REVIEW OF THE THALASSINIDEA (CRUSTACEA: DECAPODA) FROM CHILE AND ARGENTINA

UNA REVISIÓN DE LOS THALASSINIDEA (CRUSTACEA: DECAPODA) DE CHILE Y ARGENTINA

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Thalassinid decapods have received increasing attention in marine ecology due to their deep-burrowing activity and their ecological importance in benthic communities, i.e. as bioturbators in muddy environments (Pemberton et al. 1976, Stamhuis et al. 1996, Coelho et al. 2000). Due to the increasing world-wide interest in biodiversity, the number of new descriptions of thalassinid species increased significantly during the last few decades (Dworschak 2000). Biodiversity studies performed in the western Atlantic Ocean showed this region to be one of those with highest thalassinid diversity worldwide (Dworschak 2000, Williams 1993). However, marine biologists still paid little attention to the thalassinids from the southwestern Atlantic waters off Argentina and the Chilean Pacific coast (Fig. 1). Only eight thalassinid species are so far known to occur along the Chilean and Argentine coasts (Fig. 2). Recent descriptions of new species from these waters (Guzman & Thatje 2003) and especially from the deeper sublittoral (Thatje 2000, Thatje & Gerdes 2000) indicate that the total species richness of the Thalassinidea from Chile and Argentina still remains to be discovered. The present work is an attempt to summarize the extant knowledge on the Thalassinidea from both Chilean and Argentine waters.

A particular species was considered valid when it was mentioned as such in several papers or never synonymized with any other taxon. Latitudinal distribution along the Chilean Pacific and the Argentine Atlantic coast was evaluated from the literature listed in the Aquatic Science and Fishery Abstracts (ASFA, Cambridge, U.K.). Most local South American literature is not included into international computer databases. For this reason the author searched for additional information in local scientific literature from the respective countries in 1997. Additional informations on thalassinid distribution were obtained revising thalassinid material of the crustacean collections of the Zoological Museum of the Humboldt University, Berlin, Germany, and the Invertebrate Collection of the Universidad de Buenos Aires (Facultad de Ciencias Exactas y Naturales), Argentina.

This work presents as many type sampling sites as available from the literature, in order to reveal and work out exact distribution limits, and to give indications for possible sampling sites for future studies. In the case of

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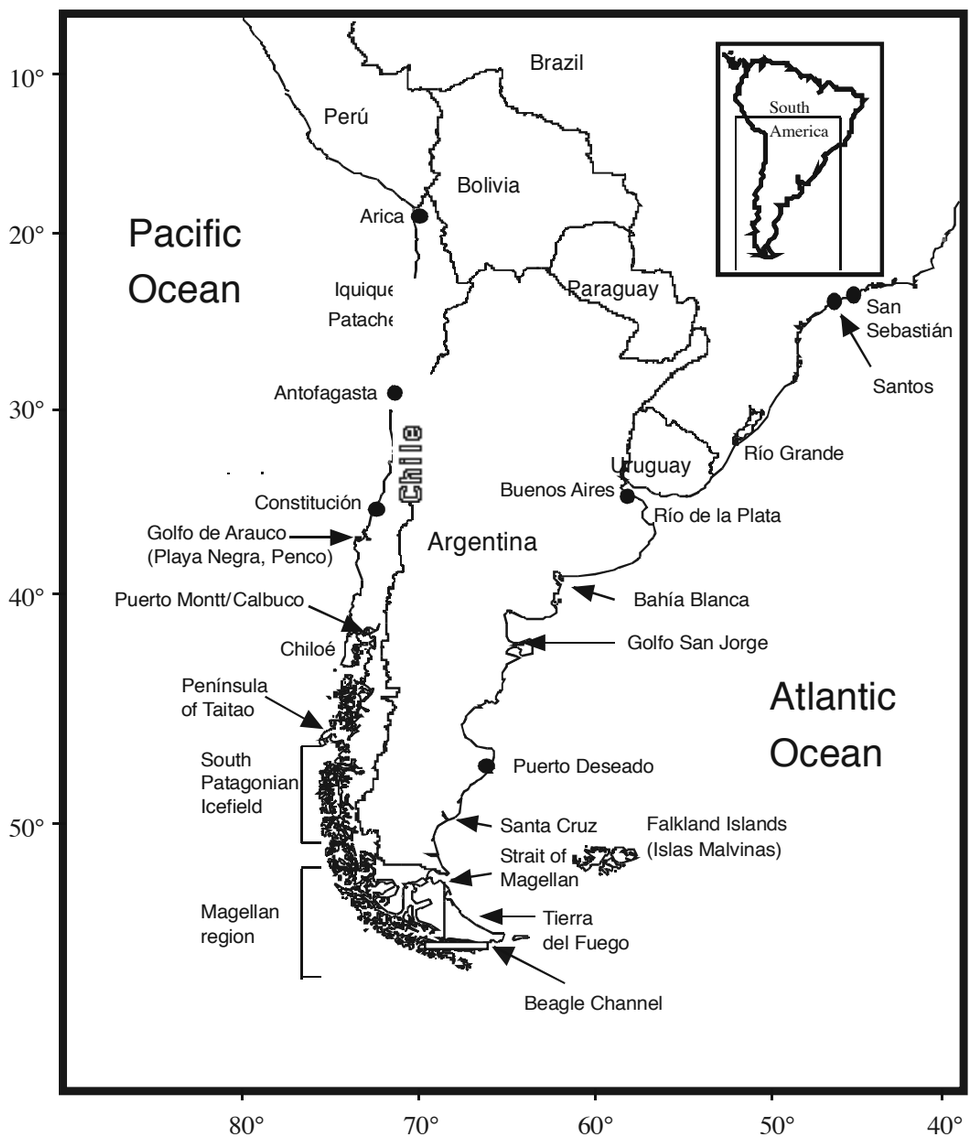

