



**HAL**  
open science

## **SUPPLEMENTARY DATA ON PUSSELLA BOTOSANEANUI DANIELOPOL, 1973 (OSTRACODA, BAIRDIIDAE)**

Dan L Danielopol

► **To cite this version:**

Dan L Danielopol. SUPPLEMENTARY DATA ON PUSSELLA BOTOSANEANUI DANIELOPOL, 1973 (OSTRACODA, BAIRDIIDAE). *Vie et Milieu*, 1976, XXVI, pp.261 - 273. <hal-02989636>

**HAL Id: hal-02989636**

**<https://hal.science/hal-02989636v1>**

Submitted on 5 Nov 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

**SUPPLEMENTARY DATA**  
**ON *PUSSELLA BOTOSANEANUI***  
**DANIELOPOL, 1973**  
**(OSTRACODA, BAIRDIIDAE)**

by Dan L. DANIELOPOL

*Limnologisches Institut, Österreichische Akademie der Wissenschaften,*  
Wien A-1090, Autriche

**ABSTRACT**

The diagnosis of the genus *Pussella* and a supplementary description of *Pussella botosaneanui* Danielopol, 1973 are presented. *Pussella* has close affinities with *Anchistrocheles*; both genera form a unit which can be considered from the systematical point of view as a subfamily of Bairdiidae, i.e. Pussellinae. Several morphological peculiarities of the Pussellinae are discussed: the carapace size, the reduction of some of the antennal bristles, the specialization of the mouth parts.

**INTRODUCTION**

*Pussella botosaneanui* is a remarkable bairdiid ostracod living in a marine interstitial habitat on the Cuban coast. It has been briefly described by DANIELOPOL (1973) and has been proposed as the type of a new family Pussellidae. Recently Dr R. MADDOCKS (Houston) found a second interstitial species of the genus *Pussella*. She noticed that this genus has many affinities with *Anchistrocheles*

and that both form a subfamily within the Bairdiidae (MADDOCKS, 1976).

In this contribution a supplementary description of *Pussella botosaneanui* is presented and the systematic position of the genus *Pussella* is discussed. The last part of the paper deals with some morphological peculiarities of the Pussellinae.

## SYSTEMATICS

Family BAIRDIIDAE Sars, 1866

Subfamily PUSSELLINAE Danielopol, 1976

Family Pussellidae Danielopol, in Maddocks, 1976, p. 197. (For Family Pussellidae Danielopol, 1973, p. 145, unavailable because the type genus was a *nomen nudum*).

MADDOCKS (1969) considered that the recent bairdiids belong to the family Bairdiidae, which can be divided into two sub-families Bairdiinae and Bythocypridinae. The genus *Anchistrocheles* is a bythocypridine group that is placed near the genera *Bythocypris* and *Zabythocypris*. According to HARTMANN & PURI (1974) the recent bairdiids represent a superfamily *Bairdiacea* with two families, Bairdiidae and Bythocyprididae, and the genus *Anchistrocheles* belongs to the Bairdiidae.

The present data suggest that *Anchistrocheles* and *Pussella* represent a group which has affinities with both bairdiids and bythocypridids. This taxon may be ranked as family Pussellidae in the system of HARTMANN & PURI or as subfamily Pussellinae in the system of MADDOCKS.

Genus *PUSSELLA* Danielopol, 1976

*Pussella* Danielopol, 1976, in Maddocks, 1976, p. 197. (For *Pussella* Danielopol, 1973, p. 145, *nomen nudum*).

TYPE-SPECIES : *Pussella botosaneanui* Danielopol, 1973, p. 145.

Derivation of name : from Puss — a young girl in English (see Collins Dictionary p. 702).

### DIAGNOSIS.

The carapace is elongated with calcareous lamellae ; an inner list is present on the anterior side ; there are 5 adductor muscle

scars aranged in two rows. The male 1st thoracic leg is transformed into a clasping apparatus ; the distal claw is fused with the 4th endopodial segment and is curved forward, forming an angle of about 120°. The protopodites of 2nd and 3rd thoracic legs in both male and female have one long ventral seta (most probably representing an exopodite), which exceeds the length of the 1st segment of the endopodite. The brushlike organ of the male is assymetrical. The copulatory tube of the male is not covered by the peniferum. The furca has a well developed shaft.

