

## Lengths of Cypridoidean (Ostracoda, Crustacea) Spermatozoa

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While cypridoidean ostracods are famed for their giant spermatozoa, very little data on ostracod spermatozoa lengths exist. Of the thousands of species in this group, spermatozoa data is only available for about a dozen identified species. The longest spermatozoa recorded for ostracods are those of *Cypris sydneya* KING, 1855, measuring in at a staggering 10,000  $\mu\text{m}$ , while lengths of 4000, 4740, and 4800  $\mu\text{m}$  have been recorded for *Bradleystrandesia dentifera* (DOBBIN, 1941), *Chlamydotheca ?flexilis*, and *Mytilocypris praenuncia* (CHAPMAN, 1966) respectively (BAUER 1940; GUPTA 1969; WINGSTRAND 1988; MATZKE-KARASZ 2005). The shortest cypridoidean spermatozoa on record are those of the candonid *Pseudocandona marchica* at 440  $\mu\text{m}$  (MATZKE-KARASZ 2005), still a remarkable length considering that ostracod spermatozoa are aflagellate, and considerably longer than the spermatozoa of many other animal groups. However, with such a small data set, it is unknown if recorded lengths are representative of the superfamily, or are anomalously long examples that have piqued researchers' interest.

We measured the lengths of spermatozoa of 21 Cypridoidea species in the taxa Candoninae, Paracypridinae, Ilyocypridinae, Cyprididae and Notodromatidae to expand the data available.

The shortest spermatozoa recorded for a species in our study ranged from 236 to 268  $\mu\text{m}$  for the Candoninae *Fabaformiscandona velifera* SMITH & JANZ, 2008, and the longest ranged from 3117 to 3285  $\mu\text{m}$  for the Cyprididae *Sclerocypris longisetosa* MARTENS, 1988. The subfamily Candoninae have the shortest spermatozoa, ranging from 268 to 737  $\mu\text{m}$  (maximum lengths), while the range for the Family Cyprididae is the widest, at 1000 to 10,000  $\mu\text{m}$  (maximum lengths). In relation to body size, the Candoninae still have the shortest spermatozoa, but many other non-cyprididae species have relatively longer spermatozoa than some Cyprididae. While species with spermatozoa as long or longer than the males' carapace length are common (40% of species we now have data for), species with spermatozoa more than twice male carapace length are few (6%). The longest spermatozoa in relative terms and second longest in absolute terms found in our study are that of the Notodromatidae species *Oncocypris voeltzkowi* MÜLLER, 1898, with spermatozoa 4.3 times the length of the males' carapace (2207 to 2334  $\mu\text{m}$  spermatozoa length), the second largest ratio on record for the superfamily.

This indicates that exceptionally long spermatozoa (i.e., over 2000 $\mu$ m in length) are not restricted to the family Cyprididae. Within the superfamily as a whole, spermatozoa lengths show no correlations with body size, length of Zenker organs, or number of Zenker rosettes.

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## References

- BAUER, H. (1940): Über die Chromosomen der bisexuellen und der parthenogenetischen Rasse des Ostracoden *Heterocypris incongruens* RAMD. – *Chromosoma*, 1: 621-637, Berlin-Heidelberg.
- GUPTA, B. (1968): Aspects of the motility in the non-flagellate spermatozoa of freshwater Ostracods. – In: MILLER, P.L. (ed.): Aspects of motility. – Symposia of the Society of Experimental Biology, 22: 117-129, Cambridge.
- MATZKE-KARASZ, R. (2005): Giant spermatozoon coiled in small egg: fertilization mechanisms and their implications for evolutionary studies on Ostracoda (Crustacea). – *Journal of Experimental Zoology (Mol Dev Evol)*, 304B: 129-149, Hoboken.
- WINGSTRAND, K.G. (1988): Comparative spermatology of the Crustacean Entomostraca. 2. Subclass Ostracoda. – *Kongelige Danske Videnskabernes Selskab, Biologiske Skrifter*, 32: 1-149, København.

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