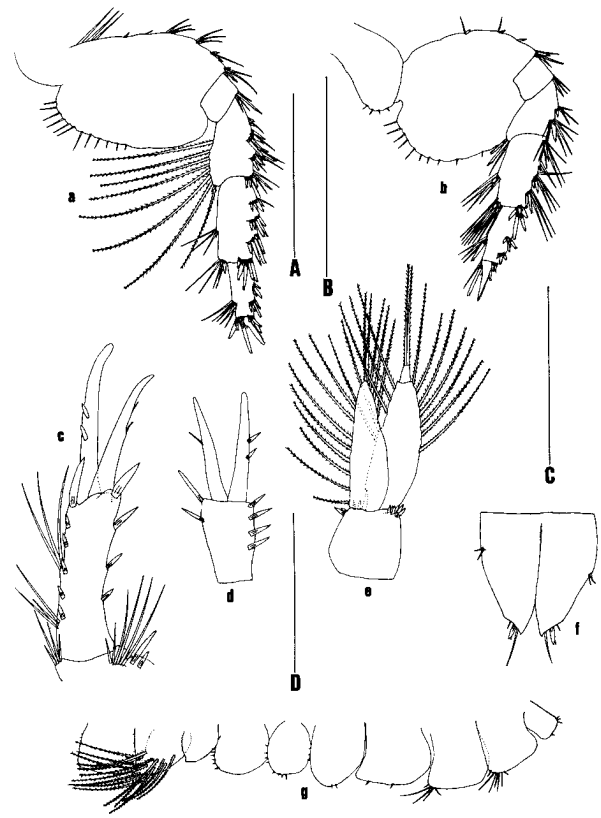

Figure 4. *Urothoe hesperiae* n. sp., female: a, pereopod 6 (B); b, pereopod 7 (B); c, uropod 1 (C); d, uropod 2 (C); e, uropod 3 (C); f, telson (C); g, coxae 1-7, epimeron 1-3 (D). Scale: A, 1,5 mm; B, 1,5 mm; C, 600 µm; D, 800 µm.

Pereopods 3 and 4 subequal, but pereopod 4 more setose than 3; basis parallel-sided, one or two scarcely plumose setae on posterior angle, anterior angle with naked setae, margin in pereopod 3 with setae lacking in pereopod 4; ischium subquadrate with a posterodistal brush; merus elongate with posterior margin strongly setose, carpus subrectangular, setose, with spines on posterior margin; propodus distally and moderately spatulate, spatula margins armed with stout spines (number of spines ranges from 5 on per-

eopod 3 and from 9 on pereopod 4), dactylus stout, as long as longest spines of propodus, with slightly dentated margin; all spines with an ancilliary small setule.

Pereopod 5, basis wider than long, ischium trapezoidal, short with poorly definited margin; merus and carpus narrower than basis, merus with two lateral rows of stout spines; carpus slightly wider than long, with four lateral rows of stout spines and two posterolateral rows of plumose setae inserted on inner surface; propodus longer than wide, narrower than carpus, with three lateral (two anterior and one posterior) rows of stout spines and one posterolateral row of plumose setae inserted on inner surface; dactylus as long as propodus, with all anterior surface nodulated.

Pereopods 6 and 7 similar, pereopod 7 smaller in size; basis broadly expanded, ischium short, merus, carpus and propodus longer than wide; merus of pereopod 6 with long plumose seta lacking in pereopod 7, dactylus as long as longest spines of propodus, with posterior ancilliary setule and inner margin slightly crenulated.

Urosomite 1 with several naked setae and two stout spines on inner angle and with few setae on outer angle. Uropod 1 peduncle with spines on inner margin ranges from four and six on outer margin, two stronger spines on each angle of peduncle; outer margin of peduncle with two groups of setae; rami subequal and slightly smaller than peduncle, outer ramus with two outer small spines and inner ramus with two setules on the inner side.

Uropod 2 much shorter than uropod 1, peduncle short, with two spines on the inner margin and four on the outer margin; rami subequal, inner ramus with a setule and outer ramus with one or two small spines.

Uropod 3 extending well beyond uropod 1, peduncle subquadrate with few short spines at the basis of rami; rami lanceolate, both with long plumose setae; inner ramus subequal to the first article of the outer.

Telson deeply cleft, bearing distally one pair of spines with posterior ancillary setule, one pair of setae and one pair of setules, and laterally two pair of setules; apices of each lobe subacuminate and divergent.

Etymology

The specific name *hesperiae* is from Latin *Hesperia*, the name given by the Romans to the westernmost regions of the Mediterranean.

Ecology

The specimens were collected in medium and fine sand (according Buchanan & Kain, 1971) (Q50= 0.212-0.395) with sorting coeficient (S0) =1.292 (Trask, 1950). The organic matter was low (0.89 % dry weight). The sandy bottom where the new species was collected is characterized by the abundance of the bivalve species *Digitaria digitaria* (L.) and *Tellina donacina* (L.) the tanaid *Apseudes latreilli*

Table 1. Species of *Urothoe* close to *U. hesperiae* n. sp. (modified and expanded from Bellan-Santini & Ruffo, 1986).

