Aspects of the mechanisms of tolerance in *Apis mellifera scutellata* colonies to *Varroa destructor* mite in Kenya

Beatrice T. Nganso[1], Ayuka T. Fombong[1], Abdullahi A. Yusuf[2], Christian Pirk[2], Baldwyn Torto[1]
[1]International Centre of Insect Physiology and Ecology (*icipe*), Kenya
[2]University of Pretoria, South Africa
bnganso@icipe.org

INTRODUCTION

Varroa destructor mite is considered one of the greatest threats to honey bee colonies worldwide, causing physical injury and transmitting pathogens to the bee host. Among the existing management options for the mite is selective bee breeding to enhance traits that contribute to resistance. Grooming is a behavioural trait employed against the mite, and has been demonstrated to reduce infestations in its original host species *Apis cerana* (found in Southeast Asia) and *A. mellifera* L. (especially the Africanised honey bees in Brazil). However, similar information is lacking for African honey bee subspecies, which the mite appears to minimally affect. Here, we highlight aspects of the mechanisms of tolerance in *Apis mellifera scutellata* in Kenya to *Varroa destructor* with a focus on the grooming behaviour.

OBJECTIVES

To establish and quantify the types of damage that the grooming behaviour of *Apis mellifera scutellata* colonies inflicts to *Varroa destructor.*

METHODS

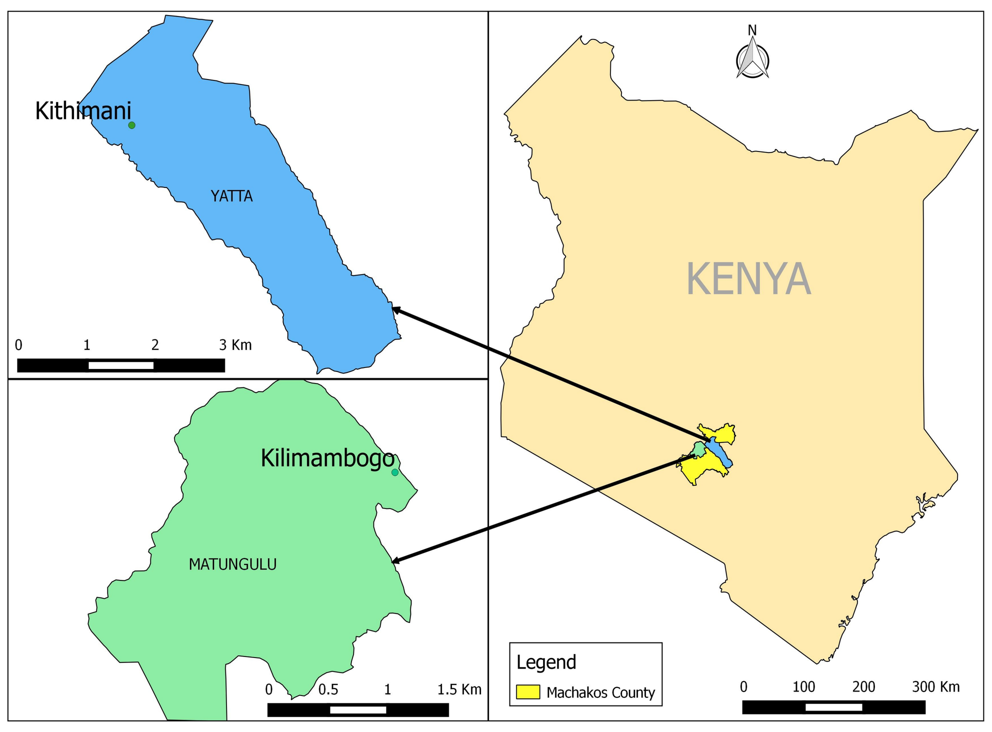

Fig. 1. Study Sites

Fig. 2. Inspecting the modified bottom board for fallen mites

Study design

We used established colonies to study the effect of grooming on *Varroa*, respectively for 7 and 10 colonies at Kilimambogo and Kithimani, in eastern Kenya. Each colony had its original bottom board replaced by a modified one equipped with a screen mesh and retractable floor to allow mite collection without interfering with the bees. A white glossy smooth ivory board coated with Vaseline® was used to collect fallen mites daily from each colony for 7 days. Collected mites were counted and their sustained damaged categorised (according to Correa-Marques *et al.* 2002) and quantified under a microscope.

