THE GENERA *ATERGATIS*, *MICROCASSIOPE*, *MONODAEUS*, *PARACTEA*, *PARAGALENE*, AND *XANTHO* (DECAPODA, XANTHIDAE) IN THE MEDITERRANEAN SEA

BY

MICHALIS MAVIDIS[1,3]), MICHAEL TÜRKAY[2]) and ATHANASIOS KOUKOURAS[1])

[1]) Department of Zoology, School of Biology, Aristoteleio University of Thessaloniki, GR-54124 Thessaloniki, Greece

[2]) Forschungsinstitut Senckenberg, Senckenberganlage 25, D-6000 Frankfurt a. M., Germany

ABSTRACT

A review of the relevant literature and a comparative study of adequate samples from the Mediterranean Sea and the Atlantic Ocean, revealed new key morphological features that facilitate a distinction of the Mediterranean species of Xanthidae. Based on this study, the Mediterranean *Xantho granulicarpus* Forest, 1953 is clearly distinguished from the Atlantic *Xantho hydrophilus* (Herbst, 1790) and *Monodaeus guinotae* Forest, 1976 is identical with *Monodaeus couchii* (Couch, 1851). For the species studied, additional information is given about their geographical distribution, as well as an identification key based on selected, constant features.

ZUSAMMENFASSUNG

Literaturstudien und vergleichende Untersuchungen geeigneter Proben aus dem Mittelmeer und dem Atlantischen Ozean haben neuen morphologische Schlüsselmerkmale erbrqacht, die eine Unterscheidung der aus dem Mittelmeer stmmenden Arten der Xanthidae erleichtern. Als Ergebnis dieser Untersuchungen kann gesagt werden, dass *Xantho granulicarpus* Forest, 1953 aus dem Mittelmeer klar von *Xantho hydrophilus* (Herbst, 1790) aus dem Atlantik unterschieden ist und dass *Monodaeus guinotae* Forest, 1976 identisch mit *Monodaeus couchii* (Couch, 1851) ist. Für die untersuchten Arten werden zusätzliche Verbreitungsangaben gemacht und ein Bestimmungsschlüssel auf der Grundlage ausgewählter konstanter Merkmale bereitgestellt.

INTRODUCTION

According to d'Udekem d'Acoz (1999) and Türkay (2001), the following nine species of Xanthidae MacLay, 1838 are known from the Mediterranean: *Atergatis roseus* (Rüppell, 1830); *Microcassiope minor* (Dana, 1852); *Monodaeus couchii*

[3]) Corresponding author; e-mail: mmavidis@bio.auth.gr

Also available online: www.brill.nl/cr

Crustaceana 81 (9): 1035-1053
DOI:10.1163/156854008X360798

(Couch, 1851); *Monodaeus guinotae* Forest, 1976; *Paractea monodi* Guinot, 1969; *Paragalene longicrura* (Nardo, 1868); *Xantho granulicarpus* Forest, 1953; *Xantho pilipes* A. Milne-Edwards, 1867; and *Xantho poressa* (Olivi, 1792). However, a consideration of the relevant literature still shows a confusion concerning the genera *Xantho* and *Monodaeus*. In particular, some authors (Garcia Raso et al., 1987; d'Udekem d'Acoz, 1999; Reuschel & Schubart, 2006) consider *X. granulicarpus* a subspecies (or forma) of *X. hydrophilus* (Herbst, 1790), which is the valid name for *X. incisus* (Leach, 1814) according to Sakai (1999), while others regard it as a distinct species (Holthuis & Gottlieb, 1958; Koukouras et al., 1992; Türkay, 2001). In respect to *Monodaeus*, *M. guinotae* and *M. couchii* are considered two distinct species, but no reliable distinguishing features have been given for them. Due to the above, the geographical distribution of these species is also uncertain.

This study aims to elucidate the two above problems, as well as to provide more information on the geographical distribution and also facilitate the distinction of the Mediterranean Xanthidae.

MATERIAL AND METHODS

Numerous Mediterranean and Atlantic specimens from various localities were examined. Initially, all the various characters of the studied species were examined, in order to estimate their variability. Then, the most comparable ones for *Monodaeus guinotae* versus *M. couchii* and *Xantho hydrophilus* versus *X. granulicarpus* were selected and are given in table I and table II, respectively, along with relevant literature data. The following abbreviations are used: CL = maximum carapace length; CW = maximum carapace width; Mxp = maxilliped; P = pereiopod.

For the distinction of *X. granulicarpus* from *X. hydrophilus* the following typical, Atlantic specimens of *X. hydrophilus* were studied: — Atlantic coast of France: 3 ♂♂, 3 ♀♀ (2 ovig.), CW = 4.0 cm, Kerlouan, Finistère, Bretagne, depth 0 m, 14.vii.1991; 1 ♂, CW = 3.7 cm, Ile de Raguenes, Concarneau, Finistère, Bretagne, depth 0 m, 23.i.1992; 1 ♂, CW = 2.9 cm, Roscoff, Finistère, Bretagne, depth 0 m, 24.i.1992; 1 ♂, 1 ♀, CW = 3.5 cm, Ile de Yeu, Vendée, Pays de Loire, depth 0 m, 15.viii.1993; 1 ♂, CW = 2.9 cm, pointe du Bindy, Brest, Finistère, Bretagne, depth 0 m, 23.i.1992.

RESULTS

Monodaeus couchii (Couch, 1851) (fig. 1)

Xantho couchii Couch, 1851: 13.

Xantho tuberculata Bell, 1853: 359, 1 fig.; Adensamer, 1898: 611. (Not *X. tuberculatus* of Heller, 1863 = *X. granulicarpus* Forest, 1953.)
Xantho couchi, Bouvier, 1940: 267, figs. 171-173, pl. 10 fig. 11.
Monodaeus couchi, Guinot, 1967: 371, figs. 23, 32.
Medaeus couchi, Zariquiey Alvarez, 1968: 400, figs. 9, 15e, 133, 134a; Relini-Orsi & Relini, 1972: 66, fig. 11; Arena & Li Greci, 1973: 166.
Monodaeus guinotae Forest, 1976: 63, figs. 1-7; Türkay & Koukouras, 1988: 401, figs. 1-3.
Monodaeus cf. *guinotae*, d'Udekem d'Acoz, 1994: 26, fig. 1.

Material examined. — Atlantic Ocean: 5 ♂♂, 9 ♀♀, CW = 2.5 cm, off Agadir (31°1′N 10°16′W), Morocco, depth 360-375 m, 18.vi.1967; 10 ♂♂, 9 ♀♀, CW = 2.4 cm, off Lisbon (37°41.5′N 9°11.9′W), Portugal, depth 800 m, 20.i.1967. — Aegean Sea, Greece: 40 ♂♂, 13 ♀♀, CW = 3.5 cm, from various localities of the Aegean, depth 2-800 m.

