



A new *Keratella* from Patagonia

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Abstract

A new species of rotifer, *Keratella morenoi* n.sp. is described from laguna Los Juncos, a temporary pool in the Patagonia Plateau of Argentina. The new taxon is characterised by its rectangular lorica with a foundation pattern consisting of 19 clearly delimited facets, including five median. The frontomedian and anteromedian facets are pentagonal. The specimens examined have two well-developed, unequal posterior spines.

Introduction

The geographic situation of the North Patagonian lakes is such that their rotifer assemblage combines elements of northern as well as southern origin (Paggi, 1981). This is particularly true for brachionids of the genera *Brachionus* and *Keratella*: a decrease in the number of *Brachionus* species from north to south can be observed, while an inverse pattern holds for *Keratella* (Dumont, 1983; José de Paggi, 1990; Modenutti & Balseiro, 1994).

Zooplankton collections from a Patagonian temporary pond made during 1996 and 1997 contained specimens of a *Keratella* belonging to the *valga* group that did not correspond to any previously named species (Dieguez & Modenutti, 1996). Considering that *Keratella* is predominantly temperate (Dumont, 1983), a large number of species is expected in the Patagonian region of Argentina. The discovery of large populations of an unknown *Keratella* supports this view. In this paper we describe this new taxon and discuss its distribution.

Material and methods

Specimens were obtained from plankton samples collected during October to January 1996 and 1997.

Samples were collected by horizontal hauls using a 50 µm plankton net and preserved in 4% formalin. At least 30 individuals were separated under a dissecting microscope and measured on a compound microscope (Olympus BH2) at 400 × using a micrometer eyepiece. Morphometric parameters considered are abbreviated as follows: TL (total length), LL (lorica length without considering anterior and posterior spines), LW (lorica width), RPS, LPS (right and left posterior spines) and AMS, AIS, ALS (anterior median, internal and lateral spines). Body dimensions are in micrometers. The animals were prepared for scanning electron microscopy (SEM) following Boltovskoy (1976). The SEM at the Laboratory of Electronic Microscopy of the Centro Atómico Bariloche was used. SEM of trophi, isolated following a method by Segers (1993) and Segers & Dumont (1993), were examined using a JEOL-JSM 640 microscope at the University of Ghent, Belgium.

Study site

The new species was recorded in Laguna Los Juncos (41° 04' S, 71° W), a temporary pool situated in the Patagonian Plateau at 911 m.a.s.l. The longitudinal gradient from west to east in Patagonia results in a wide precipitation range from the Andes *Nothofagus* forest to the Patagonian steppe. The pool has an in-

intermediate position between the Andean lakes and the Patagonian Plateau lakes. The region has an annual precipitation of 550 mm which is the main water input of the pond. The hydroperiod extends from June to January. The pool has a surface of 2 ha and a maximum depth of 1 m. Laguna Los Juncos is a turbid environment due to its shallowness and exposure to the strong Patagonian winds. The water is slightly alkaline (pH = 7.8) with intermediate levels of total dissolved solids since conductivity is around 500 μ S. The pond lacks fishes but has an important population of Chilean flamingo (*Phoenicopterus chilensis*).

Keratella morenoi new species Figures 1–8.

Synonyms: *K. valga* f. *tropica* after Ahlstrom (1943), partly (plate 42 Figures 11, 13) *K. tropica* after Olivier (1965), partly (plate 6 Figures 7–9) Holotype: a parthenogenetic female, in Centro Regional Universitario Bariloche, Univ. Nac. del Comahue, Argentina. Paratypes: two slides containing 5 parthenogenetic females in the collections of the Centro Regional Universitario Bariloche, Univ. Nacional del Comahue, Argentina and the Laboratory of Animal Ecology, Zoogeography and Nature Conservation, Dept. Biology, University of Ghent, Belgium, each.

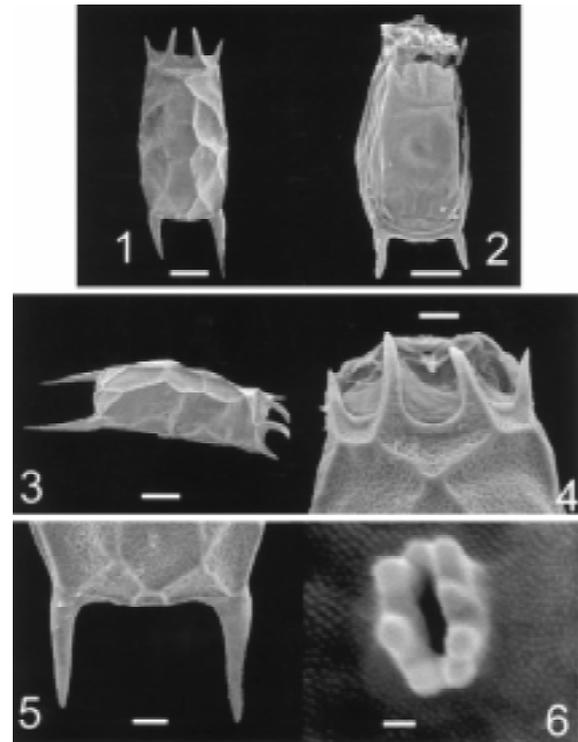
Differential diagnosis

Keratella morenoi n.sp. belongs to the *K. valga*-group, and is diagnosed by the following features:

