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**PINNOTHERID CRABS OF THE GENUS *DISSODACTYLUS* SMITH,
1870, ASSOCIATED WITH IRREGULAR SEA URCHINS AT THE
CARIBBEAN COAST OF COLOMBIA (CRUSTACEA: DECAPODA:
PINNOTHERIDAE).**

by

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Werding, B. & H. Sanchez: Pinnotherid crabs of the genus *Dissodactylus* Smith, 1870, associated with irregular sea urchins at the Caribbean coast of Colombia (Crustacea: Decapoda: Pinnotheridae).

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Key words: Crustacea Decapoda; Pinnotheridae; *Dissodactylus*; distribution; hosts; tropical western Atlantic.

Three species of the pinnotherid genus *Dissodactylus* were observed at the northern coast of the Colombian mainland and at Isla Providencia, associated with irregular sea urchins. While *D. crinitichelis* was previously known to occur at the continental coast of South America, *D. rugatus* and *D. stebbingi* are reported for the first time from the southern Caribbean Sea. *D. calmani*, previously reported from Florida, the Greater Antilles and Virgin Islands is stated to be a junior synonym of *D. rugatus*. For *D. crinitichelis*, a new host is reported.

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RESUMEN

Se observó la asociación de tres especies de pinnothéridos del género *Dissodactylus* en la costa norte de Colombia y en la Isla Providencia con erizos

del mar irregulares. *D. crinitichelis* es la única especie del género, anteriormente reportada para la costa continental de Suramerica. En cambio, *D. rugatus* y *D. stebbingi* estan reportadas por primera vez del sur del Mar Caribe. *D. calmani* que ha sido reportado de la Florida, las Antillas Mayores e Islas Virgenes es considerado como sinónimo posterior de *D. rugatus*. Para *D. crinitichelis* se reporta un nuevo huesped.

INTRODUCTION

Pinnotherid crabs of the genus *Dissodactylus* Smith are limited to the Atlantic and Pacific coasts of America. The small crabs are known to live on irregular sea urchins, although some species are reported as free living. The mode of life seems to be largely parasitic. Telford (1982) described the feeding habits of four western Atlantic species and found that all of them forage extensively upon their hosts, the food intake amounting to some 50-100% of the host's tissues. By clipping off spines and even pedicellariae, the small crabs may cause visible damage to their hosts.

So far, *D. crinitichelis* was the only species known to occur at the continental coast of South America and the southern Caribbean Sea, ranging from North Carolina (U.S.A.) to Rio Grande do Sul (Brasil). The distributional data by Rathbun (1918) even include a record from Sabanilla at the northern coast of Colombia. Investigation of different echinoids in the region of Santa Marta and Isla Providencia revealed the presence of *D. crinitichelis* and two additional species of *Dissodactylus* associated with different species of irregular sea urchins. *D. crinitichelis* has been found around Santa Marta only on *Meoma ventricosa* (Lamarck), a species hitherto not known as a host for the genus *Dissodactylus*. *D. rugatus* (here shown to be a senior synonym of *D. calmani*) has been found exclusively living on *Clypeaster rosaceus* (Linné); the records presented in this paper extend the known range of that species to the southern and southwestern Caribbean Sea. The most important range extension is reported for *D. stebbingi* [from *Clypeaster subdepressus* (Gray)], previously recorded exclusively from the southeastern U.S.A. (Virginia to Florida).

All specimens were collected by scuba-diving and the number and position of the crabs upon the host were noted in the field. The specimens reported are deposited in the collections of the Instituto de Investigaciones Marinas de Punta de Betín (INVEMAR), Santa Marta, Colombia, and in the Rijksmuseum van Natuurlijke Historie (RMNH), Leiden, The Netherlands.

Since a complete bibliography including the synonymy of *Dissodactylus* spp. is compiled in the catalogue by Schmitt et al., 1973, previous works are cited only in the case of *D. rugatus* in order to clarify the status of that species.

