



THE INCIDENCE AND MANAGEMENT OF PEST AFFECTING HONEYBEES IN NIGERIA

*Lawal, A.A., Oyerinde A.A., Asala, S.W. and Anjorin, T.S.

Department of Crop Protection, Faculty of Agriculture, University of Abuja, Abuja.

*Corresponding author email. princeadebowale639@gmail.com

ABSTRACT

This study evaluated the incidence of insect pests of honeybees (*Apis mellifera* L.) and evaluation of management techniques used in Nigeria. Questionnaires were administered in Oyo, Ogun and Osun States in the forest vegetation and Kaduna, Niger and Kano States in the savana vegetation zones of Nigeria. Data obtained were analyzed with parametric statistical tool of mean and Standard Error of Means. The incidence of insect pest affecting honeybees was reported in the forest vegetation zones were as follows: small hive beetles (*Aethina tumida* Murray) (21%), ants (19%), greater wax moth (*Galleria mellonella* Fab.) (14%), spider (10%), large bee beetle (*Oplostomus haroldi* and *Oplostomus fuliginus*) (5%), lesser wax moth (*Achroia grisella* Fab.), (5%) and wasp (5%) while the pests encountered in the savanna vegetation zones include: small hive beetle (21%), ants (17%), greater wax moth has (16%), spider (5%), large hive beetle 21%, lesser wax moth (4%) and wasp. Avoidance of scattering honey bee combs around the apiary was found as the most effective method in preventing spread of insect pests. Other methods include: hive sanitation, hive positioning, handpicking of insects, the use of spent engine oil, regular weeding, fencing of apiary and use of bee pen. The hives painted with green colour was reported by respondent to control wasp, spider, termites and lesser wax moth. The incidence of insect pest of honeybees in the forest and savanna vegetation zones showed that there was no significant difference ($p < 0.05$) in the incidence of *Aethina tumida* and *Araneus* spp among the states in the forest and savannah vegetation whereas *Galleria mellonella* and *Oecophylla smaragdina* were significantly ($p < 0.05$) higher in Niger State while the least incidence was observed at both Osun and Oyo states. *Componotus maculatus* was also significantly ($p < 0.05$) higher in Ogun State while the least incidence was observed in Kaduna State. *Coptotermis formosanus* incidence was significantly ($p < 0.05$) higher in Niger State than the other states. The least incidence of honeybee pest was recorded in Osun and Oyo states.

KEYWORDS: Insect pest, Apiaries, Honeybees, Small hive beetles, Incidence.

INTRODUCTION

Beekeeping is regarded as an agricultural venture with low requirement for land as hives can be placed on stand or hangs on tree and require very little labour and most of the other inputs are considered to be locally available (Bekele *et al.*, 2017). However, the success of apicultural activity depends on the biotic and environmental factors. Honeybee pests have been identified as one of the major biotic factors affecting the successful beekeeping practice in Nigeria which has led to reduction in productivity of honeybee and pollination services (Oyerinde and Ande, 2009). Infestation of hives by different honeybee pest results into the destruction of the hive, honeycomb, brood and some life bees. In beekeeping, the quality of land required is less important because hives are placed either on the trees or on the ground. It is also not competing with other enterprises for resources as the bees use nectar and pollen grains of plants. The honey is not only priced as food but as medicine for healing many ailments (Shu'aib *et al.*, 2009). The honeybee *A. mellifera* is a species of crucial economic, agricultural, and environmental importance. It has spread across the entire world, but its native range is large and

diverse, spanning Europe, Africa, and the Middle East. *A. mellifera adansonii* is about the most common sub species that has been given due attention in Nigeria probably because of its beneficial attributes as a natural agent of pollination and as the most important insect pollinators (Akunne, 2015).

All living organisms are subject to infestation or attack by natural enemies and honey bees are no exception. Despite the honeybees natural defense mechanisms, diseases, parasites and destructive insects may represent a problem for bee colonies. Honeybee pests have been identified as one of the major biotic factors affecting the successful beekeeping practice (Oyerinde and Ande, 2009). The major enemies of honeybees are wax moths, birds, wasps, mites, ants, bee lice, hive beetles, mice, skunks, and bears (Morbe, 1999). Cockroaches, leaf cutter bees, death's head moth, robber flies, dragon flies, praying mantis, spiders (Thakur and Sharma, 1984) are some of the minor pests which cause nuisance to bee colony. Successful beekeeping requires regular and on time monitoring of any factor that endangers honeybee life and threaten their products (Desalegn and Begna, 2015). This study was conducted identify pests

associated with beekeeping in Nigeria and develop appropriate control measures that will foster a successful beekeeping sector in the country.

