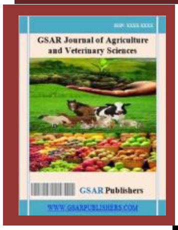

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A COMPARISON OF THE EFFICIENCY OF JARRING METHOD VERSUS PITFALL TRAPS AND ACTIVE HUNTING METHODS IN INSECT COLLECTION IN TWO CONTRASTING HABITATS (SITE 1 AND SITE 2) WITHIN FEDERAL UNIVERSITY OYE= EKITI

By

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Abstract

This study aimed at comparing the efficiency of jarring method versus pitfall traps and active hunting methods in insect collection in two contrasting habitats (site 1 and site 2) within Federal University Oye –Ekiti was carried out from December 2024 to February 2025 using a combination of jarring, pitfall traps and active hunting methods. In this study, a total of 1490 individuals belonging to 12 orders, 37 families and 57 species were recorded from the study sites. In December 2024, Camponotus pennsylvanicus had the highest relative abundance of 39.5% while Pogromyrmex rugosus had the highest relative abundance of 27.7% in January 2025. Conversely, in February 2025, Solenopsis invicta had the highest relative abundance of 38.0% respectively. Results of the Diversity Indices of Insect Orders Obtained from site 1 revealed that Coleoptera had the highest Shannon and Simpson Index values (1.083, 0.6564) respectively while Blattodea had the lowest Shannon and Simpson Index values (0.56, 0.38) respectively. However in site 2, Hymenoptera had the highest Shannon and Simpson and Evenness Index values (1.052, 0.636, 0.9545) respectively while Coleoptera had the lowest Shannon and Simpson and Evenness Index values (0.619, 0.3284, 0.619) respectively. Results of the distribution of Arthropod order based on number caught by each of the three sampling methods (December-February) revealed that Pitfall trap caught the highest number of insects (260) while Jarring caught the lowest number of arthropods (35). The findings indicate that Pitfall Trap method is the most efficient method for insect collection in the study sites as compared to active hunting and jarring methods. Pitfall Trap method captured the highest total number of insects particularly Hymenoptera and Orthoptera. This suggests that Pitfall Trapping is a superior method for capturing these orders, possibly due to their behavior and habitat preferences. Active hunting also recorded a considerable number of individuals notably from Lepidoptera and Hymeoptera suggesting its effectiveness in targeting flying or visually conspicuous insects. Jarring (J), however, was the least effective method in terms of overall insect capture, suggesting that it may be unsuitable for many insect groups or that its selectivity is too narrow for general survey purposes. The study concludes that sampling methods influences the types of insects collected.

Keywords: *efficiency, relative abundance, jarring, Shannon, selectivity*

INTRODUCTION

Arthropods are vital components of the ecosystem and contribute tremendously to ecosystem processes. As ecosystem engineers, arthropods contributes significantly to decomposition, organic matter turnover and some even build homogenic structures in the soil (Sollai, *et al.*,2024).The vast abundance of arthropods led to the development of various collection methods in order to effectively quantify them (Lauchande *et al.,* 2024). Insect collection is a fundamental

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practice in entomology and ecology, serving as a cornerstone for understanding insect biodiversity, ecology, behavior, and taxonomy (Lendemer *et al.* 2020). Through systematic collection and documentation of insects, researchers can unravel the intricate relationships between insects and their environments, contribute to species conservation efforts, and develop strategies for pest management and ecosystem conservation (Waheed & Saif, 2024).

Jarring involves dislodging arthropods from vegetation or soil by vigorously shaking or tapping the plant or substrate onto a collecting tray or cloth. This method is commonly used to sample arboreal insects, leaf-dwelling insects, or those inhabiting leaf litter and soil. Pitfall traps consist of containers sunk into the ground, capturing ground-dwelling insects that fall in (Sahayaraj and Hassan 2023). Preservatives such as propylene glycol or ethanol are commonly included in the solution at the bottom to exterminate and conserve trapped specimens for subsequent identification (Greenstone, 2016). Active hunting involves systematic searching and capturing of insects by hand. Active hunting allows researchers to target specific microhabitats, host plants, or substrates where insects are likely to be found (Imran *et al.*, 2025).

Previous studies have compared the efficiency of methods used in insect collection. Shweta and Rajmohana (2016) carried out a comparison of the efficiencies of sweep net, yellow pan trap, and malaise trap in sampling Platygastridae and found out that the malaise trap was more effective in collecting Platygastridae. Ruchin *et al.*, (2020) in the study of the use of simple crown traps for insect collection established that trap type can be used to study the vertical insect distribution in forest systems, seasonal capture, and bio-topic distribution. Despite the foregoing, no information exists on the efficiency of sampling methods within Federal University Oye-Ekiti, hence this study. This study is aimed at assessing the efficiency of jarring methods versus pitfall traps and active hunting methods in insect collection in Site 1 and Site 2 within Federal University Oye-Ekiti.