NOTES ON THE SPECIES

Dissodactylus crinitichelis Moreira, 1901

Material examined. — RMNH D 37437: 1♂, 4♀ (1 ov.), Santa Marta, Morro Grande, 20 m, on *Meoma ventricosa*, v. 1980, leg. Werding; RMNH D 37438: 1♂, 1♀, 1juv., Santa Marta, Punta de Betín, 12 m, on *M. ventricosa*, ix.1987, leg. Sanchez; RMNH 37439: 1♀, 1juv., Santa Marta, Morro Grande, 18 m, on *M. ventricosa*, ix.1987, leg. Sanchez; RMNH 37440: 1♀, Santa Marta, Morro Grande, 10 m, on *M. ventricosa*, ix.1987, leg. Werding; INVEMAR 1010a: 1♂, 1♀ (ov.), Santa Marta, Morro Grande, 18-20 m, on *M. ventricosa*, ix.1987, leg. Sanchez; INVEMAR 1010b: 1♀ (ov.), 1juv., Santa Marta, Morro Grande, 18-20 m, on *M. ventricosa*, ix.1987, leg. Werding.

Carapace of largest ♂ 5.9 × 7.7 mm, of largest ♀ 6.8 × 9.0 mm.

D. crinitichelis has been found in several localities of the bay of Santa Marta, frequently on *Meoma ventricosa*. From one to three crabs could be observed to live on one host individual, which is usually completely covered by the coarse sand and rubble of its typical habitat. The crabs usually cling onto the ventral surface near the mouth opening and may be concealed in the mouth opening. Based on field observations of 46 sea urchins, the frequency of infestation of *M. ventricosa* by *D. crinitichelis* can be estimated to be some 30-40% of the observed populations.

D. crinitichelis has been reported previously to be associated with *Encope emarginata* (Leske), *E. michelini* Agassiz and *Clypeaster subdepressus* (Gray) (Schmitt et al., 1973). An additional find on *Leodia sexiesperforata* (Leske) is given by Telford (1982). The detection of the crab on *M. ventricosa* is the first record of that species as a host of pinnotherids. On the other hand, the crab has not been found on *C. subdepressus*, which is a common species in the Bay of Santa Marta and which is known to host *D. crinitichelis* in other parts of its distributional range. A small hesionid annelid, viz. *Ophiodromus obscurus* (Verrill, 1873), which is known as a commensal of sea urchins, was always found on the same host.

Coloration. — The general coloration of the whole animal is creamish white, interrupted on the carapace by irregularly set translucent patches.

Distribution. — *D. crinitichelis* is the only species of the genus which was known to occur in the southern Caribbean and as far to the south as Rio Grande do Sul, Brasil. It also is the only species which had formerly been reported from Colombia (Rathbun, 1918). The northern limit of reported distribution is North Carolina, U.S.A.

Dissodactylus rugatus Bouvier, 1917

Dissodactylus rugatus A. Milne Edwards & Bouvier, 1923.

Dissodactylus calmani Rathbun, 1918; Voss & Voss, 1955; Telford, 1982.

Material examined. — RMNH D 37441: 1♂, 3♀ (ov.), Santa Marta, east of Rodadero, 6 m, on *Clypeaster rosaceus*, ii.1976, leg. Werding; INVEMAR 1047a: 1♂, 1♀ (ov.) Isla Providencia, Freshwater Bay, 7 m, turtlegrass, on unidentified sea urchin, 9.xii.1980, leg. Werding; INVEMAR 1047b: 1♂, 2♀ (ov.), Isla Providencia, Freshwater Bay, 7 m, turtlegrass, on *C. rosaceus*, 11.xii.1980, leg. Werding.

Carapace of largest ♂ 3.4 × 4.4 mm, of largest ♀ 4.3 × 5.7 mm.

