

On the taxonomy and distribution of the Rotifera *Keratella mexicana* Kutikova & Silva-Briano, 1995

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Keywords : *Keratella mexicana*, Rotifera, distribution, taxonomy.

Keratella mexicana is a recently described species, known from a few localities only. Here we present new information on the distribution and morphology of the species based on a survey of 104 water bodies in Central Mexico. The ultra structural morphology of the trophi and lorica of *K. mexicana* is studied using scanning electron microscopy (SEM).

Note sur la taxinomie et la distribution du rotifère *Keratella mexicana* Kutikova & Silva-Briano, 1995

Mots-clés : *Keratella mexicana*, Rotifera, distribution, taxinomie.

Keratella mexicana est une espèce, décrite récemment et seulement connue de quelques localités. Ici on présente des nouvelles informations sur la distribution et la morphologie de l'espèce, sur la base de prélèvements effectués dans 104 pièces d'eau du Mexique central. L'ultrastructure des trophi et de la lorica de *K. mexicana* est examinée par microscopie à balayage.

1. Introduction

A few years ago, Kutikova & Silva-Briano (1995) described *K. mexicana* from Aguascalientes State, Mexico. In its original description, the species was recorded from two localities only. This species is a member of the *K. quadrata* Müller group, with as closest relative *K. lenzi* Hauer. The aim of this note is to provide a more detailed morphological study of the animal, in order to obtain a better understanding of the position of the species in the genus *Keratella*, and of its distribution.

2. Study Area

Aguascalientes state is geographically located below the Tropic of Cancer (Dodson & Silva-Briano 1996),

but its climate is rather temperate (SEP, 1982) due to its relatively high altitude. The region is transitional between the neotropic and nearctic areas (Rico-Martinez & Silva-Briano 1992). It has three physiographic provinces and three orographic regions :

- Provinces (INEGI 1991) (Fig. 1) :

1) Sierra Madre Occidental with chains of mountains, large volcanic masses. Altitude between 1500 and 1800 m asl, reaching up to 3000 m asl;

2) Mesa del Centro with extensive flat lands and some dispersed sierras, of volcanic origin;

3) Eje Neovolcanico with large masses of Cenozoic volcanic rocks.

- Orography and climatology (SPP, 1981) (Fig. 1) :

1) 'Sierra Fría' (3000 m) : mean annual temperature between 9-10°C. Cool during winter with temperatures below 0°C, with occasional snow.

2) 'Sierra del Laurél' (3000 m) : mean annual temperature 20.1°C. A small subtropical region.

3) 'Zona del Llano' (1500-1800 m) : mean annual temperature 18.8°C. An arid region, with a few mm of precipitation during the year.

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3. Material and methods

During seven years (1986-1993), samples were collected across the state of Aguascalientes. 104 localities were sampled on several occasions, using a Wisconsin plankton net of 54 mm mesh. Samples are preserved in 4 % formaldehyde. Specimens were mounted on permanent glass slides in glycerine, using Depex gurr for sealing. SEM photographs were made using a JEOL JSM 840 Scanning Electron Microscope.

4. Results

4.1. Distribution

Of the 104 localities sampled in Aguascalientes state for this study, only 10 yielded specimens of *K. mexicana* (Fig. 1). These are as follows :

- 1) In Rancho nuevo town. San Fco de los Romo. (22°05'N; 102°09'W), 16 May 1993.
- 2) Mesa El Roble, Calvillo. (21°45'N; 102°45'W), 10 Dec 1991.
- 3) North, from reservoir Mesillas, Cosío. (22°19'N; 102°10'W), 19 Sep 1992.
- 4) Near El Refugio pond, Asientos. (22°11'N; 102°01'W), 1 Sep 1990.
- 5) Near Hw. to Airport, Ags. (21°43'N; 102°19'W), 17 Jul 1993.
- 6) Near P. Elías Calles town, Asientos. (22°12'N; 102°03'W), 1 May 1991, 7 Nov 1991.
- 7) La Colorada. El Llano. (21°59'N; 101°59'W), 18 Jan 1989.
- 8) Abelardo Rodríguez, Jesús María. (21°55'N; 102°26'W), 9 Apr 1990.

