

## *Meischcandona* gen. nov. from Africa, with a key to the genera of the subfamily Candoninae (Crustacea, Ostracoda)

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### Abstract

*Meischcandona* gen. nov., and *Meischcandona boitanii* sp. nov. are described from Mali. The new genus is characterized by a 5-segmented antennula and a reduced posterior furcal claw. The morphology and taxonomy of the new genus are discussed, and a key to the genera of the subfamily Candoninae is presented.

**Key-words:** Ostracoda, Candoninae, *Meischcandona* nov. gen., Taxonomy, Africa

### Résumé

*Meischcandona* gen. nov. and *Meischcandona boitanii* sp. nov. sont décrites du Mali. Le genre nouveau se caractérise par une antennule qui possède seulement 5 articles et par une furca avec une griffe postérieure réduite. La morphologie et la position systématique du genre nouveau sont discutées. Une clé de détermination des genres de la sous-famille des Candoninae est présentée.

**Mots-clés:** Ostracoda, Candoninae, *Meischcandona* gen. nov., Taxonomie, Afrique.

### Introduction

In the past 30 years the number of newly-described Candoninae genera has suddenly increased. Before that, only the following Candoninae genera were known: *Candona* BAIRD, 1835; *Candonopsis* VAVRA, 1891; *Cryptocandona* KAUFMANN, 1900; *Eucandona* DADAY, 1900 (= *Fabaeformiscandona* KRSTIC, 1972); *Nannocandona* EKMAN, 1914; *Paracandona* HARTWIG, 1899; and *Pseudocandona* KAUFMANN, 1900. Most of these genera have representatives in the Holarctic only, with the exception of *Candonopsis*, which is distributed both in tropical and sub-tropical regions (DANIELOPOL, 1980). After further investigations of the European ostracod fauna, especially from ground water, some new Candoninae genera were described. SYWULA (1970) described the genus *Mixtacandona*, but this was later synonymized (KARANOVIC & PESCE, 2000) with *Trapezicandona*, described a year earlier from the Crimea (SCHORNIKOV, 1969). However, the representatives of this genus are distributed exclusively in European ground water. *Phreatocandona* was described from ground water of Romania (DANIELOPOL, 1978), while *Trajancandona* was

described recently from the same habitat of Montenegro (KARANOVIC, 1999). Both genera have a very restricted distribution. The first one is known from its type locality only, which is a well in the Olt Valley, while the latter is known from the Lake Skadar drainage area. Another endemic genus, *Baicalocandona* MAZEPOVA, 1976 was described from Lake Baikal. A synthesis of all European Candoninae genera was given by MEISCH (1996), and he also described *Schellencandona*, another ground water genus from Europe. Investigations of non-Holarctic regions led to the description of another five Candoninae genera. *Danielocandona* and *Caribecandona* were described from the West Indies (BROODBAKKER, 1983), *Terrestricandona* from Madagascar (DANIELOPOL & BETSCH, 1980), *Namibcypris* from Namibia (MARTENS, 1992) and *Indocandona* from India (GUPTA, 1984). In the present paper *Meischcandona boitanii* gen. nov., sp. nov., is described from Mali. Beside *Terrestricandona* and *Namibcypris*, this is the third Candoninae genus known from African inland waters only. So, until now 18 Candoninae genera have been described. All of them have good diagnoses, with clear and precise differential features. The present paper gives a key for their identification.

### Abbreviations used in the text and figures

A1 - antennula; A2 - antenna; Fu - furca; L - length of the valves; LV - left valve; Md - mandibula; Mx1 - maxillula; RV - right valve; T1-T3 - thoracic limbs; W - width of the valves. The chaetotaxy of A1, A2, and Md palp follows the model proposed by BROODBAKKER & DANIELOPOL (1982), while the chaetotaxy of T3 follows the model proposed by MEISCH (1996). The terminology of the limbs is used in accordance with MARTENS (1998).