1. Lorica shape rectangular; equally wide anteriorly and posteriorly.
2. Five median fields: the frontomedian area is an open short pentagon with the lateral ridges prolonged into the anteromedian spines; the anteromedian field is pentagonal, mesomedian and posteromedian fields are hexagonal. The posteromedian field is longer than it is wide. Distally, a small squarish posteromedian remnant is present.
3. Four pairs of lateral fields.
4. Three pairs of marginal fields.
5. Two stiff, unequal postero-lateral spines are present; Ahlstrom (1943) and Olivier (1965) depict *K. morenoi* specimens having a single, variably developed spine.

Description of the female

Lorica stiff, rectangular in dorsal view (Figure 1). Lateral margins of lorica nearly parallel, equally wide anteriorly and posteriorly ($\bar{\chi}$ = 65.30 μ m, SE = 1.22;



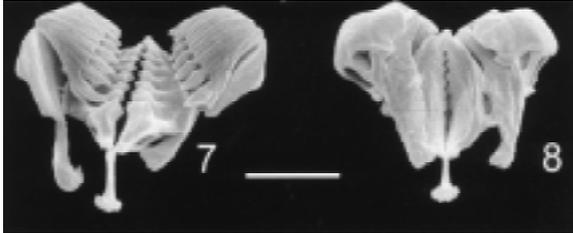
Figures 1–6. *Keratella morenoi* new species SEM micrographs (Laguna Los Juncos, Patagonia, Argentina). **Figure 1.** Lorica dorsal, scale: 30 μ m. **Figure 2.** Lorica ventral, scale: 30 μ m. **Figure 3.** Lorica lateral, scale: 30 μ m. **Figure 4.** Anterior margin of the lorica (dorsal view), scale: 10 μ m. **Figure 5.** Posterior margin of the lorica (dorsal view), scale: 10 μ m. **Figure 6.** Pore of the lateral antenna, scale: 0.5 μ m.

and $\bar{\chi}$ = 63.90 μ m, SE = 1.34 respectively). Maximum width is attained at midbody region ($\bar{\chi}$ = 73.53 μ m, SE = 1.16) (Table 1). Posterior margin straight, with one or two stiff posterior spines, the right caudal one is the most developed, similarly as in other *Keratella* of the *valga* group. A ridge clearly separates the posterior lateral and marginal facets from the caudal spine (Figure 5). The caudal spines are inserted postero-laterally, and separated from the facets by a ridge. The length of the caudal spines is positively correlated with lorica length (right and left: r = 0.65 and r = 0.54 respectively; P < 0.01, n = 42, in both cases).

Three pairs of well-developed but relatively short occipital spines of which the median pair is ventrally recurved and the longest (Figure 4). Dorsal lorica plate with 19 facets: 5 median, 4 lateral pairs and 3 marginal pairs (Figures 1 and 3). Ridges delimiting the facets are well-developed and facets ornamented by a reticulate pattern (Figures 1, 3, 4 and 5). Five median fields are clearly delimited (Figure 1). Fron-

Table 1. Morphometric parameters of *Keratella morenoi* n.sp.

	LT	LL	LW	RPS	LPS	AMS	AIS	ALS
Average	225.94	140.00	84.59	57.23	49.93	27.94	19.87	20.35
Minimum	181.48	129.05	76.62	28.23	20.16	20.16	16.32	12.09
Maximum	246.01	149.22	92.75	68.56	64.52	40.33	24.19	28.23
SE	2.12	0.72	0.59	1.49	1.53	0.51	0.41	0.52