#### AFFINITIES.

The genus *Pussella* has close affinities with the genus *Anchistrocheles*, as suggested by MADDOKS (1976). The elongated shape of the carapace occurs in most of the *Anchistrocheles* species (see MAADOCKS, 1969). The assymetrical brushlike organ is present in many Bairdiidae. The reduced number of adductor muscle scars of *Pussella's* carapace suggests affinities with *Anchistrocheles*, *Bythocypris* and *Zabytocypris*. These last two groups differ from *Pussella* in the symmetrical shape of the brushlike organ. *Bythocypris* has a remarkable antennal dimorphisms, i. e., the male has an annulated bristle near the distal claw of the 2nd antenna which, in the female, is replaced by a normal bristle. In *Zabythocypris* and *Anchistrocheles* the male copulatory tube is not covered by the peniferum, and the 1st thoracic leg has a slight sexual dimorphism, i. e., the anterior side of the male endopodite is slightly concave and forms with the distal claw a clasping apparatus (the distal claw articulates with the distal endopodial segment).

#### *PUSSELLA BOTOSANEANUI* Danielopol 1973 (1)

#### SUPPLEMENTARY DESCRIPTION

*Carapace* (Fig. 1A-D, 3A) with thin calcareous lamella, elongate shape. Dorsal margin markedly curved ; anterior margin truncate, slightly bent ; posterior margin strongly bent (compared with the anterior margin) ; ventral margin slightly concave in the anterior third ; sharp angle between the anterior and the ventral margin. On each valve in the middle of the anterior margin, there is a process-like spike. A similar spike is present also on the postero-ventral edge of the valves. Surface of carapace with few normal pore canals and thin hairs. The outer lamella covered

(1) Lectotype and paratypes deposited in the collections of the U.S. National Museum of Natural History, Smithsonian Institution, Washington D.C. (Lectotype-USNM 168569, paratypes USNM 168570 - 168574).