D. rugatus was described by Bouvier (1917) on the basis of on a single female from Dominica. In this description Bouvier does not provide any figure, but the typical rugae on the carapace distinguished it from all other known species of *Dissodactylus*. When Rathbun (1918) described *D. calmani*, with essentially the same characteristics, she was not aware of the recently described species. The original description of *D. rugatus* was repeated in a later publication by A. Milne Edwards & Bouvier (1923), this time with illustrations of the holotype. The specimens from Colombia here reported fit well the original description by Bouvier (1917) except for one character: Bouvier (1917) described the dactyl of the legs as wearing a brush of hairs, whereas the Colombian specimens show an additional, inconspicuous row of spinules on the inner side of the dactyl. This detail is also described by Rathbun (1918) in her description of *D. calmani* as “bordered posteriorly by seven slender spinules”. The number of spinules on the dactylus is variable in the Colombian specimens and may range from two to seven. A reexamination of the holotype of *D. rugatus* revealed that Bouvier overlooked the presence of these spinules. As a consequence, *D. calmani* has to range as a junior synonym of *D. rugatus*.

The species had been regarded as free living until Telford (1982) reported it to be a common associate of *Clypeaster rosaceus* at Florida, Jamaica and Mosquito Island (Virgin Islands). The records from Colombia are from the same host, and *C. rugatus* is presumably specialized to a parasitic life on this sea urchin. According to Telford (1982), the little crab lives exclusively on the tissues of its host and the unusual dark coloration of this *Dissodactylus* may be interpreted as a protection from predation, as *C. rosaceus* does not burrow but always lives upon the sediment. Since *D. rugatus* has been encountered only occasionally at Santa Marta and Providencia, an estimate of the percentage of infestation cannot be given.

Coloration. — Rathbun (1918) and Telford (1982) emphasized the conspicuous coloration of *D. calmani*, which is unusual in pinnotherids. The carapace

is covered with small brown chromatophores which overlay the creamish ground colour, combining to a brownish tone of varying intensity. The side walls of the carapace are dark, blackish brown. The ventral side and the abdomen are similar to the upper surface, but in addition there are darker brown stripes which cross the central parts of the abdominal segments in females, and which continue to the sternal plates. The legs are banded with brown. Generally one band covers the proximal part of the merus and most of the propodus, leaving the tips of the dactyl of the first three walking legs and the tips of the fingers of the chelipeds uncoloured.

Distribution. — *D. rugatus* had only been described from the type locality, Dominica. *D. calmani* was known to occur at Florida, Cuba, Jamaica and Virgin Islands. The records from Providencia and Santa Marta extend the known range of the species considerably to the western and southern Caribbean Sea.

Dissodactylus stebbingi Rathbun, 1918
(figs. a-h)

Material examined. — RMNH D 37442: 3♂♂, 4♀♀ (1 ov.), Santa Marta, Punta de Betín, 18-22 m, on *Clypeaster subdepressus*, ix.1987, leg. Sanchez; INVEMAR 1048: 1♂, 2♀♀ (1 ov.), Santa Marta, Punta de Betín, 30 m, on *C. subdepressus*, ix.1987, leg. Werding.

Carapace of largest ♂ 3.0 × 4.0 mm, of largest ♀ 3.7 × 5.1 mm.

D. stebbingi has been found but rarely in the northern West Atlantic from distant localities at Chesapeake Bay and the western coast of Florida (Schmitt et al., 1973). The species can easily be distinguished from all other known species of the genus by the presence of transverse ridges on either side of the carapace. These ridges derive from the lateral margin at the widest part of the carapace, and occupy one-third of carapace each. Rathbun (1918) did not provide any host data for the only type specimen, but Wass (1955) reported five specimens from the oral surface of a *Clypeaster subdepressus*. The samples from Santa Marta derive from the same host species. Most commonly, the crabs were found attached to the oral surface of this sand dollar, which always is completely covered by the fine sediment of its typical habitat. Out of a total of 22 individuals of *C. subdepressus* observed in the field, five proved to harbour one to three individuals of *D. stebbingi*. Additionally, all sea urchins proved to be infested with the commensal annelid *Ophiodromus obscurus*, as is the case in *M. ventricosa* in the same area. Since there exists only the photographed figure of the incomplete type specimen by Rathbun (1918), the species is here illustrated in some detail.

