

18th ACA Annual Cashew Conference & Expo



## BUILDING CAPACITIES FOR A SUSTAINABLE AFRICAN CASHEW INDUSTRY



Sofitel Cotonou Marina Hotel & Spa  
**Cotonou, Benin**  
17 - 20 September 2024



# Cashew Tree Health Status in Nigeria: Survey of Diseases and Insect Species

Adeniyi, D. O., Adebola, P. O., Asogwa, E. U., Adeji, A. O., Onifade, E. O., Olorunfemi, G.T.B. and Adedoyin, A. O.

Thursday 19<sup>th</sup> September, 2024



# Introduction

- Cashew is faced with a number of challenges
- Which have threatened productivity or compromise quality
- More than half of fruit crops are lost to pest (Vayssieres et al., 2019)
- Vegetative organs and fruits are severely affected by many insect species (Agbeton et al., 2014; Anato et al., 2015)
- Damages caused by different pest at same time is a complex
- Which have significant effect on quality and quantity of cashew nuts



# Introduction (2)

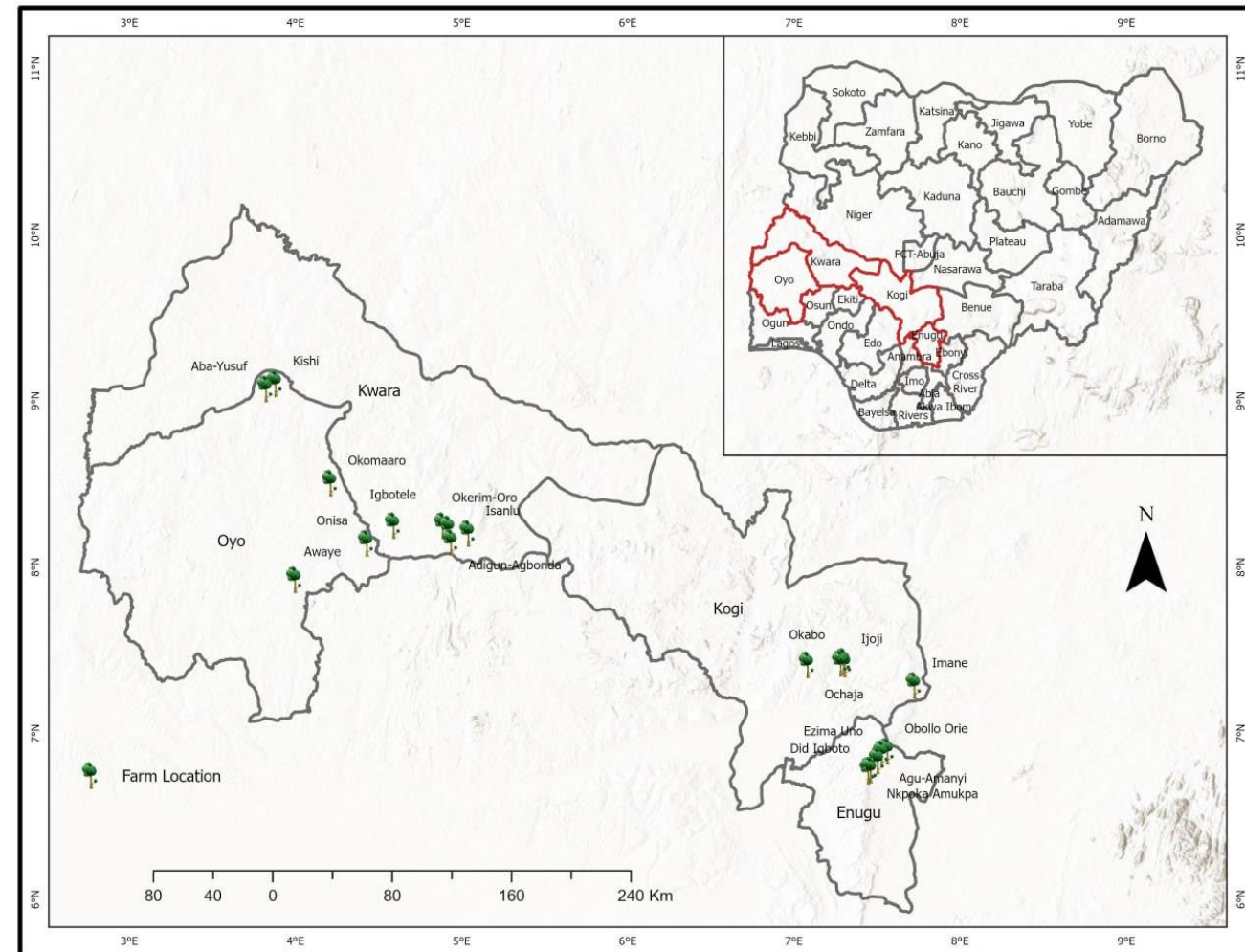
- Factors contributing to this complexity include
- Interlocking canopies, poor practice, high humidity etc
- These foster growth of multiple pathogens
- Making it difficult to control one disease without inadvertently exacerbating another (Adeigbe et al., 2015)
- Planting materials resistant to major diseases are rare (Adeniyi and Olufolaji, 2006)
- Lack of proper agronomic practices to mitigate disease spread also a factor of the complexities (Baba and Eka, 2014)