MATERIALS AND METHODS

Study Area

In this study questionnaires were administered in both forest (Oyo, Ogun and Osun states) and savanna (Niger, Kaduna and Kano states) zones of Nigeria.

Data Collection

Data for the study were gathered from responses of a total number of 240 respondents, *i.e.* 40 from each state. The questionnaires were administered to members of the Federation of Beekeepers Association of Nigeria (FEBKAN) in each of the study sites. Responses were obtained from

beekeepers and analyzed with the use of descriptive and inferential analytical tools such as percentages and charts.

RESULTS AND DISCUSSION

Incidence of Insect Pest of Honeybees in Forest Vegetation Zones of Nigeria

The percentage representation of the overall incidence of pest that had adverse effect on beekeeping in forest vegetation zone were presented in Figure 1. The smaller hive beetle recorded the highest incidence as it was found across the study area (21%). Ants (19%), greater wax moth (14%), spider (10%), large bee beetle (5%), lesser wax moth (5%) and wasp (5%) was also reported as pest of honeybees in the various states in the zone.

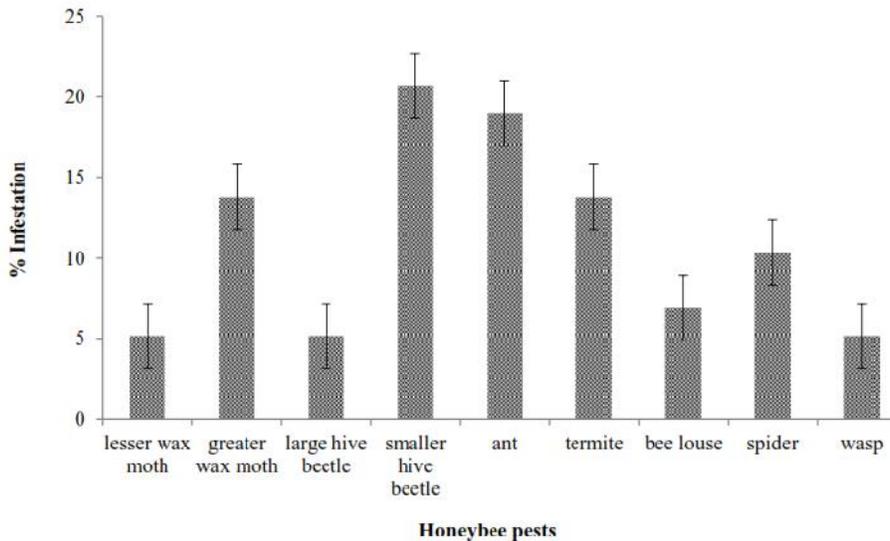


FIGURE 1: Incidence of Insect Pest of Honeybees in Forest Vegetation Zones of Nigeria