Coloration. — *D. stebbingi* appears white all over its surface, but under low magnification are visible scattered bright orange dots which fade away shortly after preservation in alcohol.

Distribution. — The species has been found only a few times and is known from Virginia and northwestern Florida (U.S.A.) (Schmitt et al., 1973). The specimens from Santa Marta provide the first records from the Caribbean Sea and extend the known range some 1800 km to the south.

DISCUSSION

As pointed out by Telford (1982), the representatives of the genus *Dissodactylus* are to a high degree parasitic, taking from 50% to 100% of their food from their sand dollar hosts. Thus the sand dollar host provides not only protection but also alimentation to the crab. Nevertheless, numerous records of free living specimens suggest that the species are relatively mobile and not as intimately associated with their host as some of the mollusc-inhabiting pinnotherids.

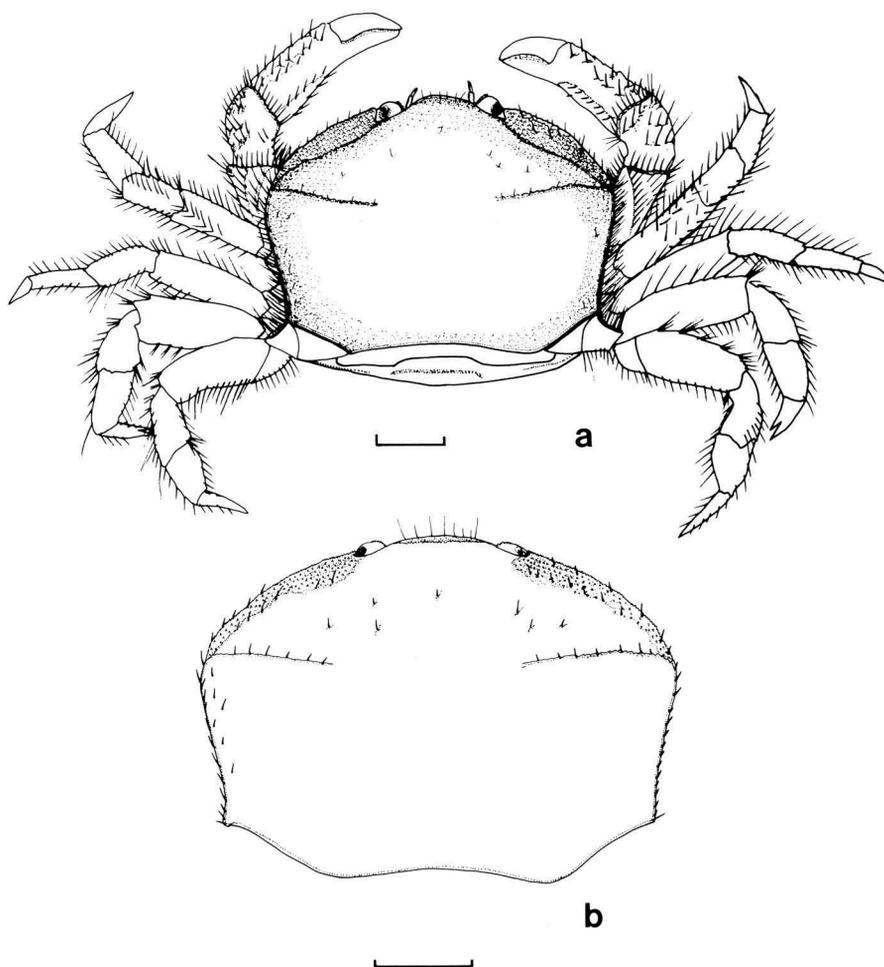
The observation that the species of *Dissodactylus* are to be found on their hosts in variable numbers suggest that the infestation of the sea urchin may be regulated by a process of immigration and emigration. Permanent establishment of pairs does not seem to occur since single females may be found, as well as combinations of various females with one male. Possibly adult males do not tolerate additional males upon the same host, since in no case more than one mature male has been found on a host, but combined occurrence with juveniles is quite common. Nevertheless, the small number of combinations studied permits no further interpretation, and analysis of greater numbers of infestations would be desirable for a better understanding of the strategy of host finding.