### Taxonomic part

Class Ostracoda LATREILLE, 1806  
Order Podocopida SARS, 1866  
Superfamily Cypridoidea BAIRD, 1845  
Family Candonidae KAUFMANN, 1900  
Subfamily Candoninae KAUFMANN, 1900  
Genus *Meischcandona* gen. nov.

## TYPE SPECIES

*Meischcandona boitanii* sp. nov.

## DIAGNOSIS

Carapace small, trapezoidal, distinctly laterally compressed in dorsal view. Six muscle scars present. A1 5-segmented. Exopodite of A2 a clearly visible plate with 2 short and 1 long seta. Setal group of second segment of Md palp with 3+1 setae on inner side, and with 2 setae on outer side. Terminal segment of Mx1 palp subquadrate and with only 3 setae, one of which is claw-like. Respiratory plate of T1 with 2 filaments. T2 5-segmented. T3 4-segmented and with 2 setae (d1 and dp) on protopodite, 1 seta (g) on penultimate segment; terminal segment bearing one extremely long (h3) and 2 short (h1 and h2) setae. Fu with only anterior claw completely developed, posterior claw reduced to short seta; both anterior and posterior setae present.

## ETYMOLOGY

The new genus is named in honour of Dr. Claude MEISCH, for his outstanding contribution to the taxonomy of Candoninae, prefixed to the genus name *Candona*. Gender feminine.

*Meischcandona boitanii* sp. nov.  
(Figs 1-13)

## MATERIAL EXAMINED

River Sangna, Mali, 09. December 1973, collector Dr. Luigi BOITANI; holotype, female, and 1 paratype, female. Both specimens were dissected and mounted on slides in Faure's medium. The holotype (female) is deposited in the collections of the Royal Belgian Institute of Natural Sciences, Brussels, O. C. 2383, the paratype (female) is deposited in the author's working collection.

## DESCRIPTION OF FEMALE (HOLOTYPE)

Carapace trapezoidal in lateral view (Fig. 1). Valves strongly asymmetric, LV being markedly longer than RV. L of LV=0.309 mm, H=0.185 mm (60% of L); L of RV=0.292 mm, H=0.166 mm (57% of L). Dorsal margin straight in middle, inclined towards posterior margin, and with sinuous recess towards anterior margin. Posterior margin lower than anterior one. Ventral margin somewhat convex around middle. In dorsal view (Fig. 2), carapace laterally compressed, LV overlapping RV both on anterior and posterior ends. Marginal zone wider anteriorly than posteriorly. Zone of conrescence narrow with straight and short marginal pore canals. Carapace white and smooth with sparse setae. A1 5-segmented (3rd and 4th; 5th and 6th segments fused). First segment with 3, second with 1, third without any setae, penultimate and terminal segments bearing 3 setae each. Aesthetasc ya extremely long. Length ratios of 3 distal segments 1.6 : 1.3 : 1 (Fig. 7). Aesthetasc Y on A2 very long (Fig. 3) and almost as long as internal margin of first endopodal segment. Aesthetascs y1 and y2 not visible, while y3 very long and 4.6 times longer than terminal segment. Three t and 2 short z setae visible. G1 2.1; G2 0.8; G3 2.03; GM 1.7 and Gm 1.1 times as long as internal margin of first endopodal segment.

All claws smooth. Second segment of Md palp (Fig. 5) with a bunch of 3+1 setae and 2 setae on the outer side of the same segment. Beta seta not visible, gamma seta smooth. Terminal segment apically fused with one claw and with an apical bunch of setae. Md coxa as in Fig. 6. Rake-like organ (Fig. 11) with 8 teeth. Terminal segment of Mx1 palp subquadrate and with 3 setae: one of which appears claw-like, other two seta-like. Penultimate segment with 4 pappose setae (Fig. 4). T1 as in Fig. 13. T2 5-segmented (Fig. 10). Basal segment without setae, first, second and third endopodal segments with 1 long seta each. Terminal segment with 2 setae and apically with claw 1.4 times as long as 3 distal segments combined. Claw smooth. T3 4-segmented (Fig. 9). Basal segment with 2 setae (d1 and dp), first endopodal segment without setae, penultimate one with 1 seta apically (g), terminal segment with setae h1 and h2 short (h1 not exceeding length of same segment), and 1 long seta (h3). All setae on that segment pappose. Fu with posterior claw reduced to a seta. Anterior claw 0.86 times as long as anterior margin of furcal ramus. Posterior seta present (Fig. 12).