Forest (1976) describing *M. guinotae*, distinguished it from *M. couchii* based on: the more hexagonal shape of the carapace, the absence of endostomal ridges in the buccal cavity, and the more slender pereiopods. However, from table I it is obvious that the only character that can distinguish the "two species", or the Atlantic and Mediterranean specimens, is the presence or absence of endostomal ridges in the buccal cavity. However, the absence of those ridges was noted only by Forest (1976), while both our Atlantic and Mediterranean specimens have endostomal ridges, which are incomplete (fig. 1). It is most likely that Forest (1976) overlooked the presence of these endostomal ridges, as they are hardly visible and incomplete. Thus, although the authors' efforts to find and study the holotype of *M. guinotae* where unsuccessful, it should be concluded that *M. guinotae* is identical to *M. couchii* and should be considered a junior synonym of the latter.

Distribution. — Eastern Atlantic: from Shetland Islands to Angola (d'Udekem d'Acoz, 1999). — Mediterranean Sea: western basin, Alboran Sea (Garcia Raso, 1984), Catalonia and Balearic Islands (Zariquiey Alvarez, 1968), Ligurian Sea (Relini-Orsi & Relini, 1972), Tyrrhenian Sea (Arena & Li Greci, 1973); Adriatic Sea (Adensamer, 1898); central basin, Gulf of Taranto (Forest, 1976); Aegean Sea (Adensamer, 1898; Türkay & Koukouras, 1988; d'Udekem d'Acoz, 1994; Ateş et al., 2006); Sea of Marmara (Müller, 1986).

Xantho granulicarpus Forest, 1953 (figs. 2, 3)

Xantho tuberculatus, Heller, 1863: 68, pl. 2 figs. 5-7; Gilat, 1969: 62; Vatova, 1975: 37.
Xantho florida, Carus, 1885: 512.
Xantho floridus, Pesta, 1918: 423, fig. 139; Colosi, 1923: 7.
Xantho floridus var. *granulicarpus* Forest in Drach & Forest, 1953: 14, figs. 2, 15, 20.
Xantho incisus granulicarpus, Forest, 1957: 118; Zariquiey Alvarez, 1968: 398, figs. 130c, 132; Pastore, 1976: 113; Garcia Raso, 1984: 108; Garcia Raso et al., 1987: 49, figs. 1-10.
Xantho granulicarpus, Holthuis & Gottlieb, 1958: 93.

Material examined. — Western Mediterranean, France: 1 ♀, CW = 1.4 cm, Six Fours les Plages, Var, Provence, depth 2 m, 16.x.1995; 3 ♂♂, 1 ♀, CW = 2.6 cm, various localities, Roussillon,

TABLE I

Comparison of the main morphological features of *Monodaeus guinotae* Forest, 1976 and *M. couchii* (Couch, 1851) according to literature data and the material studied (key features in **bold**). In parentheses, the references used: 1, Forest, 1976; 2, Crosnier, 1967; 3, Noël, 1992; 4, Garcia Raso, 1996; 5, Ingle, 1980, pl. 20b; 6, d'Udekem d'Acoz, 1994

	Literature		Present study	
	M. guinotae	*M. couchii*	Atlantic specimens	Mediterranean specimens
Carapace				
Minimum – maximum width	–	–	♂♂: 0.7-3.5 ♀♀: 0.6-3.0	♂♂: 0.9-2.4 ♀♀: 1.0-2.5
CL/CW	0.67 (1)	0.66-0.69 (2)	♂♂: 0.65-0.84 ♀♀: 0.67-0.73	♂♂: 0.68-0.76 ♀♀: 0.67-0.76
Front width/CW	0.33 (1)	–	♂♂: 0.26-0.43 ♀♀: 0.27-0.45	♂♂: 0.28-0.42 ♀♀: 0.27-0.38
Antero-lateral teeth	Denticulated (3)	Not denticulated (3)	Granulated	Granulated
Endostomal ridges of the buccal cavity	**Absent** (1)	**Present** (1)	**Present (incomplete)**	**Present (incomplete)**
P3				
Height to length ratio of dactylus	0.11 (1)	0.16 (2, fig. 14)	0.09-0.13	0.08-0.16
Dactylus to propodus and carpus length ratio	0.80 (1)	0.73 (2, fig. 14)	0.64-0.94	0.60-0.91
Dactylus to merus length ratio	0.66 (1)	0.68 (2, fig. 14)	0.6-0.78	0.62-0.76
Height to length ratio of merus	0.22 (1)	0.33 (2, fig. 14)	0.18-0.3	0.20-0.35
P4				
Merus distal margin exceeds the level of the penultimate antero-lateral tooth	Yes (4)	No (5)	No	No
Merus distal margin exceeds the level of the ultimate antero-lateral tooth	Yes (4)	Yes (5)	Yes	Yes
P5				
Merus distal margin exceeds the level of the ultimate antero-lateral tooth	Yes (6)	No (5)	No	No

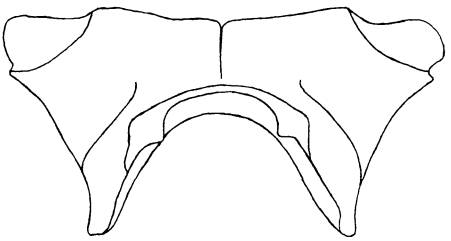

Fig. 1. Endostome of *Monodaeus couchii* (Couch, 1851). The endostomal ridges are present but incomplete.

Pyrénées Orientales, depth 0.5-7 m. — Aegean Sea, Greece: 24 ♂♂, 18 ♀♀ (1 ovig.), CW = 4.7 cm, from various localities in the Aegean, depth 0-30 m.

A detailed comparison of *Xantho granulicarpus* with *X. hydrophilus* (table II) revealed many constant, non-overlapping characters on the carapace, the carpus of the second to fourth pereiopods, and the merus of Mxp3, that clearly separate the two species. In the relevant literature, the confusion created over the validity of *X. granulicarpus* is mainly due to the use of highly variable and overlapping characters for the distinction of the two species, like the length to width ratio of dactylus and merus of the first three pairs of ambulatory legs used in the identification keys of Drach & Forest (1953), Zariquiey Alvarez (1968), and Noël (1992), or the carapace width, carapace length, body height, and P4 ventral length used by Reuschel & Schubart (2006).

Almaça (1959, 1972) in his detailed work, considered the irregular shape of the superior margin of the carpus of P2 and the presence of the concavity on the anterior margin of the merus of Mxp3 to represent basic key features to distinguish *X. granulicarpus* from *X. hydrophilus* (figs. 2, 3). These features are quite constant and the few deviations observed both in the present study (figs. 2b, 3b) and the literature (Garcia Raso et al., 1987, figs. 1-10) should be attributed to size (very small or very large individuals) or malformations during moulting, as observed in other species, too (Koukouras et al., 2002).