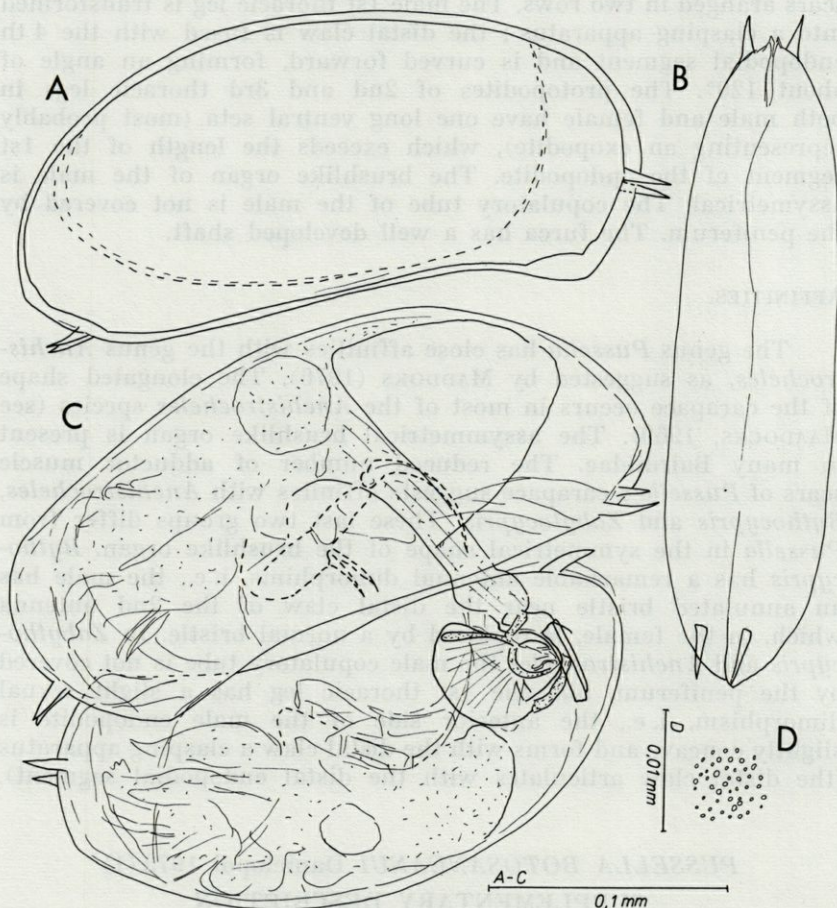


FIG. 1. — *Pussella botosaneanui* Dan.; A, B: carapace, male; A: lateral view; B: ventral view; C: male and female specimen in mating position; D: ornamentation of the carapace.

with minute pits. The asymmetry of the valves is not markedly distinct: left valve overlaps the right one especially on the ventral side (anterior third). The inner calcified lamella is well developed on the anterior and the posterior sides; the maximum length of the anterior vestibulum represents about 13% of the total carapace length. The fused zone is narrow and traversed by few marginal pore canals. In the antero-ventral corner, the fused zone is more indented (see Fig. 1A). The inner marginal line

is straight, to largely bent on the anterior side, and is more arched on the posterior side. An inner list is present on the left valve in the middle of the inner calcareous lamella. Selvage and flange slightly developed (better seen in the antero-dorsal and the postero-ventral sides). Hinge adont, the left valve has a dorsal groove. The length of male carapace measures 0.28 mm (without spikes); the maximum height is 0.12 mm, and it is located in the middle of the valves; the width of the carapace is about 1/4 of the shell length (0.07 mm). The female carapace is 0.26 mm in length; the maximum height is 0.10 mm and the width is 0.06 mm.

*The antennula* (Fig. 2A) has 4 segments; the 1st and 2nd segments bear short bristles on the outer distal margin; the 3rd segment has originated by the fusion of 3 segments and bears setae which exceed the antennular shaft. The *antenna* (Fig. 2B) has a reduced exopodite represented by a scale like segment and a small bristle. Both male and female have a two-segmented endopodite. The 1st segment (which results, most probably, from the fusion of the first 3 endopodial segments) bears on the posterior margin a short bristle in the upper part and a long one in the postero-distal corner; a third small bristle is also visible, but it is not clear if it is inserted on this segment or on the next one. The distal segment represents about 13 % of the total length of the endopodial segments, and bears a long largely curved claw. The length ratio between the endopodite (segments) and the distal claw is 1 : 2.3. A minute distal bristle is inserted on the outer margin. The *mandible* (Fig. 2C) has a gnathobasis with 6-7 teeth. The first tooth (D1) has a broad lamellar shape with 4 rounded cusps. The 2nd and 3rd teeth, lamellar, with only 3 cusps. The last 2-3 teeth sharply pointed. A longer bristle which exceeds the length of the teeth could be a "guide" seta. There are no interdental bristles. On the outer face of the mandibular gnathobasis there is a slender bristle. The mandibular palp is four-segmented. The 1st segment is very long, exceeding the total length of segments 2 and 3. The length ratios of the 4 segments are: 7.5 : 2.1 : 2.9 : 4.2. The 2nd segment, bears a long bristle on the inner side; the 3rd segment bears one anterior and one posterior bristle which reach the extremity of the distal segment. The 4th segment has distally a strong claw and an inner thin bristle. The *maxilla* (Fig. 2D-G) has three slender endites and palp. The 1st endite (anterior nearest palp) with 2 distal smooth claws; the 2nd one has a spoon-like claw and a "normal" claw; the 3rd one with 2 distal bristles; the maxillar palp (PMx) is unsegmented and shorter than the endites; it has only one bristle. The respiratory plate has 7-8 long plumose setae. The *lower lip* (Fig. 2H) has near the anterior margin one

