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# *Varroa destructor* – Free Islands in the South West Indian Ocean

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## Introduction

Honey bees, *Apis mellifera*, play an important role in ecosystem services ensuring sustained food production, habitat conservation through pollination, ecosystem stability and provide opportunities for income (Kremen et al., 2007). Recently, honey bee health has been one of the most important topics in apicultural research owing to the recent emergence of unprecedented high colony losses in many parts of the world (Traynor et al., 2016; van der Zee, Gray, Pisa, & de Rijk, 2015). Several factors negatively impact on the health of honey bee colonies, such as parasites (Sammataro, Gerson, & Needham, 2000), pathogens (Antúnez et al., 2012; Genersch, 2010), pesticides (Deborah et al., 2017), poor nutrition (Brodschneider & Crailsheim, 2010), reduced genetic diversity

(Mattila & Seeley, 2007) and poor management practices (vanEngelsdorp, Caron, Hayes, Underwood, & Henson, 2012).

The ectoparasitic mite *Varroa destructor* (Acari; Varroidea) has emerged as the most devastating pest of honey bees worldwide (Anderson & Trueman, 2000; Rosenkranz, Aumeier, & Ziegelmann, 2010). On the South West Indian ocean off the continent of Africa, *Varroa* has been detected in Zanzibar (Frazier et al., 2010). The mite was further found in 2010 in Madagascar, in 2014 in Mauritius and most recently, 2017, in Réunion (OIE, 2010).

## Material and Methods

This field survey was carried out between March and September 2017 to determine

the status of *Varroa* in the archipelago islands of Seychelles and Comoros (Figure 1). Beekeeping in both, Seychelles and Comoros, is practiced at small-scale, with beekeepers owning mostly less than 10 hives, except in very few cases where some beekeepers own 30–100 hives. Colonies are usually obtained from natural swarms, capturing and hiving wild colonies and a small number of beekeepers split colonies. In both countries, statistics on the total number of colonies are lacking. In Seychelles, 76 colonies in 17 apiaries were sampled across three main islands of Mahe, Praslin, and La Digue (Figure 1). In Comoros, 49 colonies in 17 sites were sampled in the islands of Ngazidja, Anjouan and Mohéli (Figure 1). On each site, five colonies were randomly

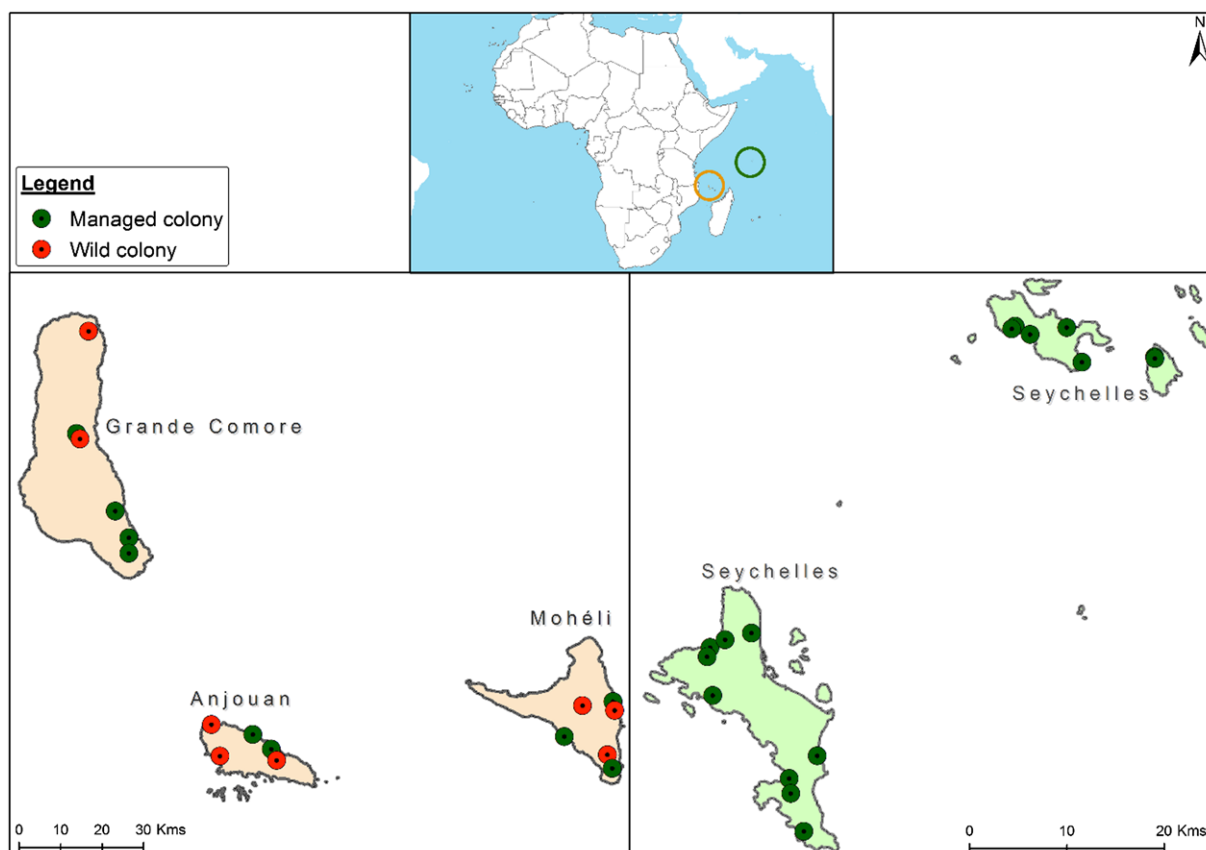


Figure 1. Overview of the South Western Indian ocean islands and sampling sites for *Varroa destructor* in honey bee colonies of Comoros (left) and Seychelles (right).

selected and tested for *Varroa* presence. In apiaries with less than five colonies, all colonies present at that site were sampled (see Supplementary Table S1 for further details). Wild colonies were identified with the help of local beekeepers, in rocks and tree cavities in the vicinity of villages. The presence of *Varroa* mites was determined using a standard sugar roll assay following the method of Ellis and Macedo (2001). Brood was also examined for *Varroa* presence, with particular attention given to drone brood. From each colony, 200 worker brood cells were randomly opened and pink-eyed pupae pulled out of the cells. The same was done with drone brood cells, up to a maximum of 50 cells. Drone rearing is seasonal, hence from some colonies, no drone brood could be investigated.

## Results and Discussion

All the 125 colonies sampled across the two countries (six islands) were negative for *Varroa*, both in adult bees and brood. *Varroa* has been reported in neighboring Indian Ocean islands of Mauritius, Zanzibar, Madagascar, and Réunion. We report on the status of *Varroa* in the islands of Seychelles and Comoros where *Apis mellifera unicolor* is endemic (Techer et al., 2016, 2017). Considering the high movement of people and materials between these islands, there is a high likelihood of introduction of the mite into Seychelles and Comoros in the near future. Moreover, these islands are small in size (10.08–1,025 km<sup>2</sup>) and the spread of the mite across the local honey bee population could be fast, complicating management strategies. We recommend that quarantine protocols and sentinel apiaries are established near ports of entry to minimize the risk of introduction of the mites and for fast detection in case *Varroa* is introduced.

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## Supplementary Material

Supplementary material is available for this article at: <http://dx.doi.org/10.1080/0005772X.2018.1522835>.

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