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Thalassinideans new to the fauna of Bermuda and the Cape Verde Islands

D. Abed-Navandi*

Abstract

Neocallichirus rathbunae, a thalassinidean common in the western Atlantic, is first recorded for Bermuda from two subtidal habitats. *Corallianassa intesi* comb.n. and *Axiopsis serratifrons* are recorded for the first time from inter- and subtidal sediments of the Cape Verde Islands. Based on morphological and ecological traits, *Corallianassa intesi* is transferred from its former genus *Glypturus* STIMPSON, 1866 to the genus *Corallianassa* MANNING, 1987.

Key words: *Neocallichirus rathbunae, Corallianassa intesi* comb.n.*, Axiopsis serratifrons,* Crustacea, Decapoda, Thalassinidea, tropical Atlantic Ocean, first records, Bermuda, Cape Verde Islands.

Zusammenfassung

Drei Maulwurfskrebs-Arten wurden auf Atlantischen Inseln erstmals gefangen: *Neocallichirus rathbunae* in zwei Lebensräumen Bermudas, *Corallianassa intesi* comb.n. und *Axiopsis serratifrons* auf verschiedenen eu- und sublitoralen Sandböden der Kap Verde Inseln. Aufgrund von morphologischen und ökologischen Merkmalen wird vorgeschlagen *Corallianassa intesi* aus der Gattung *Glypturus* STIMPSON, 1866 in die Gattung *Corallianassa* MANNING, 1987 zu stellen.

Introduction

Littoral sediment bottoms still harbour undiscovered infauna, thalassinidean shrimp feature prominently among this animals (KAZMI & KAZMI 1992, ABED-NAVANDI & DWORSCHAK 1997, 1998, BLANCO-RAMBLA 1998, 1999, LOPEZ DE LA ROSA & al. 1998). Recent search surveys on northern Atlantic islands revealed three thalassinidean species as new records for the respective regions.

Neocallichirus rathbunae (SCHMITT, 1935) is widely distributed in the subtropical and tropical western Atlantic. A faunistic search of sediment bottoms on the Bermuda Islands in 1998 revealed several specimens of *N. rathbunae*; the tabulation of the Crustacea Decapoda of Bermuda (MARKHAM & MCDERMOTT 1980) does not list this species. This is the northernmost record of *N. rathbunae*.

Corallianassa intesi (DE SAINT LAURENT & LE LOEUFF, 1979) is a callianassid species inhabiting the tropical Eastern Atlantic, its sole record is from the Senegal coast. During a search survey for thalassinideans on the Cape Verde Islands in 1999, this species was caught on two islands in different habitats.

* Mag. Daniel Abed-Navandi, Department of Marine Biology, Institute of Ecology and Conservation Biology, University of Vienna, Althanstr. 14, A-1090 Vienna, e-mail: a8600808@unet.univie.ac.at

Fig. 1: Mounds and funnels produced by *Neocallichirus rathbunae*. Bermuda, Bethel's Island, Elys Harbor, 0.5 m water depth, August 1992. Distance across base is ca. 1.5 m.

Concurrently, *Axiopsis serratifrons* (A. MILNE-EDWARDS, 1873) a circumtropical axiid species dwelling in shallow subtidal sand bottoms with a high content of gravel and rocks (KENSLEY 1980, LEMAITRE & RAMOS 1992, SAKAI 1992, NOMURA & al. 1996), was collected there.

Material & Methods

The sampling sites of *Neocallichirus rathbunae* are in Harrington Sound (Bermuda), west of Trunk Island (32°20'00"N, 64°43'35"W). In 3 m depth of this very protected marine lake the bottom consists of medium fine carbonate sand. Mounds up to 40 cm high with adjacent funnels indicate the burrows of this callianassid (Fig. 1). Syntopic macrofauna elements were the Calico clam *Macrocallista maculata* (LINNAEUS, 1758), the spotted eagle ray *Aetobatus narinari* (EUPHRASEN, 1790) and the upside-down jellyfish *Cassiopeia xamachana* BIGELOW, 1892. Another specimen was caught on the west coast of Bermuda, 200 m offshore of Pompano Beach Club (32°15'36"N, 64°52'42"W). In 2.5 m depth, the bottom also consisted of medium fine carbonate sand and was interspersed with coral heads. A population of a syntopic callianassid, *Corallianassa longiventris* (A. MILNE-EDWARDS, 1870) had its shoreward distribution limit there. A steel yabby pump was used for sampling while snorkeling in October 1998.

