SHORT COMMUNICATION

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ON THE OCCURRENCE OF *AFROPINNOTHERES MONODI* MANNING, 1993 (DECAPODA, PINNOTHERIDAE) IN EUROPEAN WATERS

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According to D´Udekem D´Acoz (1999) the family Pinnotheridae is represented in European waters by five species: *Nepinnotheres pinnotheres* (Linnaeus, 1758), *Pinnotheres ascidicola* Hesse, 1872, *P. marioni* Gourret, 1887, *P. pectunculi* Hesse, 1872 and *P. pisum* (Linnaeus, 1767). More recently, Becker and Turkay (2010) studied the adult morphology of European pinnotherids and concluded that *Pinnotheres ascidicola* and *P. marioni* are junior synonyms of *N. pinnotheres*, restricting the European pinnotherids species to *N. pinnotheres*, *P. pisum* and *P. pectunculi*. Nevertheless, in 2002 López de la Rosa et al. reported the presence of one small specimen belonging to the genus *Afropinnotheres* in the Bay of Cadiz (SW Spain) (September, 1995), although they did not assign it to any species nor provided data about its host (it was collected free in the water column).

In 1993 Manning described the new genus *Afropinnotheres*, comprising 4 species, viz. *A. larissae* (Machkevskiy, 1992), *A. crosnieri*, *A. guinotae* and *A. monodi*, from which the three latter were new species. The type species of this new genus is *Afropinnotheres monodi*, a small pinnotherid crab with a known distribution restricted to four localities of the western Atlantic coast of Africa, two in Morocco (Monod, 1933, Forest and Gantes, 1960) and two in Mauritania (Capart, 1951, Fransen, 1991) (see fig. 1 and Table 1). The diagnosis of this new species was based on 1 male, 8 females and 2 ovigerous females, being the holotype (MNHN-B 10646) one of the largest non ovigerous females (8.0 x 9.0 mm) from Morocco. The host of this species was unknown until now because all specimens had been collected in the water column as free individuals.

Recently, in different studies carried out in the Gulf of Cádiz from 2003-2010, a total of 69 specimens of *Afropinnotheres monodi* Manning, 1993 (see Table 1) were collected on populations of the mud clam *Scrobicularia plana* (da Costa, 1778), the grooved carpet shell *Ruditapes decussatus* (Linnaeus, 1758) and the lagoon cockle *Cerastoderma glaucum* (Poiret, 1789). In order to assess the distribution of this species in the remaining southern Atlantic

coast of Spain, a survey was carried out (June-July 2010) on populations of *S. plana* collected at different estuarine systems and salt marshes from the Bay of Cadiz to the Mediterranean Sea. Despite the important number of clams examined, no specimens of *A. monodi* were found outside the Bay of Cadiz during this survey (see fig. 1 and Table 1).

Comparing data on *A. monodi* in Manning (1993) with the ones from the present study, no remarkable morphological differences could be found between the African and European specimens concerning the characters described in the diagnosis and illustrations. Concretely, the following taxonomical characters were also observed in the European specimens: carpus subequal to propodus in male pereipods, dactylus of P5 not longest of all dactyli of walking legs and dactylus of longer walking legs distinctly shorter than respective propodus in females, and finally the total length relationship between P5 and P4 in both males and females. The main differences observed were limited to the size: the 11 specimens studied by Manning (1993) ranged from 4.5 x 4.5 to 12.1 x 13.6 mm while the 69 individuals examined in the present work are clearly smaller, ranging from 1.34 x 1.65 to 4.31 x 4.85 mm. The size of adult pinnotherids can vary deeply accordingly to host size, as demonstrated by Palmer (1995), Pregenzer (1978) and Becker and Turkay (2010). Unfortunately, the hosts of the African specimens could not be measured because they are unknown, thus it is not possible to attribute the small size of European specimens to small sizes of the available European hosts.

The results presented herein, point to at least three different hosts for *A. monodi* in the Gulf of Cádiz: the clams *S. plana*, *R. decussatus* and *C. glaucum*, with higher infestation rates observed in the latter (see Table 1). Nevertheless, even when these clam hosts were available, *A. monodi* was not collected in the smallest Salado, Barbate and Palmones estuaries (Table 1 and Figure 1). This apparent limitation in the spatial distribution of *A. monodi* may be due to: *(i)* environmental constrains - the strong water salinity fluctuations occurring during rainfall

67 periods in these estuarine habitats may be detrimental for the pea crabs; *(ii)* dispersal
68 constrains – the features of the ocean circulation both from the African shelf to the Gulf of
69 Cádiz and within the Gulf of Cádiz (Hagen, 2001; García-Lafuente et al., 2006) may limit the
70 dispersal of this species westward of the Bay of Cadiz. .

