



Diversity of honey bee (*Apis mellifera*) subspecies and their pests in Cameroon

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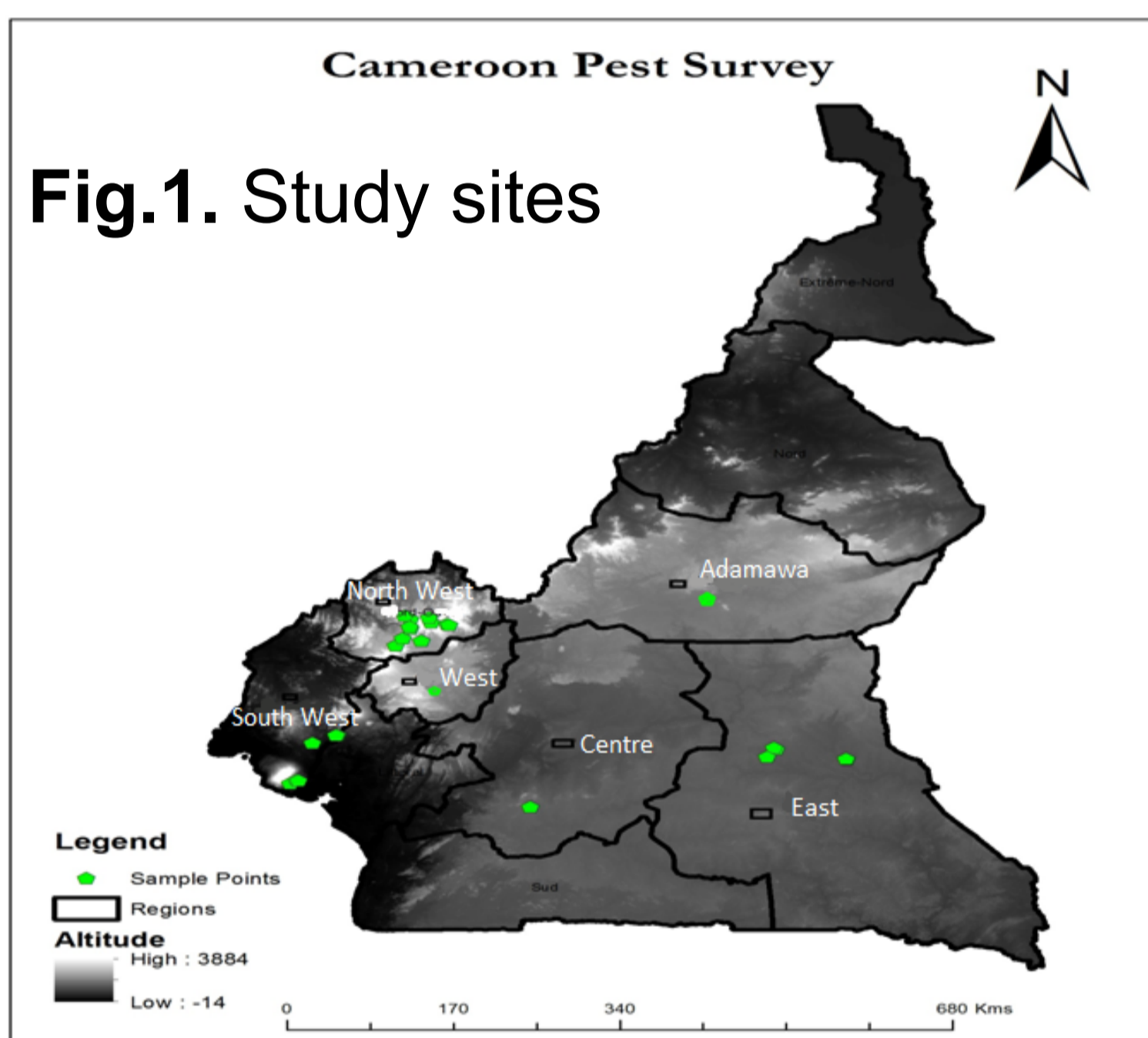
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INTRODUCTION

Recent global honey bee colony decline poses a substantial threat to food security worldwide, and has been linked to a myriad of factors (including pathogens, diseases, pests, and pesticides). Among these, pests are the most damaging given their ability to inflict both direct and indirect damage via physical injury, and to transmit disease. At the top of this list is *Varroa* mite. In Africa, impact of honey bee pests on colony decline remains understudied, with a small number of reports of tolerance and susceptibility involving different bee subspecies. In the Central African region and Cameroon, little information exists on honey bee subspecies and their associated pests. This study was, therefore, initiated to fill this knowledge gap.

