
Varroa destructor invasion in the South West Indian Ocean islands and its mortality impacts on the endemic honeybee subspecies *Apis mellifera unicolor* in Madagascar, Mauritius and La Réunion

Olivier Esnault*¹, Preaduth Sookar², Nivohanitra Perle Razafindraibe³, Marie-Pierre Chauzat⁴, and Hélène Delatte⁵

¹GDS Réunion CIRAD UMR PVBMT – 1 rue du père Hauck 97418 La Plaine des Cafres 7, chemin de l'IRAT Ligne Paradis 97410 Saint-Pierre, Réunion

²Entomology Division Agricultural Services Ministry of Agro Industry and Food Security – Reduit, Mauritius

³Service de Surveillance et de Lutte contre les Maladies Animales Direction des Services Vétérinaires – Ampandrianomby, Madagascar

⁴ANSES – Agence française de sécurité sanitaire des aliments, de l'environnement et de la santé au travail [Maisons-Alfort], Agence française de sécurité sanitaire des aliments, de l'environnement et de la santé au travail [Maisons-Alfort], Agence française de sécurité sanitaire des aliments, de l'environnement et de la santé au travail [Maisons-Alfort], Agence française de sécurité sanitaire des aliments, de l'environnement et de la santé au travail [Maisons-Alfort] – Maisons-Alfort, France

⁵CIRAD UMR PVBMT – 7, chemin de l'IRAT Ligne Paradis 97410 Saint-Pierre, Réunion

Abstract

Invasive species cause severe impacts on biodiversity losses, among them, emerging diseases caused by parasites are also considered as invasive species. *Varroa destructor* is an ectoparasite mite native from South-East Asia and has spread all over the world since the early 50's. The mite is considered as the main sanitary threat for honeybee health worldwide. This parasite was detected for the first time in the islands of the South-West Indian Ocean (SWIO): 2010 in Madagascar, 2014 in Mauritius and 2017 in La Réunion. The aims of this work were (i) to characterize the genetic diversity of the parasite on the three islands, (ii) to assess the mortalities within honeybee population after the detection of *V. destructor* and (iii) to assess the spread of the parasite and identify the associated drivers. To identify the parasite strain and its diversity, mitochondrial DNA sequences were analyzed. Sanitary and epidemiological surveys were conducted in Madagascar, Mauritius and La Réunion. The varroa strain identified in the SWIO area was the invasive K strain, nevertheless several haplotypes were retrieved, among which one was common in Madagascar, Mauritius and La Réunion. The parasite invasion increased significantly the mortalities in the honeybee populations (for example, +185% of mortalities were observed in La Réunion). Beekeepers played a major role in dispersing the parasite within the islands and the dispersion speed estimated was higher in La Réunion and Mauritius than in Madagascar where the beekeeping practices are really different (modern vs. traditional). Varroa mite eradication cannot

*Speaker

be an option for local beekeepers and several control options should be considered. Several other sanitary threats such as *Aethina tumida* (small hive beetle) and *Paenibacillus larvae* (American foulbrood) threaten the honeybees from the SWIO islands. In this insular context, routes of introduction have to be identified and the sanitary surveillance tools should be improved for all the islands.

Keywords: honeybee, invasion, mortalities, surveillance, SWIO, varroa destructor