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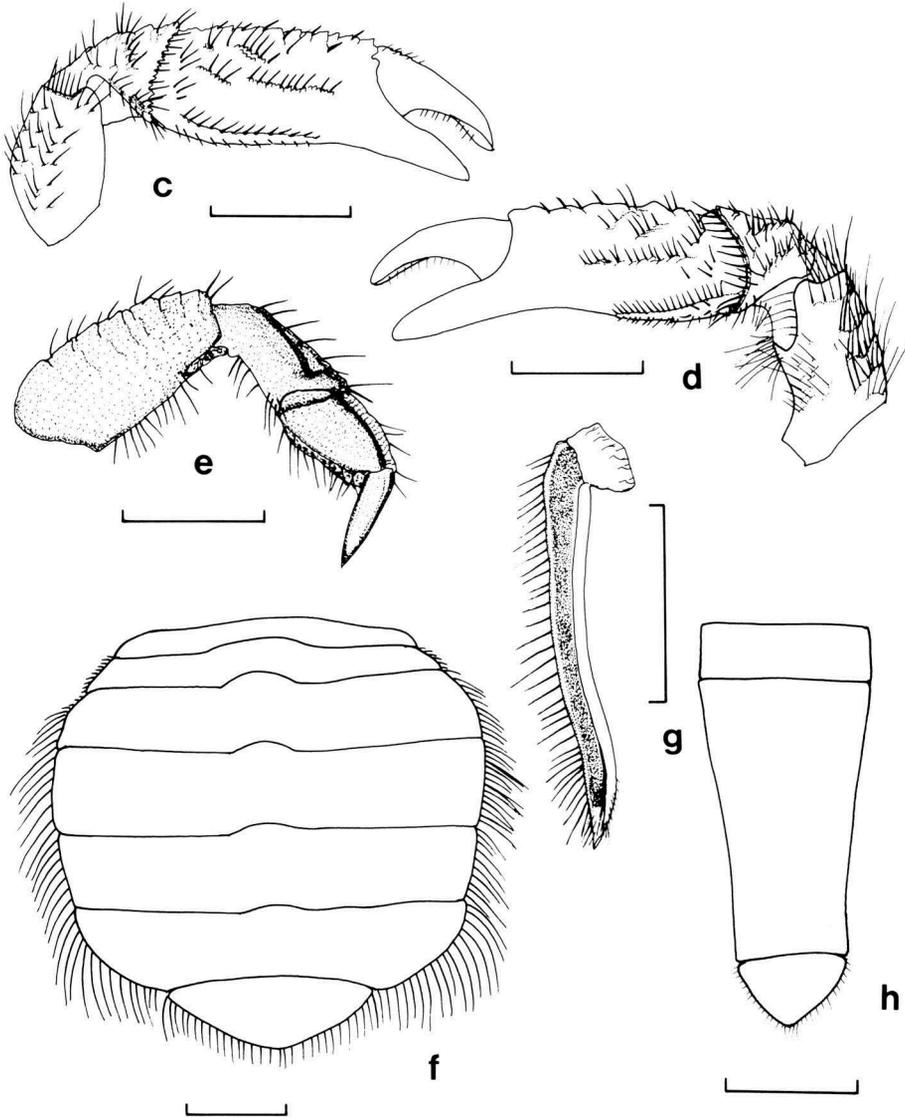
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Figs. a-b. *Dissodactylus stebbingi* (Colombia, Santa Marta); a. dorsal view of adult ♀; carapace of adult ♂. Scale lines 1 mm.

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Figs. c-h. *Dissodactylus stebbingi* (Colombia, Santa Marta); c. frontal view of right cheliped; d. frontal view of left cheliped; e. last right leg; f. abdomen of adult ♀; g. first pleopod of ♂; h. abdomen of adult ♂. Scale lines 1 mm.