Drivers of plant speciation: understanding the role of pollinators in shaping geographical variation in floral traits

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Variation of floral traits across a geographical framework of pollinator assemblages differing in functional, morphological and ethological features.

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The study of geographical variation of phenotypic floral traits provides a suitable background to understand the role of pollinator assemblages as drivers of floral diversity patterns. Here we present three plant-pollinator systems that differ in pollinator assemblages features. *Monttea aphylla* (Plantaginaceae), widespread in the Monte desert, offers simultaneously oils and nectar as reward to functionally distinct pollinators. Variation in floral rewards as a response to functionally diverse assemblages, as well as to other biotic and abiotic factors suggest that investment in the more expensive reward (oil) is promoted in communities where nectar foragers in addition to oil-collecting bees are present and stronger competition for the services of the more specialized pollinator should favor the evolution of narrower pollination niches. In communities where specialized foragers are the only available, competition for niches should be relaxed and investment in the more expensive reward would not be compensated with better services of pollinators. *Calceolaria polyrhiza* (Calceolariaceae) is widely distributed in the arid Patagonian steppe and in the temperate forests understory. Pollinators are either of two oil-collecting bee species which strongly differ in size. Through analyses of floral integration and covariation patterns we observed that plant-pollinator phenotypic matching across the geographical range is facilitated through variation in mechanical-fit related traits and their decoupling from variation on attraction-related traits mainly affected by abiotic gradients. Finally, phenotypic selection in the finch-pollinated Patagonian bush *Anarthrophyllum desideratum* (Fabaceae) showed that variation in floral traits was only partially explained by assemblage shifts; the finch species dominant in most populations seems to be locally idiosyncratic in the way it handles flowers to access nectar. As a consequence, pollen is carried on different parts of the head. Both, changes in pollinator assemblages and behavior across populations appear to complementarily account for the geographical variation in flower phenotype.