Male - unknown

## ETYMOLOGY

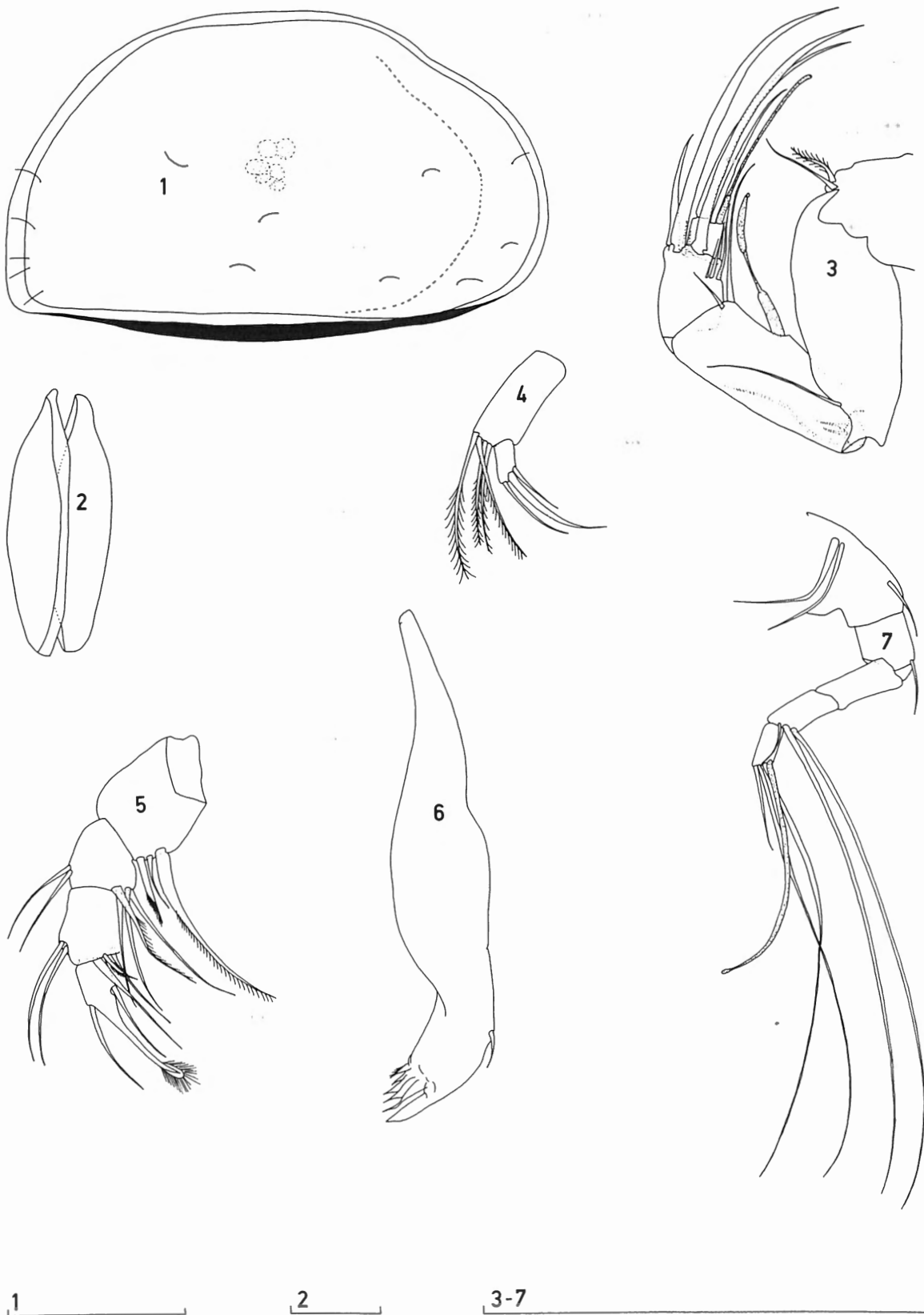
The specific name is dedicated to Dr. Luigi BOITANI, who collected the material.