On the Cape Verde Islands, *Corallianassa intesi* was collected on a tidal flat north of the village Moia-Moia (15°2'40"N, 23°27'30"W) on the Ilha de Santiago. The sediment in this very protected bay consisted of black fine sand of volcanic origin (Fig. 2). At low tide, the lebensspuren of this ghost shrimp were round holes in the sand surface. Syntopic macrofauna included an unidentified large stomatopod, the callianassid *Neocallichirus pachydactylus* (A. MILNE-EDWARDS, 1870), two new species of alpheids (DWORSCHAK & al. 2000) and cows. A yabby pump was used for collection during low tide; the residents of Moia-Moia thankworthy helped spot the lebenspuren of the animals in September 1999.

Fig. 2: Habitat of *Corallianassa intesi*. Cape Verde Island, Ilha do Sao Tiago, tidal flat at Moia-Moia at low tide, view to NW, October 1999.

On the Ilha da Boavista, *Corallianassa intesi* was caught on a beach on the northeastern coast of the Ilheu de Sal-Rei (16°10'00"N, 22°55'50"W). In 2 m depth the sediment consisted of medium fine carbonate sand and was interspersed with rubble originating from the coral heads nearby. In addition, *Corallianassa intesi* was observed 5 km offshore the northeastern coast of the Ilha da Boavista (16°10'00"N, 22°55'50"W) in 17 m depth and on the Ilha do Maio, 4.5 km offshore north of Punta Cais in 16 m depth. At these locations, the burrow openings were also round holes in the sand surface; the sediment was a medium carbonate sand between coral heads.

Axiopsis serratifrons was found with *Corallianassa intesi* in the above described habitats on the Ilheu de Sal-Rei and on the Ilha do Maio; seagrass leaves and algae were used to lure both species to the sediment surface in September 1999.

Abbreviations

BAMZ	Bermuda Aquarium, Museum and Zoo	P2L, P6L	length of second or sixth pleomere in mm
NHMW	Naturhistorisches Museum Wien	TNL	telson length in mm
TL	total length in mm	na	not available
CL	carapace length in mm		

Neocallichirus rathbunae (SCHMITT, 1935)

Callianassa (*Callichirus*) *rathbunae* SCHMITT, 1935: 4, 15, pls. 1-4.
Callianassa rathbunae BIFFAR, 1971: 700, 701, figs. 19, 20; SUCHANEK, 1983: 281; MANNING & HEARD, 1986: 347-249, fig. 1; MANNING, 1987: 397; DWORSCHAK, 1992: 202, fig. 10.
Callichirus rathbunae DE SAINT LAURENT & LE LOEUFF, 1979: 97.
Neocallichirus rathbunae MANNING & FELDER, 1991: 779; MANNING, 1993: 113; SAKAI, 1999: 92, TUDGE & al., 2000: 144.

Material: BAMZ 1998-174-004, one female (TL = 70, CL = 22), Bermuda, Harrington Sound, Trunk I., "Callianassa landscape" D. Abed-Navandi coll. with yabby pump, 9 October 1998. – BAMZ 1998-174-007, one male (TL = 82, CL = 23), Bermuda, Harrington Sound, Trunk Island, "Callianassa landscape" D. Abed-Navandi coll. with yabby pump, 10 October 1998. – NHMW 19379, two females (TL = 40, CL = 11; TL = 50, CL = 13), Bermuda, Harrington Sound, Trunk Island, D. Abed-Navandi coll. with yabby pump 8 October 1998. – NHMW 19380, one female (TL = 49, CL = 14), Bermuda, Pompano Beach, syntopic with *Corallianassa longiventris*, D. Abed-Navandi coll. with yabby pump 14 October 1998.

