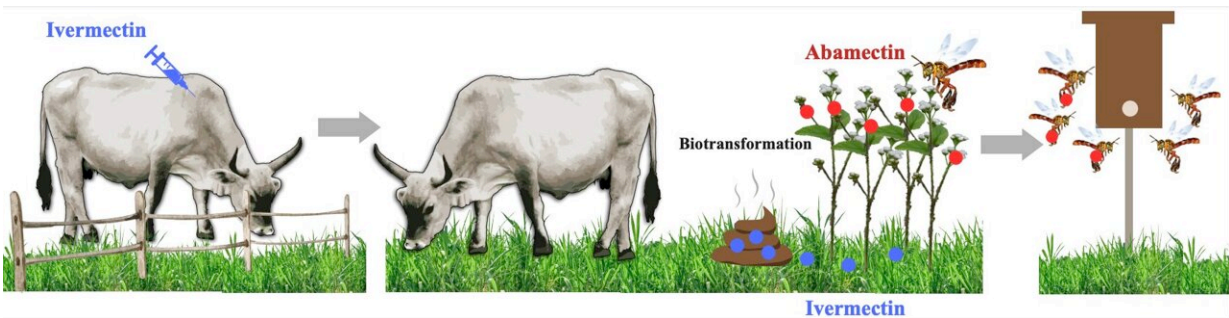


Study finds wild bees are developing tolerance to veterinary drugs

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Potential route of avermectin exposure in stingless bee colonies located in livestock dominated landscapes. When ivermectin is applied to cattle to treat endo and ectoparasites, residues end up in the urine and feces, which flowering plants can absorb. Inside the plant, ivermectin can biotransform into abamectin through desaturase enzymes and contaminate the pollen. Bees forage through contaminated pollen that is transported to their colonies. Credit: Obregon et al

Stingless bees in the Colombian Andes are adapting to a derivative of the ubiquitous insecticide ivermectin, which the bees ingest along with pollen from pasture flowers, according to a new study.

Over four months, Diana Obregón and her colleagues gathered bee bread from 16 wild colonies of the stingless bee *Tetragonisca angustula*. Colony growth was measured by colony weight changes over time. Bee bread is the compressed packet of pollen that bees create to carry back

to the hive.

The authors performed palynological and pesticide analysis on the bee bread, and found abamectin in 59.3% of the samples, with concentrations ranging from 9.6 to 1,856 $\mu\text{g}/\text{kg}$. Concentrations at the high end of this range are thought to be lethal to bees, but colonies with high levels of abamectin were growing at similar rates to colonies with low levels of abamectin. The work is [published](#) in the journal *PNAS Nexus*.

Through manipulative experiments, the authors determined that the bees in areas where much of the land was pasture were developing [tolerance](#) to abamectin—and that the abamectin ultimately derived from the cattle anti-parasite medication ivermectin. Abamectin differs from ivermectin by only one [double bond](#) in its [chemical structure](#).

When [cattle](#) excrete ivermectin, it is taken up by plants from the soil. The plants then transform it into abamectin via desaturase enzymes. In part due to their tolerance to abamectin, bee colonies in areas with a high proportion of pasture were found to grow at the same rates as colonies in low-pasture areas, according to the authors.

More information: Diana Obregon et al, Route of exposure to veterinary products in bees: Unraveling pasture's impact on avermectin exposure and tolerance in stingless bees, *PNAS Nexus* (2024). [DOI: 10.1093/pnasnexus/pgae068](https://doi.org/10.1093/pnasnexus/pgae068)

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