INSECT SUCCESSION PATTERNS DURING DECOMPOSITION IN SOUTHERN NIGERIA

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INTRODUCTION AND AIM

- Frequent armed conflict and kidnapping for ransom in Nigeria usually leaves behind unidentified human remains at various stages of decomposition.
- Often, these remains retain evidence of ongoing or past insect activity.
- In the absence of post-mortem interval (PMI) estimation methods, insect succession patterns could be used.
- Therefore, the aim of this study was to provide baseline data pertaining to insect succession patterns on carrion in southern Nigeria.

MATERIALS AND METHODS

- This research was conducted in Nibo, Anambra state, southern Nigeria (6°10'0"N, 7°4'0"E) which has a tropical climate with wet and dry seasons (Figure 1).
- Ten fresh pig carcasses were deposited in metal cages in the wet and dry seasons, respectively, and arthropod succession were observed and collected.
- Flies, larvae and beetles were collected once daily in the first one week, every three days in the second week, then every second week until end of decomposition.
- The collected arthropods were killed in boiling water and preserved in 70% ethyl alcohol for identification.[1]
- One group of larvae was reared to adult stage, while the other group was preserved for identification.
- Photographs of the arthropods and larvae were sent to, and identified by, an entomologist at the Department of Forensic Medicine, University of the Witwatersrand.
- The insect succession patterns obtained from this identification were compared between the wet and the dry seasons.

RESULTS AND DISCUSSION

- First to arrive in the fresh stage – the common housefly (within 5 minutes)
- Second - the blowfly *Chrysomya marginalis* (within 10 minutes).
- Duration of the fresh stage – between day 0 to one.
- The bloat stage (day two to three): *Chrysomya chloropyga* (a blowfly), flesh flies, ants (Family Formicidae), beetles (Family Gyrinidae), the black soldier fly (*Hermetia illucens*) and a group of tiny flies (Family Phoridae) visited in that order.
- The active decay (days four to six): mainly beetles and a few bees. The beetles included *Dermestes maculatus*, *Platycorynus dejeani*, the rove beetle, and the scarab beetles.
- Major arthropods in the advanced and dry stages – mainly incidentals like the jumping spiders (Family Salticidae), centipedes, crickets, and grasshoppers which used the carcass as shelter.
- Overall, Calliphoridae was the most dominant family, and *Platycorynus dejeani* was the most dominant beetle followed by *Dermestes maculatus.*
- The arthropods collected – three classes, six orders, and 16 families.
- The wet season witnessed more species richness than in the dry season.
- The arthropods that appeared exclusively in the wet season were the black soldier fly (*Hermetia illucens*), rove beetle and beetles of the Gyrinidae and Scarabaeidae families.
- When insects that visit the remains exclusively in the wet season, or their pupal casings, are recovered from remains, it could indicate that death occurred in the wet season.
- The short period of colonization, within 5 minutes for *Musca domestica*, could be exploited for more precise PMI estimates in southern Nigeria when these flies are found on remains.
- In conclusion, a list of arthropods and their succession patterns on carrion in southern Nigeria provides a valuable resource for forensic scientists for PMI estimation and other related applications.

Figure 1: Map of Nigeria indicating Anambra state in red (en.wikipedia.org)

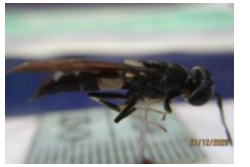
Collected arthropods according to class, order, and family.

Class	Order	Family
Insecta	Diptera	Muscidae
		Calliphoridae
		Stratiomyidae
		Phoridae
		Sarcophagidae
	Coleoptera	Chrysomelidae
		Gyrinidae
		Dermestidae
		Scarabaeidae
		Staphylinidae
	Hymenoptera	Formicidae
		Apidae
	Hemiptera	
	Orthoptera	Grylloidea
		Acrididae
		Pyrgomorphidae
Arachnida	Araneae	Salticidae
Chilopoda		

Musca domestica

Chrysomya marginalis

Family Gyrinidae



Hermetia illucens

Dermestes maculatus

Platycorynus dejeani

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