# Materials and Methods

Study state:

- Kogi, Kwara (North Central)
- Enugu (South East)
- Oyo (South West)
- Five farms randomly selected and surveyed
- Total of twenty farms evaluated for cashew health update

Figure 1: Map of Nigeria; cashew health study farm





# Materials and Methods (2)

- The trees were observed and evaluated based on symptoms and expressions of diseases
- And damages caused by insect species on cashew parts: leaves, flowers, twigs, apple, nuts and trunk
- The evaluations were carried out at pre-flowering, flowering / fruiting and post fruiting stages
- A one-hectare of cashew trees was mapped out on each farm
- Ten trees were randomly selected through a zig-zag movement through the farms and selected trees were tagged



# Results

- Sixteen disease expressions were recorded on cashew parts
- Anthracnose, leaf spot, chlorosis, dieback, rust, blight, bacteriosis, gummosis and suspected powdery mildew
- Disease distribution vary from farm to farm in selected location
- Also the update recorded thirteen insect species both pest and beneficial

# Results (2)

Figure 2a: Distribution of diseases in study farms

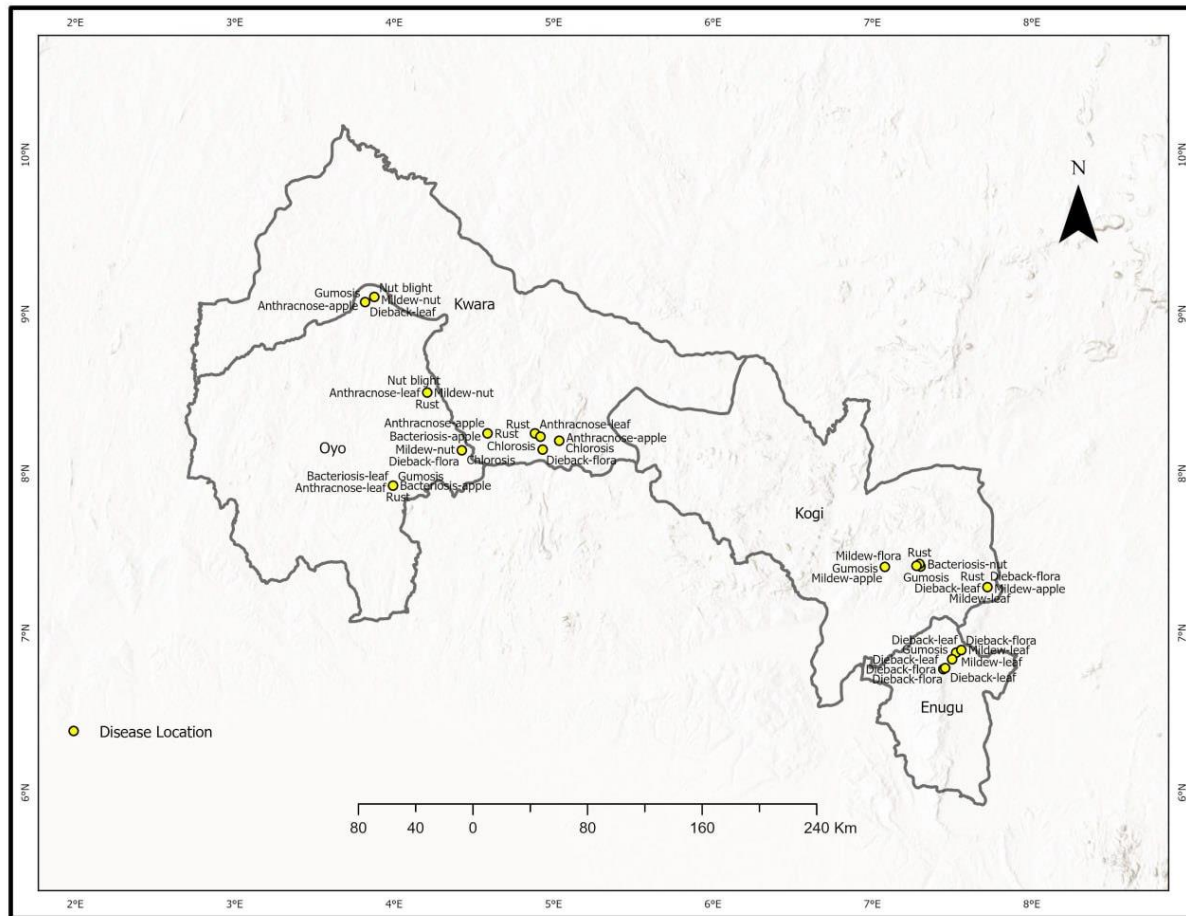
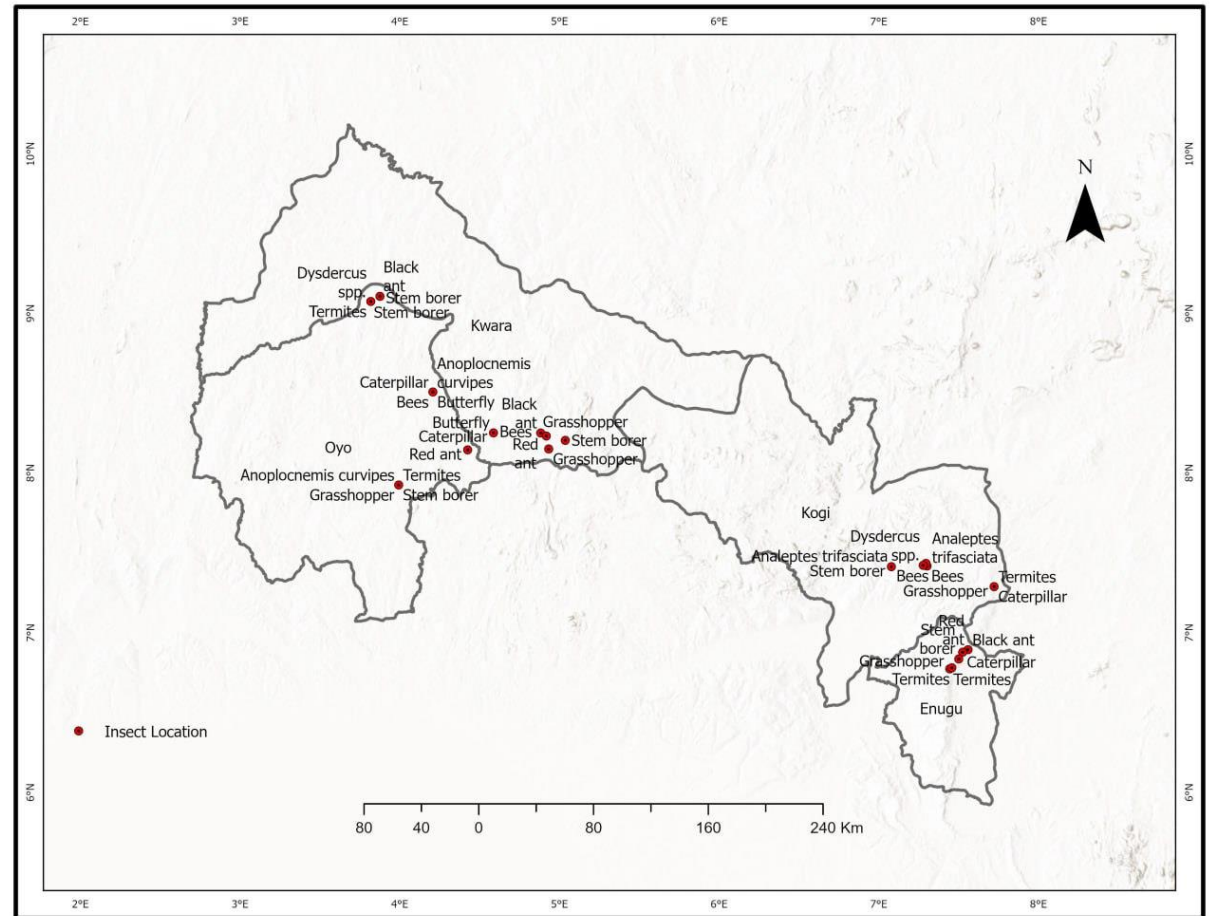


