

Nectar is not a simple soft drink

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The sugar-containing nectar secreted by plants and consumed by pollinators shares a number of similarities to fitness drinks, including ingredients such as amino acids and vitamins. In addition to these components, nectar can also contain secondary metabolites such as the alkaloid nicotine and other toxic compounds.

Scientists Danny Kessler and Ian Baldwin from the Max Planck Institute for Chemical Ecology in Jena, Germany, recently addressed the question, why would plants risk poisoning the insects and birds that provide pollination services? Their findings have been published in *The Plant Journal*.

Kessler and Baldwin examined the nectar of a wild tobacco species, *Nicotiana attenuata*, and discovered that it is flavoured with 35 secondary compounds. The researchers then tested 16 of these in cafeteria-style bioassays with three groups of native visitors - hawkmoths, hummingbirds (both pollinators) and ants ('nectar thieves'). Some compounds were attractive and others were not. Certain nectar blends seem to increase a flower's chances of being visited by useful pollinators while discouraging nectar thieves.

Nicotine, the most abundant repellent found, affected both pollinators and nectar thieves in the same way. The visitors removed less nectar per visit when nicotine was present. To determine if nicotine was repellent in the real world, the researchers genetically transformed *N. attenuata* plants to create nicotine-free plants, which were planted into a natural population and nectar removal rates were measured. Native floral

visitors removed much more nectar from the plants that had no nicotine than from the normal nicotine-containing plants.

Why would a plant produce nectar that repels pollinators? Data from the bioassays provided a hypothesis: when nectar contains nicotine, the amount of nectar consumed per visit decreases but the number of visitations increases. Increasing the number of visitors might increase the genetic diversity of the offspring produced. The researchers are planning to test this hypothesis in the upcoming field season.

Dissecting the function of this secret formula of nectar, thought to be nature's soft drink, has instead shown it to be quite 'hard'.

Source: Blackwell Publishing

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