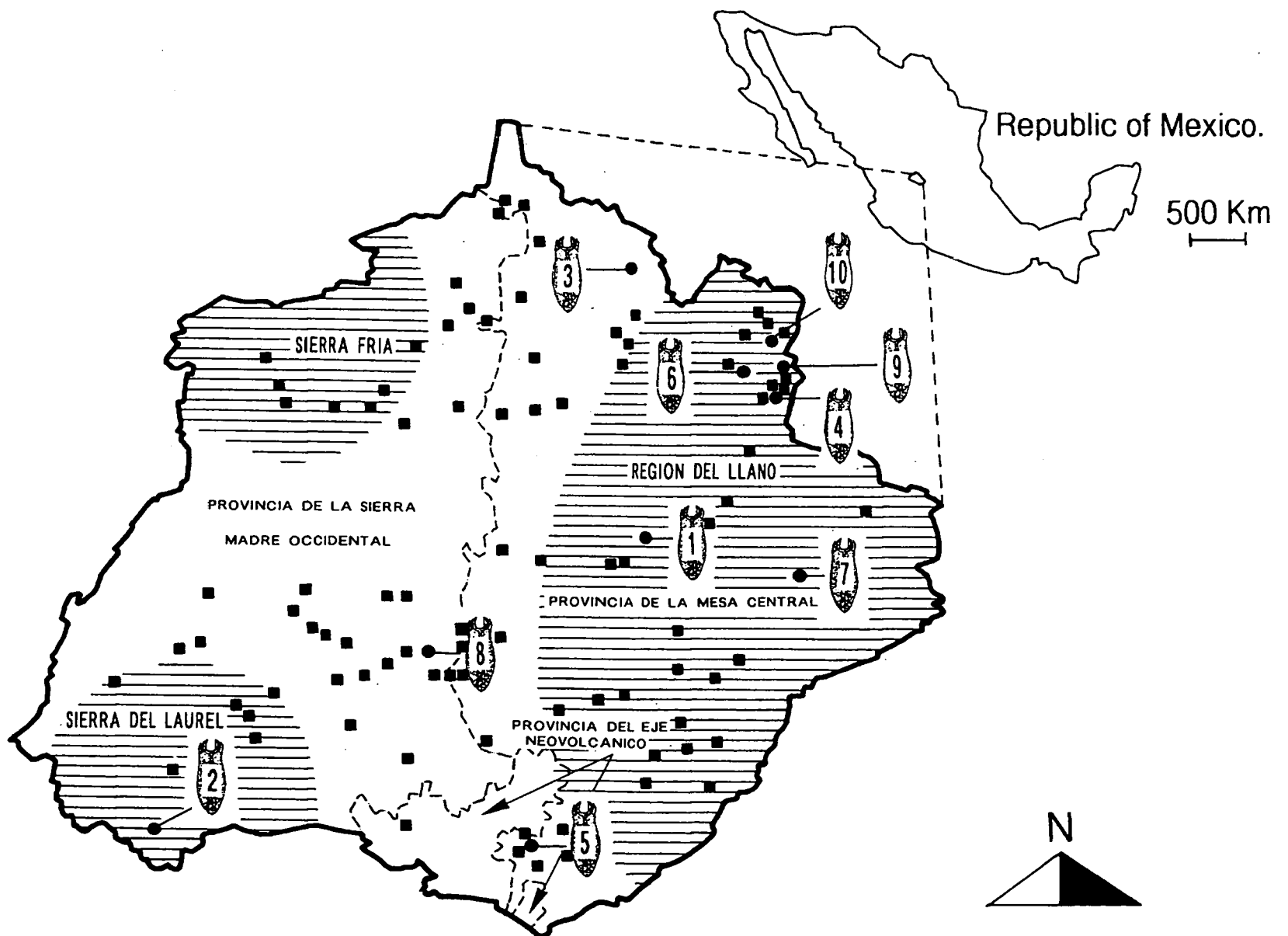


Fig. 1. Provinces of Aguascalientes State. Orography and distribution of *Keratella mexicana*. The black squares indicate localities without *K. mexicana*.

Fig. 1. Provinces de l'état d'Aguascalientes. Orographie et distribution de *Keratella mexicana*. Les carrés noirs indiquent les localités dépourvues de *K. mexicana*.