Distribution. — Mediterranean Sea: western basin, Alboran Sea (Garcia Raso, 1984), Catalonia and Balearic Islands (Zariquiey Alvarez, 1968), French coast (Bourdillon-Casanova, 1960), Ligurian Sea (Carus, 1885; Gilat, 1969), Tyrrhenian Sea (Drach & Forest, 1953), Algeria (Forest, 1957); Adriatic Sea (Pesta, 1918); central basin (Vatova, 1975; Pastore, 1976); Aegean Sea (Kocataş, 1971; Koukouras et al., 1992); Sea of Marmara (Müller, 1986); Levantine basin, Libya (Colosi, 1923), Cyprus (Lewinsohn & Holthuis, 1986), Israel (Holthuis & Gottlieb, 1958), Lebanon (Shiber, 1981).

TABLE II

Comparison of the main morphological features of *Xantho hydrophilus* (Herbst, 1790) and *X. granulicarpus* Forest, 1953 among literature data and material studied (key features in **bold**). In parentheses, the number of specimens

	Drach & Forest (1953)		Almaça (1959, 1972)		Present study	
	X. hydrophilus	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*
Carapace						
Minimum/Maximum CW					♂♂: 1.6-4.7 ♀♀: 3.4-3.8	♂♂: 0.5-3.9 ♀♀: 0.6-2.5
Dorsal surface	Slightly or not granulated	Strongly granulated	Granulose 93.4% (128) Not granulose 6.6% (9)	Granulose 93.4% (43) Not granulose 6.6% (3)	Granulose 0% (0) **Not granulose** **100% (11)**	**Granulose** **100% (47)** Not granulose 0% (0)
Last 2 antero-lateral teeth	Blunt or slightly acute	Acute	Acute 97.1% (133) Blunt 2.9% (4)	Acute 100% (44) Blunt 0% (0)	Acute 27.3% (3) Blunt 72.7% (8)	Acute 100% (47) Blunt 0% (0)
Large chela of males						
The pigmentation of the fixed finger enters the palm	No	Yes	No (small ind.) Yes (large ind.)	No (small ind.) Yes (large ind.)	Yes 100% (6)	Yes 100% (20)
P2 Merus						
L/W ratio	<2	>2	–	–	>2: 100% (11)	>2: 100% (24)
P2 Carpus						
Superior margin	Regular	Very irregular	Slightly irregular 19.0% (26) Regular 81.0% (111)	Very irregular	Very irregular 0% (0) **Slightly irregular** **9.1% (1)** **Regular** **90.9% (10)**	**Very irregular** **93.1% (27)** Slightly irregular 6.9% (2)* Regular 0% (0)

TABLE II
(Continued)

	Drach & Forest (1953)		Almaça (1959, 1972)		Present study	
	X. hydrophilus	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*
Tubercles on superior margin	Absent	Present (strong)	Present All over (6%) Distal half (12%) Distal end (82%)	Present All over (100%)	Present 0% (0) **Absent** **100% (11)**	**Present (strong)** **93.1% (27)** Absent 6.9% (2)*
Lateral depression on external surface	Shallow	Deep	–	–	**Very shallow** **72.7% (8)** **Shallow** **27.3% (3)** Deep 0% (0)	Very shallow 0% (0) Shallow 6.9% (2)* **Deep** **93.1% (27)**
P2 Carpus						
Lateral keel of external surface	Regular	Irregular	–	–	**Regular** **100% (11)** Irregular 0% (0)	Regular 0% (0) **Irregular** **100% (29)**
Tubercles on lateral keel of external surface	Absent	Present	–	–	Present 0% (0) **Absent** **100% (11)**	**Present** **93.1% (27)** Absent 6.9% (2)*
P2 Dactylus						
L/W ratio	≈4	5	–	–	⩽4: 18.2% (2) 4-5: 54.5% (6) ⩾5: 27.3% (3)	<4: 3.4% (1) 4-5: 13.8% (4) ⩾5: 82.8% (24)
P3 Merus						
L/W ratio	<2	>2	–	–	=2: 18.2% (2) >2: 81.8% (9)	=2: 0% (0) >2: 100% (24)

TABLE II
(Continued)

	Drach & Forest (1953)		Almaça (1959, 1972)		Present study	
	X. hydrophilus	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*
P3 Carpus						
Superior margin	Regular	Very irregular	Slightly irregular 19.0% (26) Regular 81.0% (111)	Very irregular	Very irregular 0% (0) **Slightly irregular** **9.1% (1)** **Regular** **90.9% (10)**	**Very irregular** **100% (24)** Slightly irregular 0% (0) Regular 0% (0)
Tubercles on superior margin	Absent	Present	Present All over (6%) Distal half (12%) Distal end (82%)	Present All over (100%)	Present 0% (0) **Absent** **100% (11)**	**Present** **91.7% (22)** Absent 8.3% (2)*
Lateral depression on external surface	Shallow	Deep	–	–	**Very shallow** **72.7% (8)** **Shallow** **27.3% (3)** Deep 0% (0)	Very shallow 0% (0) Shallow 8.3% (2)* **Deep** **91.7% (22)**
P3 Carpus						
Lateral keel of external surface	Regular	Irregular	–	–	**Regular** **100% (11)** Irregular 0% (0)	Regular 0% (0) **Irregular** **100% (24)**
Tubercles on lateral keel of external surface	Absent	Present	–	–	Present 0% (0) **Absent** **100% (11)**	**Present** **91.7% (22)** Absent 8.3% (2)*

TABLE II
(Continued)

	Drach & Forest (1953)		Almaça (1959, 1972)		Present study	
	X. hydrophilus	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*
P3 Dactylus L/W ratio	≈4	5	–	–	⩽4: 36.4% (4) 4-5: 21.2% (3) ⩾5: 36.4% (4)	⩽4: 4.2% (1) 4-5: 12.5% (3) ⩾5: 83.3% (20)
P4 Merus L/W ratio	<2	>2	<2: 5.2% (7) =2: 52.9% (72) >2: 41.9% (57)	<2: 0% (0) =2: 0% (0) >2: 100% (46)	<2: 0% (0) =2: 0% (0) >2: 100% (10)	<2: 0% (0) =2: 0% (0) >2: 100% (22)
P4 Carpus superior margin	Regular	Very irregular	–	–	**Regular 100% (10)** Irregular 0% (0)	Regular 0% (0) **Irregular 100% (22)**
Lateral depression on external surface	Shallow	Deep	–	–	**Very shallow 80.0% (8)** **Shallow 20.0% (2)** Deep 0% (0)	Very shallow 0% (0) Shallow 0% (0) **Deep 100% (22)**
P4 Dactylus L/W ratio	≈4	5	=4: 29.1% (39) =5: 70.9% (95)	=4: 4.8% (2) =5: 95.2% (42)	⩽4: 30% (3) 4-5: 40% (4) ⩾5: 30% (3)	⩽4: 9.1% (2) 4-5: 9.1% (2) ⩾5: 81.8% (18)
P5 Carpus superior margin	Regular	Very irregular	–	–	**Regular 100% (11)** Irregular 0% (0)	Regular 0% (0) **Irregular 100% (24)**

TABLE II
(Continued)

