Why does an obligate autogamous orchid produce insect attractants in nectar? - a case study on *Epipactis albensis* (Orchidaceae)

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Background

The flowers of some species of orchids produce nectar as a reward for pollination, the process of transferring pollen from flower to flower. *Epipactis albensis* is an obligatory autogamous species, does not require the presence of insects for pollination, nevertheless, it has not lost the ability to produce nectar, the chemical composition of which we examined by gas chromatography-mass spectrometry (GC–MS) method for identification of potential insect attractants.

Results

During five years of field research, we did not observe any true pollinating insects visiting the flowers of this species, only accidental insects as ants and aphids. As a result of our studies, we find that this self-pollinating orchid produces in nectar *inter alia* aliphatic saturated and unsaturated aldehydes such as nonanal (pelargonal) and 2-pentenal as well as aromatic ones (i.e., syringaldehyde, hyacinthin). The nectar is low in alkenes, which may explain the absence of pollinating insects. Moreover, vanillin and eugenol derivatives, well-known as important scent compounds were also identified, but the list of chemical compounds is much poorer compared with a closely related species, insect-pollinating *E. helleborine*.

Conclusion

Autogamy is a reproductive mechanism employed by many flowering plants, including the orchid genus *Epipactis*, as an adaptation to growing in habitats where pollinating insects are rarely observed due to the lack of nectar-producing plants they feed on. The production of numerous chemical attractants by self-pollinated *E. albensis* confirms the evolutionary secondary process, i.e., transition from ancestral insect-pollinating species to obligatory autogamous.