Coloration: All specimens were faintly pink; the uropods of smaller specimens had yellow fringes.

This species was described as *Callianassa* (*Callichirus*) *rathbunae* from a ghost shrimp washed ashore after a storm in Bluefields, Jamaica in 1899 (SCHMITT 1935). The first sampling from its habitat was made by BIFFAR (1971) while dredging sandy bottoms in Key Biscayne, Florida. Further sampling with a yabby pump in this region by MANNING & HEARD (1986) yielded findings on intertidal sand flats in the Indian River, Florida and on 3-5 m deep silty, coralline sand bottoms at Bimini, Bahamas. Extensions of the species' geographical range are due to the findings of SUCHANEK (1983) in St. Croix, Virgin Island in depths down to 40 m and DWORSCHAK (1992) on the Belize Barrier Reef. Recent reports for the southern Caribbean coast are from SAKAI (1999) for sand bottoms in 15 m depth near Santa Marta, Colombia and by BLANCO-RAMBLA (1999) for the region near Cumana, Venezuela. The southernmost reports are from Pernambuco, Brazil (COELHO 1997) (Fig. 3).

Two previous studies on the ecology of a Bermudian callianassid in "Coot Pond", a protected bay (WASLENCHUK & al. 1983, BIANCHI 1991), assume *Neocallichirus grandimanus* (GIBBES, 1850) to be the species creating the large sublittoral burrow mounds. Unfortunately, no specimens were obtained during these studies. The only habitat where this species was caught on Bermuda is the eulittoral of a very protected bay, "Tucker's Town Cove"; *Neocallichirus grandimanus* does not build mounds there (pers. obs.). A previous study on the burrow morphology of this species on the Belize Barrier reef never encountered large mounds (DWORSCHAK & OTT 1993); the burrow opening is usually characterised by a simple round hole at the sediment surface, sometimes by a small mound.

Neocallichirus rathbunae (SCHMITT, 1935), a large mound builder (SUCHANEK 1983), is probably the species studied in WASLENCHUK & al. (1983) and BIANCHI (1991).

Corallianassa intesi (DE SAINT LAURENT & LE LOEUFF, 1979) comb.n.

Callichirus intesi DE SAINT LAURENT & LE LOEUFF, 1979: 69, figs. 14g, 16c, 17b, 18b, 19g, 21a,c, 23j-m; TUDGE & al., 2000: 144.
Glypturus intesi MANNING 1987: 392; SAKAI, 1999: 71.

Material: NHMW 18800, 1 male (TL = 28, CL = 8, P2L = 5.4, P6L = 4.2, TNL = 1.4), Cabo Verde Arquipelago, D. Abed-Navandi coll., Ilha do Sao Tiago, NE coast, tidal flat at Moia-Moia, fine sand, AN.

1999 XXVIII. – NHMW 19381, 1 female lacking large cheliped (TL = 63, CL = 16, P2L = 11.5, P6L = 10.2, TNL = 4.3) Cabo Verde Arquipelago, D. Abed-Navandi coll., Ilha do Sao Tiago, NE coast, tidal flat at Moia-Moia, fine sand, AN. 1999 XXVIII. – NHMW 19382, one male, pleon cut off (TL = na, CL = 18, P2L = na, P6L = na, TNL = na) Cabo Verde Arquipelago, D. Abed-Navandi coll. Sept.1999, Ilha da Boavista, sandy bottom+rubble, 2 m depth SSE of Ilha do Sal-Rei, AN. 1999 XXVIII.

Coloration: All animals showed orange markings on the merus, carpus, propodus and dactylus of the first pereiopod.