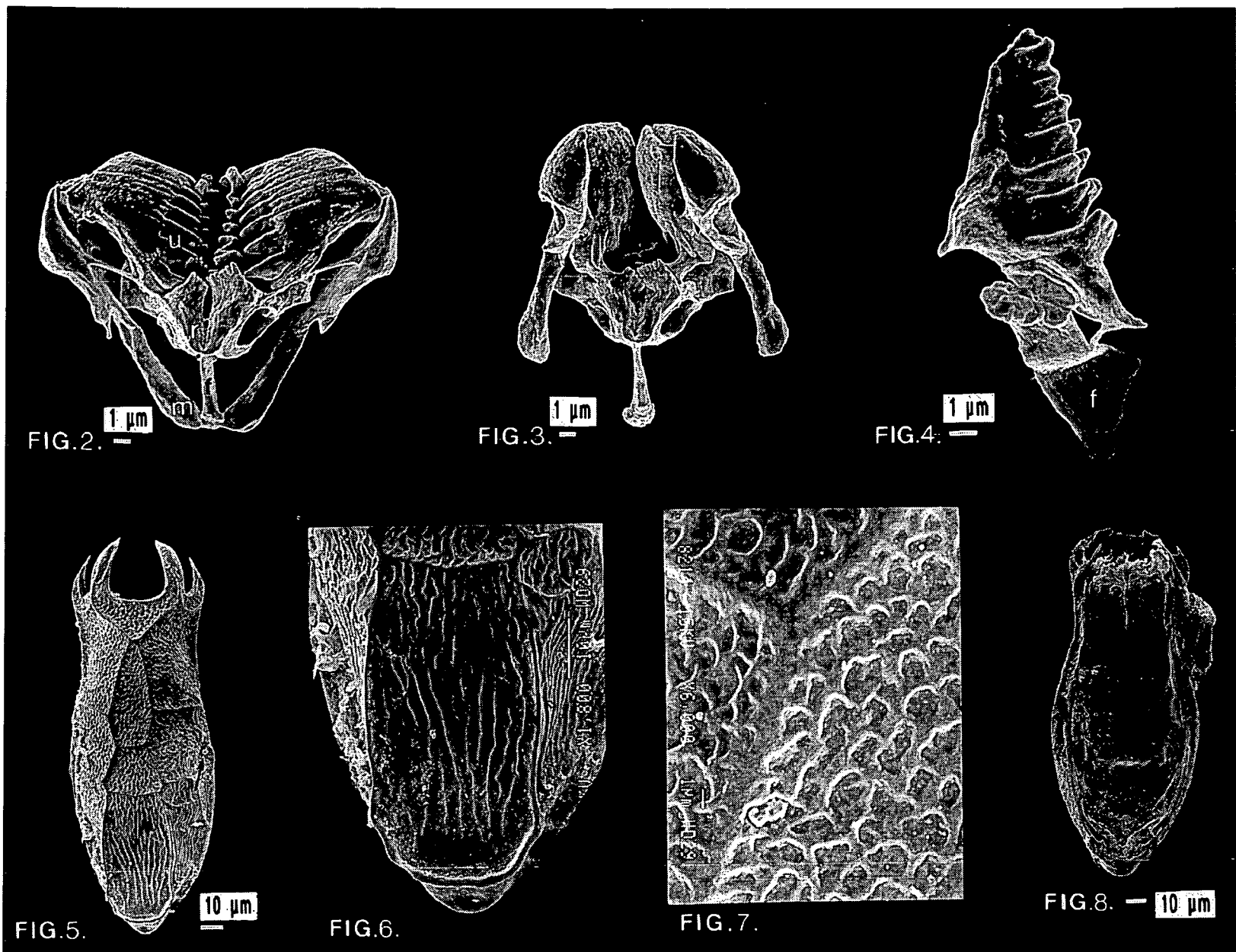


Fig. 2-8. *Keratella mexicana*, SEM photographs. 2-4 : trophi. 2 : frontal view, 3 : dorsal view, 4 : ramus and fulcrum, lateral view ; 5-12 : lorica. 5 : habitus, dorsal (arrow indicates position of lateral antenna), 6 : postero-median facet, 7 : detail of alveolar network ; 8 : habitus, ventral (f = fulcrum, m = manubrium, r = ramus, u = uncus).

Fig. 2-8. *Keratella mexicana*, photo SEM. 2-4 : trophi. 2 : vue frontale, 3 : vue dorsale, 4 : ramus et fulcrum, vue latérale ; 5-12 = lorica. 5 : habitus, dorsal (la flèche indique la position de l'antenne latérale), 6 : facette postéro-médiane, 7 : détail du réseau alvéolaire ; 8 : habitus, ventral (f = fulcrum, m = manubrium, r = ramus, u = uncus).

9) Near Ciénega Grande town, Asientos. (22°11'N; 102°01'W), 1 Sep 1990.

