Understanding and planning ecological restoration of plant-pollinator networks

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Abstract

Theory developed from studying changes in the structure and function of communities during natural or managed succession can guide the restoration of particular communities. We constructed 30 quantitative plant-flower visitor networks along a managed successional gradient to identify the main drivers of change in network structure. We then applied two alternative restoration strategies in silico (restoring for functional complementarity or redundancy) to data from our early successional plots to ask whether different strategies affected the restoration trajectories. Changes in network structure were explained by a combination of age, tree density and variation in tree diameter, even when variance explained by undergrowth structure was accounted for first. A combination of field data, a network approach and numerical simulations helped identify which species should be given restoration priority in the context of different restoration targets. This combined approach provides a powerful tool for directing management decisions, particularly when management seeks to restore or conserve ecosystem function.