Fig. 1. Geography of the Chilean and Argentine study areas, with indications of major thalassinid distribution/sampling areas obtained from the literature and unpublished sources.

widely scattered records, it was assumed that a continuous latitudinal distribution between endpoints exists. Where any original sampling area could be identified from the literature, latitudinal ranges were just readjusted according to previous work.

Biogeography and bathymetric distribution

Two thalassinid families are known to occur in Chilean and Argentine waters (Callianassidea, Upogebiidae, Table 1). The recently discovered species *Upogebia australis* Thatje and Gerdes, 2000, is the only representative of the Upogebiidae cited for Chilean and

Argentine waters and was recorded from the subantarctic Beagle Channel (Fig. 1). Although this species was found in Chilean territory (Thatje & Gerdes 2000), I herein consider it as a representative for both Chile and Argentina, due to the special geographic situation of the Beagle Channel, being divided by the political frontier of both countries. The same holds true for the callianassid *Notiax santarita* Thatje 2000, from the same area.

The Callianassidae are represented by 7 species in 6 genera: four species are cited for the south-western Atlantic Argentine waters (including the Beagle Channel, Fig. 1) and five for the Chilean Pacific coast, most of which are of intertidal living. The only species occurring continuously at either sides off southern South America is *Notiax brachyophthalma* (c.f. Retamal 1981, Ferrari 1981) which is known from the Golfo San Jorge south to Puerto Deseado along the Argentine coast, and from Puerto Montt northwards to Arica and the frontier with Perú (Fig. 1). Retamal (1981) cited this species to occur around the southernmost tip of South America, i.e. the Magellan region, but the only records recorded from the literature are those mentioned above (compare Fig. 1 and Fig. 2). It is questionable, whether this distribution was really based on continuous finds all over the area under investigation, or was just considered as a continuous distribution pattern on the basis of endpoint localities. *Notiax,* in addition, is the only genus represented by two species in the Beagle Channel, which joins Chile and Argentina. The second representative, *Notiax santarita* Thatje, 2000, was recorded from the deeper sublittoral of the Beagle Channel and adjacent southern Seno Ponsonby off Tierra del Fuego (Thatje & Mutschke 1999), and both species of *Notiax* can be clearly separated on the basis of morphological differences (Thatje 2000). Additionally, both species show seemingly a bathymetric separation in habitats, *Notiax brachyophthalma* being an inter- and shallow subtidally occurring species, whereas *N. santarita* prefers the deeper sublittoral (Table 1). I never found intertidally occurring mud shrimps around Tierra del Fuego and many adjacent fjords studied. This apparent absence of thalassinids from those intertidal zones might be attributed to low average temperatures in the Magellan region, and the Atlantic coast being exposed to the physical impact of heavy waves. The fjords are usually affected by extremely high sedimentation rates due to glacier rubdown, which may affect thalassinid populations, too (for discussion see, Thatje *et al*. 1999). The same pattern, low temperatures and high sedimentation rates, could also explain the virtual absence of mud shrimps from the area off the Chilean South Patagonian Icefield (Fig. 1; Mutschke *et al*. 1998), where decapod diversity was found to be extremely low (Mutschke *et al*. 1998, Mutschke & Gorny 1999).

Neotrypea uncinata shows the widest latitudinal distribution along the Pacific American coast, from Mexico south to central Chile (Península de Taitao, Fig. 1). The intertidal species *N. uncinata* and *Callichirus garthi* are both of interest for local artisanal fisheries in Chile and frequently used as bait.

