

EVOLUTION OF AUTONOMOUS SELFING ACCOMPANIES INCREASED SPECIALIZATION IN THE POLLINATION SYSTEM OF *SCHIZANTHUS* (SOLANACEAE)

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Abstract

The co-occurrence of elaborate flowers visited by specific groups of pollinators and capacity for autonomous selfing in the same plant species has puzzled evolutionary biologists since the time of Charles Darwin. To examine whether autonomous selfing and floral specialization evolved in association, we quantified the autofertility level (AFI) in nine *Schizanthus* species characterized by a wide range of pollination specialization, revealing AFI values of 0.02 to complete selfing. An independent contrasts analysis conducted on AFI and number of functional pollinator groups showed that autonomous selfing evolved from an ancestral outcrossing system as plants became increasingly specialized ($r = -0.82$). To assess whether autonomous selfing together with specialization acts as a reproductive assurance mechanism, we estimated spatial and interannual variation in fruit set due to pollinator failure in two closely related high Andean *Schizanthus* species differing in their specialization levels. Variation in pollinator failure rate was more pronounced and autonomous selfing increased fruit production over biotically assisted pollination in the more specialized species. Our study suggests that specialized pollination deems species more vulnerable to pollinator fluctuation thus promoting the evolution of delayed autonomous selfing.

Key words: autonomous selfing; breeding system; floral specialization; independent contrasts analysis; pollination syndrome; pollinator failure; reproductive assurance.