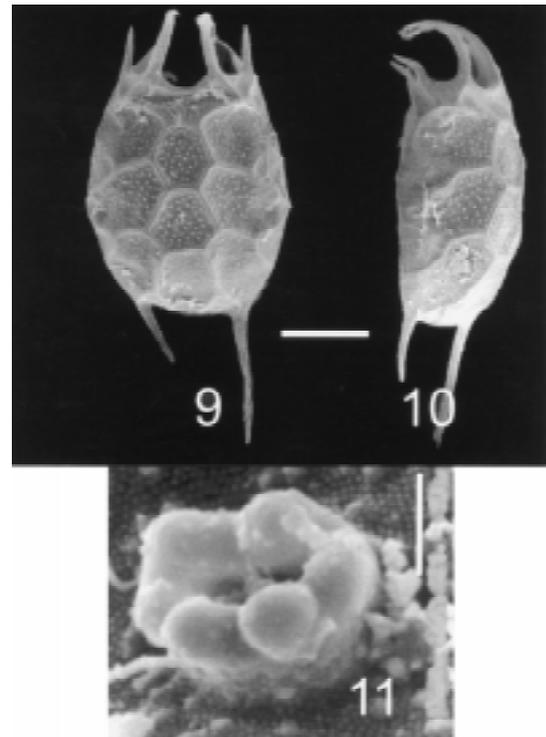
Figures 7–8. *Keratella morenoi* new species, SEM of trophi. **Figure 7.** Ventral view. **Figure 8.** Dorsal view. scale: 10 μm .

tomedian field is an open short pentagon, with lateral ridges prolonged into anteromedian spines (Figure 4). Anteromedian field pentagonal, mesomedian and posteromedian fields hexagonal (Figures 1 and 5), the latter is elongated in its anterior part. A small posteromedian remnant is present (Figure 5). Four pairs of large, polygonal lateral fields (Figures 1 and 3). Pores of the lateral antenna in lateromedian fields, bordered by eight papillae forming an oval ring (Figure 6). Posteromedian fields are the largest, extending from midbody to posterior end. Posteromarginal lateral fields are irregular quadrangles. Three pairs of triangular marginal fields of which the posterior pair is the largest and the anterior the smallest (Figures 1 and 3).

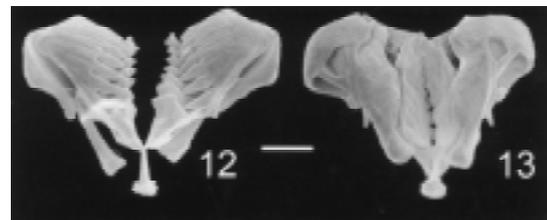
Ventral plate relatively delicate, narrower and shorter than the dorsal plate. Anterior margin bilobate. Ventral plate is almost smooth, with a weakly developed ornamentation in its anterior part (Figure 2).

Trophi malleate (Figures 7 and 8). Fulcrum short, basal plate developed. Rami triangular, medullae with large projections. No allulae. Both unci with eight teeth, first tooth of each uncus with fused remnants of additional, anterior teeth. Dorsal two pairs of teeth less developed than main teeth. Shafts of teeth connected. Manubria with rod-shaped shaft. Ventral lamella posteriorly terminated midlength along manubrium shaft, dorsal lamella more elongated, rounded.

The species can be confused with *K. tropica* (Apstein), a widespread species in the lakes of the world



Figures 9–11. *Keratella tropica* SEM micrographs (Kenya, Africa). **Figure 9.** Lorica dorsal, scale: 30 μm . **Figure 10.** Lorica lateral, scale: 30 μm . **Figure 11.** Pore of the lateral antenna, scale: 1 μm .



Figures 12–13. *Keratella tropica*, SEM of trophi. **Figure 12.** Ventral view. **Figure 13.** Dorsal view. Scale: 5 μm .

Table 2. Distinguishing features of *K. tropica* and *K. morenoi* n.sp.

	<i>K. tropica</i>	<i>K. morenoi</i>
Lorica shape	glossiform	rectangular: the same anterior and posterior width
Anterior spines	elongate	relatively short
Frontomedian field	open hexagon	open pentagon, smaller than in <i>K. tropica</i>
Anteromedian field	hexagon	pentagon
Posteromedian remnant	present: small plaque	present: conspicuous plaque
Posterior end of lorica	rounded	straight
Posterior spines	long delicate sometimes with recurved extremes	smaller than in <i>K. tropica</i> , strong and frequently straight

(Figures 9 and 10). Differences with the latter are the rectangular lorica shape and the configuration of the median fields, especially the pentagonal shape of the frontomedian area and anteromedian field. The postero-median remnant in *K. morenoi* is easily seen due to its relatively larger size when compared to that of *K. tropica* (Table 2). The lorica of *K. morenoi* is relatively longer and wider than that of specimens of *K. tropica* from other North Patagonian Plateau lakes (Figure 4 a, b and c). Posterior spines were observed to be straight, stronger and shorter in *K. morenoi* (Figure 5 and 14 d) comparing them to those of *K. tropica* (Figures 9 and 10). Pores of the lateral antenna in *K. tropica* are bordered by six papillae forming an oval ring (Figure 11). Trophi structure in *K. morenoi* (Figures 7 and 8) and *K. tropica* (Figures 12 and 13) revealed no additional diagnostic features, reflecting their close relationship. Both *K. tropica* and *K. morenoi* have eight teeth (six gradually decreasing large and two reduced) on both unci.