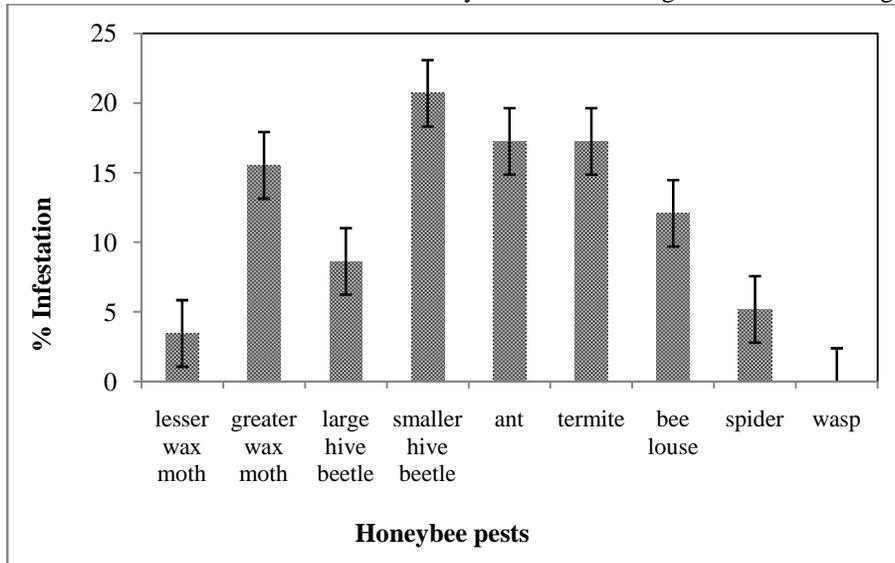


FIGURE 2: Incidence of Insect Pest of Honeybees in Savanna Vegetation Zones of Nigeria

Incidence of Insect Pest of Honeybees in Savanna vegetation Zones of Nigeria

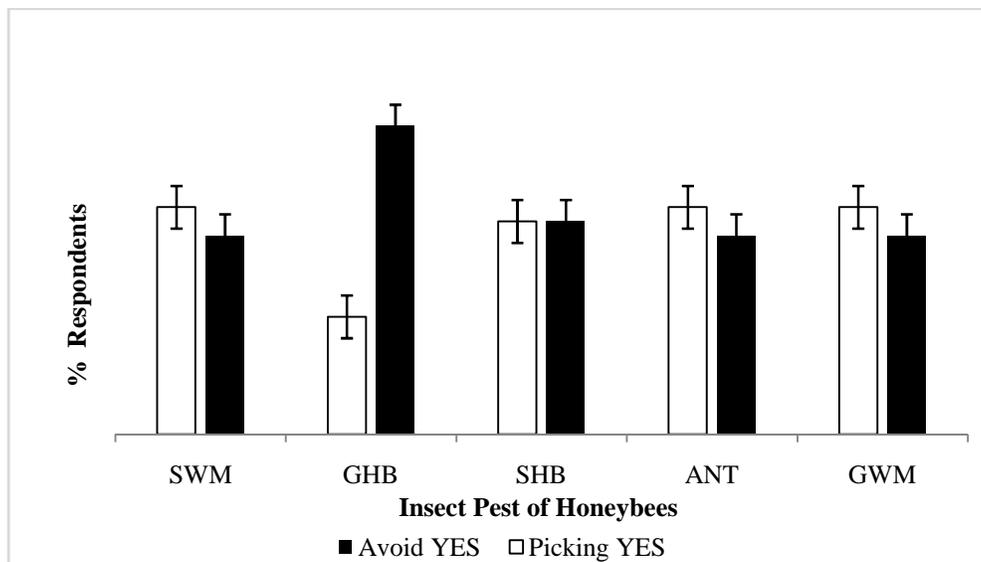
Incidence of pests that had adverse effect on beekeeping in savanna vegetation zone was presented in Figure 2. The smaller hive beetle and large hive beetle recorded the highest prevalence in the study areas (21%). The insect was reported to causing significant harm by feeding on honey, pollen, brood and beeswax. These findings conform to earlier report by Benda *et al.* (2008) on the economic importance of small hive beetle in the tropics. Ants 17%, greater wax moth 16%, spider 5% and lesser wax moth 4%.

Method used to prevent infestation and Control Honeybee Pests in Nigeria

Picking and Avoidance of Scattering Combs in Forest and Savana Vegetation of Nigeria

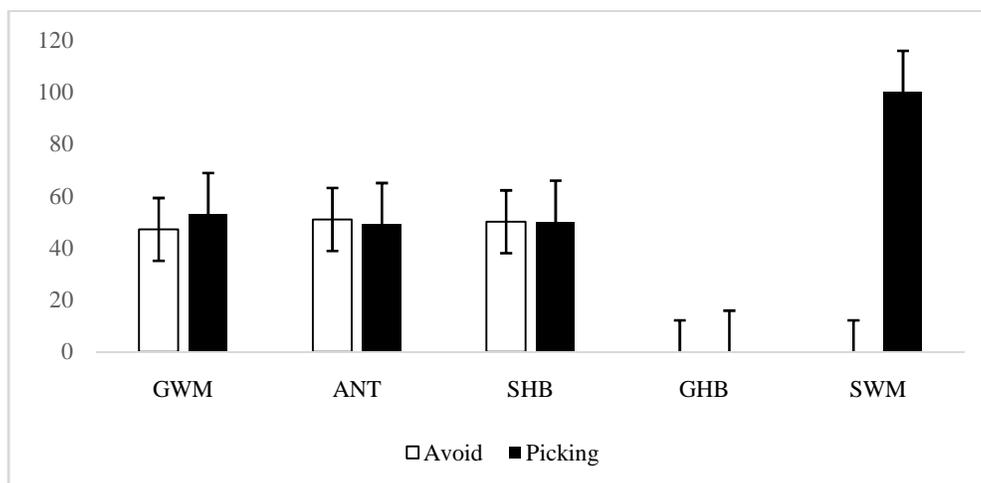
Respondents affirmed that avoidance of scattering of combs and picking within and around the apiary reduced greater