71 In the samples from the Gulf of Cádiz no relationship was observed between clam size
72 (in specimens > 20 mm length) and degree of infection (fig. 2A) (χ^2= 17.47, p > 0.05).
73 Although a positive relationship was observed between pea crab length and clam length, it
74 was not statistically significant (fig. 2B) (r = 0.25; p = > 0.05).

75 *Afropinnotheres monodi* is not the first African crab that extends its distribution to
76 European waters. *Uca tangeri* (Eydoux, 1835) and *Panopeus africanus* A. Milne Edwards,
77 1867 are other good examples of African species inhabiting the same South Atlantic
78 European coasts (D´Udekem D´Acoz, 1999). These three cases correspond to species
79 inhabiting estuarine systems with remarkable extensions of muddy sediments and strong tidal
80 variations, conditions hardly found in the Mediterranean. This could be the reason why none
81 of these species have been recorded in Mediterranean waters. The northward limits of
82 distribution of these ones are probably defined by temperature; *Uca tangeri´*s and *Panopeus*
83 *africanus´* northern populations are the Mira and Mondego estuaries respectively. The same
84 happens with other sublittoral African crabs, such as *Liocarcinus mcleayi* (Barnard, 1947) and
85 *Brachynotus atlanticus* Forest, 1957 (García Raso and Manjón-Cabeza,1996; García Raso,
86 1985), which have their northern limit of distribution in the Gulf of Cádiz and only some
87 accidental specimens (not stable populations) could be found in the Western Mediterranean
88 Sea (Alboran Sea) (García Raso, 1984). Thus, in the near future new records of *A. monodi*
89 could also be expected in Portuguese estuaries supporting muddy habitats with moderate
90 salinity fluctuations.
91

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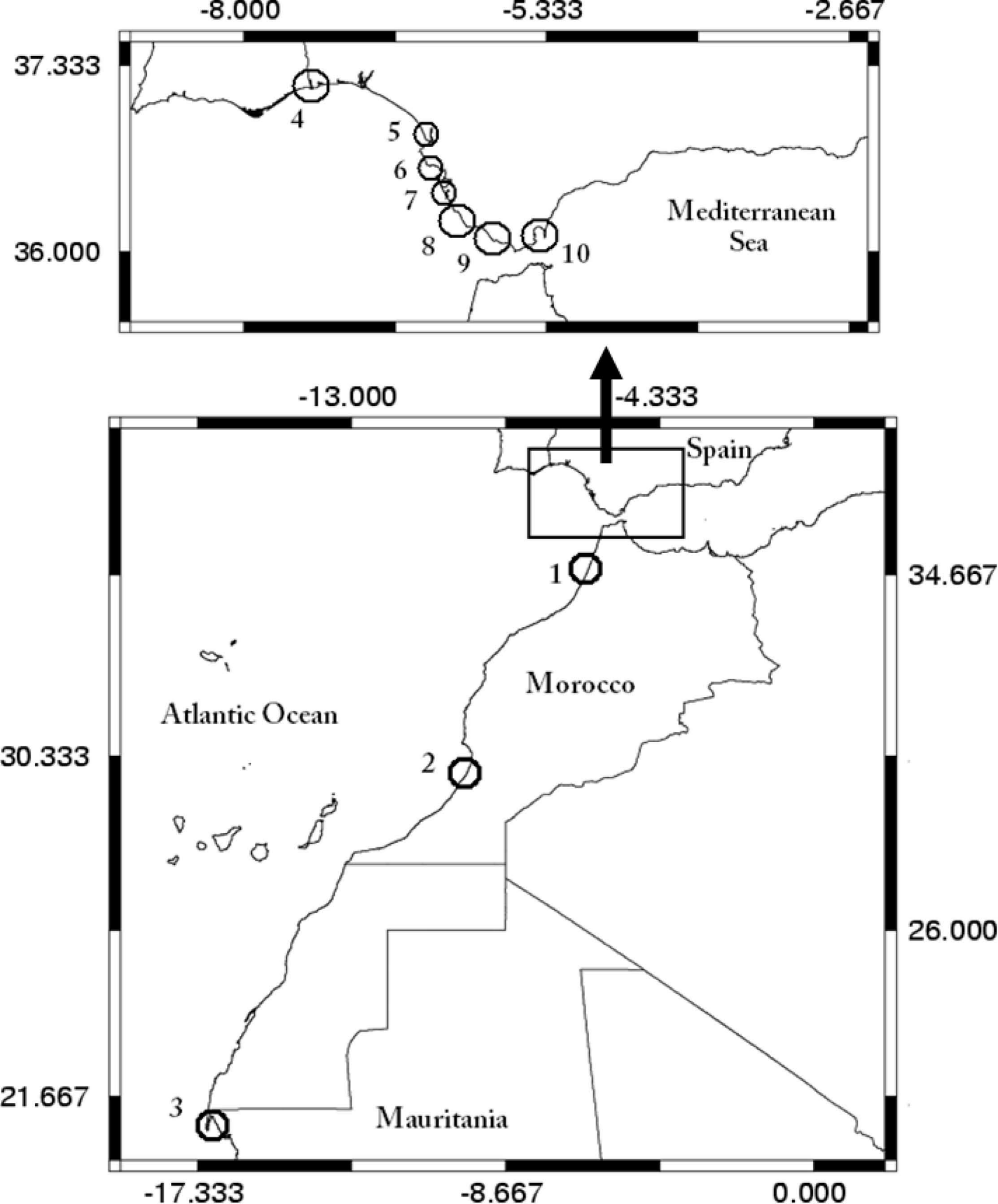
FIGURE CAPTIONS