DE SAINT LAURENT & LE LOEUFF (1979) described this species as *Callichirus intesi* from material collected by the Calypso Expeditions to western Africa 1951-1957. Sampling sites were bottoms from 5-15 m depth near Gorée and Dakar, Senegal (Fig. 3). No further findings were reported in the literature.

This species was later placed in the genus *Glypturus* STIMPSON, 1866 (MANNING 1987). The genus *Corallianassa* MANNING, 1987 was synonymized with the genus *Glypturus* STIMPSON, 1866 by SAKAI (1999), this synonymy, however, was not supported by a recent multivariate phylogenetic analysis based on 93 morphological characters (TUDGE & al. 2000).

Several features of this species, including ecological traits, justify a transfer to the genus *Corallianassa* MANNING, 1987:

The carapace shows a straight rostrum and two spines that are separated from the carapace by a decalcified membrane. The eyes of the three examined specimens show variations from a medium-sized subterminal subglobular cornea to a large terminal globular one; two specimens of *Corallianassa borradailei* (DE MAN, 1928) from Fiji and Hawaii show similar variations (MANNING 1987, Figs. 8a, 9a).

The pleomeres are quite slender with the second pleomere being the longest; the major cheliped shows just one rather blunt terminal spine on the dorsal margin of its palm. The vivid colouration similar to that of *Corallianassa longiventris* (A. MILNE-EDWARDS, 1870) may be characteristic for the genus *Corallianassa* according to MANNING (1987).

The burrow entrance is always flush with the sediment surface; at least the upper portion of the burrow is lined with fine sand. The animals appear at the burrow entrance, where they can be baited with seagrass and algae; they dwell in sediments between coral heads. *Corallianassa intesi* also shares this specific burrow morphology, behaviour and ecological demands with its congener *Corallianassa longiventris* (MANNING 1987, DWORSCHAK & OTT 1993, ABED-NAVANDI, pers.obs., DWORSCHAK, pers.comm.).

Axiopsis serratifrons (A. MILNE-EDWARDS, 1873)

Axia serratifrons A. MILNE-EDWARDS, 1873: 11, pl. 2, fig. 6.
Axius affinis DE MAN, 1888: 469, pl. 20, fig. 1.
Axius spinipes DE MAN 1888: 464, pl. 19, fig. 6.
Axiopsis (*Axioposis*) *serratifrons* KENSLEY, 1980: 1253, figs 1-5
Axiopsis serratifrons WERDING & MÜLLER, 1989: 251; MANNING & CHACE, 1990: 31, figs. 16-17, DWORSCHAK, 1992: 215.

Material: NHMW 19455, 1 ovigerous female, Cabo Verde Arquipelago, Ilha do Maio, N of Praia do Galleão, 20 m. maerl and coarse sand D. Abed-Navandi coll. September 1999, AN. 1999 XXVIII. – NHMW 19456, 2 males, 1 detached cheliped, Cabo Verde Arquipelago, Ilha do Boavista, sandy bottom and rubble, 2 m, SSE of Ilha do Sal Rei, D. Abed-Navandi coll. 2. October 1999 AN. 1999 XXVIII.

