Orchid's scent stronger in Swiss lowlands than mountains

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A pollinator on a *Gymnadenia odoratissima* inflorescence. Credit: Gross et al.

Pollinators select orchids with stronger scents in the Swiss lowlands, than in the mountains, according to a study published Feb. 17, 2016 in the open-access journal *PLOS ONE* by Karin Gross at the University of Zurich, Switzerland and colleagues.

Flower species growing in two different geographic regions have been known to develop distinct characteristics based on the pollinators' preferences, but previous research has mostly focused on divergence of visual characteristics. Certain aromatic compounds in the scent are known to attract orchid pollinators, and in this study, the authors looked at over 1000 Scented Gymnadenia orchids from several lowland and mountain populations to understand potential selective pressure based on scent. They measured flower size, color, and scent molecules over two flowering seasons. They also analyzed differences in the pollinator populations between the mountains and lowlands.

The authors found that pollinators selected orchids for their stronger scent in the lowlands, but not in the mountains. For characteristics like flower color and size, they didn't find significant variation in selective pressures between regions. The authors identified almost 200 pollinators in the study areas, including butterflies, moths, flies and beetles, but found some differences in the pollinator community between the mountains and lowlands. The difference in pollinator communities between regions may indicate that different pollinators select for differences in floral scent chemicals, but further experiments would be required to test this theory. Nonetheless, the authors state their study is the first to find consistent regional differences in selection on floral

scent, showing that this could be one mechanism behind geographical floral chemical scent divergence.

Karin Gross notes: "The observed regional differences in selection are an important evolutionary force contributing to divergence in floral fragrances. Other traits such as plant height were also affected by selection, but in a more uniform way."

More information: Gross K, Sun M, Schiestl FP (2016) Why Do Floral Perfumes Become Different? Region-Specific Selection on Floral Scent in a Terrestrial Orchid. *PLoS ONE* 11(2): e0147975. DOI: 10.1371/journal.pone.0147975