Figure 2b: Distribution of insect spp. in study farms



# Results (3)

Figure 3: Expression of anthracnose



Figure 4: Expression of bacterial leaf spot





# Results (4)

Figure 5: Expression of chlorosis



Figure 6: Expression of rust on cashew



# Results (5)

Figure 7: Suspected fresh infection of powdery mildew on leaves (A) and flower (B)



Figure 8: Suspected advance powdery mildew situation on leaves



# Results (6)

Figure 9: Dieback on flowers (A) and twig (B)



Figure 10: Suspected powdery mildew on apples



# Results (7)

Figure 11: Anthracnose on apple



Figure 12: Expression of Bacteriosis on apples



# Results (8)

Figure 13: Suspected powdery mildew on nuts    Figure 14: Cashew nut blight



# Results (9)

Figure 15: Gum exudation on infected trees



# Results (10)

Figure 16: *Analeptes trifasciata* and damages cause



Figure 17: Exudate from holes by stem borers



# Result (11)

Figure 18: *Helopeltis* spp: Wrinkled and folded leaves



Figure 19: *Helopeltis* spp: Curled leaves (A) and twig dieback (B)





# Result (12)

Figure 20: *Pseudothoraptus devastans*;  
Apple deformation



Figure 21: *Helopeltis schoutedeni*



# Result (13)

Figure 22: Leaf miner caused by *Eteoryctis gemoniella*



Figure 23: *Dysdercus* spp. on leaf



# Result (14)

Figure 24: *Nasutitermes* spp. infestation (A), termitarium on farm (B)

Figure 25: Caterpillar worms: Leaf perforation



# Result (15)

Figure 26: Grasshopper: Perforation of leaves



Figure 27: Grasshopper: Damage to apple



# Result (16)

Figure 28: *Anoplocnemis curvipes*: Damage effect on young nut



# Result (17)

Figure 29: *Oecophylla longinoda*  
(Beneficial)