## ECOLOGY

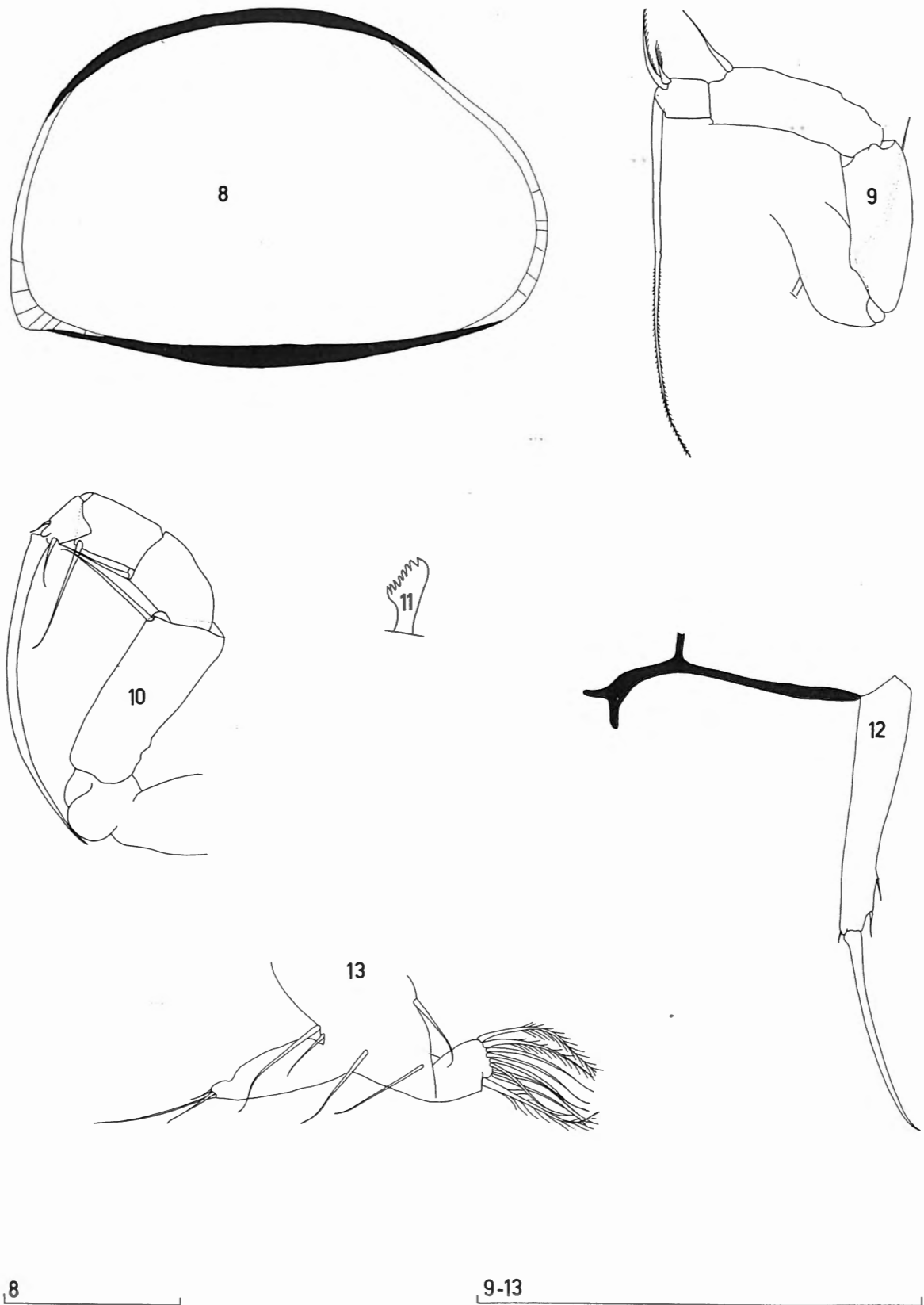
According to its morphological characteristics (white carapace, long aesthetascs), *Meischcandona boitanii* most likely is a troglobiont or troglophile species. Two females found in the river Sangna were probably collected accidentally, and their presence in the river is more likely due to the high water level which ejected the species from the ground water habitat.

