How are insects considered in ecological restoration projects?

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Résumé

We reviewed the link between restoration and insects and found that they are considered in three different ways, that we will present and illustrate. (A) Insects contribute to the monitoring of restoration projects: after the implementation of an ecological restoration project, monitoring has to be conducted to evaluate restoration success and plan adaptive management. Very often, vegetation is monitored, but how insects use the restored ecosystem compared to the reference or compared to the degraded area is sometimes also studied. Specific insects may also be used to serve as bioindicators of restoration success or of particular ecosystem functions. **(B) Restoration assists the recovery of target insect taxa**. In that case, the complete life cycle of the insect has to be well described to provide the habitats required for all or locally important life stages. **(C) Insects are used for restoration**: restoration is implemented using insects as ecosystem engineers (i.e. organisms controlling the availability of resources to other organisms by causing physical state changes in biotic or abiotic materials, leading to modification of habitats), such as ants or termites. In all cases, the recovery of insect diversity at the restored sites is dependent on the level of degradation, on the implemented restoration actions, on the landscape and regional context, on the mobility of insect species and on specific species interactions. Insects have a complex life cycle: eggs, larvae and adults do not share the same habitat, larvae and adults do not always have the same diet and are not at the same level in the trophic network. Because of this, no restoration action can provide an ideal habitat for all insects. However, maximizing habitat complexity and heterogeneity in the restoration design, is a way to provide a variety of habitats for the different life stages and to promote insect diversity.

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