	Drach & Forest (1953)		Almaça (1959, 1972)		Present study	
	X. hydrophilus	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*	*X. hydrophilus*	*X. granulicarpus*
Dactylus L/W ratio	–	–	–	–	⩽4: 81.8% (9) 4-5: 18.2% (2) ⩾5: 0% (0)	⩽4: 45.8% (11) 4-5: 25.0% (6) ⩾5: 29.2% (7)
3rd abdominal somite (♂♂)						
Lateral board	Right or slightly acute angle	Acute angle	Acute angle 86.4% (76) Right or slightly acute angle 13.6% (12)	Acute angle 100% (18) Right or slightly acute angle 0% (0)	Acute angle 100% (7) Right or slightly acute angle 0% (0)	Acute angle 100% (27) Right or slightly acute angle 0% (0)
Exceeding the external edges of the penultimate thoracic sternite	No	Yes (in general)	Reaching or passing 44.3% (39) Not reaching 55.7% (49)	Reaching or passing 50% (9) Not reaching 50% (9)	Reaching or passing 100% (7) Not reaching 0% (0)	Reaching or passing 100% (27) Not reaching 0% (0)
Mxp3 anterior margin of merus						
Alignment in comparison with the posterior margin	Very oblique	Almost parallel	–	–	**Very oblique** **100% (11)**	**Almost parallel** **100% (47)**
Projecting lobe near the articulation with the carpus	–	–	–	–	**No** **100% (11)**	**Yes** **100% (47)**
Concavity near the articulation with carpus	No	Yes	–	–	Yes 0% (0) **No** **100% (11)**	**Yes** **91.5% (43)** No 8.5% (4)

* Moulting specimens.

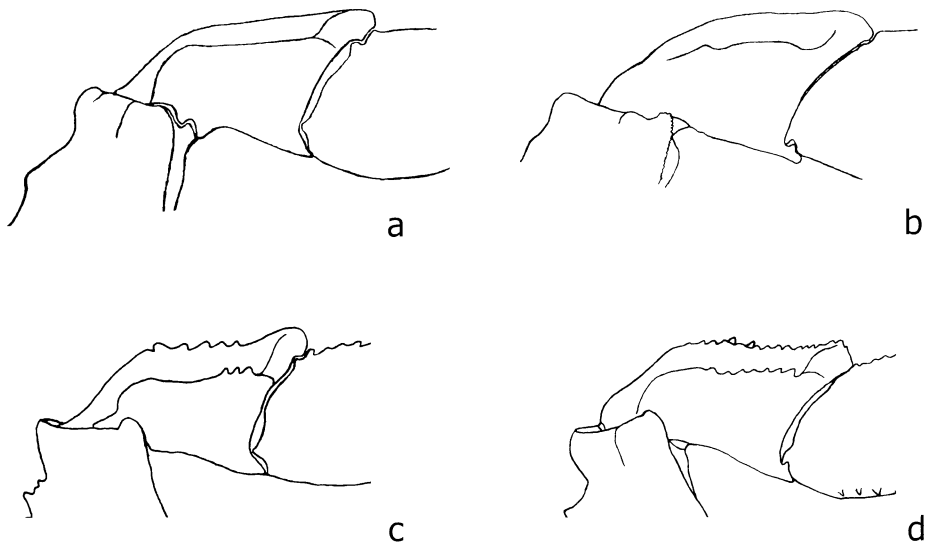

Fig. 2. Carpus of second pereiopod, external view, of: a, *Xantho hydrophilus* (Herbst, 1790): typical specimen from sta. 3 (CW = 2.5 cm); b, *X. granulicarpus* Forest, 1953: moulting specimen from sta. 42 (CW = 1.6 cm); c-d, *X. granulicarpus*: typical specimens from sta. 36 (CW = 1.0 cm) and sta. 104 (CW = 2.5 cm), respectively.

Xantho pilipes A. Milne-Edwards, 1867

Xantho pilipes A. Milne-Edwards, 1867: 268; Drach & Forest, 1953: 17, figs. 4, 7, 9, 11, 13, 17, 23; Ingle, 1980: 118, figs. 57, 64, 65, pl. 21a.

Material examined. — Atlantic Ocean, France: 19 ♂♂, 10 ♀♀ (4 ovig.) CW = 3.9 cm, various localities, Finistère, Bretagne, depth 0 m. — Western Mediterranean, France: 2 ♂♂, 3 ♀♀, CW = 2.7 cm, various localities, Pyrénées Orientales, depth 0-7 m; Spain: 1 ♀, CW = 1.4 cm, Baleares (39°52′N 02°45′E), depth 0-1 m, 10.vi.1952. — Aegean Sea, Greece: 2 ♂♂, 6 ♀♀, CW = 1.7 cm, from various localities of the Aegean, depth 0-20 m.

The material examined fits well to the descriptions of this species given by Nobre (1936), Drach & Forest (1953), and González & Méndez (1986). The complex nomenclatural history of this species was discussed by Holthuis (1954).

Distribution: — Eastern Atlantic: from S.W. Norway to Angola (d'Udekem d'Acoz, 1999). — Mediterranean Sea: western basin (d'Udekem d'Acoz, 1999); Adriatic Sea (Stevcic, 1990); central basin (Forest & Guinot, 1956; Pastore, 1976); Aegean Sea (Kocataş, 1981; Koukouras et al., 1992).

Xantho poressa (Olivi, 1792)

Cancer poressa Olivi, 1792: 48, pl. 2 fig. 3.
Xantho rivulosa, Ostroumoff, 1896: 83.
Xantho hydrophilus, Pesta, 1918: 420, fig. 138; Bouvier, 1940: 266, pl. 10 fig. 171; Huni & Aravindan, 1984: 5. (Not *X. hydrophilus* (Herbst, 1790).)
Xantho rivulosus, Drach & Forest, 1953: 16, figs. 3, 6, 8, 10, 12, 16, 22.

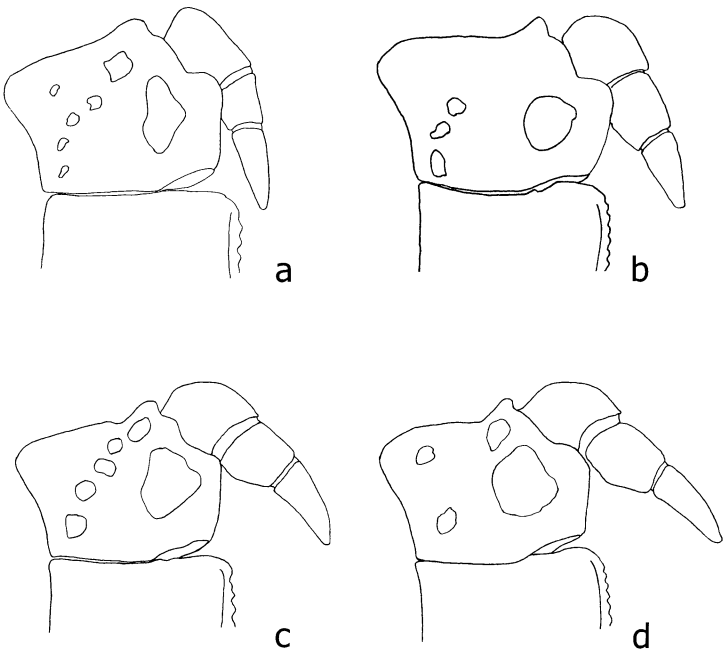

Fig. 3. Third maxilliped of: a, *Xantho hydrophilus* (Herbst, 1790): typical specimen from sta. 3 (CW = 2.5 cm); b, *X. granulicarpus* Forest, 1953: moulting specimen from sta. 42 (CW = 1.6 cm); c-d, *X. granulicarpus*: typical specimens from sta. 36 (CW = 1.0 cm) and sta. 104 (CW = 2.5 cm) respectively.