METHODS



Study sites

The study took place in the savannah highland zones of the North West (NW), West and Adamaoua, the lowland evergreen forest zone of the South West (SW), and the lowland evergreen degraded forest zones in Central and East (Fig.1). These represent the major honey-producing areas of Cameroon.

Inspecting colonies, and collecting and processing samples

Over 133 honey bee colonies in 23 apiaries distributed in 20 localities were assessed throughout this study. Colony assessment took place during the dry, minor wet (mW), and major wet (MW) seasons, in both modern hives [Kenya Top Bar (KTB)] and traditional [Cylindrical Indian Bamboo (CIB) and Cylindrical Log (CL)] hives. Honey bee races and pests were processed and identified using morphological features.

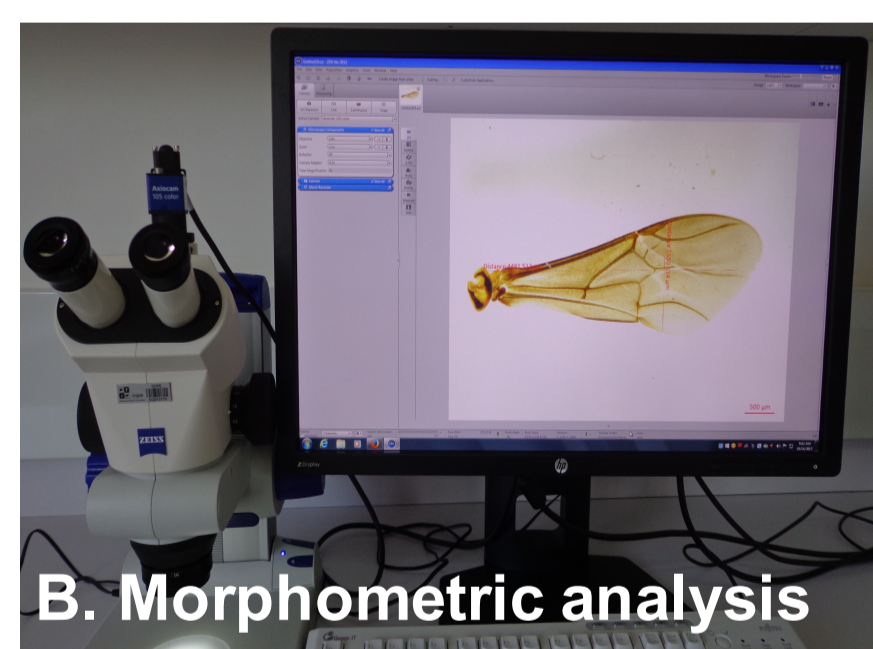


Fig. 2. Colony inspection (A), and morphometric analysis (B), of honey bees and pest samples

CONCLUSION

- Honey bee populations in Cameroon are under pressure from diverse arthropod pests, including *Varroa* mite.
- Agroecological zone, hive design, and seasonality have an affect on pest occurrence, diversity, and abundance.
- There exist at least three ecologically distinct subpopulations of *Apis mellifera* in Cameroon.

IMPACT

Establishment of the occurrence and seasonal dynamics of key honey bee pests in Cameroon will lead to adopting of appropriate control measures in good time to mitigate the negative impact of these pests on beekeeping.

OBJECTIVES

- To assess honey bee colonies for the occurrence of honey bee pests, and determine their prevalence and abundance in Cameroon.
- To establish whether variability of the associated honey bee races exists across different agroecological zones.