Life history

Studies on thalassinid population dynamics or adult life history do not exist for the Chilean and Argentine representatives. Larval development and morphology are only known for the intertidal callianassids *Callichirus garthi* and *Neotrypea uncinata* from Chile (Table 1). Thalassinid larvae were frequently shown to contribute an important part to the spring meroplankton community (Baez & Martin 1992, Cervellini 1986, Palma 1976, 1980, Thatje *et al*. 2003), but the lack of larval descriptions hampers larval identification (Wehrtmann & Baez 1997).

Larvae of *N. uncinata* collected during spring were reported from the South Patagonian Icefield and the Magellan region (see Fig. 1, Mujica & Medina 1996, Mujica & Villablanca 1999). The southernmost find of adult *N. uncinata* is known from Puerto Montt and the island of Chiloé (Table 1). Since adults of this intertidal species were never reported from the Magellan region and the South Patagonian Icefield, the occurrence of its larvae is doubtful and may be a misidentification due to a lack of morphological descriptions. This is supported by the fact that further meroplankton samples taken in the Magellan region in spring (Thatje *et al*. 2003) did not contain *N. uncinata* larvae, albeit the

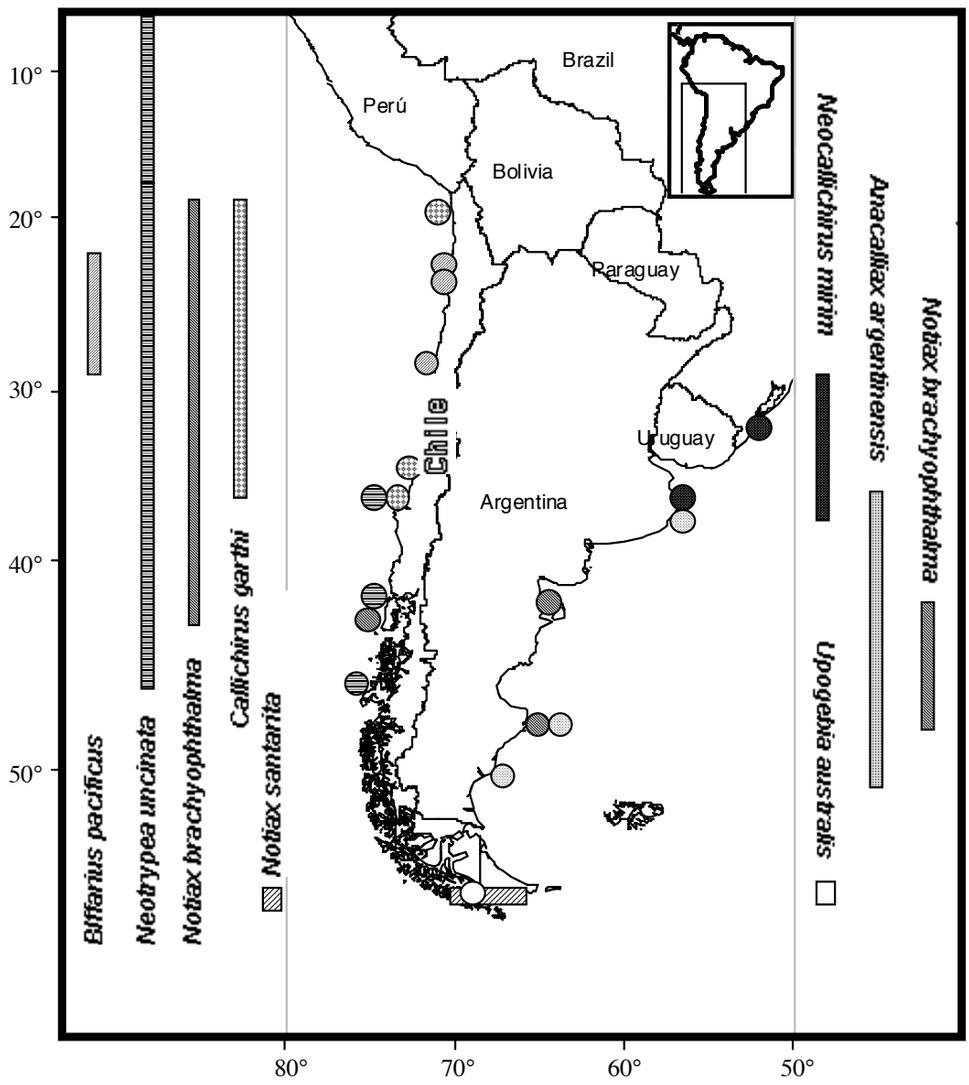

Fig. 2. Approximate latitudinal distribution of the Chilean and Argentine Thalassinidea along the Atlantic and Pacific coast. Dots indicate original type material sampling sites, which could have been identified from the literature or unpublished data.

thalassinid larvae found (Thatje *et al*. 2003) contributed about 20% to the total meroplankton fraction. These larvae were not identified to species level due to the absence of adequate larval descriptions, but were hypothesized to belong to the genus *Notiax*, the only thalassinid genus yet known to occur in the Beagle Channel (Thatje 2000).