Materials and Methods

Study Area

The research work was carried out in Site 1, Site 2, and Site 3 of the University Main Campus. Site 1 is located on Latitude N7.77627° and Longitude E5.31322° while Site 2 is located on Latitude N7.77694° and Longitude E5.31535°. Site 1 is located behind the new Faculty of Science Auditorium. The site is a cassava farmland, which has the following plants and trees in it: *Uncaria rhynchophylla* (Flowering plant), *Piscidia piscipula* (tree), *and Chinese tallow* (tree). Site 2 is a fallow located close to the hill leading to phase 3, Federal University Oye-Ekiti. Prominent plant and trees found in the study site include: *Alchornea* (plant), *Acgiphila*(tree), *Vitex lucens* (tree) and *Banisteriopsis caapi*(plant).

Sampling Techniques

In this study, a combination of pitfall traps, jarring and active hunting methods were used to collect insects. Sampling was carried out thrice in a week for a period of three months (December 2024 to February 2025).

Pitfall Traps

Eight pitfall traps were set across the three study sites. The traps were of diameter 10cm & and 12cm depth. The rims of the traps were set to flush with the soil surface. The traps were filled to two thirds with 70% ethanol solution and left in place for 48 hours after which they were transported to the laboratory of the Department of Animal and Environmental Biology, Federal University Oye-Ekiti for subsequent counting, sorting and identification.

Jarring method

This method involved the mechanical knockdown of insects from a flowering plant. Trees/Shrubs were shaken vigorously, a piece of two and half yard of white cloth was placed beneath the tree. Insects disloged from the flowering plants were counted and placed in collecting vials containing 70% alcohol. The vials were transported to the laboratory of the Department of Animal and Environmental Biology, Federal University, Oye-Ekiti for Sorting, counting and identification.

Active Hunting

This method involved active hunting techniques for getting insects that accumulate on open surfaces and in both leaf and log environments. Manual collection of insects from specific microhabitats through handpicking served to obtain diverse species which passive traps would capture inadequately. The study focused extra effort on gathering amazing species because beetles, ants, and other ground-dwelling creatures and leaf-dwelling insects are known to congregate.

Sorting, Counting and Identification

Trap contents from all the traps were brought to the laboratory of Animal and Environmental Biology Oye-Ekiti. The insects were sorted into taxonomic groups with the aid of a magnifying glass, spatula and light microscope. The sorted insects were counted and entered into a tally book. The arthropods were identified using relevant identification keys (Nice, 2024).

Computation of Diversity Indices

The following biodiversity indices were computed:

$$N = \sum N_i \quad (1)$$

Where: N_T = total number of individuals; Ni= Number of individuals in each sample

$$D = S - \frac{1}{\ln(N)} \quad (2)$$

Where D= Margalef diversity Index; S= total number of species; N= total number of individuals in the sample

$$(H') = \sum pi * \ln(pi) \quad (3)$$

Where H'= Shannon Index; Σ=greek symbol that means sum; ln= natural log; pi= the proiportion of the entire community made up of species i

$$D = \sum n^{(n-1)} / N(N-1) \quad (4)$$

Where D= Simpson Index; n=total number of individuals of each species; N=total number of individuals of all species

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$$J = {H'}/{\ln S} \qquad (5)$$

Where J= Evenness; H'=Shannon Weiner Diversity; S =total number of species in a sample across all species in a dataset

Data Analysis

All data collected were analyzed using SPSS 20.0 software. Abundance and relative abundance was determined. Descriptive Statistics was employed. Bar chart was used to represent the mean monthly variation of Hymenoptera, Orthoptera and Coleoptera across the study sites. Percentage Composition of Hymenoptera, Orthoptera and Coleoptera were also estimated.

RESULTS

Diversity and Abundance of Arthropods

The diversity and abundance of Arthropods collected from Site 1 is as presented in Table 1. A total of 1490 individuals belonging to 12 orders, 37 families and 57 species were recorded from the study sites (Table 1). During the sampling period, Hymenoptera was the most dominant order across all the sampling sites. In December 2024, *Camponotus pennsylvanicus* had the highest relative abundance of 39.5 while *Melitaca enxira, Papilio polyxenes, Alphitobius diaperinus, Hydrobius fuscipes, Megaloptera (naid), Corydalus cornutus, Zoropsis spinimana, Dorlomedes tenebrosus and Blatella germanica* had the lowest relative abundance of 0.2 respectively (Table 1). In January 2025, *Pogromyrmex rugosus* had the highest relative abundance of 27.7 while *Diaplazon lactatrius, Stenolophus ochropezus, Limodromus assimilis, Tachporus hypnorum, Otiorhynchus sulcatus, Tetrix subulata, Drosophilia melanogaster, Sarcophaga carnaria and Oxidus gracillis* had the lowest relative abundance of 0.3 respectively (Table 1). However, in February 2025, *Solenopsis invicta* had the highest relative abundance of 211 (Table 1) while *Drosophilia melanogaster* had the lowest relative abundance of 0.4 respectively (Table 1).

