OC13 - Interaction between temporary pond isolation and faunal dispersal ability

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INTRODUCTION

Temporary ponds dynamics are driven by several factors but one of the most important is dispersal between them. It could determine species composition, abundances and interactions through its effect on the outcome of competition, predation and the interplay between individuals' traits and environment. However, within a pond network not all ponds will be equally influenced by dispersal, neither all organisms will behave equally when disperse.

In this study, our aim is to assess how the isolation (opposite to centrality) affects dispersion, taking into account dispersal abilities of organisms. To do that, we set up a field experiment to compare isolation in a temporary pond network.

METHODS

The pond network (Clots de Guils) was situated in north eastern Iberian Peninsula, in the Pyrenees mountain range (2000 m.a.s.l.). It is constituted of 25 temporary ponds, homogeneously distributed throughout the landscape. We selected two contrasting pond locations in the isolation-centrality gradient of the ponds metacommunity (one *central* and the other *peripheric*). To this aim we worked with the percolation network, which is the graph that connect all local ponds with a minimum linkage distance between them. We estimated isolation or centrality with the closeness metric. In each pond, we placed 12 artificial pools filled with filtered water. Following the same distance distribution as Fig. 1: eight artificial pools at 10 meters of the selected pond (four between the selected pond and other closer ponds (*between*) and four without other closer ponds (*alone*)), the last four artificial pools were located at 100 meters of the selected ponds (*distant*) in the same direction of *alone* artificial pools.

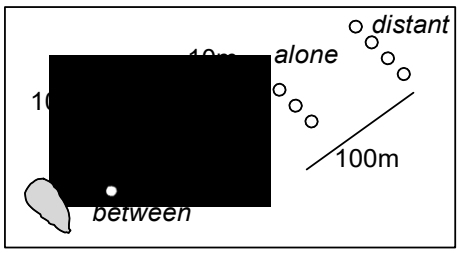

Fig. 1: Representation of artificial pools emplacement around the selected pond (dark). Other closer ponds (grey)

Artificial pools were placed in the beginning of pond flooding (snow-melting) and remained there 3 months until the complete drying of the ponds (May to July). During that time, we sampled artificial pools weekly. Additionally, at the end of the hydroperiod, we collected the whole artificial pool community. Organisms were

counted and classified according to their dispersal ability group (DAG) adapting the groups proposed by Heino (2013): passive dispersers (DAG1), weak (DAG2), and strong aerial dispersers (DAG3). To test differences between isolation, distance, and time, linear-mixed models were used. Similarity (Bray-Curtis) of final pool communities was analysed with a PERMANOVA.

RESULTS and DISCUSSION

Results indicate that ponds' isolation could be interacting with species dispersal ability. Isolation was not an important determinant of DAG1 and DAG2 abundances. However, abundance and composition of DAG3 was significantly associated with isolation. Therefore, DAGs show different landscape perceptions. Unexpectedly, DAG1 did not arrive to central artificial pools. Probably, it was due to landscape configuration and physical barriers (trees). Finally, there was a clear divergence along time of the 3 different dispersal groups. This divergence was linked with distance from the pond (Fig. 2), which is noteworthy, because while DAG2 arrive at both central and peripheric *distant* pools, DAG3 seldom arrive. This may suggest a directionality of strong aerial dispersers towards wetter areas and thus, an avoidance of peripheric *distant* pools.

Additionally, central and peripheric pools final communities were significantly different and central ones more similar within them, suggesting a higher homogenisation in central pools than in peripheric ones.

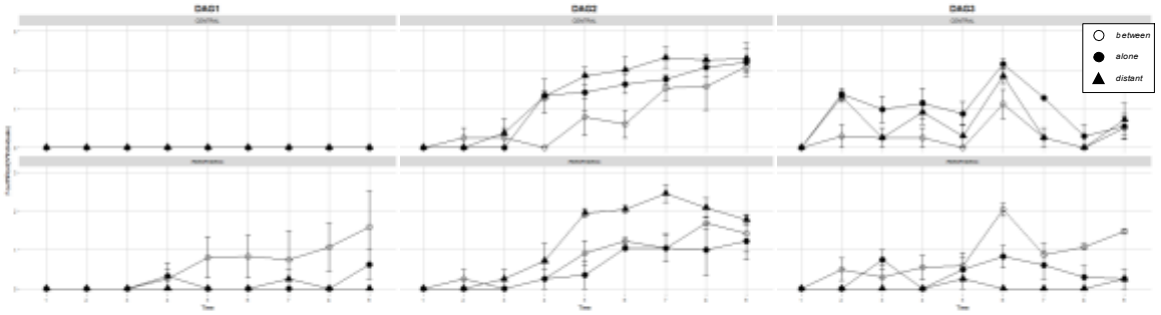

Fig. 2: Plots representing fourth root abundance of different ability groups DAG1, DAG2 and DAG3 (from left to right) and for *central* (top) and *peripheric* (bottom) artificial pools. *Between* pools are white circles, *alone pools* black circles and *distant* pools black triangles.

CONCLUSIONS

As expected, centrality played a key role in dispersion dynamics interestingly showing divergent influences in DAGs. However not all DAGs behaved as predicted (DAG1), emphasizing the physical landscape barriers importance, that can shape network community configuration.

REFERENCES

Heino, J. 2013. Does dispersal ability affect the relative importance of environmental control and spatial structuring of littoral macroinvertebrate communities? Oecologia 171:971–980.