Type Locality: Laguna Los Juncos, Estación Perito Moreno, Río Negro Province, Argentina. **Collector:** Diéguez, M.C.

Etymology

The species is named after Perito Francisco Moreno, an early explorer of Patagonia and devoted naturalist. His work for the Argentinian government was rewarded with vast stretches of land in the region, which he donated for the creation of Nahuel Huapi National Park.

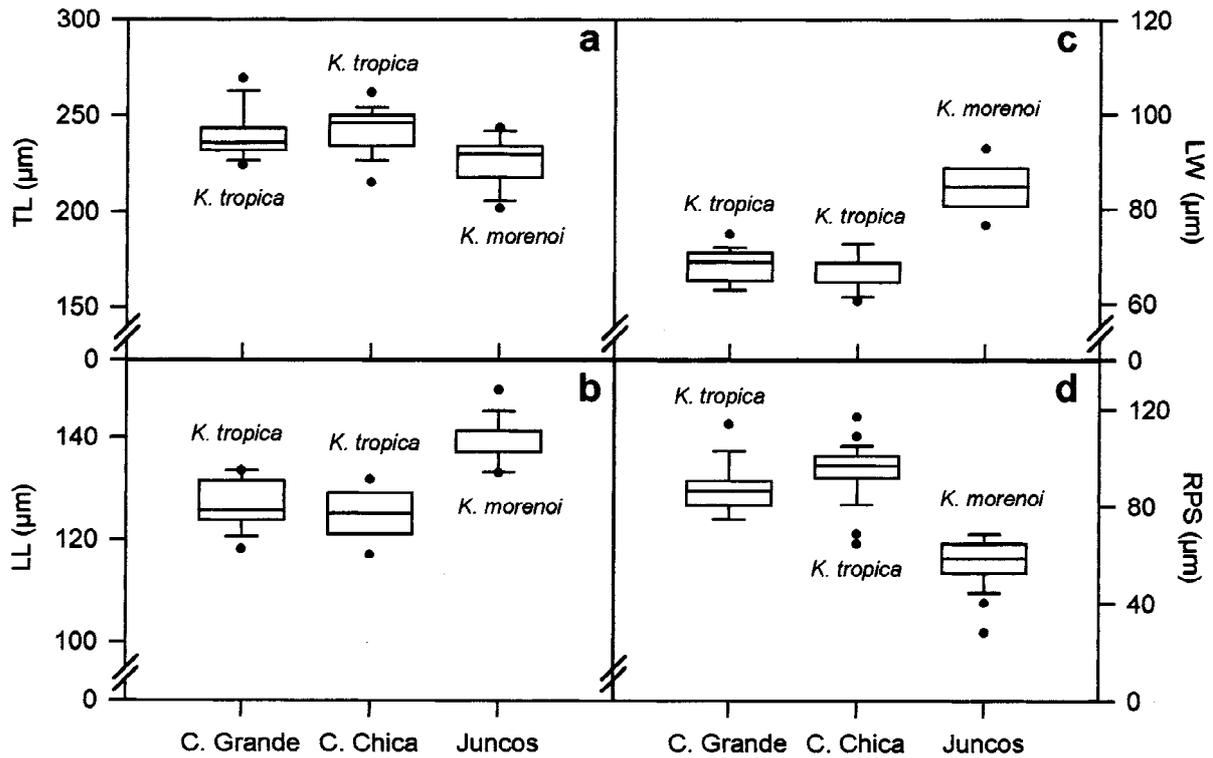
Ecological observations

In the pool the species coexists with *Daphnia pulex*, *Parabroteas sarsi* and Boeckellids. Other rotifer species in the pond are *Filinia longiseta* and *Brachionus urceolaris*, which are less abundant than *Keratella*. We observed a wide range of morphological variability in this species. Specimens from the field are well armoured with the two caudal spines developed. When cultured in the laboratory the individuals develop populations in which the posterior spines are reduced, similar in shape to the populations reported by Olivier (1965).

South America includes two large biogeographic subregions, the Guiana-Brazilian (tropical and subtropical) and the Andean Patagonian (temperate-cold) (Rapoport, 1968). Although many rotifer species are shared by both subregions, each of them has particular characteristics (José de Paggi, 1990). The Brachionidae exhibit an interesting distributional pattern as few *Brachionus* and *Keratella* are endemic to tropical South America (Dumont, 1983). However, a number of cold-water South American endemisms, especially in *Notholca* and also in some *Keratella* has been found (Dumont, 1983). The record of *Keratella morenoi* appears as another cold-water endemic *Keratella* of South America.

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Figures 14. Box-Whisker plots of morphometric parameters of *K. tropica* and *K. morenoi* of the Patagonian Plateau lakes Carrilauquen Grande, Carrilauquen Chica and Los Juncos. a: Total lorica length; b: Lorica length; c: Lorica width; d: Right posterior spine.

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