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In Analyses of Pesticide Risk, Substitute Species are: Information on Three Kinds of Stingless Bees' Toxicology

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Abstract

Since the diversity of bee species is significantly diverse in tropical and subtropical locations, discussions concerning the environmental risk reassessment of pesticides have increased over the past few decades. Pesticides have a significant negative impact on stingless bees, hence toxicity data is required to include them in the regulatory process of nations that host a variety of these species. The current study therefore assessed the sensitivity of three species of stingless bees exposed to the commercial formulation of the neonicotinoid thiamethoxam, evaluated the Median Lethal Concentration (LC50), estimated the Median Lethal Dose (LD50), and evaluated the Median Lethal Dose (LD50) (TMX).

Keywords: Surrogate species; Bees; Thiamethoxam

Introduction

Large-scale monoculture farming degrades natural ecosystems, eliminates floral resources, and places a heavy demand on pesticides. In addition to endangering the survival of animal and plant species, this practise has a direct negative influence on the biodiversity of bee species and other pollinators. Because the UN (United Nations) prioritises the preservation of natural resources and the climate for future generations, the maintenance of bee biodiversity fits the sustainable development goals established for the year 2030[1].

Harvesting bee

In order to accomplish this goal, access to and development of scientific knowledge are essential, just as they are for involving other facets of our society. As a result, stronger laws and regulations are made. Research that evaluates the effects of neonicotinoid insecticides on honey bees, which was crucial for mobilising and restricting these pesticides and improves the regulatory process in the European Union and the United States, can highlight the understanding of how factors related to agricultural production methods interact with pollinator's biodiversity[2].

Currently, the pesticide risk assessment is incorporated into toxicological bioassays that adhere to the rules set forth by the Organization. The Organization for Economic Co-operation and Development (OECD) has produced guidelines for toxicological bioassays that incorporate pesticide risk assessment. Due to their significance as crop pollinators, geographic distribution, large colonies, well-known biology, and good adaptation to experimental conditions, they primarily use the species Apis mellifera as biological models[3,10].

Depending on their sizes, life cycles, metabolism, habits, biology, and exposure routes, bees' sensitivity to pesticides varies. Researchers dispute the extrapolation of hazardous data for other bees that exhibit social and solitary behaviour as a result [4,9].

Discussion

Using consumption and body mass to infer LD50 values, we determined the oral toxicity of TMX for the stingless bee species T. angustula, S. postica, and M. scutellaris that live in trees. The investigated species displayed a range of LC50 and LD50 values that were all highly hazardous for 24 hours (less than 2 g/bee) (USEPA, 2017). Neonicotinoids often have lower oral and topical LC50 and LD50 values than other insecticides, making them more hazardous to bees [5,7].

Conclusion

According to the LC50 values calculated for the three species of stingless bees, M. scutellaris is most negatively impacted by TMX, followed by T. angustula and S. postica. T. angustula is more sensitive to TMX when food consumption is taken into account for the LD50 computed based on the data available for A. mellifera. The estimation shows that TMX is more harmful to M. scutellaris when body weight is taken into account. A. mellifera is also less responsive to TMX than every other stingless bee tested. Our findings suggest that body[6,8].

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Declaration of competing interest

The authors affirm that they have no known financial or interpersonal conflicts that would have appeared to have an impact on the research presented in this study.

References

1. Ohrloff C, Olson R, Apple D (1987) [Congenital corneal opacity caused by thickening of Bowman's membrane]. Klin Monbl Augenheilkd 191: 352-354.
2. Yang LL, Lambert SR, Lynn MJ, Stulting RD (1999) Long-term results of corneal graft survival in infants and children with peters anomaly. Ophthalmology 106: 833-848.

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3. Waring GO, Laibson PR (1977) Keratoplasty in infants and children. Trans Sect Ophthalmol Am Acad Ophthalmol Otolaryngol 83: 283-296.
4. Ni W, Wang W, Hong J, Zhang P, Liu C (2015) A novel histopathologic finding in the Descemet's membrane of a patient with Peters Anomaly: a case-report and literature review. BMC Ophthalmol 15: 139.
5. Vanathi M, Panda A, Vengayil S, Chaudhuri Z, Dada T (2009) Pediatric keratoplasty. Surv Ophthalmol 54: 245-271.
6. Pohlmann D, Rossel M, Salchow DJ, Bertelmann E (2020) Outcome of a penetrating keratoplasty in a 3-month-old child with sclerocornea. GMS Ophthalmol Cases 10: Doc35.
7. Binenbaum G, Zackai EH, Walker BM, Coleman K (2008) Sclerocornea associated with the chromosome 22q11.2 deletion syndrome. Am J Med Genet A 146: 904-909.
8. McClellan K, Lai T, Grigg J, Billson F (2003) Penetrating keratoplasty in children: visual and graft outcome. Br J Ophthalmol 87: 1212-1214.
9. Nischal KK, Naor J, Jay V, MacKeen LD, Rootman DS (2022) Clinicopathological correlation of congenital corneal opacification using ultrasound biomicroscopy. Br J Ophthalmol 86: 62-69.
10. Huang C, O'Hara M, Mannis MJ (2009) Primary pediatric keratoplasty: indications and outcomes. Cornea 28: 1003-1008.