## REMARKS

Both specimens were females without eggs. Only the appearance of one seta (g), on the penultimate segment of T3 (Fig. 9), is not like in typical adult specimens of the subfamily Candoninae. It has a bulbous base. There were no other signs of juvenility. Maybe the specimens were in the last larval stage, but according to other ostracod species, only the length of the carapace and the length of some setae can change slightly, while the number of most of the setae and of all segments as well as the general appearance of appendages will remain the same in the adult stage (see BRONSTEIN, 1947; SYWULA, 1974; HENDERSON, 1990). The most recent studies of the ontogeny of cypridid ostracods, by SMITH & MARTENS (2000), have shown that the following additional setae appear in the adult stage of *Eucypris virens* (JURINE, 1820): 1. the outermost (shortest) natatory seta on A2; 2. t-4 seta on the same appendage; 3. another seta in the gamma group of Md-palp; 4. seta on the ventral edge of the same appendage, 5. fifth seta on the penultimate segment of Mx-palp, and 6. two setae on the first podomere of Mx. Furthermore, in the adult stage appropriate setae on A2 transform into claws G2 and Gm. Our recent knowledge of the ontogeny of Candoninae is extremely poor, so we can hardly state with complete certainty if additional setae develop in the adult stage, and if the



Figs 1-7. *Meischcandona boitanii* gen. nov., sp. nov., holotype female, L = 0.309 mm: 1. carapace, general appearance from the right side; 2. carapace, dorsal view; 3. A2; 4. Mx1 palp; 5. Md palp; 6. Md coxa; 7. A1. Scales = 0.1 mm.



Figs 8-13. *Meischcandona boitanii* gen. nov., sp. nov., holotype female, L = 0,309 mm: 8. LV, internal view; 9. T3; 10. T2; 11. Rake-like organ; 12. Fu; 13. T1. Scales = 0.1 mm.