RESULTS

Fig. 3. Percentage damaged *Varroa destructor* collected in the frass of *A. m. scutellata* colonies at Kithimani and Kilimambogo

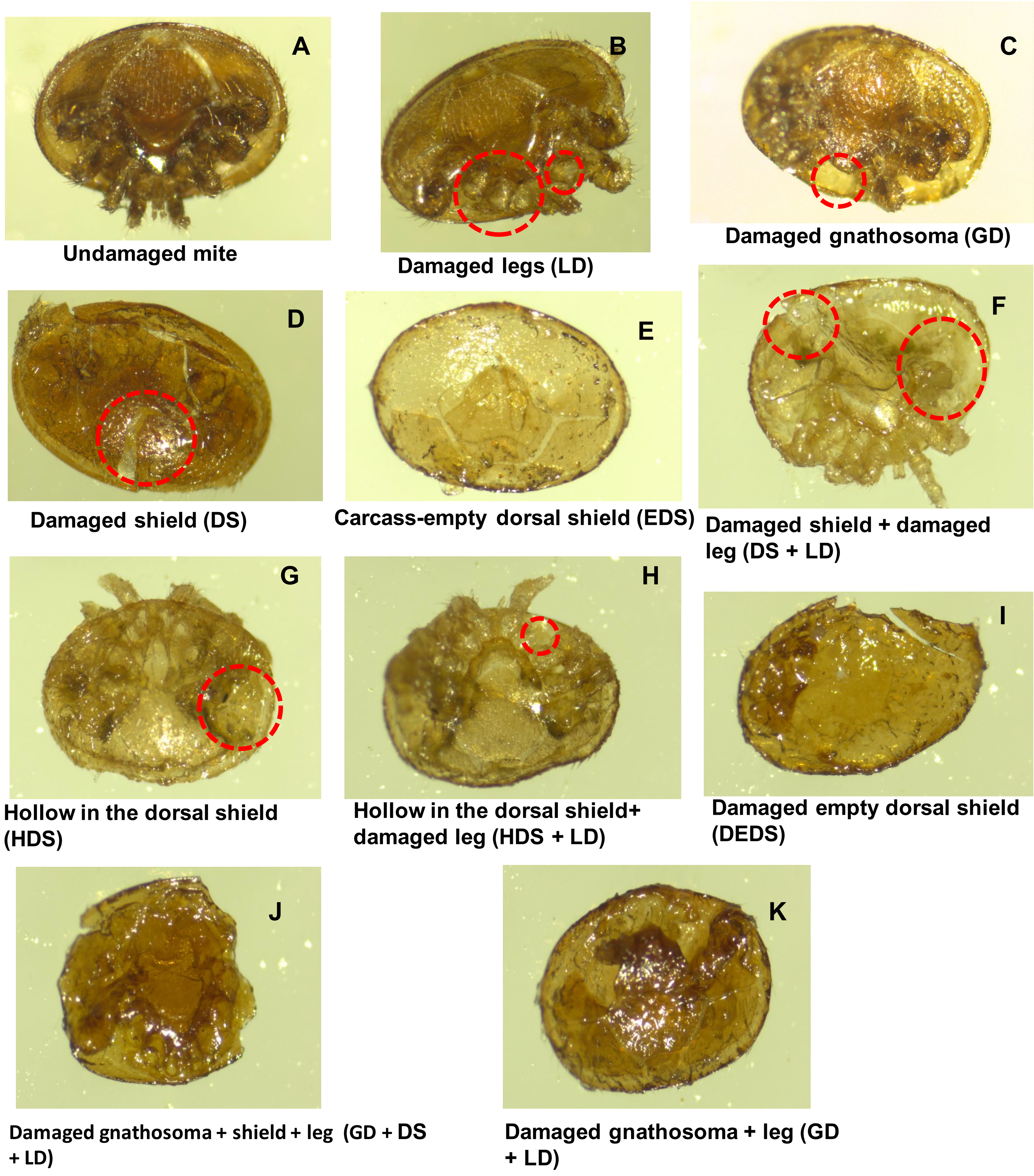

Fig. 4. Undamaged mite (A), and observed damage patterns on *V. destructor* recovered from *A. m. scutellata* colonies in Kenya. A-H= damage patterns (after Correa-Marques *et al.* 2002); I-K= newly reported damage