wax moth to 45% and 55%, large hive beetle to 72% and 28% , small hive beetle 50% and 50%, ant 45% and 55% and greater wax moth 45% and 55% respectively, while avoidance of scattering of combs and picking in apiaries sited in the savana zone also minimized the infestations of greater wax moth to 45% and 55% , ants 55% and 45%, small hive beetle has 50% in both of the control methods, greater wax moth had 100% incidence with picking, *A. tumida* and *G. mellonela* were best controlled by maintaining healthy and robust honeybee colonies (Figure 4). Strong colonies was earlier reported as not having issues with moths and other secondary pests (Anonymous, 2010). This can be linked to the activity of the worker bees that kill and evict lesser wax moth larvae and seal areas where adult moths may lay eggs.



key: greater wax moth (GWM), smaller hive beetle (SHB), large hive beetle (LHB), lesser wax moth (LWM).

FIGURE 3: Evaluation of Picking and Avoidance of Scattering Combs in Forest Vegetation Zones of Nigeria

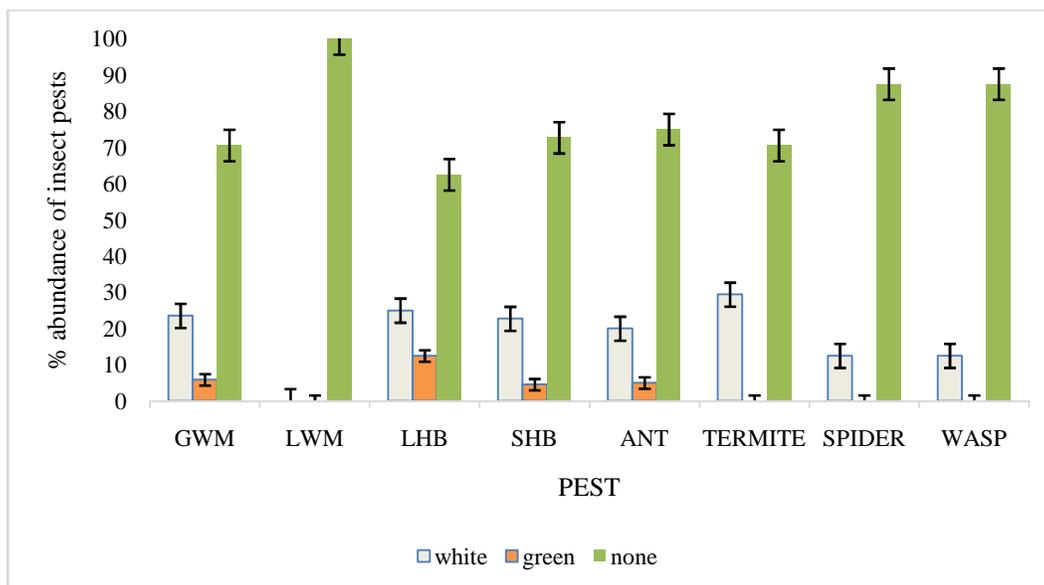


KEY: greater wax moth (GWM), smaller hive beetle (SHB), large hive beetle (LHB), lesser wax moth (LWM). **FIGURE 4:** Evaluation of Picking and Avoidance of Scattering Combs in Savanna Vegetation Zones of Nigeria

Hive Colour

Respondents reported abundance of insect pest of honeybees in relationship with the colour of beehives as shown in (Figure 5). Hives painted with green paint were reported to prevent wasp, spider, termites and smaller wax moth infestations while hives without paints recorded greater wax moth, small hive beetle, ant and termites at 50% level of abundance. Painting of hives does not only prevent invasion

by insect pest but also protect the outer surfaces of hives from sun, rain and temperature fluctuations which at most time decrease the shelf life of the wood. Painting hives with white colour also prevent it against excessive temperature while hives painted in green repels insect pest. This corroborates the earlier submission of need for painting of bee hives to increase shelf live and retard pest invasion (DADANT, 2018).