Xantho poressa, Holthuis, 1954: 104; Zariquiey Alvarez, 1968: 395, figs. 1, 130, 131.

Material examined. — Western Mediterranean, Italy: 1 ♂, 3 ♀♀, CW = 1.5 cm, Cagliari, Sardinia, depth 0-1 m, 21.ii.1997. — Aegean Sea, Greece: 140 ♂♂, 68 ♀♀ (14 ovig.), CW = 4.1 cm, from various localities of the Aegean, depth 0-20 m.

The examined material agrees well with the descriptions of this species given by Nobre (1936), Drach & Forest (1953) and Christiansen (1969). The complex nomenclatural history of this species was discussed by Holthuis (1954).

Distribution: — Eastern Atlantic: from Portugal to Canary Islands (d'Udekem d'Acoz, 1999). — Mediterranean Sea: western basin (d'Udekem d'Acoz, 1999); Adriatic Sea (Stevcic, 1990); central basin (Forest & Guinot, 1956; Pastore, 1976); Aegean Sea (Koukouras, 1972; Kocataş et al., 1987); Sea of Marmara (Ostroumoff, 1896); Levantine basin (Holthuis & Gottlieb, 1958; Huni & Aravindan, 1984; Lewinsohn & Holthuis, 1986). — Black Sea (Băcescu, 1967).

OTHER XANTHIDAE IN THE MEDITERRANEAN SEA

Atergatis roseus (Rüppell, 1830)

Carpilius roseus Rüppell, 1830: 13, pl. 3 fig. 3.

Atergatis roseus, Lewinsohn & Holthuis, 1964: 58, fig. 4; Barnard, 1950: 207, fig. 38; Galil et al., 2002: 132, photo.

Material. — No specimens studied.

Distribution. — Indo-Pacific: from Red Sea to Fiji (Galil et al., 2002). — Mediterranean Sea: Lessepian species, first recorded in Israel in 1961 (Lewinsohn & Holthuis, 1964). Also found in Lebanon (Shiber, 1981) and southern Turkey (Ozcan et al., 2005).

Microcassiope minor (Dana, 1852)

Xantho minor Dana, 1852: 169; atlas, 1855, pl. 8 fig. 7.
Xanthias granosus, Balss, 1936: 38; Bouvier, 1940: 268, pl. 10 fig. 12.
Micropanope rufopunctata, Monod, 1956: 313, figs. 386-392; Guinot, 1967: 358, figs. 10, 15.
Microcassiope minor, Manning & Holthuis, 1981: 138, fig. 30.

Material examined. — Aegean Sea: 1 ♂, CW = 0.7 cm, Linaraki, Sykia, Chalkidiki, depth 0-0.5 m, 5.viii.1975.

The only individual studied matches well the descriptions of the species from the literature (Holthuis & Gottlieb, 1958; Guinot, 1967; Garcia Raso & López de la Rosa, 1992). The complex ancient nomenclature of this species is well given by Manning & Holthuis (1981).

Distribution. — Western Atlantic: from Bahamas to Venezuela (d'Udekem d'Acoz, 1999). — Eastern Atlantic: from Azores to Saint Helena Islands (d'Udekem d'Acoz, 1999). — Mediterranean Sea: western basin (Garcia Raso & Lopez de la Rosa, 1992); Aegean Sea (Kocataş, 1981); Levantine basin (Balss, 1936; Kocataş et al., 2001).

Paractea monodi Guinot, 1969

Actaea rufopunctata, Balss, 1936: 37; Bouvier, 1940: 269, fig. 174, pl. 10 figs. 13, 14; Zariquiey Alvarez, 1968: 404, fig. 134c.
Paractea monodi Guinot 1969: 259, figs. 33, 34; Türkay, 1982: 118.
Paractea rufopunctata, Garcia Raso & Barrajón, 1982: 8, fig. 3; Castelló et al., 1987: 296.

Material examined. — Aegean Sea: 1 ♀, CW = 1.3 cm, Sykia, Milos I., depth 10-40 m, 19.vi.1992; 1 ♂, CW = 0.5 cm, Antipsara I., depth 60 m, 26.ix.1955; 1 carapace, CW = 1.0 cm, Messiniakos Gulf, depth 38-40 m, 11.iv.1955.

Our specimens fit well the original description of Guinot (1969) for this species. The male studied had the three areas of the gastric lobe (3M) merged, as noted by Guinot (1969) for very small individuals.

Distribution. — Eastern Atlantic: from Azores to Cape Verde Islands (d'Udekem d'Acoz, 1999). — Mediterranean Sea: western basin (Zariquiey Alvarez, 1968; Castello et al., 1987; Noël, 1993); Adriatic Sea (Stevcic, 1990); central basin, from various localities (d'Udekem d'Acoz, 1999); Aegean Sea (Koukouras et al., 1992); Levantine basin (Balss, 1936; d'Udekem d'Acoz, 1994).

Paragalene longicrura (Nardo, 1868)

Eriphia longicrura Nardo, 1868: 302, pl. 13 fig. 8.
Paragalene neapolitana Kossmann, 1878: 253.
Paragalene longicrura, Bouvier, 1940: 263, fig. 169, pl. 10 fig. 8; Türkay, 1976: 70, figs. 1-2; Pallaoro, 2005: 750, fig. 2.

Material examined. — Levantine, Greece: 1 ♂, 2 ♀♀ (1 ovig.), CW = 4.2 cm, Kastelorizo I., Dodekanissa, 40 m, 20.x.2004.

Distribution. — Eastern Atlantic: Madeira (Türkay, 1976); Canary Islands (González Pérez, 1995). — Mediterranean Sea: western basin (Kossmann, 1878; Dieuzeide & Goëau-Brissonière, 1955; García Socias, 1985; Grippa, 1993); central basin (Pallaoro, 2005); Aegean Sea (Türkay, 1976); Levantine basin, reported for the first time in the present study from Kastelorizo I., Greece.