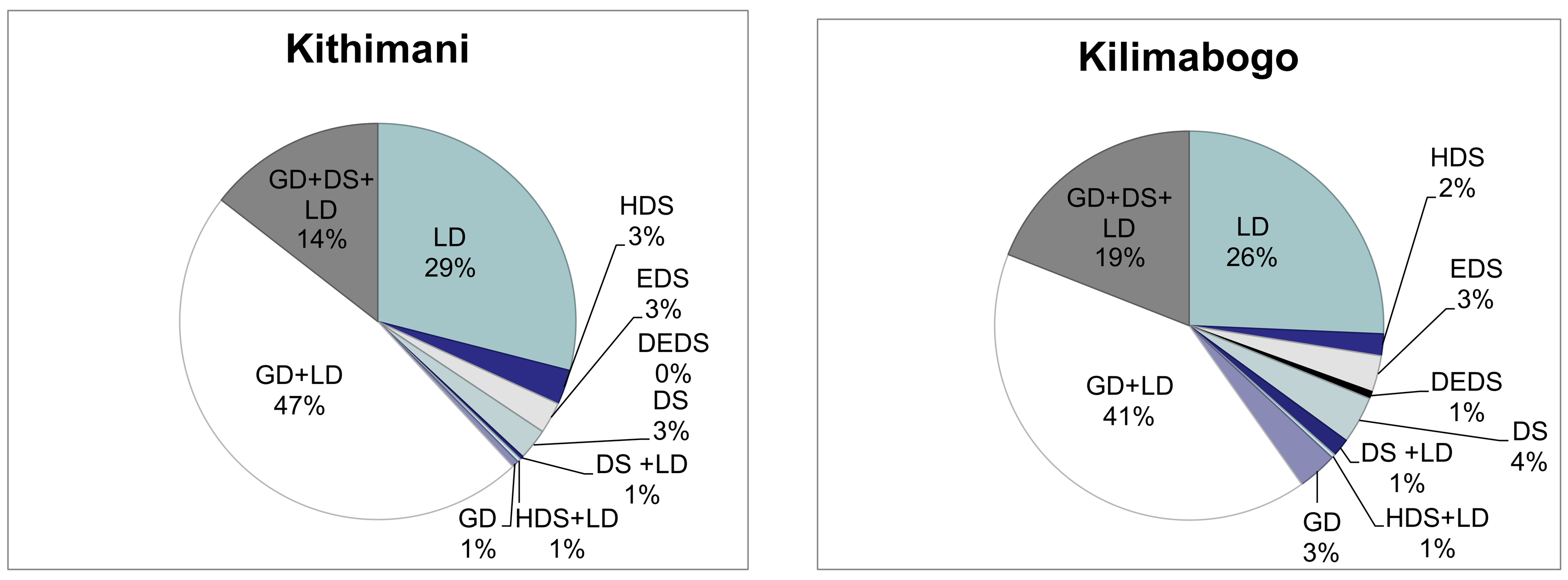

Fig.5. Summary graph showing the average percentage of damaged mites at each apiary during the collection periods (August and September).

CONCLUSIONS

- *Apis m. scutellata* damage on mites appears lower when compared to its European counterparts (*A. m. ligustica* 26.4 to 35.8%; *A. m. carnica* 42.3%; Africanised honey bees 37%). However, more leg damage was observed in Kenya than previously reported, which is suggestive of the role grooming plays in tolerance to *Varroa* in African honey bees.
- The proportion of damaged mites was similar between both study sites with gnathosoma and leg damage being the most prevalent.

WAY FORWARD

- Quantify hormonal changes in the haemolymph of honey bees that trigger grooming behaviour in *A. m. scutellata* colonies.

icipe
African Insect Science for Food and Health

International Centre of Insect Physiology and Ecology (*icipe*)
P.O. Box 30772-00100, Nairobi, Kenya
Tel: +254 (20) 8632000. E-mail: icipe@icipe.org

USDA
DAAD Deutscher Akademischer Austausch Dienst German Academic Exchange Service
UNIVERSITEIT VAN PRETORIA UNIVERSITY OF PRETORIA YUNIBESITHI YA PRETORIA
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