10) Near railroad. San Gil. Asientos. (22°12'N; 102°01'W), 1 May 1991.

The majority of these localities is in the north east part of the State, although isolated populations of *K. mexicana* were also found in the central and southern portions of the State.

4.2. Morphology of *Keratella mexicana*

The trophi of *Keratella mexicana* is malleate (Figs 2, 4). The unci consist of two plates of seven connected

teeth. The tips of the unci teeth are situated between seven median projections on the rami on both sides. These projections appear to be made up of fused elements, the number of which is variable (compare Figs 2 and 4). The basal plate of the fulcrum is relatively weakly developed (Fig. 3).

The lorica of *K. mexicana* (Fig. 5) has four median facets. The median frontal area, the elongated antero-median and the meso-median facets are ornamented by an alveolar network (Fig. 7). The postero-median, tongue-shaped facet has longitudinal ridges (Fig. 6).

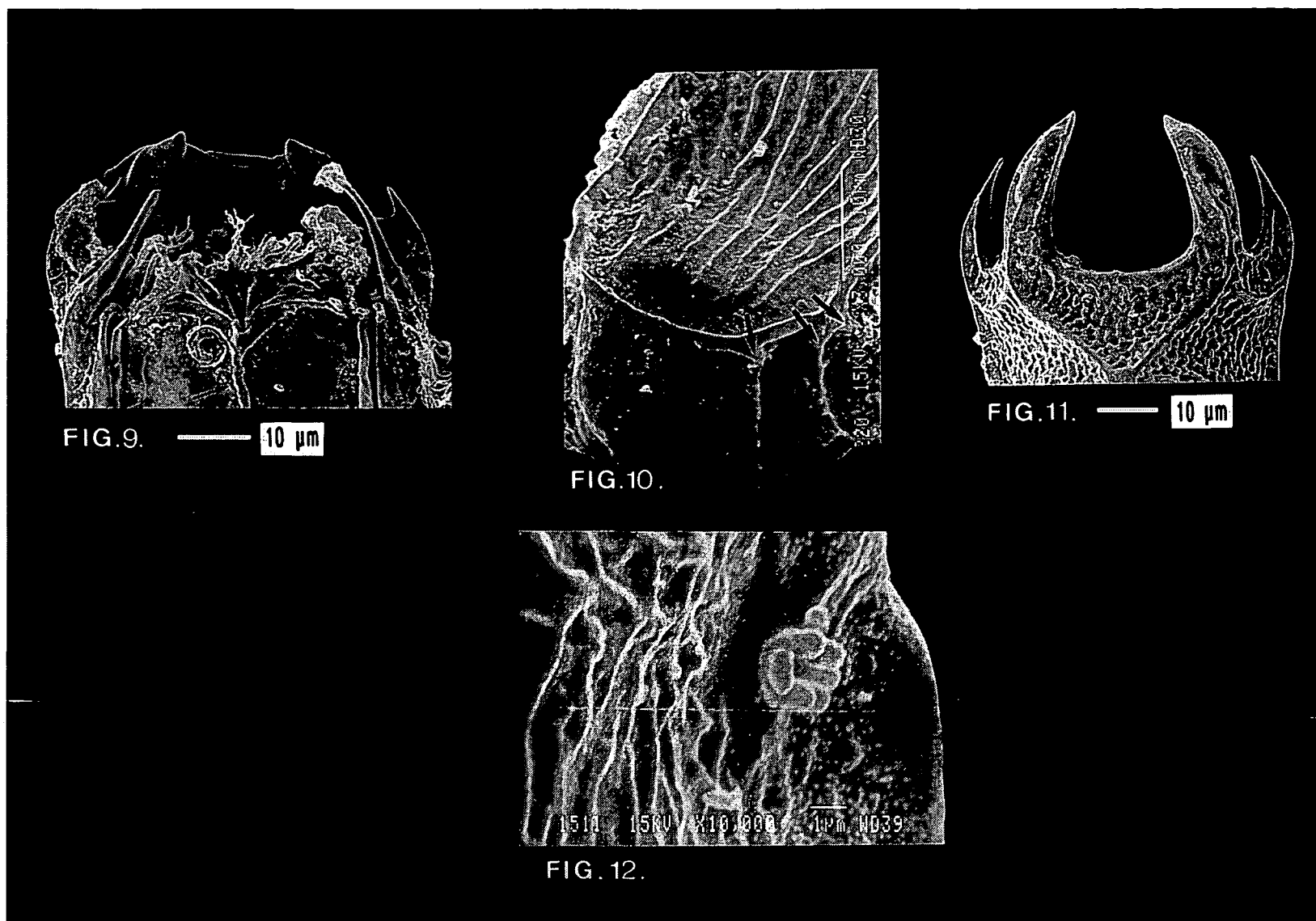


Fig. 9-12. *Keratella mexicana*, SEM photographs. 9 : head aperture, ventral ; 10 : latero-posterior view of lorica (arrows indicate ridges separating postero-cardinal facets) ; 11 : anterior spines, dorsal ; 12 : lateral antenna.