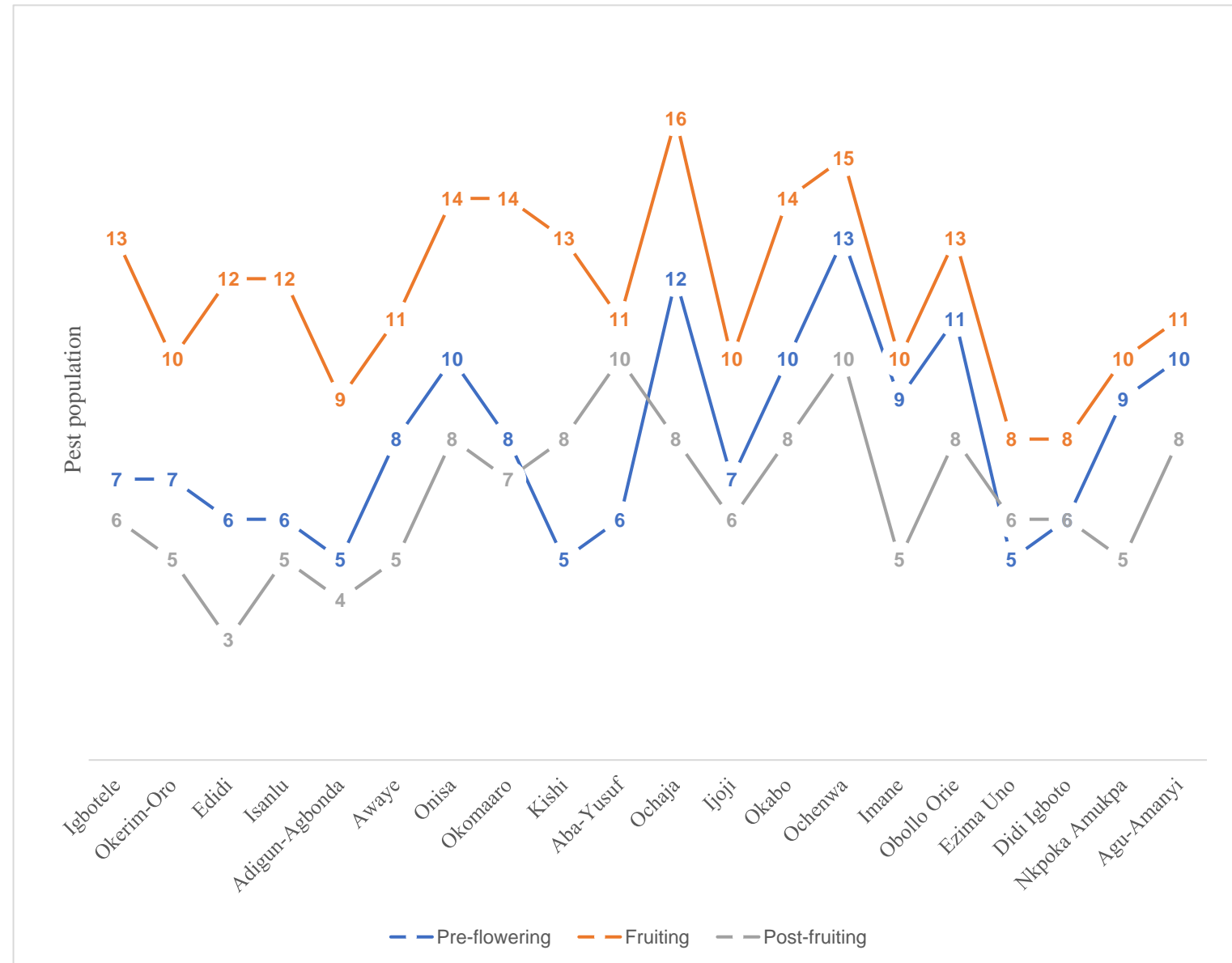
Figure 30: Bees (Beneficial)