KEY: greater wax moth (GWM), smaller hive beetle (SHB), large hive beetle (GHB), lesser wax moth (LWM).

FIGURE 5: Effect of Hive Colour on Abundance of Insects Pest of Honeybees

Use of Spent Engine Oil and Grease in the Control of Insect Pest of Honeybees in Nigeria

One of the methods used by beekeepers to control the incidence of ant and termite was the application of grease and spent engine oil on hive stands as shown in (Figure 6). Termites neither consume honey nor feed on the honeybees but caused a lot of harm hindering the productivity of honeybees by feeding on the wooden part of the bee hives, and wooden beekeeping equipment (MAAREC, 2000). Report on termite infestation of hives recorded in this study was in line with the problems posed by termites on bee hives (Oyerinde and Ande, 2009). The respondents also reported

the efficacy of grease in the control of termites. Beekeepers that did not use grease on their hive stand reported the incidence of ant up to 65% while farmers that applied grease recorded 8% ant infestation.

In addition, respondents in the savana zone of Nigeria reported the efficacy of grease in the control of termites with an incidence of 12% in the treated hives and beekeepers that did not use grease on their hive stand reported up to 88% incidence of termite. Likewise respondents also observed that the incidence of ant was as low as 13% in the treated hives and 87% when the control measure was not applied (Figure 7).

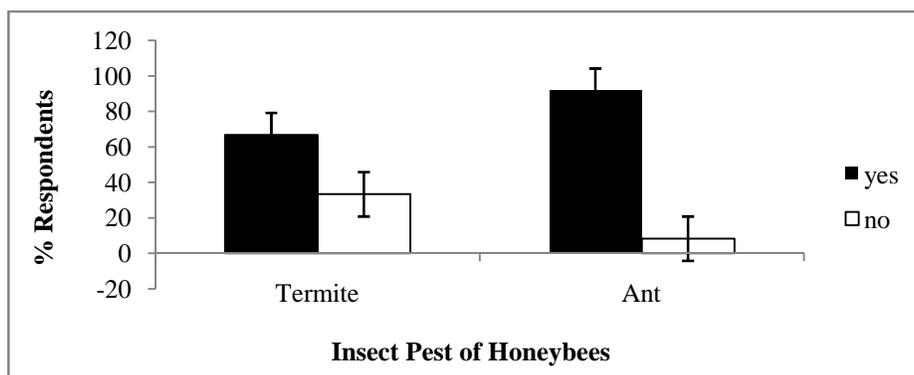


FIGURE 6: Effectiveness of Spent Engine Oil in the Control of Termites and Ants of Honeybees in Forest Vegetation Zones of Nigeria

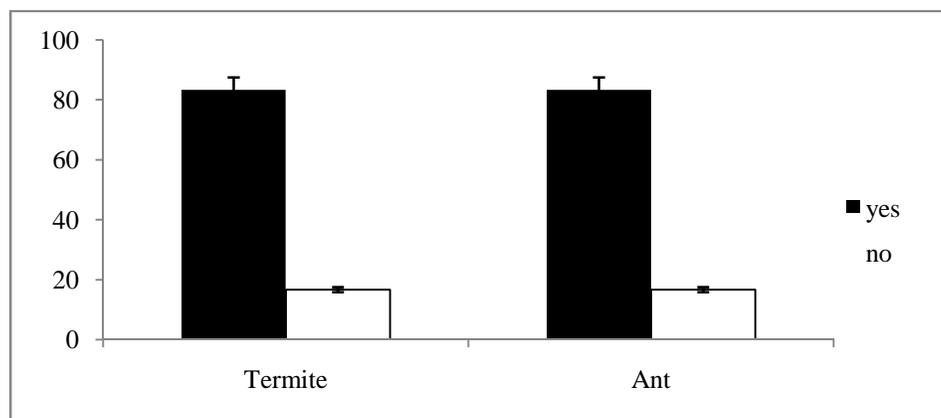


FIGURE 7: Effectiveness of Spent Engine Oil in the Control of Insect Pest of Honeybees in Savannah Vegetation Zones of Nigeria