Fig. 9-12. *Keratella mexicana*, photos SEM. 9 : ouverture de la tête, ventrale ; 10 : vue latéro-postérieure de la lorica (les flèches indiquent les arêtes séparant les facettes postéro-cardinales) ; 11 : épines antérieures, vue dorsale ; 12 : antenne latérale.

Lateral antennas (Figs 5 & 12) are situated dorsally and medially in the meso-lateral facet, near the widest part of the lorica. Postero-carinal facets are present, there is one median and two pairs of lateral facets (Fig. 10). The anterior margin of the dorsal plate is armed with three pairs of spines, of which the median are the longest. The median spines are relatively stout. They are widely separated at their basis, but converge slightly towards the tips (Figs 5 & 11). The intermedian and lateral spines are relatively short and thin. (Fig. 9). In ventral view, the lorica of *K. mexicana* is smooth (Fig. 8), and bordered anteriorly by a cord-like bulge (Fig. 9).

5. Discussion

5.1 Comparison of the morphology of *Keratella mexicana* with other species

As mentioned by Kutikova & Silva-Briano (1995), *K. mexicana* belongs to the *Keratella quadrata* group. Its trophi is similar in shape to the trophi of *K. quadrata* and *K. sinensis* (see Segers et al. 1993; Segers & Wang 1997). Its number of unci teeth is similar to *K. quadrata* (7-7 unci teeth), but not to *K. sinensis* (6-6 unci teeth). The basal plate of the fulcrum is more strongly developed in *K. quadrata* and *K. sinensis*.

By its lorica shape, the animal can only be confused with the closely related *K. lenzi*, which also has four

median facets. The second and third are hexagonal, and the postero-median facet is elongated, but here its surface is smooth (Olivier 1965; Koste & Shiel 1987). Postero-carinal facets are distinctly present in both *K. mexicana* and *K. lenzi*, and they appear similar in the two taxa. The median spines of *K. lenzi* are relatively longer than the intermedian and lateral ones, when compared to *K. mexicana*. Reports on the anterior margin of the ventral plate of *K. lenzi* are not sufficiently detailed to enable comparison (see Koste & Shiel 1987).

5.2. Distribution

Keratella mexicana was described from a pond in El Llano, Aguascalientes (La Colorada pond), and was also found in material collected by C.H. Fernando in a reservoir in Fortaleza, Brazil (Kutikova & Silva-Briano 1995). In the present study, *Keratella mexicana* was found in the semiarid region (Zona del Llano, plain zone) of Aguascalientes State, and occurred in shallow, warm waters. Also the Brazilian record is from a semiarid region with warm water bodies, but south of the Equator. Dumont (1983) mentioned that many *Keratella* species show restricted ranges, and *K. mexicana* appears to be an example of such a species. As far as the available data allow us to conclude, *K. mexicana* is a species typical of the semiarid zones on both sides of the Equator in the Americas. It could be expected to occur in the relatively arid coastal areas of the north of South America, and in the arid islands of the Caribbean. It has not been recorded from any of these regions yet, although there have been important studies on the Rotifera of these regions (e.g. Collado et al. 1984). The close morphological similarity between *K. mexicana* and *K. lenzi*, may have caused one to be mistaken for the other and may have led to under reporting of *K. mexicana*

Acknowledgments

Mrs. S. Wellekens and Dr. H. Segers are acknowledged for help using the SEM, Mr. M. Bruyneel did the artwork. Prof. H. Dumont is thanked for his comments on an early draft of the manuscript. We are grateful to José María Conde Porcuna, Francisco José Flores Tena and Lynda Beladjal for their assistance.

This contribution was presented at the VIIIth International Rotifer Symposium, 23-27 June 1997, Colledgeville, Mn USA. The Fideicomiso Profesor Enrique Olivares financially supported attendance to the symposium by the senior author. The first author is a Conacyt scholar.

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