Figure 1. Global distribution of *Afropinnotheres monodi* Manning, 1993, including sampled localities where the presence of *A. monodi* could not be confirmed. Confirmed localities: Morocco: 1. Moulay bou Selham, 2. Oued Massa estuary (topotypic population). Mauritania: 3. de Cansado Bay and Port-Étienne. Spain: 4. Guadiana estuary, 5.Guadalquivir estuary, 6.San Pedro estuary, 7.Sancti Petri creek. Unconfirmed localities: 8. Salado estuary, 9. Barbate estuary, 10. Palmones estuary.

Figure 2. *Scrobicularia plana* specimens collected in San Pedro estuary. A - size frequency distribution of clams with and without the pea crab *Afropinnotheres monodi*; B - relationship between the length of each clam host and the corresponding hosted pea crab.

Table 1. Distribution, host and proportion of infection of *Afropinnotheres monodi*. Locality numeration is the same as in figure 1. Sampled localities where the presence of *A. monodi* was not confirmed, are included.

No. Locality	Locality	Country	Coordinates	No. specimens	Host	Host examined/infection %
1	Moulay bou Selham	Morocco	35º00'N, 6º22'W	1 ♀ovig.	Unknown	- / -
2	Oued Massa estuary	Morocco	30º05'N, 9º30'W	1 ♂ + 7 ♀	Unknown	- / -
3	de Cansado Bay	Mauritania	20º54'N, 17º02'W	1 ♀ovig	Unknown	- / -
3	Port-Étienne	Mauritania	20º54'N, 17º04'W	1 ♀	Unknown	- / -
4	Guadiana estuary	Spain	37º10'N, 7º23'W	3 ♂	*Ruditapes decussatus*	120 / 2.5 %
5	Guadalquivir estuary	Spain	36º47'N, 6º21'W	1 ♂	Unknown	- / -
5	Guadalquivir estuary	Spain	36º47'N, 6º21'W	0	*Scrobicularia plana*	54 / 0 %
6	San Pedro estuary	Spain	36º31'N, 6º12'W	39♂+21♀+1♀ ovig.	*Scrobicularia plana*	687 / 8,88 %
6	San Pedro estuary	Spain	36º31'N, 6º12'W	1 ♂	*Cerastoderma glaucum*	4 / 25 %
6	San Pedro estuary	Spain	36º31'N, 6º12'W	1 ♀	*Ruditapes decussatus*	14 / 7.1 %
7	Sancti Petri creek	Spain	36º23'N, 6º12'W	2 ♂	*Cerastoderma glaucum*	13 / 15.4 %
8	Salado estuary	Spain	36º16'N, 6º05'W	0	*Scrobicularia plana*	24 / 0 %
9	Barbate estuary	Spain	36º11'N, 5º54'W	0	*Scrobicularia plana*	383 / 0 %
10	Palmones estuary	Spain	36º10'N, 5º25'W	0	*Scrobicularia plana*	125 / 0 %


