Pollination in a drier world: how climate change affects pollination networks via the alteration of floral traits

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Abstract

Pollinator decline is ubiquitous, yet pollinators are essential for the reproduction of the vast majority of plants, and hence they play a major role in the stability of terrestrial ecosystems. They also contribute to the productivity of 75% of human cultivated crops. Among the causes of their decline is habitat fragmentation and climate change, but how precisely environmental changes affect wild pollinators and their interactions with plants is unknown. One way to bridge this gap is to extend studies to entire plant-pollinator communities, and to incorporate functional traits that are relevant to plant-pollinator interactions, such as floral signalling traits. Although floral scent is considered a major communication channel between flowering plants and their pollinators, it is currently underrepresented in community-level studies. We measured how experimentally drier conditions affect floral traits, including floral scent, and how this alteration may in turn affect the pollination network, in a Mediterrranean shrubland community. Using the drought-mimicking CLIMED experimental in the garrigue near Marseilles, we measured floral scent, floral colour and nectar production of the most abundant species in experimentally drier areas, as well as in control areas. We also measured the frequency of visits of the different pollinator guilds (mostly bees) on those abundant plant species. We then built the pollination networks in the different climatic treatments and incorportated the floral traits as explanatory variables on networks' structure. With this dataset, the first of its kind, we will answer fundamental questions on the resilience of plant-pollinator communities in a drier world.

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