RESULTS

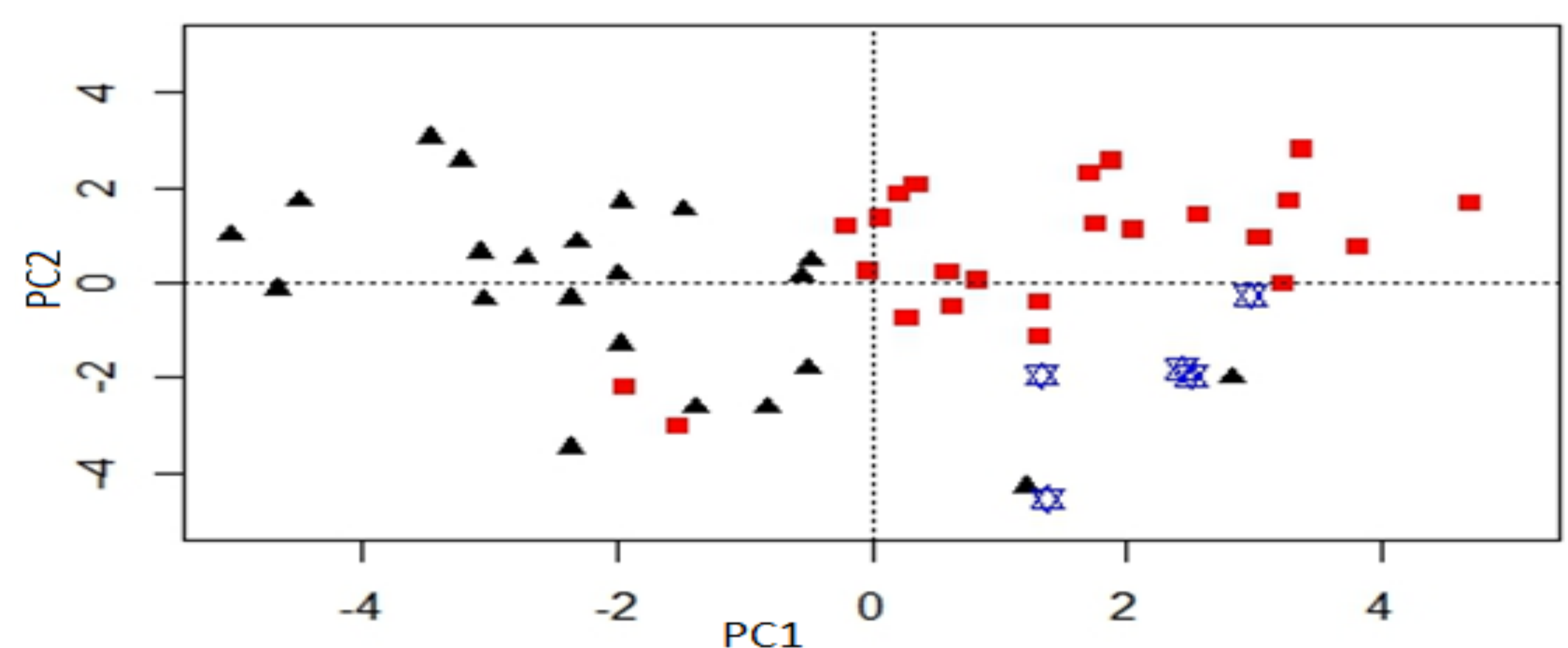
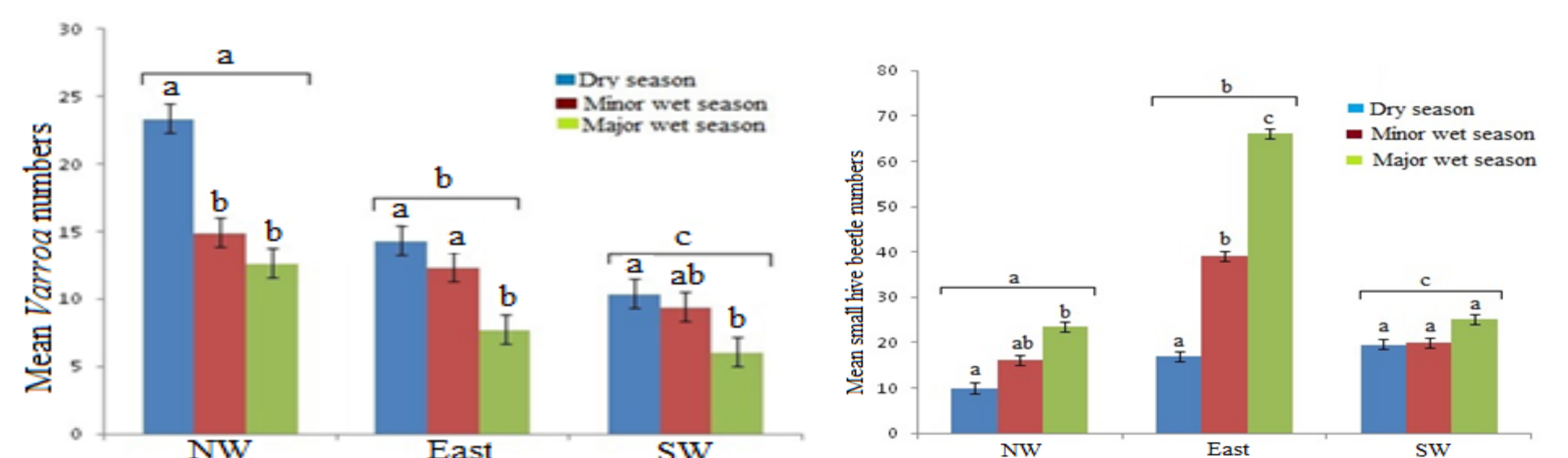


Fig. 4. Scatter plot of principal components 1 and 2 from Principal Component Analysis (PCA) based on colony means of 18 morphometric characters.