## Key to the genera of the subfamily Candoninae

1. T2 4-segmented, terminal segment of Mx1 palp elongated ..... 2
  - T2 5-segmented, terminal segment on Mx1 palp subquadrate ..... 3
2. Carapace sculptured, pore canals long and branched ..... *Namibcypris* MARTENS, 1992
  - Carapace smooth, pore canals short and straight ..... *Danielocandona* BROODBAKKER, 1983
3. Terminal segment on T3 with only one sclerotized seta ..... *Terrestricandona* DANIELOPOL & BETSCH, 1980
  - Terminal segment on T3 with 3 setae ..... 4
4. Terminal segment on T3 with 1 very long and 2 clearly shorter setae ..... 5
  - Terminal segment on T3 with 2 long and 1 distinctly shorter seta ..... 8
5. A1 5-segmented ..... *Meischcandona* gen. nov.
  - A1 7-segmented ..... 6
6. Fu with reduced posterior claw ..... *Indocandona* GUPTA, 1984
  - Fu completely developed ..... 7
7. Lateral shield of hemipenis thin and elongated ..... *Trapezicandona* SCHORNIKOV, 1969
  - Lateral shield of hemipenis robust and squarish ..... *Cryptocandona* KAUFMANN, 1900
8. Fu without posterior seta ..... 9
  - Fu with posterior seta ..... 10
9. Lateral shield of hemipenis consists of 2 lobes, penultimate segment of Md palp 2.7 times the length of terminal one ..... *Caribecandona* BROODBAKKER, 1983
  - Lateral shield of hemipenis consists of 1 lobe, penultimate segment of Md palp 1 - 1.5 times the length of terminal one ..... *Candonopsis* VAVRA, 1891
10. A1 5-segmented ..... *Nannocandona* EKMAN, 1914
  - A1 7-segmented ..... 11
11. Penultimate segment on T3 with 2 setae ..... *Paracandona* HARTWIG, 1899
  - Penultimate segment on T3 with 1 seta ..... 12
12. Exopodite of A2 plate with 3 short setae ..... 13
  - Exopodite of A2 plate with 2 short and 1 distinctly longer seta ..... 14
13. Posterior furcal claw reduced ..... *Phreatocandona* DANIELOPOL, 1978
  - Both furcal claws well developed ..... *Trajancandona* KARANOVIC, 1999
14. Zenker's organ with 6 whorls of spines ..... 15
  - Zenker's organ with 7 whorls of spines ..... 16
15. Carapace strongly ornamented ..... *Baicalocandona* MAZEPOVA, 1976
  - Carapace smooth, or with shallow pits ..... *Schellencandona* MEISCH, 1996
16. Basal segment of T3 with 3 setae ..... *Pseudocandona* KAUFMANN, 1900
  - Basal segment of T3 with 2 setae ..... 17
17. Gamma seta on Md palp smooth ..... *Eucandona* DADAY, 1900
  - Gamma seta of Md palp hirsute ..... *Candona* BAIRD, 1835

specimens of the new species are last instar juveniles. The carapace of both specimens was completely decalcified what is most probably due to bad conservation of material (glycerol was added).

## Discussion

## DIFFERENTIAL DIAGNOSIS

The new genus possesses one relatively rare characteristic among Candoninae genera: it has only 3 setae on the terminal segment of Mx1 palp. This feature is noticed also in the following Candoninae genera: *Namibcypris*, *Danielocandona*, and *Trajancandona*. *Meischcandona* gen. nov. can be distinguished from *Namibcypris* and *Danielocandona* by the appearance of the exopodite of A2 (in *Namibcypris* a plate with 2 short setae, in *Danielocandona* a plate with only one long seta) and the appearance of Fu (in both genera the furcal ramus is strongly reduced and with 1 claw only). Both

*Namibcypris* and *Danielocandona* are monospecific. The first one has a 6-segmented, the latter 5-segmented A1. *Danielocandona lieshoutae* and *Meischcandona boitanii* sp. nov. also have the appearance of terminal segment of T3 in common, especially the appearance of its setae. All 3 setae on the exopodite of A2 are short in the genus *Trajancandona*, what, among other differences, clearly separates it from the new genus. The reduced or completely missing furcal appendages are noticed in the following genera: *Phreatocandona*, *Caribecandona*, *Candonopsis* and *Indocandona*. The monospecific genus *Phreatocandona* also has 3 short setae on exopodite of A2 and, in *Phreatocandona motasi*, the posterior furcal claw is not reduced into a small seta, as it is in *Meischcandona*, but rather into one stunted claw. Both *Caribecandona* and *Candonopsis* only miss the posterior furcal seta, which is present in *Meischcandona*. According to the description given by GUPTA (1984), it is not completely clear if *Indocandona krishnacanti*, the type and only species of the genus, possesses a posterior furcal seta or not, but its

