

PALEONTOLOGIA I EVOLUCIÓ

I IBERIAN SYMPOSIUM ON GEOMETRIC MORPHOMETRICS

EDITORES

SOLEDAD DE ESTEBAN TRIVIGNO

ISAAC CASANOVAS VILAR

CARLOS MARTÍNEZ PÉREZ

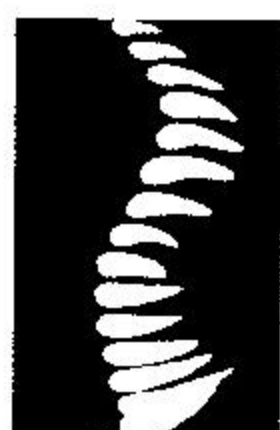
SERGIO ALMÉCIJA

JUDIT MARIGÓ



I ISGM

Sabadell 2009, memòria especial núm. 3



ICP^R

Institut Català
de Paleontologia

Carapace shape of some trichodactylidae crabs: Analysis by geometric-morphometric tools as a possible way of including females in taxonomic differentiation

Federico GIRI^{1,2}, Verónica WILLINER^{1,2} & Pablo COLLINS^{1,3}

Freshwater decapods of South America are grouped into seven families (MAGALHÃES & TÜRKAY, 1996, MORRONE & LOPRETTO, 2001). One of them, the family Trichodactylidae, characterizes the aquatic environments of the plain, being the Paraná river an important system in the continent. The taxonomic studies of this group were based on carapace ornamentations and male gonopod morphology but these systematic definitions, mainly the latter, only apply to male specimens. In studying the biodiversity of the group, females are not considered, and it is not possible to make specific identifications when only females are captured. The Trichodactylidae family have characteristic ornamentations of the carapace that are useful as distinctive points for fixation, corresponding to type 1 landmarks (BOOKSTEIN, 1991). The objective of this study was to explore an alternative way of taxonomic identification of the members of the Trichodactylidae

family, including females. The study focused on the application of geometric morphometric analysis to the carapace of representative species from the Middle Paraná River. Digital pictures of all specimens were taken using a Nikon EOS400 camera, placed at a fixed distance of 35 cm from the specimen. Twelve landmarks were recorded on the dorsal view of the cephalothorax through the tpsDig program (ROHLF, 2004), and two of them were analyzed as semilandmarks. Configurations were superimposed through the Generalized Procrustes Analysis (ROHLF & SLICE, 1999) in the tpsRelw program (ROHLF, 2005). Shape variation between samples was first explored through Relative Warp Analysis (RW). There were no significant differences between genera in relation to RW 1, 2 and 3 ($p > 0.05$). The MANCOVA revealed significant differences ($P < 0.05$) among species. This occurred mainly in the position of the landmark, on the last spine of the carapace,

1. Instituto Nacional de Limnología (INALI, CONICET-UNL). Ciudad Universitaria, Santa Fe, Santa Fe, Argentina, CP 3000. vwilliner@inali.unl.edu.ar, fgiri@inali.unl.edu.ar and pcollins@arnet.com.ar

2. Facultad de Humanidades y Ciencias, Universidad Nacional del Litoral. Ciudad Universitaria, Santa Fe, Santa Fe, Argentina, CP 3000.

3. Escuela de Sanidad, Facultad de Bioquímica y Ciencias Biológicas, Universidad Nacional del Litoral. Ciudad Universitaria, Santa Fe, Santa Fe, Argentina, CP 3000.

causing variations in the RW1. Changes consisted in the migration of the last spine from an anterior to a posterior position. The second RW showed variations between balloon or angular shapes of the carapace. Furthermore, differences between males and females were not significant in all species studied. The methodology of geometric morphometric analysis is useful in the differentiation of species of endemic freshwater crabs, members of the Trichodactylidae family. Moreover, when only female specimens are collected in sampling programs, the carapace shape and specially the position of the posterior spine can be used as systematic indicators.

REFERENCES

- BOOKSTEIN, F. L. (1991). *Morphometric tools for landmark data*. Cambridge University Press, Cambridge, UK. 435 pp.
- MAGALHÃES, C. & TÜRKAY, M. (1996). Taxonomy of the neotropical freshwater crab family Trichodactylidae I. The generic system with description of some new genera. *Senckenbergiana Biologica*, 75: 63-95.
- MORRONE, J.J. & LOPRETTO, E.C. (2001). Trichodactylid biogeographic patterns (Crustacea: Decapoda) and the Neotropical region. *Neotropica*, 47: 49-55.
- ROHLF, F.J. (2005). *TPSRelw, Version 1.42* Copyright © 2005, Ecology & Evolution, SUNY at Stony Brook. (<http://life.bio.sunysb.edu/morph/>).
- ROHLF, F.J. (2004). *TPSDig, version 1.40*. Department of Ecology and Evolution, State University New York. Stony Brook (<http://life.bio.sunysb.edu/morph/>).
- ROHLF, F.J. & SLICE, D.E. (1999). Extensions of the procrustes method for the optimal superimposition of landmarks. *Systematic Zoology*, 39: 40-59.