Abstract of Isabelle Muller's PhD Thesis,
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Temporary wetland and mesoxeric grassland restoration of former ricefields: Respective role of filters in community assembly

Ecological restoration is considered as one approach to slow down the loss of biodiversity. Changes in land-uses may be an opportunity to restore ecosystems degraded by agricultural activities. This is the case of the participatory project of the Cassaïre site, located in the Rhône delta, which aims at recreating Mediterranean ecosystems favorable to hunting on former ricefields. Two ecosystems are targeted, temporary wetlands and meso-xeric grasslands. The aims of the thesis are to highlight the main drivers of plant community establishment, to test restoration techniques and to evaluate their effects on plant communities but also on other compartments of the ecosystem. In the absence of target species in the regional species pool, the introduction of these species is necessary in addition to the restoration of abiotic conditions. Topsoil removal and soil transfer for wetland communities allow an increase of target species and of similarity with the reference community. This technique appears to be less relevant for aquatic invertebrate community. The contrasted successful of soil transfer highlights the risks of favoring some indicators of restoration success, as they may not reflect the entire ecosystem. Topsoil removal and hay transfer seem to be a relevant combination to recreate grassland plant community, although the results obtained are less convincing than for temporary wetland, probably due to high competition. Our results, obtained in mesocosms, even if they relate only to the early stages of recovery, provide restoration techniques that seem relevant to establish some components of the two reference ecosystems. These results, by their limitations, however, suggest focusing on in situ conservation of natural habitats rather than trying to restore them after they were destroyed.

Keywords: Biodiversity, Community ecology, Restoration ecology, Aquatic ecosystem, Terrestrial ecosystem, Mediterranean Ecosystems, Topsoil removal, former ricefield, disturbance, Hay transfer, Soil transfer

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