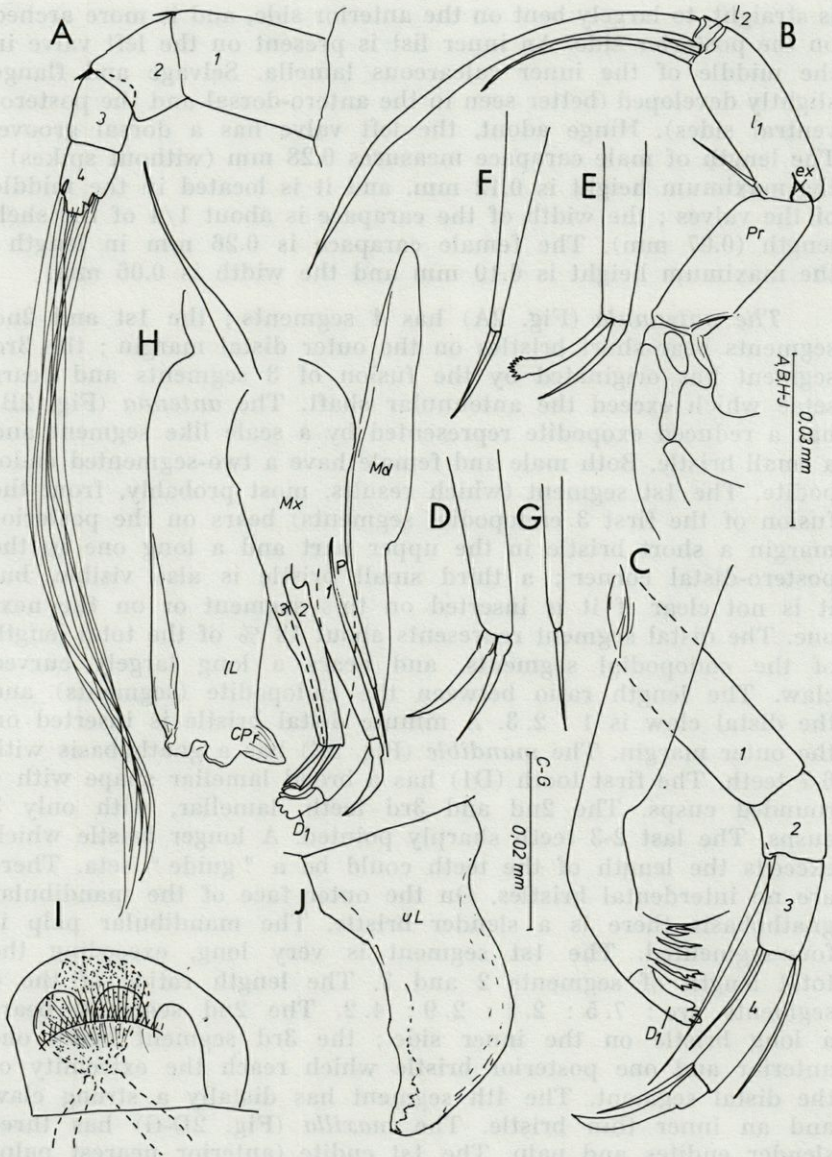


FIG. 2. — *Pussella botosaneanui* Dan., male; A: antennula; B: antenna; C: mandible; D-G: maxilla, details; D: 1st endite; E: 2nd endite; F: 3rd endite; G: maxillar palp ( $P_{Mx}$ ); H: lower lip (IL), maxilla (Mx) and mandible (Md); general view; I: the oesophagean chewing organ; J: upper lip (uL).

