Pollination efficiency and the evolution of specialized deceptive pollination systems in orchids

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Deceptive pollination strategies evolved independently in many orchid clades and in different geographic areas across all the continents. In these systems, plant-pollinator interactions range from highly specialised (sexually deceptive species) to generalised (food-deceptive species) and their employment can have dramatic consequences on patterns of reproductive success and on population-level genetic variation. In a survey of terrestrial orchids from the Mediterranean and Australia highly specialised orchids were consistently found to have a more efficient pollen transfer. Contrarily to highly specialised systems, in generalised pollination strategies a positive correlation was observed between flower number and pollination success. Thus highly specialised pollination systems, such as sexual deception, may allow the production of inflorescences with fewer flowers that permits the plant to allocate fewer resources to floral displays. This trade-off can be particularly relevant in water-deprived habitats and might explain the higher frequency of sexually deceptive species in these environments compared to tropical regions.