Figure 31: Pest population and distribution in study farms

## Results (18)

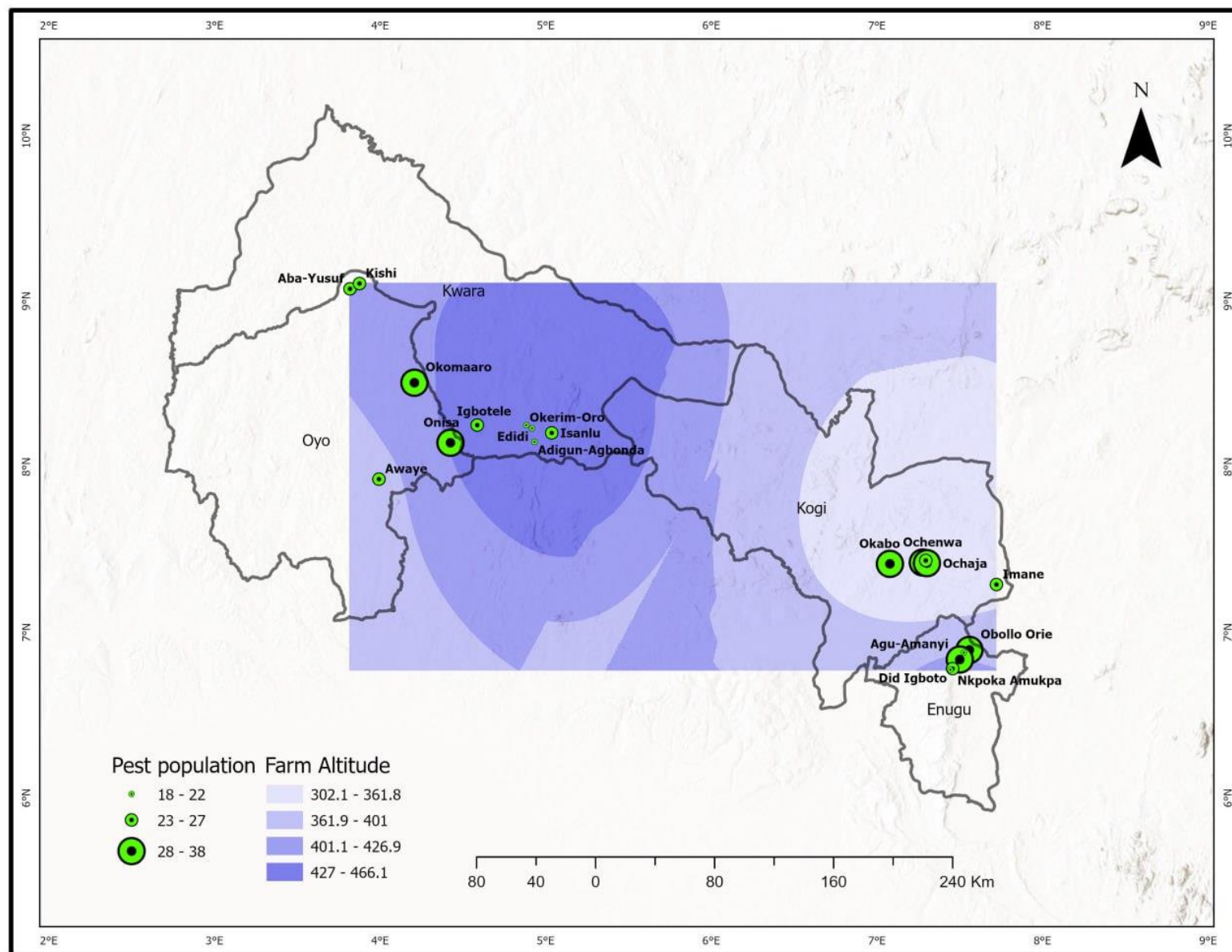
- Pest population in study farms
- According to phenological stages
- Population was dispersed in farms
- And varied with phenological stage of growth