CONCLUSION

The findings showed that the prominent pests of honeybees in Nigeria include: *A. tumida*, *C. maculatus*, *O. smaragdina*, *G. melonella* also painting of bee hives was effective in control of insect pests. The hives painted in green colour was found to be less attractive to the honeybee pest and recorded minimal infestation. *A. tumida* has the highest incidence in the two vegetation zones, while *G. mellonella* and *Araneus* sp occurred only in the forest zones. 100% of the respondent agreed to embark on beekeeping at a commercial scale if all the menace are curbed which will obviously increase the productivity of honeybees and its product

REFERENCES

- Akunne, C.E. (2015) *The Rudiments of Beekeeping*. Divine Press and Publishers, Awka, Nigeria, pp. 52.
- Anonymous (2010) Wax moth. The food and environment Research agency, New Zealand, National bee unit.
- Arias, M.C. and Sheppard, W.S. (2005) Phylogenetic relationships of honey bees (Hymenoptera: Apinae: Apini) inferred from nuclear and mitochondrial DNA sequence data. *Mol. Phylogenet. Evol.*, 37:25–35.
- Barassa, P. (2005) Assessment of farmers' awareness and perceptions on local control methods of pests and diseases in Agro-forestry system of Budongo sub-county, Masindi district, Uganda *Journal of Agricultural science* pp 520-529.
- Bekele T., Genet D. and Temaro G. (2017) Assessment of honeybee enemies (pests and predators) in Bale zone, southeastern Ethiopia. *Journal of Agricultural Extension and Rural Development*. Vol.9(4), pp. 53-61.
- Benda, N.D., Boucias, D., Torto, B. and Teal, P. (2008) Detection and characterization of Kodamaeohmeri associated with small hive beetle *Aethinatumida* infesting honey bee hives. *Journal of Apicultural Research* 47(3): 194-201.
- Chantawannakul, P., de Guzman, Li J. and Williams G.R. (2016) Parasites, pathogens, and pests of honeybees in Asia. *Apidologie*; 47:1–24. doi: 10.1007/s13592-015-0407-5.
- Chala, K., Taye, T., Kebede, D. and Tadele, T. (2012) Opportunities and challenges of honey production in Gomma district of Jimma zone, South-west Ethiopia. *J. Agric. Ext. Rural Dev.* 4(4):85-91.
- Desalegn, B. & Begna, A. (2015) Occurrences and distributions of varroa mite (*Varroa destructor*) in Tigray regional state, Ethiopia *J. of Livestock and Fisheries*, 2015 2.3, <http://dx.doi.org/10.4172/2332-2608.1000126>.
- Dadant (2018) Learn painting hives. Retrieved from <http://www.dadant.com/learn/painting-hives-right-way/>.
- Mid Atlantic Apiculture Research and Extension Consortium (MAAREC 2000) Pests of honeybees. MAAREC Publication 4.3 February 2000. Available online <http://MAAREC.cas.psu.edu>
- Morhe, R.A. (1999) *Honeybee Pests, Predators and Diseases*. Cornell University Press, Ithaca, New York, USA 8: 30-42
- Oyerinde, A.A. and Ande, A.T. (2009) Distribution and impact of honey bee pests on colony development in Kwara State, Nigeria. *J. Agric. Soc. Sci.* 5:85-88.
- Shu'aib, A.U., Kyiogwom, U.B. and Baba, K.M. (2009) Resource- Use Efficiency of Modern Beekeeping in Selected Local Governments Areas of Kano State, Nigeria. *Proceedings of the 23rd Annual National Conference of Farm Management Society of Nigeria*, held at Usumanu Danfodio University Sokoto, Sokoto Nigeria, 14th–17th December, 2009. pp. 630-634
- Thakur, A.K. and Sharma, O.P. (1984) The spider as bee enemy. *Journal of Bombay Natural History Society*, 81(1): 208-211.