

OR357*Pharmacophagy: self-medication in bumblebees***David Baracchi**, Mark J.F. Brown, Lars Chittka

In the wild, *Bombus spp.* may contract infections of the trypanosome parasite *Crithidia bombi* from their nestmates or contaminated flowers while foraging. The prevalence of colonies infected with *C. bombi* rises during the season and *C. bombi* often infects the majority of foragers within a hive. *C. bombi* has a wide range of impacts on worker bumblebees, inducing a costly immune response, increasing mortality under food stress, and reducing learning and foraging efficiency. The severity of foraging impairments increases with parasite load and any mechanisms that reduce infection intensity in a forager would therefore improve its foraging efficiency and the health of its colony. Evidence that secondary metabolites in nectar have antimicrobial activity suggests that bumblebees may derive a benefit from the consumption of nectars rich in these metabolites. While some insects are known to shift their diet to toxin-rich food to counteract infections, this phenomenon is understudied and there are no reports of active self-medication (pharmacophagy) in pollinators. We tested whether nicotine, a nectar secondary metabolite common in Solenaceae and several other bee-pollinated plants, could reduce pathogen load in bumblebees infected by *C. bombi*. We first studied whether the consumption of nicotine by bumblebees reduced their parasite load, and then, whether nicotine directly reduced the infectivity of the protozoans. Finally, we allowed healthy and infected bees to choose their diet from plastic flowers in an artificial arena to test for a nicotine preference among infected individuals. Our results demonstrated that artificial nectar containing a natural nectar alkaloid reduced the severity of a gut infection in bumblebees. More interestingly, our behavioural test showed that infected bees actively self-medicate themselves by shifting their diet towards non-nutritive secondary metabolites. This finding raises the possibility that pollinators play an important role in maintaining secondary metabolites in plants.