KEY TO THE MEDITERRANEAN XANTHIDAE

1. Dorsal face of carapace smooth, suboval, without any indication of regions. Antero-lateral margin of carapace smooth, without any teeth or lobes ..... *Atergatis roseus*
– Dorsal face of carapace more or less divided into regions. Antero-lateral margin of carapace with teeth or lobes ..... (2)

2. Dorsal face of carapace divided into lobes that are covered with pearl-like granules. Antero-lateral margin of carapace with five rounded lobes (exorbital lobe included) ..... *Paractaea monodi*
– Dorsal face of carapace divided into lobes that are not covered with pearl-like granules. Antero-lateral margin of carapace with more or less acute teeth ..... (3)

3. Carapace front with four distinct teeth ..... *Paragalene longicrura*
– Carapace front smooth or granulated ..... (4)

4. Carapace hexagonal. Last three antero-lateral teeth prominent, triangular, and elevated. Ambulatory legs (P2-P5) very slender ..... *Monodaeus couchii*
– Carapace transversally oval. Last three antero-lateral teeth not prominent or not triangular. Ambulatory legs short ..... (5)

5. Carapace surface and chelipeds strongly tuberculated. Antero-lateral teeth small, subtriangular, and denticulated. Small species (CL < 1 cm) ..... *Microcassiope minor*
– Carapace surface and chelipeds smooth or weakly granulated. Antero-lateral teeth smooth or granulated. Large species ..... *Xantho* (6)

6. Carapace with last two antero-lateral teeth with fringe of long hairs on their ventral surface. Carpus and propodus of ambulatory legs with a continuous fringe of long hair ..... *Xantho pilipes*
– Carapace with last two antero-lateral teeth without fringe of hairs on their ventral surface. Carpus and propodus of ambulatory legs sparsely setose ..... (7)

7. Carapace lobes granulose, strongly projecting, and limited by deep depressions. Antero-lateral teeth more or less granulated. First sternite apically triangular, with narrow lateral depressions. P2-P4 carpus with superior margin and lateral keel tuberculated ..... *Xantho granulicarpus*
– Carapace lobes smooth, weakly projecting, and limited by shallow depressions. Antero-lateral teeth smooth. First sternite apically ensiform, with wide lateral depressions. P2-P4 carpus with superior margin and lateral keel smooth or granulated ..... *Xantho poressa*

ACKNOWLEDGEMENTS

We would like to thank Dr. P. Y. Noël, Muséum National d'Histoire Naturelle, Paris, for kindly offering the Atlantic and western Mediterranean *Xantho* material from his personal collections.

This study was supported by the Operational Programme for Education and Initial Vocational Training (EPEAEK II), action "PYTHAGORAS I" (co-funded by the Ministry of Education and Religious Affairs of Greece and the European Union).

REFERENCES

ADENSAMER, T., 1898. Decapoden gesammelt auf S. M. Schiff Pola in den Jahren 1890-1894. Berichte der Commission für Erforschung des östlichen Mittelmeeres XXII. Zoologische Ergebnisse XI. Decapoden. Denkschriften der Kaiserlichen Akademie der Wissenschaften, Vienna, (mathematisch-naturwissenschaftliche Klasse) **65**: 597-628, 1 fig.

ALMAÇA, C., 1959. Sobre a variabilidade e a posiçao sistemática de *Xantho incisus* Leach (= *X. floridus* Montagu) da zona intercotidal do litoral português. I. Populaçoes ao sul do cabo da Roca. Rev. Fac. Cienc. Lisboa, **7**(2): 233-252.

— —, 1972. Le littoral portugais, zone d'intergradation entre *Xantho incisus incisus* Leach et *X. incisus granulicarpus* (Forest). Thalassia Jugoslavica, **8**(1): 59-61.

ARENA, P. & F. LI GRECI, 1973. Indagine sulle condizioni faunistiche e sui rendimenti di pesca dei fondali batiali della Sicilia occidentale e della bordura settentrionale dei banchi della soglia Siculo-Tunisina. Quad. Lab. Tecnol. Pesca, **1**(5): 157-201.

ATEŞ, A. S., T. KATAĞAN & A. KOCATAŞ, 2006. Bathymetric distribution of decapod crustaceans on the continental shelf along the Aegean Sea coasts of Turkey. Crustaceana, **79**(2): 129-141.

BĂCESCU, M. C., 1967. Crustacea Decapoda. Fauna Republicii Socialiste România, **4**(9): 1-351, figs. 1-141.

BALSS, H., 1936. Decapoda (with an appendix, Schizopoda, by C. ZIMMER). Part VII. In: The fishery grounds near Alexandria. Fisheries Research Directorate Notes and Memoirs, Cairo, **15**: 1-67, figs. 1-40.

BARNARD, K. H., 1950. Descriptive catalogue of South African decapod Crustacea (crabs & shrimps). Ann. South African Mus., **38**: 1-837.

BELL, T., 1853. A history of the British stalk-eyed Crustacea: i-xv, 1-386. (J. Van Voorst, London).

BOURDILLON-CASANOVA, L., 1960. Le méroplancton du golfe de Marseille. Les larves de crustacés décapodes. Recueil des Travaux de la Station Marine d'Endoume, Marseille, **30**(18): 1-286, figs. 1-77, tabs. 1-27.

BOUVIER, E. L., 1940. Décapodes marcheurs. Faune de France, **37**: 1-404, pls. 1-11. (Paul Le Chevalier, Paris).

CARUS, J. V., 1885. Prodromus faunae Mediterraneae sive descriptio animalium maris Mediterranei incolarum quam comparata silva rerum quatenus innotuit adiectis locis et nominibus vulgaribus eorumque auctoribus in commodum zoologorum congessit J. V. Carus, **1**(2): 283-524. (Schweizerbart, Stuttgart).

CASTELLÓ, J., F. PORTAS & J. ISERN-ARÚS, 1987. Contribución al conocimiento de los Crustáceos Decápodos alguícolas de las islas Baleares. Investigación Pesquera, Barcelona, **51** (suppl. 1): 293-300.

CHRISTIANSEN, M. E., 1969. Crustacea Decapoda Brachyura. Marine Invertebrates of Scandinavia, **2**: 1-143.

COLOSI, G., 1923. Crostacei decapodi della Pirenaica. Mem. R. Com. Thalassogr. Italiana, **104**: 1-11.

COUCH, R. Q., 1851. Notice of a Crustacea new to Cornwall. Trans. nat. Hist. antiq. Soc. Penzance, **2**: 13-14.

CROSNIER, A., 1967. Remarques sur quelques crustacés décapodes benthiques Ouest-Africains. Description de *Heteropanope acanthocarpus* et *Medaeus rectifrons* spp. nov. Bull. Mus. natn. Hist. nat., Paris, (2) **39**(2): 320-344.

DANA, J. D., 1852. Crustacea, Part I. In: United States Exploring Expedition during the Years 1838, 1839, 1840, 1841, 1842 under the Command of Charles Wilkes, U.S.N., **13**: 1-685. Atlas (1855): 1-27, pls. 1-96. (C. Sherman, Philadelphia).

DIEUZEIDE, R. & W. GOËAU-BRISSONIÈRE, 1955. *Paragalene longicrura* Nardo (Décapode Brachyoure) aux environs d'Alger. Bull. Trav. Stat. Aquic. Pêche Castiglione, **7**: 275-279.

