

## **Does size matter? Variability of *Cyprideis* JONES, 1857 within a transgressive-regressive sequence (Lake Pannon: Early Late Miocene)**

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Lake sediments play a key role in understanding ecological and evolutionary processes. The ~30m thick succession in the clay pit Mataschen (c. 40 km SE Graz/Styria) represents a transgressive-regressive sequence of Early Late Miocene Lake Pannon. The base of the profile is marked by *in situ* preserved tree trunks. Up-section, clayey to silty sediments were deposited indicating a rising lake level. Above the maximum flooding surface several sandy intercalations point to an increased influence of a fluvial system. The section is topped by cross-bedded sandy layers. To track variations of faunal associations, as well as possible adaptations of various species to the changing environment, an extensive sampling programme was organised.

At the lowermost part of the profile, five 50 cm long cores were drilled with a percussion drill and sliced into 5 mm thick samples. All 447 samples (~20 cm<sup>3</sup> of sediment per sample) were washed, sieved and residues >250 μm picked for ostracods. The ostracod fauna is dominated by *Cyprideis* (49% of all valves), *Loxoconcha* (27%), *Hemicytheria* (4%) and candonids (5%) like cf. *Lineocypris*, cf. *Fabaeformiscandona* and cf. *Typhlocypris*. Furthermore, rare abundances of *Amplocypris*, *Xestoleberis* and leptocytherids are recognised.

*Cyprideis* is well known for its adaptability to a broad range of salinity. Fluctuations in Lake Pannon's salinity and therefore variations in shape lead to several tens of species described in Lake Pannon. In Mataschen three species of can be distinguished: *C. ex gr. pannonica*, *C. mataschensis* and *C. kapfensteinensis*. Whereas *C. ex gr. pannonica* is widespread within Lake Pannon, *C. mataschensis* and *C. kapfensteinensis* are so far only reported from their type locality Mataschen. Noticeable is the restricted occurrence of *C. kapfensteinensis* within the samples representing ecologically better conditions for *Cyprideis*, with relative high abundances of up to 180 valves per sample. Therefore, the appearance of this species can be considered as an ecological marker.

Due to the high resolution of our samples we tried to correlate morphological adaptations of *Cyprideis* to ecological changes. In total, length and height of 1347 adult valves of *Cyprideis* were measured. Additionally, 1084 outlines of those valves were obtained using MORPHOMATICA 1.6. *C. ex gr. pannonica* is well separated through

its smaller size, more elongated valves and smooth ornamentation. In contrast, *C. mataschensis* and *C. kapfensteinensis* show the same variability in their outlines.

For adult valves of those two species, hinge morphology was identified as the most important feature for differentiation. Based on this, valve length for *C. mataschensis* ranges from 847  $\mu\text{m}$  to 987  $\mu\text{m}$ , whereas *C. kapfensteinensis* varies between 965  $\mu\text{m}$  and 1114  $\mu\text{m}$ . Both species show normal distribution regarding valve length with only a slight overlap of 20  $\mu\text{m}$  (Fig. 1). Assuming, that the general growth rate for juvenile

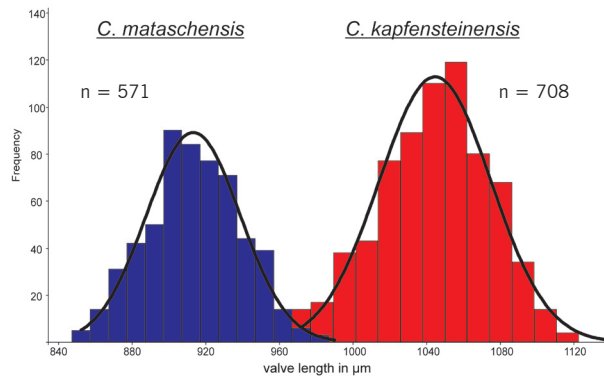


Fig. 1: Histogram of valve lengths for *C. mataschensis* (blue) and *C. kapfensteinensis* (red).

*Cyprideis torosa* is more or less equivalent in *C. kapfensteinensis* and *C. mataschensis*, valve length represents also a good method to distinguish even juvenile valves.

The combination of hinge structure and total valve length gives us an easy-to-use tool to identify the two species. Taking into account, that *C. kapfensteinensis* might represent an opportunistic species, while *C. mataschensis* seems to be adapted to a broader range of ecological niches, this approach might lead to an easier interpretation of ecological changes within Lake Pannon, or similar *Cyprideis*-dominated systems. Further research will focus on additional *Cyprideis* species of Lake Pannon and “Lake” Pebas (Amazonia) to look for similar or different adaptation patterns within *Cyprideis* species flocks.

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