OC11 - Genetic cleavage in the fairy shrimp Tanymaxtix stagnalis from southwestern Portuguese temporary ponds

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Temporary ponds are wetland habitats exposed to extreme environmental conditions that host vulnerable biotic assemblages. Given the distinctiveness of these environments and their associated communities, they are listed as a conservation priority by the Annex I of the EU Habitats Directive. Under the LIFE Charcos project (LIFE12 NAT / PT / 000997) several pond restoration experiments have been carried out in southwest Portugal. Among flagship invertebrates inhabiting temporary ponds from this geographic area are small crustaceans belonging to the order Anostraca (Crustacea: Branchiopoda), commonly known as fairy shrimps. Their cysts remain in the soil and may endure several years of drought. The area of occurrence has been subjected to intense anthropogenic disturbance that is causing habitat fragmentation and, ultimately, destruction of locally adapted gene pools. Here we focused on one of the most common Anostraca species in Portuguese temporary ponds, *Tanymastix stagnalis*. This species is considered a good ecological indicator because it is adapted to very specific environmental conditions.

Using a fragment of the mitochondrial cytochrome oxidase subunit I (COI) gene we assessed the genetic variability in 109 individuals belonging to populations from five northern and six southern ponds, to analyse their level of connectivity. Also, we used combinations of samples of different years (2008, 2014, 2015 and 2016) from ponds of the northern region to investigate temporal variation.

Preliminary results indicated significant genetic differentiation ($\phi ST=0.98$, $p<0.002$) and absence of shared haplotypes between northern and southern ponds, indicating no connectivity between the two regions. Therefore, soil transferences between northern and southern ponds are not advised. Southern ponds present much higher levels of genetic diversity than their northern counterparts. While the most common haplotype of the northern region is shared among all ponds, only three ponds (out of six) share the most frequent haplotype in the south suggesting lower levels of connectivity. Within-pond samples from different years showed no significant genetic differences suggesting that active populations represent reliable samples of the gene pool, and recruitment results from cysts generated on each pond. Restoration experiments with soil replacement among ponds should be avoided. In those cases where restoration success is absolutely dependent on this procedure, it should predominantly include soil transferences containing the same metapopulation of *T. stagnalis* and between ponds presenting higher genetic variability (source populations) to the remaining ones (sink populations).