# Result (19)

- Pest population were least in Edidi, Okerimi, Adigun-Agboda (>427m above sea level)
- Moderate population at Igbotele, Isanlu (>427m)
- Similarly at Aba-Yusuf, Kishi, Awaye Didi Igboto ( $\leq 401$ m) but also at Ochaja, Imane (<361m)
- But high infestations by pests were common at 302-361m (Ochenwa, Okabo) and 361-401m (Obollo Ori, Agu-Amanyi)
- However, highest pest population also recorded at 427-401m above sea level, Onisa and Okomaaro respectively

Figure 32: Pest population with altitude of study farms







# Discussion

- Most prominent diseases are anthracnose (leaf, apple), bacteriosis (leaf, apple), inflorescence blight and dieback
- Flora dieback is common but chlorosis was often localized
- Adeigbe et al., (2015), Adeniyi, (2012) reported spread of anthracnose (*C. gloeosporioides*) in growing ecologies
- Powdery mildew (*O. anacardia*) was characterized by a white powdery growth on leaves and flowers (Baba and Eka, 2014; Adeniyi and Olufolaji, 2006)
- This is prevalent in the humid and semi-humid regions of Nigeria, notably Kogi and Oyo states



# Discussion (2)

- Earlier findings reported fruit rot (*C. gloeosporioides*) and gummosis by *L. theobromae* (Cardosa et al., 2004; Cysne et al., 2010)
- Also presence of leaf and nut blight, rust and bacterial leaf spot diseases (Majune et al., 2018)
- Dieback and root rot resulting into complete loss of trees (Adeigbe et al., 2015)
- Presence of *E. gemoniella*, *Helopeltis spp.*, termites, *A. curvipes*, grasshopper
- *Analeptes trifasciata*, stem borer corroborate the report of Adewale et al., (2013)



# Discussion (3)

- *Apate terebrans* (stem borer) was reported as serious biotic constrain to good prospect of cashew production
- Classified as important wood-boring beetles that infest cashew trees in Nigeria, Benin (Agboton et al., 2014)
- Likewise in many cashew producing countries in West Africa (Dwomoh et al., 2008; Wagners et al., 2008; Vasconcelos et al., 2014)
- Stem borer also have preference for new trees
- Rather than previously infested trees whose nutrients potential has been depleted



# Discussion (4)

- Red ants are dominant predator on crop pest such as cashew bugs
- Red ants as natural control agents in protecting cashew trees has been shown in Australia (Peng et al., 1997), Vietnam (Peng et al., 2014)
- Recently in many Africa countries in the control of fruit fly in West Africa (Vayssieres et al., 2016)
- Red ants' controls *A. curvipes*, *H. schoutedeni*, *Psuedotheraptus devastans*, *P. wayi*, *Tupalus fasciatus*, *Mirperus jaculus* (Oluthu et al., 2013; Abdullah et al., 2016; Anano et al., 2015)
- The presence of beneficial insect spp. is crucial for natural pest control
- And for maintaining ecological balance within farms (Waliyar et al., 2006)



# Conclusion

- Infestation by pest is a major factor affecting productivity and quality of cashew
- At farmers level, overall impact of pest is currently been mitigated by ecological factors and physiological response of the tree
- The study provides valuable insights into current health status of cashew trees in Nigeria
- And a guide to future research strategies to improve cashew productivity and quality
- Enhancing biodiversity in cashew farms and adopting better agronomic practices could further improve health of cashew



# Recommendation

- Research into organic, eco-friendly and climate-resilience management techniques need to be developed for cashew pest management



# Acknowledgement

- The study was supported and financed by PRO-Cashew project in Nigeria
- PROcashew Country office: Oloruntoyin Olorunfemi, Adedotun Adedoyin, Yemisi Ariba
- Field officers: Segun Adeyemi and Julius Oladipo
- Technical support: Segun Afolayan, Christianah Onifade, Temitope Adeyemi, Monday Elugbe, Sunday Wada and Ibrahim Noah



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Obrigado  
Merci  
Thank you