conical process on the lateral sides. The *upper lip* (Fig. 2J) is elongated and has on the anterior margin small teeth. The *oesophagian chewing organ* (Fig. 2I) with a distal oval sclerotized plate (SPL) which distally bears 4-6 teeth. This plate is moved by 2 strong muscles. The 1st *thoracic leg* (Fig. 1C, 3B) has a strong sexual dimorphism. The female has a normal pediform limb. The 1st podomere bears a long seta (an exopodite ?) on the posterior margin which exceeds the length of the 1st endopodial podomere (see DANIELOPOL, 1973). The endopodite has 2 long segments and a short distal one (length ratio 3.3 : 3.2 : 0.6). The 1st segment is devoid of bristles ; the 2nd segment (resulting from the fusion of 2 endopodial segments) has a short subdistal bristle. The distal segment bears a long slightly bent claw. The male's 1st thoracic leg is transformed into a clasping apparatus. The endopodite with 2 strong bristles on the margin of the 1st segment (Fig. 1C). The width of this segment is larger than that of the female's. The 2nd segment similar to that of the female. The 3rd segment strongly sclerotized and fused with the distal claw. The protopodite has a strong plumose seta on the posterior side. The *2nd and 3rd thoracic legs* (Fig. 4A-D) are pediform limbs with long distal claws. They have no sexual dimorphism. The 1st podomere bears a well developed plumose seta (exopodite ?) on the posterior margin. The endopodites have 3 segments ; the 1st segment without setae ; the 2nd segment with a short distal bristle on the anterior side ; the 3rd segment is small and bears a long claw ; the length ratio of the endopodial segments and the claw are 13 : 15 for the 2nd thoracic leg and 12 : 12.5 for the 3rd one. *Brush shaped organ (BO) of the male* (Fig. 4A) is asymmetrical and situated between the 2nd and the 3rd thoracic legs. The *furca* (Fig. 3C) has a strong shaft (Fu) which bears subdistally 2 slender bristles. Between the 2 furcal shafts there is one bristle (l). The *posterior part of the male body* is markedly extended during copulation (Fig. 1C). *Eyes and pigments* of the body are lacking. The *male copulatory organ* (Fig. 3C-E) is paired. Each hemipenis has a strong clasping apparatus (Cp) which resembles a spoon. The peniferum has a spiniferous bulge-like process (bp) on its distal side. The strongly sclerotized copulatory tube (Cot) is located outside of the peniferum. Its distal extremity is sharply pointed (Fig. 3E). The proximal part is inflated (VS) and resembles the seminal vesicle of the Bairdiinae (see DANIELOPOL, 1972). The copulatory tube, which is bent towards the posterior does not exceed the extremity of the bulge-like process. Several strong muscles are situated inside the peniferum.

