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An association between floral sex allocation and floral longevity in a non-sequentially blooming ladybell

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ABSTRACT

Background: Floral longevity has been assumed to reflect a balance between the fitness gain through increased pollination and the cost of flower maintenance.

Question: Is there variation in the amount of resources allocated to male and female functions within flowers? Does floral longevity vary with temporal variation in floral sex allocation?

Organism: *Adenophora jasionifolia*, a perennial species with flowers differing greatly in floral sex allocation.

Field site: Shangri-La Alpine Botanical Garden, Yunnan Province, southwest China.

Methods: Daily observations of flowers for floral longevity, counts of traits indicating resource allocation, bagging flowers to reveal the effect of pollinator visitation on floral longevity.

Results: Within a six-flowered inflorescence, the apical flower opened first followed by the middle flower, before two pairs of flowers in different spatial positions opened simultaneously. The patterns of floral sex allocation and floral longevity were strongly associated with the order of flower opening but not with the spatial arrangement of flowers within inflorescences. The shift to male-biased sex allocation in late-opening flowers corresponded with a decrease in floral longevity, and reduced female allocation.

Conclusion: There is a temporal decline of floral longevity and female sex allocation in *A. jasionifolia*. This positive relationship between floral longevity and floral sex allocation provides new insights into the evolution of floral longevity.

Keywords: *Adenophora jasionifolia*, Campanulaceae, dichogamy, floral longevity, floral sex allocation, mating-environment hypothesis, pollen–ovule ratio, pollen removal and receipt.

INTRODUCTION

Variation in floral longevity, the time over which a flower remains open and functional, affects the total number of pollinator visits and consequently the amount and quality of

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