DRACH, P. & J. FOREST, 1953. Description et répatition des *Xantho* des mers d'Europe. Arch. Zool. exp. gén., **90**(1): 1-35.

FOREST, J., 1957. Crustacés décapodes recueillis au cours de la croisière du "Profeseur Lacaze Duthiers" au large des côtes d'Algérie (juin-juillet 1952). Reptantia. Travaux du C.L.O.E.C. d'Algérie, 40. In: Résultats des campagnes du "Professeur Lacaze Duthiers". Vie et Milieu, **2** (suppl. 6): 117-120.

— —, 1976. Une espèce nouvelle de Xanthidae des eaux bathyales de Méditerranée: *Monodaeus guinotae* sp. nov. Thalassia Yugoslavica, **8**(1): 63-69.

FOREST, J. & D. GUINOT, 1956. Sur une collection de crustacés décapodes et stomatopodes des mers Tunisiennes. Bull. Sta. océanogr. Salammbô, **53**: 24-43.

GALIL, B., C. FROGLIA & P. Y. NOËL, 2002. CIESM atlas of exotic species in the Mediterranean, **2**. Crustaceans: decapods and stomatopods: 1-192. (CIESM Publishers, Monaco).

GARCIA RASO, J. E., 1984. Brachyura of the coast of southern Spain. (Crustacea, Decapoda). Spixiana, Munich, **7**(2): 105-113.

— —, 1996. Crustacea Decapoda (excl. Sergestidae) from Ibero-Moroccan waters. Results of Balgim-84 expedition. Bulletin of Marine Science, **58**(3): 730-752.

GARCIA RASO, J. E. & A. BARRAJÓN, 1982. Contribución al conocimiento de los Xanthidae MacLeay (Crustacea, Decapoda, Brachyura) del sur de España. Mon. Trab. Zool. Univ. Málaga, **3-4**: 3-14.

GARCIA RASO, J. E. & I. LÓPEZ DE LA ROSA, 1992. Presencia de *Microcassiope minor* (Dana) (Crustacea: Decapoda: Xanthidae) en aguas europeas del Mediterráneo occidental. Cah. Biol. mar., **33**: 75-81.

GARCIA-RASO, J. E., E. GONZÁLEZ-GURRIARAN & F. SARDA, 1987. Estudio comparativo de la fauna de crustaceos decapodos braquiros de tres areas de la peninsula Iberica (Galicia, Malaga y Cataluna). Investigación Pesquera, Barcelona, **51** (supl. 1): 43-45.

GARCÍA SOCIAS, L. L., 1985. Sobre la presenzia en aguas de Mallorca de *Paragalene longicrura* (Nardo, 1868) y *Euchirograpsus liguricus* H. Milne-Edwards, 1853 (Crustacea, Decapoda, Brachyura). Boll. Soc. Hist. nat. Balears, **29**: 123-127.

GILAT, E., 1969. Study of an ecosystem in the coastal waters of Ligurian Sea. III. Macrobenthic communities. Bulletin de l'Institut Océanographique, Monaco, **69**(1396): 1-76.

GONZÁLEZ GURRIARÁN, E. & G. MÉNDEZ, 1986. Crustáceos decápodos das costas de Galicia. I. Brachyura. Cuadernos da Área de Ciencias Biolóxicas, Seminario de Estudos Galegos: 1-242. (Castro-Sada, A Coruña).

GONZÁLEZ PÉREZ, J. A., 1995. Catálogo de los crustáceos decápodos de las Islas Canarias: 1-282. (S. L Turquesa., Santa Cruz de Tenerife).

GRIPPA, G. B., 1993. Notes on decapod fauna of "Arcipelago Toscano". Bios (Macedonia, Greece), **1**(1): 223-239.

GUINOT, D., 1967. Recherches préliminaires sur les groupements naturels chez les crustacés décapodes brachyoures. II. Les anciens genres *Micropanope* Stimpson et *Medaeus* Dana. Bull. Mus. natn. Hist. nat., Paris, (2) **39**(2): 345-374.

— —, 1969. Sur divers Xanthidae notamment sur *Actaea* De Haan et *Paractaea* gen. nov. (Crustacea Decapoda Brachyura). Cahiers du Pacifique, **13**: 223-267, figs. 1-36.

HELLER, C., 1863. Die Crustaceen des südlichen Europa. Crustacea Podophthalmia: 1-336, pls. 1-10. (Wilhelm Braumüller, Vienna).

HOLTHUIS, L. B., 1954. The names of the European species of the genus *Xantho* Leach, 1814 (Crustacea Decapoda Brachyura). Proc. Kon. Nederlandse Akad. Wetensch., (3) **57**: 103-107.

— —, 1987. Vrais crabes. In: W. FISHER, M. SCHNEIDER & M.-L. BAUCHOT, Fiches FAO d'identification des espèces pour les besoins de la pêche (révision 1). Méditerranée et mer Noire. Zone de Pêche **37**, 1, Végétaux et Invertébrés: 321-367. (FAO, Rome).

HOLTHUIS, L. B. & E. GOTTLIEB, 1958. An annotated list of the decapod Crustacea of the Mediterranean coast of Israel, with an appendix listing the Decapoda of the eastern Mediterranean. Bull. Research Council Israel, **7**(2): 1-126.

HUNI, A. A. D. & C. M. ARAVINDAN, 1984. A preliminary study of indertidal organisms on a rocky platform of Tajura coast near Tripoli (Libya). The Libyan Journal of Science, **13**: 1-8.

INGLE, R. W., 1980. British crabs: 1-222, pls. 1-34. (British Museum (Natural History), Oxford University Press, London).

KOCATAŞ, A., 1971. Investigations on the taxonomy and ecology of crabs (Brachyura) from Izmir Bay and its adjacent areas. Sci. Rep. Fac. Sci., Ege Univ., **121**: 1-77. [In Turkish.]

— —, 1981. Liste préliminaire et répartition des crustacés décapodes des eaux turques. Rapport de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée, **27**(2): 161-162.

KOCATAŞ, A., Z. ERGEN, S. MATER, İ. ÖZEL, T. K. KATAĞAN, T. ORAY, M. ÖNEN & M. KAYA, 1987. Marine Fauna. In: Ö. MATBAASI, Biological diversity in Turkey: 141-161. (Environmental Problems Foundation of Turkey, Ankara).

KOCATAŞ, A., T. KATAĞAN & H. A. BENLI, 2001. Contribution to the knowledge of the crustacean fauna of Cyprus. Israel Journal of Zoology, **47**: 147-160.

KOSSMANN, R., 1878. Kurze Notizen über einige neue Crustaceen, sowie über neue Fundorte einiger bereits beschriebener. Arch. Naturgesch., **44**(1): 251-258.

KOUKOURAS, A., 1972. A contribution to the study of decapod Crustacea of Greece. Hellenic Oceanol. Limnol., **11**: 745-779. [In Greek.]