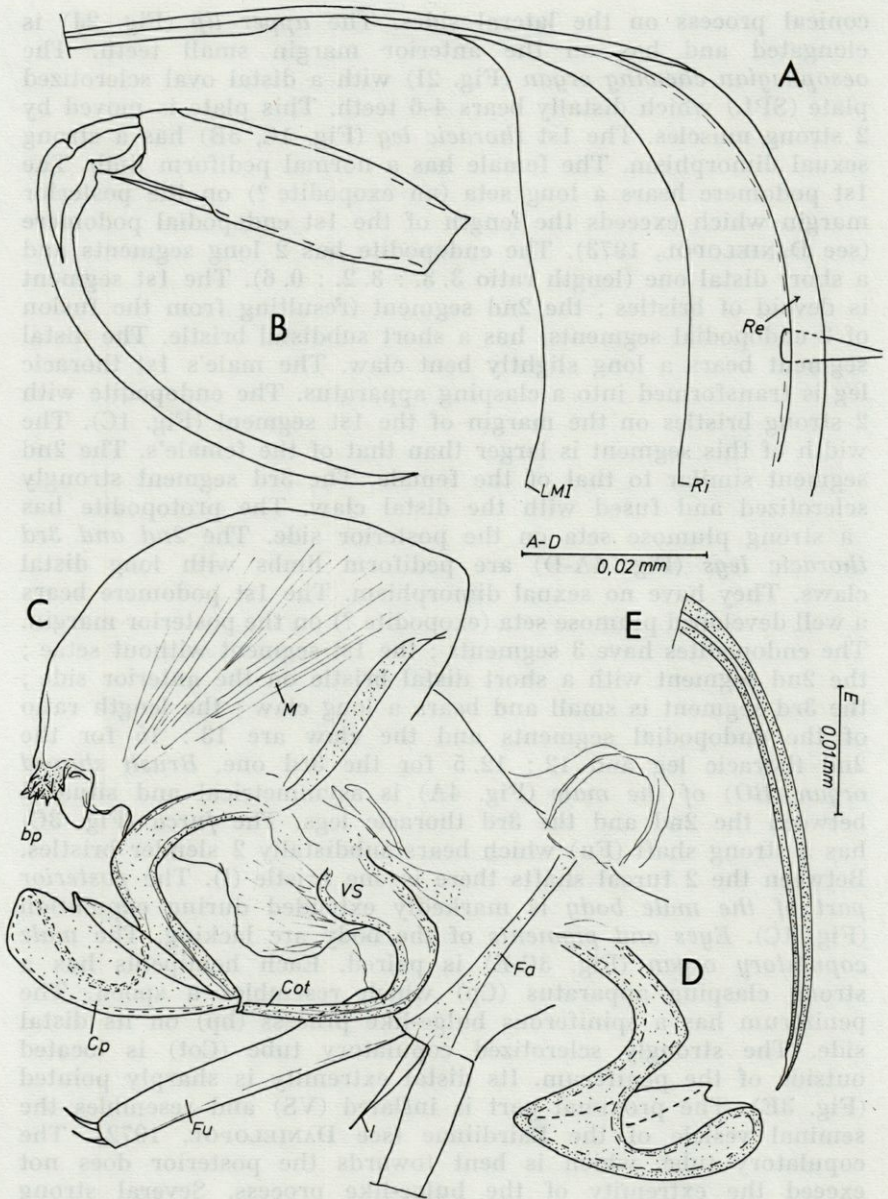


FIG. 3. — *Pussella botosaneanui* Dan., male; A: left valve detail of the antero-dorsal area; B: 1st thoracopod, endopodite; C: copulatory organ, furca and the posterior bristle "e"; D: the clasp process (Cp), detail; E: the ejaculatory (copulatory) tube (cot), detail.

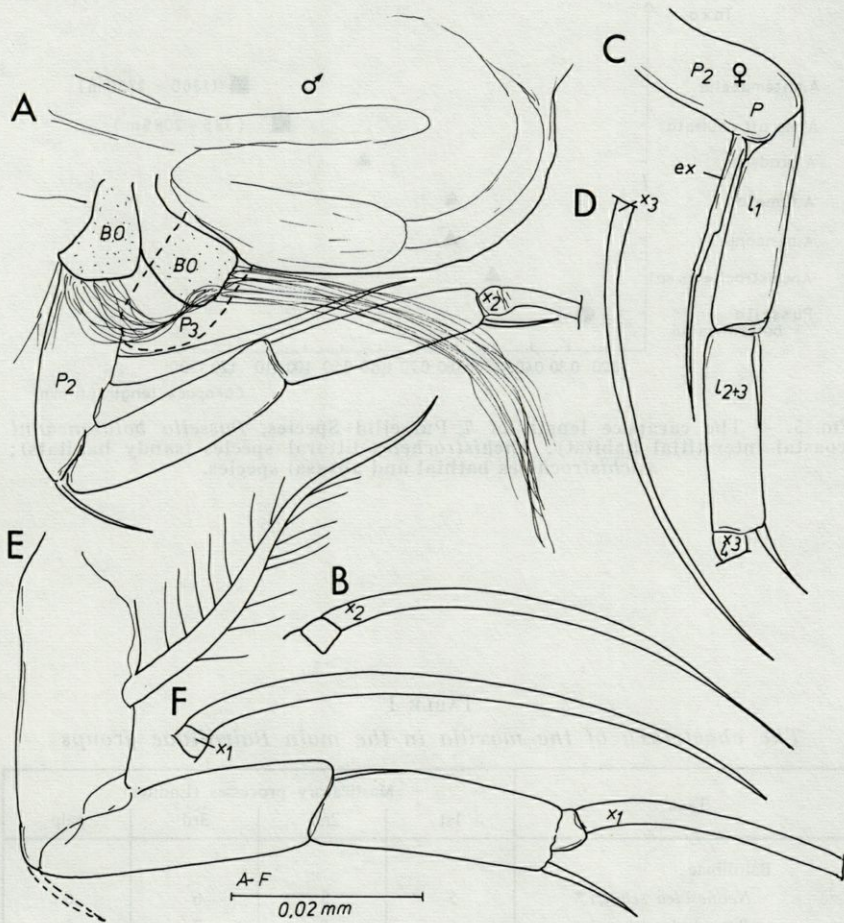


FIG. 4. — *Pussella botosaneanui* Dan., A,B,E,F: male; C,D: female; A: extremity of the body with brush like organ (BO) and the 2nd thoracopod; B: 2nd thoracopod, the distal claw; C,D: 2nd thoracopod; E,F: 3rd thoracopod.

