

## Salinity dependant morphological variation in *Cyprideis torosa*

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*Cyprideis torosa* (JONES, 1850) is one of the most widespread brackish water ostracod species in the Northern hemisphere. It occurs in high frequencies in brackish marginal seas as the Baltic Sea, in lagoons, estuaries, as well as brackish athalassic waters. Often, ostracod associations with *C. torosa* are dominated by this species or even monospecific. Such low diversity associations are hard to interpret using ecological tolerance data of species alone. Intraspecific morphological variations may give a key to the reconstruction of low diversity brackish water palaeoenvironments.

We give an overview on salinity dependant morphological variation in *C. torosa* based on literature data and our own observations covering several sites along the coasts of the North Sea, Baltic Sea, Mediterranean Sea, and Aral Sea, as well as smaller saline inland waters in Central Germany and Saudi Arabia. These observations show (1) a salinity dependant size variation with a maximum around the switching point between hyper-osmotic and hypo-osmotic regulation at 8–9psu sensu ALADIN (1993), (2) noded valves in the oligohaline range (<7–8psu) of thalassic habitats, dominating in beta-oligohaline waters (<2psu), (3) a correlation of the proportion of round sieve pores to salinity of ambient water according to ROSENFELD & VESPER (1975), allowing a reconstruction for marginal marine habitats following the formula:

$$S = e^{-0.06 RS + 4.7}$$

(S = salinity [psu], RS = proportion of round sieve pores [%];  $R^2 = 0.95$ ),

and (4) no salinity dependant shape variation of valves. There seem to be the same tendencies to morphological changes in athalassic waters but the thresholds are different.

A culture experiment complimented the field observations. We took *C. torosa* from a site on the southern Baltic Sea coast and kept it for 550 days in the lab covering a salinity range of between 0.5 and 13psu in several series of microcosms. The specimens hatched and developed in our microcosms and were studied for size variation, nodding, sieve pores, and shape variation. The size variation along the salinity gradient shows the same pattern as in the field but are clearly dwarfed specimens. In contrast to the staircase pattern of field data a clear linear correlation of noded valve proportion to salinity is visible in our cultures:

$S = -0.24 NV + 12$   
(NV = proportion of noded valves [%];  $R^2 = 0.77$ ) for sea water diluted by fresh-water, and

$S = e^{-0.04 NV + 2.2}$   
( $R^2 = 0.72$ ) for sea water diluted by distilled water.

We explain the difference between field and lab data by highly variable salinity in the field allowing waiting of individuals for better salinity conditions during molting. Probably because of the same reason, the sieve pore proportion correlates linearly and not logarithmically to salinity in cultures:

$S = -0.51 RS + 35$  for  $S < 7.5$  ( $R^2 = 0.78$ )  
 $S = -0.07 RS + 12$  for  $S > 7.5$  ( $R^2 = 0.85$ )

The limit between both trend lines lies at 7.5 psu pointing to the osmoregulation threshold as identified by ALADIN (1993). A salinity dependant shape variability of valves is not recognizable.

Different correlations in water with different ionic composition but same conductivity values point to a prominent water chemistry influence beside total dissolved salt concentration. Our next research step is to study cultures and field samples from athalassic waters with different solute compositions.

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## References

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