Occurrence of *Nosema* species in honey bee colonies in Kenya

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Introduction

- Nosemosis is a highly infectious disease of the digestive tract of honey bees
- It is caused by *Nosema*, a microsporidian (Liu *et al.*, 2006).
- It does not have any obvious characteristic symptoms and it is therefore overlooked by most beekeepers(Hornitzky, 2005)
- *Nosema* spores can remain viable for a long time in the hive

Introduction cont...

- The severity of *Nosema* infections varies from one colony to the other (Fries, 2010; Gisder *et al*., 2010)
- honey bee pathogens and pests initially thought to be confined in temperate regions, are spreading out to the tropical climates (Muli *et al*., 2014; Higes, *et al*., 2009).
- The presentation is on findings of a baseline survey on Nosema in different agro-ecological zones undertaken in 2012/2013 in Kenya

Materials and Methods

- **Study area:** carried out in different agro-ecological zones in Kenya with different temperature, annual precipitation, altitude and distance from the coast
- **Sampling technique:** Honey bee samples collected from 72 colonies in 43 apiaries distributed in different agro-ecological zones.
- 30 adult honey bees sampled from each colony, were preserved with 70% ethanol

Sampling technique cont.....

- Standard methods were used for sampling (Traver and Fell, 2011) with 30 bees collected per colony
- Microscopy identification of samples was done in the laboratory.
- Positive samples were quantified using counting chamber (Gary *et al*, 2012).

Data analysis: quantification of spores

- Calculation was done using the formula (Cantwell 1970; Oliver, 2013; Hornitzky, 2005, 2009 and OIE 2008).
- Number of spores per bee = (Total number of spores counted) x (4×10^6) / Number of squares counted

Results

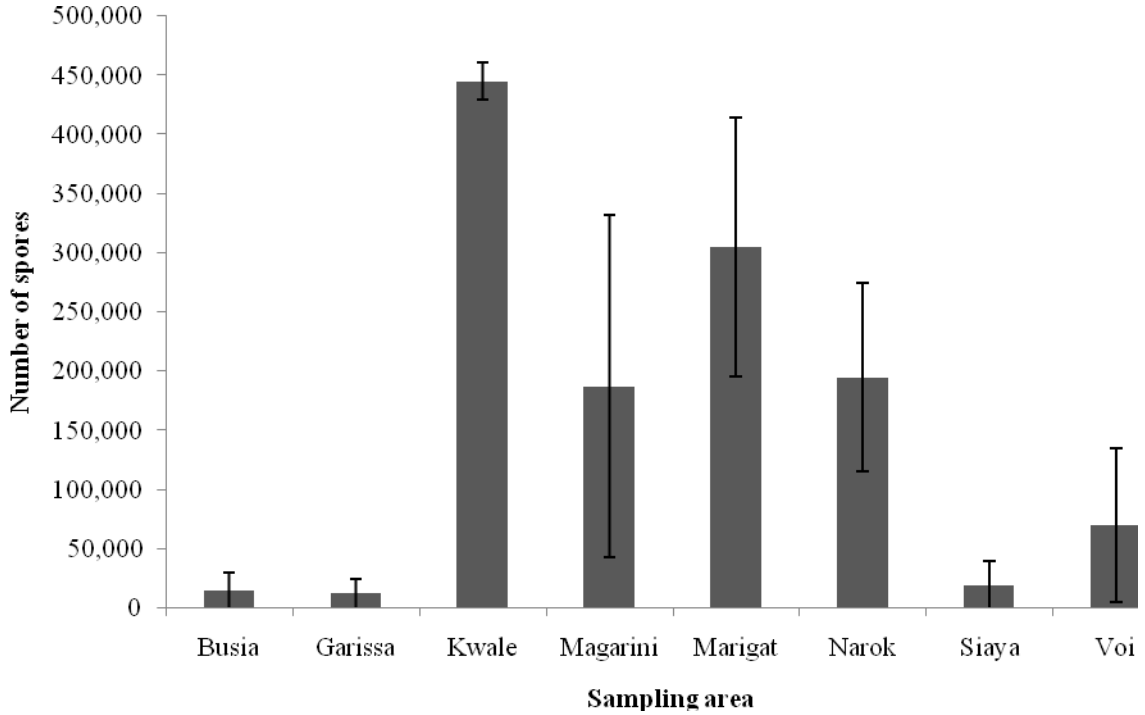
- *Nosema* spores were found in all the sampled sites,
- infection rate of spore density differed significantly ($P < 0.05$) amongst different agro-ecological zones.
- Magarini and Kwale which are within the coastal region had the highest infection per bee

Infection rates of ***Nosema*** in honey bee colonies

Agro-ecological zones (Regions)	Number of Hives (30 bees/Hive)	Number of bees sampled per area	Number of Hives Infected	Highest Number of spores/bee/area
Magarini	8	240	2 (25%)	1,150,000
Kwale	10	300	7 (70%)	1,000,000
Marigat	10	300	5 (50%)	800,000
Narok	10	300	5 (50%)	750,000
Voi	10	300	2 (20%)	650,000
Siaya	10	300	1 (10%)	200,000
Busia	10	300	1 (10%)	150,000
Garissa	4	120	1 (25%)	50,000
Total	**72 (colonies)**	**2,160**	**24**	

Magarini and Kwale fall in the coastal region

Average number of *Nosema* spores in the honey bee hives in different agro-ecological zones in Kenya



Discussion

- This study demonstrated that *Nosema* was present in all the agro-ecological zones sampled despite their diversity in the country.
- This should be a major concern to bee farmers and bee keeping industry
- The findings suggest that, low altitude may have a role in high infestation of the colonies.

Discussions cont…….

- beekeepers in the surveyed areas are neither aware of the *Nosema*'s presence. Thus they would not be able to relate any negative impact in the survival and productivity of their colonies to *Nosema*

Recommendations

- need for a study to reveal the impact of *Nosema* on bee colonies in Africa.
- need to understand the role of various environmental and physical variables in relation to bee diseases
- Establishment of sentinel apiaries to monitor bee diseases in different agro ecological zones should be considered.
- comprehensive survey of bee keepers and sensitization of farmers on better hive management practices and control of disease is needed.

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- AU-IBAR, for this opportunity to present the findings

Thank you for listening

Laboratory analysis remain the solution to bee diseases in Africa