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LANDSCAPE-SCALE STRUCTURING OF FLOWER COLOUR ACROSS POLLINATOR MOSAICS IN CAPE DAISIES

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ABSTRACT

The striking variation in Angiosperm flower colour is often attributed to divergent selection imposed by allopatrically distributed pollinators with different colour preferences. Despite its importance, the distributions of pollinators and their colour preferences are seldom quantified. The extensive mass-flowering daisy displays in Namaqualand, South Africa, exhibit striking flower colour convergence within communities, but also geographic flower colour turnover within species and genera. By quantifying the geographic pollinator mosaics across which daisy floral signals have diverged, and experimentally testing pollinator preferences for floral colour signals I investigate the drivers of floral signal divergence and convergence in Namaqua daisies. I show that landscape-scale turnover of dominant flower colours in daisy communities is strongly associated with largely non-overlapping distributions of dominant bee-fly pollinators with divergent flower colour preferences, suggesting the importance of pollinator shifts across strong qualitative pollinator mosaics for signal divergence. However, extensive divergence in floral signals, in response to selection imposed by different behaviours of the same pollinator, also occurs across more subtle gradients in the abundance of dominant pollinating fly species. The geographically structured diversification of floral colour signals across qualitative and quantitative pollinator mosaics that I show is perhaps unexpected given the classically generalist pollination phenotype of daisies. However, because of the dominance of single fly pollinators within communities, and the virtual absence of bees as pollinators, I suggest that Namaqua daisies function as pollination specialists despite their generalist phenotypes, thus facilitating differentiation of floral signaling by pollinator shifts and sexual deception.