SOME REMARKS ON THE MORPHOLOGY OF PUSSELLINAE

THE SIZE OF CARAPACE.

MADDOCKS (1976) discussed several evolutionary trends of the *Anchistrocheles-Pussella* group. She pointed out the trend towards reduction in size of the carapace. Figure 5 shows the

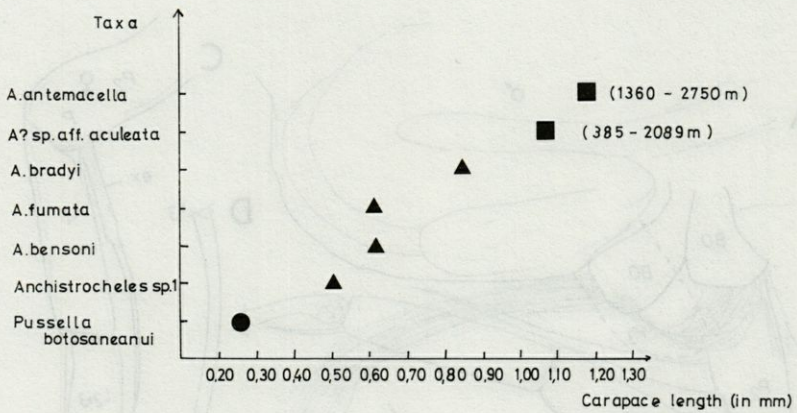


FIG. 5. — The carapace length of 7 Pussellid Species. *Pussella botosaneanui* (coastal interstitial habitat); *Anchistrocheles* littoral species (sandy habitats); *Anchistrocheles* bathial and abyssal species.

TABLE I

The chaetotaxy of the maxilla in the main Bairdiidae groups

Taxa	Masticatory processes (Endites)			
	1st	2nd	3rd	palp
<b>Bairdiinae</b>				
<i>Neonesidea schulzi</i> *	5	5	6	6
<i>Paranesidea algicola</i> *	5	5	7	5
<i>Triebelina bradyi</i> *	6	6	8	6
<i>Bairdopilata alcionicola</i> *	5	6	7	6
<b>Bythocypridinae</b>				
<i>Bythocypris eltanina</i> *	6	5	6	6
<b>Pussellinae</b>				
<i>Anchistrocheles bensoni</i> *	3	3	4	5
<i>Pussella botosaneanui</i>	2	2	2	1

(\* data from MADDOCKS, 1969); the 1st endite is located anteriorly, the nearest to the palp.

length of 6 *Anchistrocheles* species and one *Pussella* species. *Anchistrocheles* sp. 1., *A. bensoni*, *A. fumata* and *A. bradyi* all live in marine littoral environments, on sand substrates. The size-range of the carapace varies between 0.50 mm and 0.84 mm; *A. sp. aff. aculeata* Maddocks 1969 and *A. antemacella* occur in bathyal and abyssal environments; their carapace lengths are larger than those of littoral species (between 0.92 mm and 1.17 mm). *Pussella botosaneanui* which was found in the coastal groundwater of a coralligenous sandy beach has the smallest carapace (0.26 — 0.28 mm). These data suggest that in the Pussellinae group there are two trends in the evolution of the carapace size i.e. reduction in those species which are specialized for the interstitial environment and increase in size of the carapace of species which are adapted to deep sea conditions.