posterior furcal claw is reduced into a seta. This species can be distinguished from *Meischcandona boitanii*, among other features, also by the 7-segmented A1 and the extremely elongated carapace shape. It must be pointed out that both genera have a very similar appearance of the terminal segment of T3. Two short and one distinctly longer seta on the same segment is also one of the generic features of *Trapezicandona* (= *Mixtacandona*) and *Cryptocandona*, but both genera have a 7-segmented A1 and completely developed Fu. The genus *Nannocandona* has a 5-segmented A1, like *Meischcandona*, and this is used as a distinguishing feature in our key to the Candoninae genera. EKMAN (1914), in the description of *Nannocandona* and its type species *N. faba*, wrote that the A1 was 4-segmented in this species. Afterwards, in the redescription of the same species (MARMONIER & DANIELOPOL, 1988), as well as in the description of *N. stygia* from the underground waters of Poland (SYWULA, 1976), it became clear that the species of the genus *Nannocandona* have 5-segmented A1, and that EKMAN (1914) overlooked the separation between first and second segment. The genus *Nannocandona* differs from *Meischcandona* by many features, but the most noticeable are: terminal segment of T3 in *Nannocandona* bears 1 short and 2 long setae, terminal segment of Md palp has 2 strong claws, Fu is completely developed. In *Nannocandona*, the 3rd segment of the A1 is fused with the 4th while the 6th segment is fused with the 7th (in *Meischcandona* 3rd and 4th; 5th and 6th segments are fused). From all other Candoninae genera (mentioned in the key), the new genus can be distinguished also by several other features, but the most noticeable are: A1 5-segmented and posterior furcal claw reduced into seta.

#### BAIKALIAN CANDONIDS

Here, I would like to propose the transfer of the Baikalian species, belonging to the genus *Pseudocandona*, into the genus *Baicalocandona*. All those species show great similarity with the other European species of the genus *Pseudocandona*, but they belong to a clearly separate phyletic lineage. Differences between Baikalian and European species of the genus *Pseudocandona* were noticed by many ostracodologist (DANIELOPOL, 1978; BROODBAKKER, 1983; MARTENS *et al.*, 1992a; MARTENS *et al.*, 1992b). In the ostracod fauna of Lake Baikal, MAZEPOVA (1990) also noticed the same fact but she did not propose any change in the systematics of *Pseudocandona* species from Lake Baikal. However, the only clear difference between those and the species already placed in *Baicalocandona* is that *Pseudocandona* species from Lake Baikal do not possess the male bristles on the A2, while males of the genus *Baicalocandona* do have such bristles. On the other hand, all other morphological characteristics, of both soft and hard parts, are extremely similar. Also, they have one very important feature in common: the Zenker's organ has 6 whorls of spines. This, more than any other feature, separates both Baikalian *Pseudocandona* and *Baicalocandona* on the one hand from European *Pseudocandona* on the other (Zenker's organ possesses 7 whorls of spines). There is only one exception. Namely, according to MAZEPOVA (1990) *Pseudocandona saxatilis* has 5 whorls on the Zenker's organ. This, however,

should be rechecked because, until now, the variation in the number of whorls on Zenker's organ within one Candoninae genus is unknown, and this would be an exception. The presence or absence of male bristles in some species of the same genus is noticed in many other Candoninae genera: *Pseudocandona*, *Trapezicandona*, *Trajancandona* and *Caribecandona*. So, this characteristic alone is not enough for distinguishing two Candoninae genera, especially if all other morphological characteristics are extremely similar. It is a pity that there is no clear description of the chaetotaxy of the basal segment of T3. There is only one figure (MARTENS *et al.*, 1992b: p. 5, Text-fig. 1-k) which shows that the basal segment of the same appendage possesses 2 setae. If this is true for all other species it will be another important distinguishing feature between *Pseudocandona* (basal segment bears 3 setae) and *Baicalocandona*.

#### Acknowledgments

The author would like to thank Dr. C. MEISCH (Museum of Natural History, Luxemburg) and Dr. K. MARTENS (Royal Belgian Institute of Natural Sciences, Brussels) for reviewing the manuscript and for their useful comments.

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