-8.000
-5.333
-2.667
37.333
36.000
4
5
6
7
8
9
10
Mediterranean Sea
-13.000
-4.333
Spain
1
34.667
Morocco
Atlantic Ocean
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2
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3
Mauritania
-17.333
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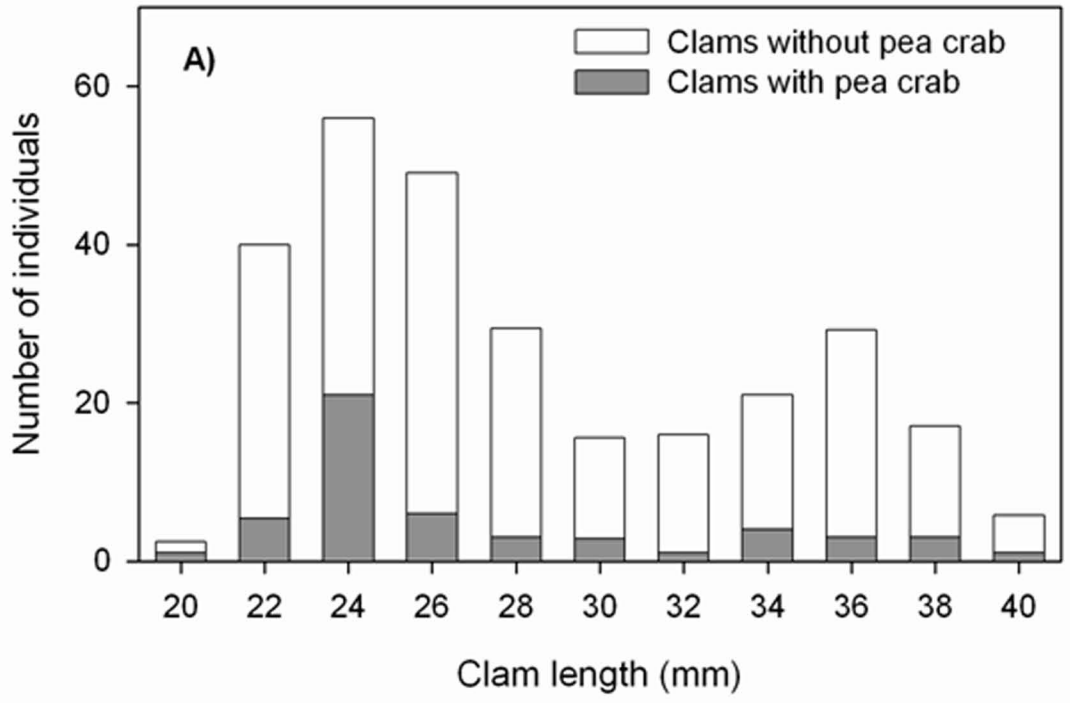
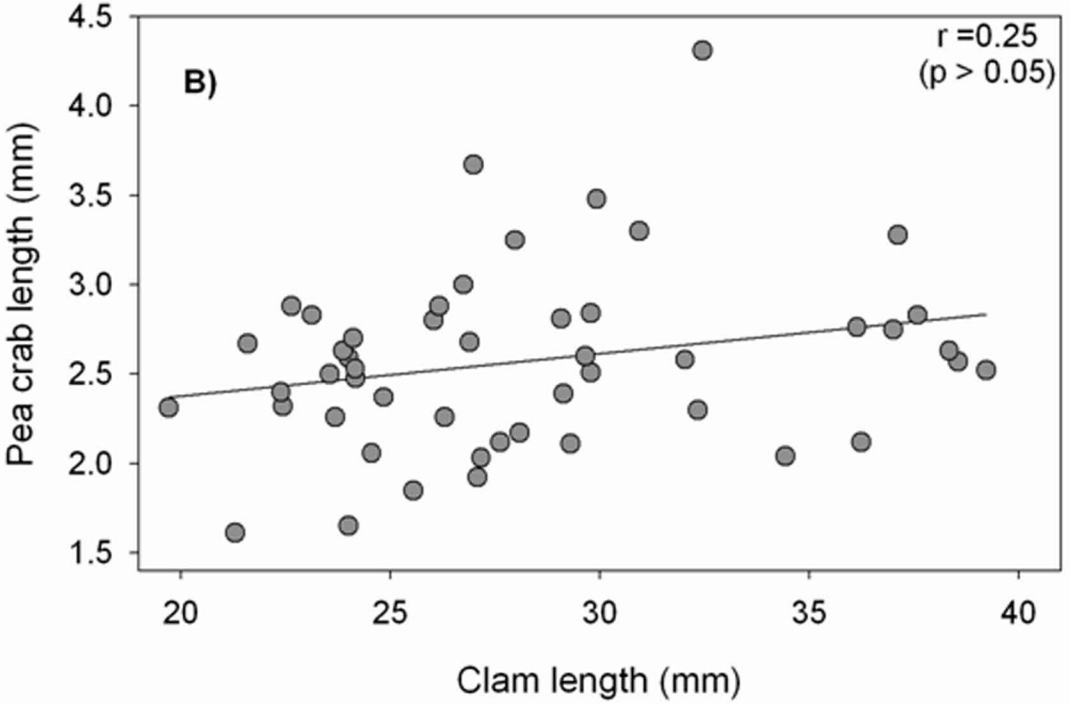

A)
Clams without pea crab
Clams with pea crab
Number of individuals
0
20
40
60
20
22
24
26
28
30
32
34
36
38
40
Clam length (mm)


B)
r =0.25
(p > 0.05)
Pea crab length (mm)
1.5
2.0
2.5
3.0
3.5
4.0
4.5
20
25
30
35
40
Clam length (mm)