Parasitism

Infestation by bopyrid isopods had frequently been observed in the thalassinid species *N. brachyophthalma* and *N. uncinata*. *Neotrypea uncinata* was shown to be affected by three different bopyrid species (see Stuardo *et al* 1986a, b, and references therein), which are

TABLE 1. Overview on distribution and life history data of the Chilean and Argentine Thalassinidea. Data obtained from the literature and unpublished sources (Aste & Retamal 1983, 1984, Biffar 1971, Boschi *et al*. 1992, Boschi 2000, Brattström & Dahl 1951, Brattström & Johanssen, 1983; Ferrari 1981, Guzman & Thatje 2003, Holthuis 1952, 1956, Lichtwardt 1961, Manning & Felder 1991, Quintana 1978, Rathbun 1910, Retamal 1975, 1981, 1994, Spivak 1997, Thatje, 2000, Thatje & Gerdes 2000, Thatje unpublished data).

Species	**Distribution**	**Total length (mm)**	**Bathymetric depth (m)**	**Larval development**
Upogebiidae				
Upogebia australis	Chile/Argentina: Beagle Channel	26	255	unknown
Thatje & Gerdes 2000				
Callianassidae *Callichirus garthi* (Retamal 1975)	Chile: Arica, Golfo de Arauco to Constitución	90-130	0.5-5	Zoea I-V + megalopa, (Quintana 1978, Aste & Retamal 1983)
Neocallichirus mirim Rodrigues 1971	Brazil: Santos, San Sebastián, San Pablo, Río Grande; Uruguay; Argentina: Buenos Aires	45-75	intertidal, nearshore	unknown
Notiax santarita Thatje & Gerdes 2000	Chile/Argentina: Beagle Channel; Chile: Seno Ponsonby (south of Beagle Channel)	28-71	65-246	unknown
Notiax brachyophthalma (A. Milne-Edwards 1870)	Chile: Chiloé, Puerto Montt (Estero Reloncaví fjord), central to northern Chile; Argentina: Puerto Deseado, Golfo San Jorge	8-42	0-40	unknown
Neotrypea uncinata (H. Milne-Edwards 1837)	Chile: Península de Taitao, Puerto Montt (Calbuco, Isla Tengo), Bahía Coliumo, Playa Negra; Perú: Capón, Tumbes; Mexico	25-90	0-1	Zoea I-V (Aste & Retamal 1984)
Anacalliax argentinensis (Biffar 1971)	Argentina: Province of Buenos Aires to Puerto Deseado, Province of Santa Cruz	50-65	shallow, subtidal, to 50	unknown
Biffarius pacificus Guzman & Thatje 2003	Chile: Iquique, Patache, Antofagasta	17-26	intertidal to shallow subtidal, 1-30	unknown

Ionella agassizi Bonnier, 1990, *Ione ovata* Shiino, 1964, and *Pseudione brattstroemi* Stuardo *et al*, 1986. *Notiax brachyophthalma* was found to be infested by *P. brattstroemi* and *I. ovata* (Muñoz 1997).

Perspectives

The knowledge of diversity and life history of the Chilean and Argentine thalassinid shrimps remains scarce and future studies on these topics are needed. The callianassid *Notiax santarita* and the upogebiid *Upogebia australis* from the subantarctic cold-temperate Beagle Channel (Fig. 1), represent the southernmost records of Thalassinidea in the southern hemisphere. Thalassinidea are virtually absent from the polar regions (for the southern hemisphere see, Gorny 1999), although fossil records have been made from the Antarctic (Rodney *et al*. 1984, Feldmann *et al*. 1997). Ecophysiological constraints affecting decapod life history, are assumed to be responsible for the low benthic decapod diversity in polar areas, and may explain the apparent absence of reptant crabs from Antarctic waters (for discussion see Frederich *et al*. 2001). Future physiological studies on the thalassinid representatives of the Subantarctic Magellan Province (*e.g*. Beagle Channel, Fig. 1) may allow further insight into decapod evolution and distribution limits.

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