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THE ROLE OF SHORT-TONGUED FLIES AS POLLINATORS IN SOUTHERN AFRICAN HIGH ELEVATION SYSTEMS: A CASE STUDY OF *Crassula peploides* (CRASSULACEAE)

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ABSTRACT

True flies (Insecta: Diptera) are often regarded as pests, however, evidence increasingly indicates that they play an important role in pollination in natural systems, especially at high elevation. Fly pollination is frequently associated with foul smelling flowers, but this has hitherto only been documented in a relatively limited number of plant families. We studied the pollination system of the putrid-smelling flowers of *Crassula peploides* in the high elevation Drakensberg Mountain region.

Visitor observations and pollen load analyses revealed almost exclusive pollination by short-tongued flies, primarily species of the families Sarcophagidae, Tachinidae and Muscidae, although pollinator assemblages varied between localities and years. Preliminary morphospecies identifications were confirmed by DNA barcoding. Flower scent analysis using GC-MS showed that scent profiles of *C. peploides* are dominated by aliphatic acids, which potentially mediate attraction of flies to the flowers. To the human eye, flowers have white petals with a red base and a red gynoecium, contrasting with the gravel substrate. Flies were observed probing the flower surface systematically, indicating the potential presence of nectaries. Results provide the first evidence of functional specialization of foul-smelling flowers for pollination by short-tongued flies in Crassulaceae. Trait similarities with other, previously studied species at high elevation suggest the presence of a guild of small, unpleasant-smelling, usually white-flowered plant species pollinated by short-tongued flies. The intriguing dominance of acids in the floral scent of *C. peploides* merits further investigation as a potential indicator of mimicry. This study further highlights the importance of flies as pollinators, especially in alpine regions.