Species	A1 p. fl./ac. fl.	Mx 1	Cox 1	P5 art. 4/art. 5	P5 dactylus	U1 peduncle	U1 rami	Telson
U. irrostrata Dana, 1853	6-7/2-3	?	?	=	nodulate	spines	?	?
U. pulchella (Costa, 1853)	5-6/3-4	4 setae	rectangular	5>4	smooth	spines	spines	ext: 1 spine, 1 seta
U. elegans Bate, 1857	6/3	2 setae	triangular	=	slightly crenulate	spines	0	ext: 1 spine, 2 setae lat: 2 setae
U. marina (Bate, 1857)	9/5-7	very setose	subrectangular	=	crenulate	spines	0	ext: 1 spine, 3-4 setae lat: 4 setae
U. brevicornis Bate, 1862	7/6	3 setae	subrectangular	5>4	crenulate distally	spines	spines	ext: 1 spine, 2 setae lat: 2 setae
U. poucheti Chevrenx, 1888	8/-	?	?	=	spinose distal half	spines	spines	?
U. varvarini Gurjanova, 1953	5/3	?	triangular	=	smooth	spines, brush setae	?	ext: 1 spine
U. gelasina Imbach, 1967	5/2	1 seta	rectangular	=	smooth	spines	1 spine/ramus	ext: 1 spine lat: 2 setae
U. tumorosa Griffiths, 1974	6/3	?	triangular	5>4	nodulate	spines	ext: 1 spine int: 0	ext: 1 spine, 3 setae lat: 2 setae
U. intermedia Bellan-Santini & Ruffo, 1986	5/2	1 seta	rectangular	5 slightly>4	nodulate	spines, brush setae	1 spine/ramus	ext: 3 setae lat:2 setae
U. hesperiae n. sp.	8/5	4 setae	rectangular	5 slightly>4	nodulate	spines, setae	ext: 2 spines int: 2 setae	ext: 1 spine, 2 setae lat: 2 setae

(Milne-Edwards), the amphipods *Leptocheirus hirsutimanus* (Bate), *Photis longipes* (della Valle) and *Siphonoecetes* sp., and the polychaetes *Sphaerosyllis hystrix* Claparède, *Pseudobrania clavata* (Claparède) and *Aonides oxycephala* (Sars).

Discussion

Urothoe hesperiae belongs to the "elegans" group, i.e. it possesses eyes, lateral lobes of the head without an upturned point, gnathopods similar, epimeral plate 3 without point and pereopod 5 with the length of the carpus 1.5 time that of the merus. Ten species conform to these criteria, three possess pereopod 5 dactylus with smooth anterior edge, in others this edge is crenulate or nodulate. Only 3 species have the dactylus as nodulate as *U. hesperiae, viz. U. irrostrata, U. tumurosa, U. intermedia*. A poorly known species, *U. irrostrata*, is distinguished from *U. hesperiae* by the size of A1 and especially the ratio of the principal flagellum to the accessory flagellum. *U. tumurosa* is distinguished from *U. hesperiae* by the ratio of flagellae of A1, the shape of the coxa 1 (triangular), the ratio of merus and carpus of the P5, and the armament of U1. *U. intermedia* is the mediterranean species closest to *U. hesperiae*. It is distinguished by the ratio of A1 flagellae, number of setae to the inner lobe of Mx1, the armament of U1 and telson (Table 1).

Key to *Urothoe* species (modified after Bellan-Santini, 1989)

1. Lateroventral cephalic corner produced and upturned *U. corsica*
 - Lateroventral cephalic corner more or less quadrate 2
2. P5 carpus not broader thean merus *U. elegans*
 - P5 carpus broader than merus 3
3. P5 with dactylus spinose *U. grimaldii*
 - P5 with dactylus not spinose 4
4. P5 with dactylus anteriorly nodulate 5
 - P5 with dactylus smooth 6
5. A1 accessory flagellum 2-articulate, Mx1 inner plate with 1 seta, telson with 3 distal setae *U. intermedia*
 - A1 accessory flagellum 5-articulate, Mx1 inner plate with 4 setae, telson with 1 spine and 2 distal setae *U. hesperiae*
6. P5 carpus with 1 row of spines, U1 peduncle with 1 row of spines *U. pulchella*
 - P5 carpus with 3 rows of spines, U1 peduncle with only 1 spine *U. poseidonis*

Acknowledgements

This research has been partially supported by the project "Fauna Iberica III" (DGICYT PB92-0121).

Appreciation is extended to CEPSA, Fundacion Sevillana de Electricidad, Excmo Ayuntamiento de Los Barrios, Manconunidad de Municipios del Campo de Gibraltar and Agencia de Medio Ambiente (Junta de Andalucia) for financial support to research project "Estudio biologico de las comunidades benticas de la Bahia de Algeciras.

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