KOUKOURAS, A., C. DOUNAS, M. TÜRKAY & E. VOULTSIADOU-KOUKOURA, 1992. Decapod crustacean fauna of the Aegean Sea: new information, check list, affinities. Seckenbergiana marit., **22**(3/6): 217-244.

KOUKOURAS, A., M. MAVIDIS & P. Y. NOËL, 2002. The genus *Pisidia* Leach (Decapoda, Anomura) in the northeastern Atlantic Ocean and the Mediterranean Sea. Crustaceana, **75**(3-4): 451-463.

LEWINSOHN, CH. & L. B. HOLTHUIS, 1964. New records of decapod Crustacea from the Mediterranean coast of Israel and the eastern Mediterranean. Zoologische Mededelingen, Leiden, **40**(8): 45-63.

— — & — —, 1986. The Crustacea Decapoda of Cyprus. Zoologische Verhandelingen, Leiden, **230**: 1-64.

MANNING, R. B. & L. B. HOLTHUIS, 1981. West African brachyuran crabs (Crustacea: Decapoda). Smithson. Contr. Zool., **306**: i-xii, 1-379.

MILNE-EDWARDS, A., 1867. Description de quelques espèces nouvelles de crustacés brachyures. Ann. Soc. entom. France, (4) **7**: 263-288.

MONOD, TH., 1956. Hippidea et Brachyura ouest-africains. Mém. Inst. Français d'Afrique Noire, **45**: 1-674.

MÜLLER, G. J., 1986. Review of the hitherto recorded species of Crustacea Decapoda from the Bosporus, the Sea of Marmara and the Dardanelles. Cercetari Marine, **19**: 109-130.

NARDO, G. D., 1868. Annotazioni illustranti cinquantaquattro specie di crostacei podottalmi, endottalmi e succhiatori del mare Adriatico, alcune delle quali nuove o male conosciute, accompagnate da trentare figure litografate, e precedute dalla storia della carcinologia Adriatica antica e rencente. Mem. Ist. Venetiano Sci. Lett. Art., Venice, **14**: 217-340.

NOBRE, A., 1936. Fauna marinha de Portugal. IV. Crustáceos decápodes e stomatópodes marinhos de Portugal: 1-213, pls. 1-61. (Imprensa Portuguesa, Porto).

NOËL, P. Y., 1992. Clé préliminaire d' identification des Crustacea Decapoda de France et des principales autres espèces d' Europe. Secrétariat de la Faune et de la Flore. Mus. nat. Hist. natur., Paris, (Collection Patrimoines Naturels) **9**: 1-145.

— —, 1993. Atlas des crustacés décapodes de France (espèces marines et d'eaux saumâtres), état d'avancement au 28-06-1993: 1-96. (SFF et BIMM/MNHN, CSP, Minist. Environnement, Paris).

OLIVI, G., 1792. Zoologia Adriatica, ossia catalogo ragionato degli animali del golfo e della lagune di Venezia: i-ix, 1-334, i-xxxii, pls. 1-9. (Bassano, Venice).

OSTROUMOFF, A., 1896. Comptes-rendus des dragages et du plancton de l'expédition de Selianik. Bull. Acad. Sci. St. Petersburg, **5**(5): 33-93.

OZCAN, T., T. KATAGAN & A. KOCATAŞ, 2005. Brachyuran crabs from Iskenderun Bay (south-eastern Turkey). Crustaceana, **78**(2): 237-243.

PALLAORO, A., 2005. The rediscovery of the crab *Paragalene longicrura* (Nardo, 1868) (Decapoda, Brachyura, Xanthidae) in the Adriatic Sea. Crustaceana, **78**(6): 749-753.

PASTORE, M., 1976. Decapoda Crustacea in the Gulf of Taranto and the Gulf of Catania with a discussion of a new species of Dromiidae (Decapoda Brachyoura) in the Mediterranean Sea. Thalassia Jugoslavica, **8**(1): 105-117.

PESTA, O., 1918. Die Decapodenfauna der Adria.: i-x, 1-500, 1 map. (Franz Deuticke, Leipzig and Vienna).

RELINI-ORSI, L. & G. RELINI, 1972. Recenti reperti ittiologici su fondi fangosi batiali del mar Ligure. Quad. Civ. Staz. Idrob. Milano, **3-4**: 5-18.

REUSCHEL, S. & C. D. SCHUBART, 2006. Phylogeny and geographic differentiation of Atlanto-Mediterranean species of the genus *Xantho* (Crustacea: Brachyura: Xanthidae) based on genetic and morphometric analyses. Marine Biology, Berlin, **148**: 853-866.

RÜPPELL, F. W., 1830. Beschreibung und Abbildung von 24 arten kurzschwänzigen krabben, als beitrag zur naturgeschichte des Rothen Meeres: 1-28, pls. 1-6 (L.H. Brönner, Frankfurt a. M.).

SAKAI, K., 1999. J.F.W. Herbst-collection of decapod Crustacea of the Berlin Zoological Museum, with remarks on certain species. Naturalists, Publications of Tokushima Biological Laboratory, Shikoku University, **6**: 1-45, pls. 21.

SHIBER, J. G., 1981. Brachyurans from Lebanese waters. Bulletin of Marine Science, **31**(4): 864-875.

STEVCIC, Z., 1990. Check-list of the Adriatic decapod Crustacea. Acta Adriatica, **31**(1/2): 183-274.

TÜRKAY, M., 1976. Ein Fund von *Paragalene longicrura* (Nardo, 1868) in der Ägäis (Decapoda, Brachyura). Crustaceana, **30**(1): 108.

— —, 1982. Marine Crustacea Decapoda von den Kapverdischen Inseln mit bemerkungen zur Zoogeographie des Gebietes. Cour. Forsch. Inst. Senckenberg, **52**: 91-129.

— —, 2001. Decapoda. In: M. J. COSTELLO et al. (eds.), 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, **50**: 284-292. (Paris).

TÜRKAY, M. & A. KOUKOURAS, 1988. The rediscovery of *Monodaeus guinotae* Forest, 1976 in the Aegean Sea. Seckenbergiana Biologica, **68**(4/6): 401-405.

UDEKEM D'ACOZ, C. D', 1994. Contribution à la connaissance des crustacés décapodes Helléniques I: Brachyura. Bios (Macedonia, Greece), **1**(2): 9-47.

— —, 1999. Inventaire et distribution des crustacés décapodes de l'Atlantique nord-oriental, de la Méditerranée et des eaux continentales adjacentes au nord de 25°N. Patrimoines Naturels (M.N.H.N./S.P.N.), **40**: 1-383. (Paris).

VATOVA, A., 1975. Ricerche qualitative e quantitative sulla fauna bentonica del Golfo di Tara. Boll. Pesca Piscic. Idrobiol., **30**(1): 5-38.

ZARIQUIEY ALVAREZ, R., 1968. Crustáceos decápodos Ibéricos. Investigación Pesquera, Barcelona, **32**: i-xv, 1-510.

First received 6 September 2007.
Final version accepted 25 February 2008.