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Extension

Insect repellent and seed dispersal in catnip

Liz Sheffield

What does nepetalactone do for the catnip plant (and how can a plant that secretes an insect repellent get pollinated by insects)?

The chemical secreted by catnip that excites most cats is nepetalactone. This organic compound contains only carbon, hydrogen and oxygen ($C_{10}H_{14}O_2$) but has a range of interesting effects on many animals, including humans. The compound is secreted by special glands on the surface of the leaves, and has a powerful repellent effect on many insects. The compound therefore probably serves the plant best as a deterrent to herbivorous insects — biting or rubbing against the glands releases the chemical, so grazing insects get a taste or smell of something distasteful, and leave the plant alone.

The flowers lack the secretory glands, and are therefore not off-putting to the insects that pollinate them. These insects are mostly honeybees, which are attracted by the colour of the flowers. While pushing inside the flowers for their nectar reward, the bees get dusted with pollen that they then rub onto the stigma of the next flower they visit (see Figure 1). When the stigma gets dusted with pollen from another catnip plant, the pollen germinates and grows down the style to fertilise the eggs.

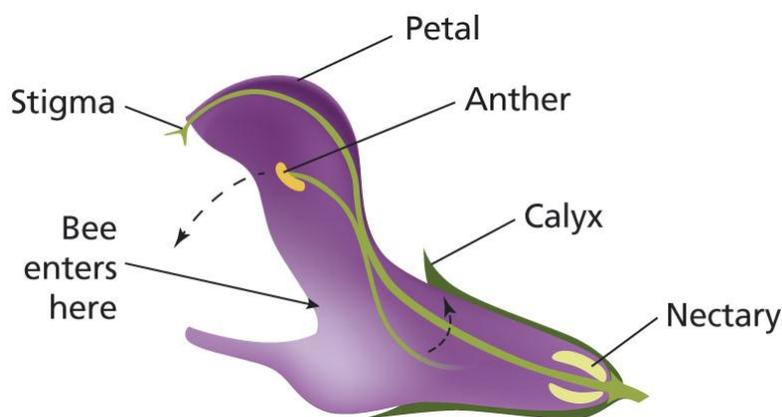


Figure 1 Longitudinal section through a catnip flower. The young flower secretes nectar from the nectaries. When a bee pushes inside, the stamens are bent down onto the back of the bee, depositing pollen as the bee sucks up the nectar. When the bee visits a more mature flower the stamens have withered away and it is the stigma that is bent down to touch the bee's back, thereby collecting pollen

As the seeds are forming, the petals wither but the flower when it was a bud) becomes dry and stiff. When an animal or another plant brushes against it, the calyx recoils and flings the seeds a metre away from the parent plant (see Figure 2). This is how the mint family sprouting up a comfortable distance

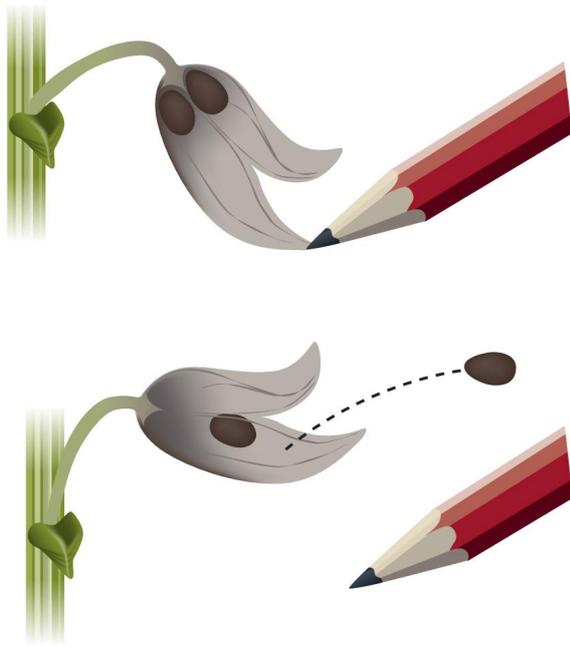


Figure 2 Diagram showing the calyx of catnip when the flower has withered away and left only the seeds. Anything brushing against the calyx causes the elastic stalk supporting it to fling the seeds into the air