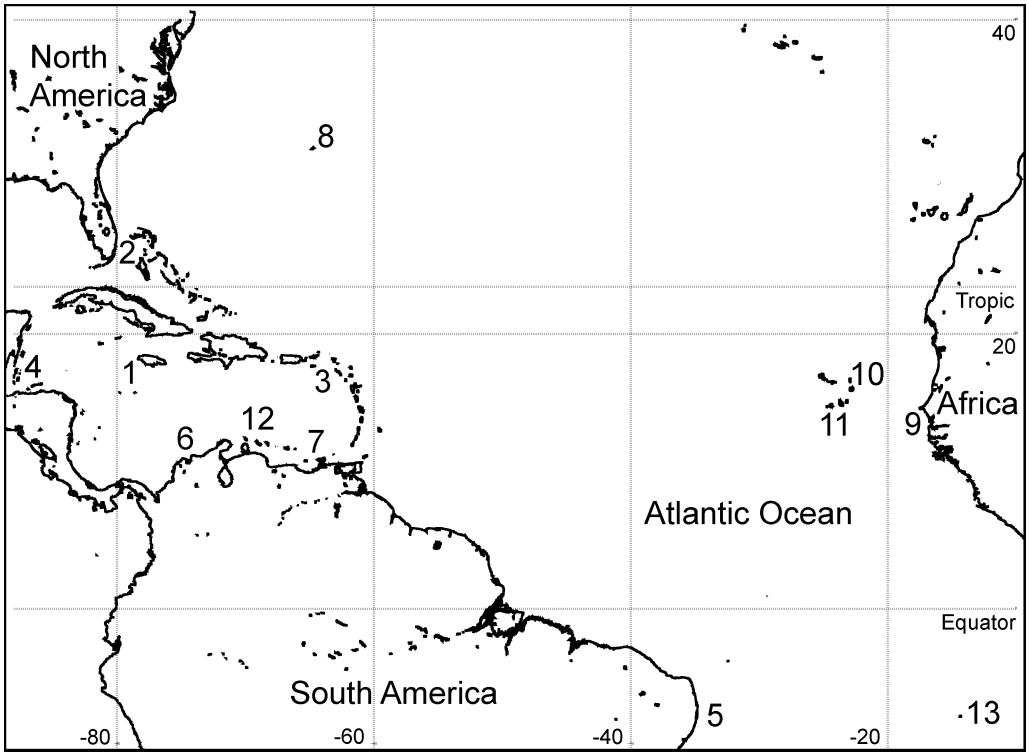

Fig. 3: Distribution map of thalassinideans:

Sampling sites of *Neocallichirus rathbunae*: **(1)** Bluefields, Jamaica (SCHMITT 1935), **(2)** Key Biscayne, Florida (BIFFAR 1971), Indian River, Florida; Bimini, Bahamas (MANNING & HEARD 1986), **(3)** St.Croix, Virgin Islands (SUCHANEK 1983), **(4)** Belize Barrier Reef (DWORSCHAK 1992), **(5)** Pernambuco, Brazil (COELHO 1997), **(6)** Santa Marta, Colombia (SAKAI 1999), **(7)** Cumana, Venezuela (BLANCO-RAMBLA, 1999) and **(8)** Bermuda (this study);

Sampling sites of *Corallianassa intesi:* **(9)** Gorée and Dakar, Senegal (DE SAINT LAURENT & LE LOEUFF 1979), **(10)** Ilha da Boavista, Cape Verde and **(11)** Ilha do Maio and Ilha de Santiago, Cape Verde (this study);

Sampling sites of *Axiopsis serratifrons* (restricted to the Atlantic Ocean): **(2)** KENSLEY 1980, **(4)** KENSLEY 1980, DWORSCHAK & OTT 1993, **(6)** WERDING & MÜLLER 1989, **(8)** CHACE & al. 1986, **(10)**, **(11)** this study, **(12)** Curaçao (RODRIGUES 1994), **(13)** Ascension (MANNING & CHACE 1990).

Findings of this species for the Atlantic Ocean are reported from Ascension (MANNING & CHACE 1990), the Caribbean coast of Columbia (WERDING & MÜLLER 1989), Curaçao (RODRIGUES 1994), the Belize Barrier Reef (KENSLEY 1980, DWORSCHAK 1992, DWORSCHAK & OTT 1993), Florida (KENSLEY 1980) and Bermuda (CHACE & al. 1986) (Fig. 3).

Some confusion regarding the identity of *Axiopsis brasiliensis* COELHO & RAMOS-PORTO, 1991 in the tropical Atlantic exists. COELHO (1997) mentions that *A. serratifrons* recorded for Brazil by RODRIGUES & KENSLEY (1991) is probably *A. brasiliensis*. RODRIGUES & SHIMIZU (1998) list only *A. serratifrons*, without further reference to *A. brasiliensis*, whereas MELO (1999) lists both species as part of the littoral fauna of Brazil.

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