- ▲ = Bee populations from the highland Sudan savannah zone of the NW
- = Bee populations from the lowland forest regions of the SW, Central and East
- ★ = Bee populations from Adamaoua in the Guinea savannah zone.

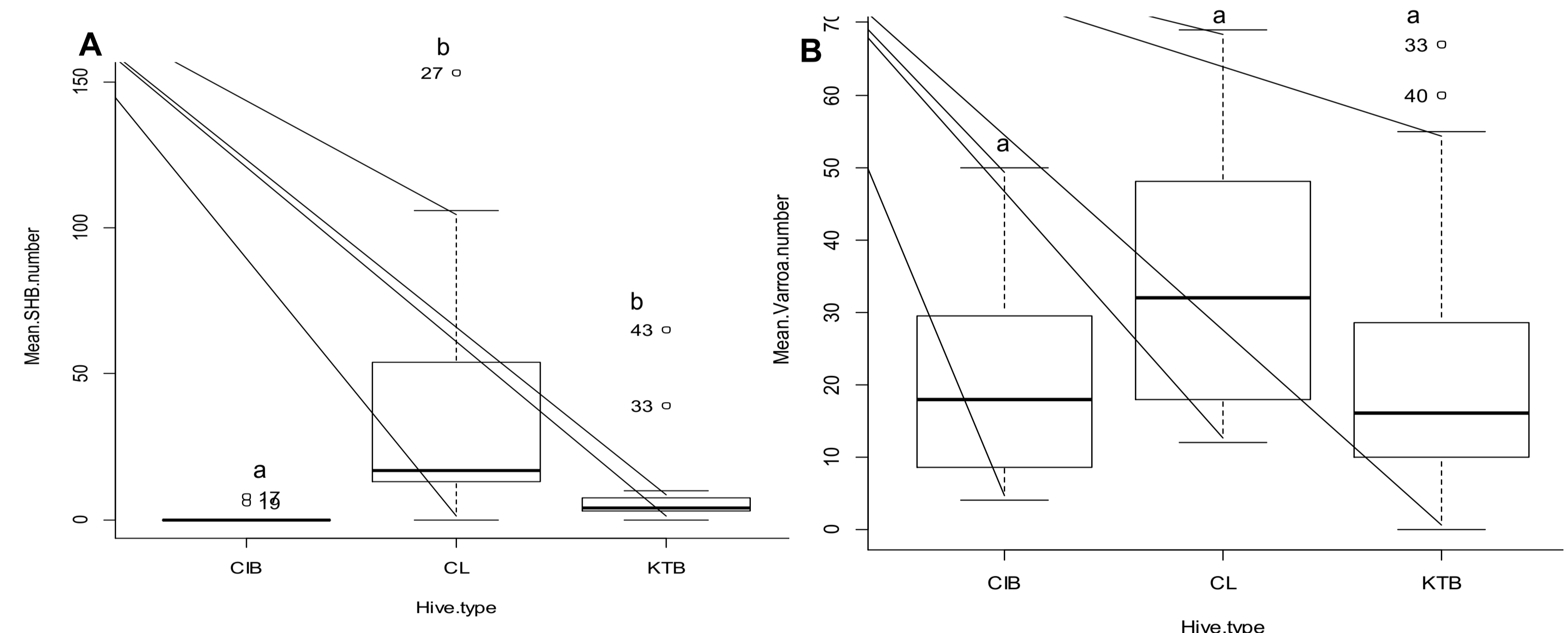


Fig. 5. Effect of hive type on the most abundant honey bee pests: (A) small hive beetle (SHB), and (B) *Varroa* in Cameroon. Pest numbers were estimated for the Cylindrical Indian Bamboo (CIB), Cylindrical Log (CL), and Kenyan Top Bar (KTB) hives. Different letters represent significant differences in pest abundance between hive types (Kruskal-Wallis test followed by Mann-Whitney U tests with adjusted p value).

WAY FORWARD

- DNA typing of honey bee races and their associated pests from different ecological zones
- Experiments on effects of hive designs on colonisation, pest infestation, and establishment.