#### THE REDUCTION OF THE LIMB BRISTLES.

MADDOCKS (1976) showed that another evolutionary trend in the Pussellinae group is the reduction of the number of bristles and segments of the limbs. *Pussella botosaneanui* has the lowest number of bristles among the recent *Bairdiacea* ostracods. DANIELOPOL (1972) pointed out that *Neonesidea sp. aff. ifalikensis* Madd. has three blunt bristles inserted on the 1st endopodial segment of the 2nd antenna, which stained very quickly with methylene blue; two other similar bristles were observed on the 3rd and 4th segments. It was suggested that these bristles are chemosensorial organs. In the *Anchistrocheles* genus, MADDOCKS (1969) illustrated 3 long bristles on the 1st endopodial segment of the 2nd antenna of *Anchistrocheles* sp. 1, which are equivalent to the 3 bristles described in *Neonesidea sp. aff. ifalikensis* Madd. There is no evidence of any blunt bristles on the 3rd and 4th endopodial segments. *Pussella botosaneanui* has only one bristle on the inner side of the 1st endopodial segment.

*Pussella botosaneanui* has no interdental bristles on the mandibular gnathobasis and the 1st tooth is very large with four rounded cusps. In other Bairdiinae and Bythocypridinae the mandibular gnathobasis has conspicuous interdental bristles as well as 3 brush-shaped bristles.

If one compares the maxillary chaetotaxy of *Pussella botosaneanui* with those of representatives of *Neonesidea*, *Paranesidea*, *Bairdopilata*, *Triebelina* (Bairdiinae) and *Bythocypris* (Bythocypridinae) (see also Table I), it appears obvious that the first species (*Pussella botosaneanui*) has a very reduced number of bristles (Fig. 2D-H).

## ACKNOWLEDGEMENTS

The author is much indebted to Prof. Dr. H. LÖFFLER (Limnolog. Institut, Wien), Mrs. S. POWELL (Wien) and Dr. R. MADDOCKS (University of Houston, Texas) for useful discussions and for reading and criticizing a first draft of this paper.

## RÉSUMÉ

La diagnose du genre *Pussella* et une description supplémentaire de *Pussella botosaneanui* Danielopol 1973, sont présentées. *Pussella* offre des affinités étroites avec *Anchistrocheles*; les deux genres forment une unité qui du point de vue systématique peut être interprétée comme une sous-famille appartenant aux Bairdiidae, i. e. Pussellinae. Plusieurs particularités morphologiques des Pussellinae sont discutées: la dimension de la carapace, la réduction de certains poils antennaires, la spécialisation des appendices buccaux.

## ZUSAMMENFASSUNG

Die Arbeit bringt eine Diagnose der Gattung *Pussella* und eine zusätzliche Beschreibung der *Pussella botosaneanui* Danielopol 1973. Die Gattung *Pussella* ist nahe mit der Gattung *Anchistrocheles* verwandt. Beide bilden eine Einheit, die systematisch gesehen als Unterfamilie der Bairdiidae, d. h. Pussellinae gilt. Einige morphologische Eigenschaften der Pussellinae werden besprochen: die geringe Carapax-Grösse, die Reduktion einiger antennaler Borsten und die Spezialisierung der Mundteile.

## REFERENCES

- DANIELOPOL D.L., 1972. Supplementary data on the morphology of Neonesidea and remarks on the systematic position of the family Bairdiidae (Ostracoda, Podocopida). *Proc. biol. Soc. Wash.*, **85**, 2: 39-48.
- DANIELOPOL D.L., 1973. Preliminary report on the new family Pussellidae (Ostracoda, Podocopida). *Résultats des expéditions biospéléologiques cubano-roumaines à Cuba*: 145-149. Acad. R.S.R. éd. Bucaresti.

HARTMAN G. & H.S. PURI, 1974. Summary of neontological and paleontological Classification of Ostracoda. *Mitt. hamburg. zool. Mus. Inst.*, **70** : 7-73.

MADDOCKS R.F., 1969. Revision of Recent Bairdiidae (Ostracoda). *Bull. U.S. Natn Mus.*, **295** : 1-126.

MADDOCKS R.F., 1976. Pussellinae are interstitial Bairdiidae (Ostracoda). *Micropaleontology*, **22** (2) : 194-214.

*Reçu le 12 février 1976.*