

# Variation of Floral Scent in Orchids

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We all know that most flowers often give off a wonderful bouquet of scent. These pleasant-smelling bouquets are not only very attractive to us humans, but also for the animals which pollinate them. This is in fact the main reason most flowers give off such sweet smells, as attracting pollinators is important for the production of healthy seeds. But giving off scent may not be beneficial all the time, for instance, giving off scent when there are no pollinators around to pick-up the signal would be wasteful. Smelling a lot can also attract the wrong kind of attention, as the sweet smells of flowers may also seem irresistible to a hungry herbivore! This means therefore that plants should be careful about when and where they release scent.

I wanted to see how plants vary their scent to reduce these costs and match the activity of pollinators around them. To do this, I collected samples of floral scent for two closely related plant species in different environments and at different times of day. Using two plants which were closely related to each other would also allow me to see if there were any subtle variations between them. The scent was sampled using an air pump and scent trap, which collected the scent released over the period of an hour. This meant that samples from different times and regions could be fairly compared.

Even though the two species were very similar, they gave off scent at different times of the day, with one 'smelling' more during the day and the other at night. This probably means that they two species were targeting different types of pollinators, perhaps butterflies during the day and moths at night. They also had different scent bouquets, again most likely because they are targeting different pollinators. Interesting though, one of the species gave off different amounts of scent depending on its location. Plants in Norway smelled strongly during both day and night, whereas plants on the Swedish island of Oland showed a clear increase in scent at night. Again, this could be the result of the plants targeting different groups of pollinators, but this time depending which pollinators are available in different regions.

Also, I found some evidence that plants may pay a cost when producing scent. After testing, I saw that plants with many flowers actually produced less scent for each individual flower than those with fewer. This indicates that plants must make a 'choice' between the amount of resources they can spend on the number of flowers versus those that they can spend on scent.

In conclusion, my work shows that floral scent can be quite variable, even between two closely related species. Variation in scent can occur on several different scales; between night and day, between different regions and even between individuals with greater or fewer flowers. Most of the results show that plant scent seems to change in response to which pollinators are available at a specific time or location. This is important as it furthers our understanding of how the relationship between plants and pollinators affects important biological processes, such as the production of scent and other floral signals.