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## Responses from olfactory sensilla of *Sitophilus zeamais* to Andean essential oils

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Lamiaceae species are well-known in traditional medicine. In the last years, Essential Oils (EOs) of many Lamiaceae have showed to be excellent repellents and/or insecticides. Tropical Andes are extremely rich in endemic flora, possible source of new bioactive substances. Here, we verified the insect repellent activity of the EOs extracted from *Clinopodium tomentosum* and *C. nubigenum*, two Lamiaceae typical of the Ecuadorian Andes. The two EOs were tested against the maize weevil *Sitophilus zeamais* (Motschulsky) (Coleoptera: Curculionidae), one of the most destructive pests of stored and processed cereals. To characterize the olfactory sensilla of *S. zeamais*, its antennal structure was investigated by scanning and transmission electron microscopy. The electrophysiological and behavioural responses of the insect to the EOs were then investigated by electroantennography and olfactometer trials. The morphological study revealed the presence of three types of sensilla (Basiconic Sensillum 1, 2, and Grooved Peg Sensillum), that could be involved in the perception of the EOs volatile compounds. Accordingly, the electroantennography showed a positive dose-dependent response of the insect antennae to both the EOs. The behavioural tests displayed a significative repellence of the EOs, starting from 8.4  $\mu\text{L L}^{-1}$  air, and that the efficacy and readiness of the response to the stimulus was higher for *C. tomentosum*. In conclusion, both the EOs are detected by the insect by its antennae and exert a strong repellent effect. The results confirm that Andean flora represents a valuable source of unexploited bioactive substances that can be utilized as promising tools for foodstuff pests' control.