The diversity and abundance of Arthropods collected from Site 2 is as presented in Table 2. A total of 2046 individuals belonging to 9 orders, 23 families and 35 species were recorded from the study sites (Table 2). In December 2024, *Camponotus pennsylvanicus* had the highest relative abundance of 39.5% while *Melitaca enxira, Papilio polyxenes, Alphitobius diaperinus, Hydrobius fuscipes, Megaloptera (naid), Corydalus cornutus, Zoropsis spinimana, Dorlomedes tenebrosus and Blatella germanica* had the lowest relative abundance of 0.2% respectively (Table 2). In January 2025, *Pogromyrmex rugosus* had the highest relative abundance of 27.7% while *Diaplazon lactatrius, Stenolophus ochropezus, Limodromus assimilis, Tachporus hypnorum, Otiorhynchus sulcatus, Tetrix subulata, Drosophilia melanogaster, Sarcophaga carnaria and Oxidus gracillis* had the lowest relative abundance of 0.3% respectively . However, in February 2025, *Solenopsis invicta* had the highest relative abundance of 38.0% (Table 2) while *Drosophilia melanogaster* had the lowest relative abundance of 0.4 respectively (Table 2).

Table 1: Diversity and Abundance of Arthropods Collected from Site 1, Federal University. Oye-Ekiti

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME	DEC	RA	JAN	RA	FEB	RA
Lepidoptera	Nymphalidae	*Melitaca enxira*	Glanville Fritilla	1.0	0.2	0.0	0.0	0.0	0.0
	Nymphalidae	*Euthalia aconthea*	Common Baron	7.0	1.2	22.0	6.3	0.0	0.0
	Nymphalidae	*Vanessa cardui*	Painted lady butterfly	0.0	0.0	0.0	0.0	0.0	0.0
	Papilionidae	*Papilio polyxenes*	Black swallow tail	1.0	0.2	0.0	0.0	5.0	0.9
	Pyraidae	*Pyralis farimdes*	Meal moth	0.0	0.0	4.0	1.1	0.0	0.0
	Noctuidae	*Ascalapha odorata*	Black witch moth	0.0	0.0	28.0	8.0	0.0	0.0
Hymenoptera	Formicidae	*Camponotus americanus*	American Carpenter Ant	23.0	3.9	11.0	3.1	12.0	2.2
	Formicidae	*Camponotus pennsylvanicus*	Black Carpenter Ant	231.0	39.5	81.0	23.1	185.0	33.3
	Formicidae	*Pogromyrmex rugosus*	Rough Harvester Ant	19.0	3.2	97.0	27.7	0.0	0.0
	Formicidae	*Camponotus vagus*	Fairy carpenter ant	39.0	6.7	0.0	0.0	0.0	0.0
	Formicidae	*Camponotus consobrinus*	Banded sugar ant	0.0	0.0	0.0	0.0	5.0	0.9
	Formicidae	*Tapinema*	Ghost ant	5.0	0.9	0.0	0.0	14.0	2.5
		Melanocephalum		0.0	0.0	0.0	0.0	0.0	0.0

	Formicidae	*Solenopsis invicta*	Red imported fire ant	84.0	14.4	0.0	0.0	211.0	38.0
	Formicidae	*Brachyponara chinensis*	Asian needle ant	6.0	1.0	4.0	1.1	0.0	0.0
	Formicidae	*Myrmelia gulosa*	Red bull ant	0.0	0.0	6.0	1.7	0.0	0.0
	Apidae	*Xylocopa*	Carpenter bee	2.0	0.3	0.0	0.0	0.0	0.0
	Ichneumonidae	*Diplazon lactatrius*	Common hover fly	0.0	0.0	1.0	0.3	0.0	0.0
	Entomobriendae	*Orchesella cineta*	Black gordon ant	0.0	0.0	6.0	1.7	0.0	0.0
Coleoptera	Staphylinidae	*Tasgius ater*	Large Rove Beetle	20.0	3.4	0.0	0.0	0.0	0.0
	Carabidae	*Harpalus tardus*	Ground beetle	7.0	1.2	0.0	0.0	0.0	0.0
	Carabidae	*Stenolophus ochropezus*	Heavy ochre harp ground beetle	0.0	0.0	1.0	0.3	0.0	0.0
	Carabidae	*Limodromus assimilis*	Ground beetle	0.0	0.0	1.0	0.3	0.0	0.0
	Tenebrionidae	*Tenebrio molitor*	Yellow meal worm	11.0	1.9	0.0	0.0	0.0	0.0
	Tenebrionidae	*Aphitobius diaperinus*	Darkling beetle	1.0	0.2	0.0	0.0	0.0	0.0
	Hydrophilidae	*Hydrobius fuscipes*	Swampy water scavenger	1.0	0.2	0.0	0.0	0.0	0.0
	Staphylinidae	*Tachporus hypnorum*	Rove Beetle	7.0	1.2	1.0	0.3	0.0	0.0
	Curculionidae	*Sitophilus oryzae*	Rice weevil	14.0	2.4	3.0	0.9	15.0	2.7
	Curculionidae	*Otiorhynchus sulcatus*	Vine weevil	1.0	0.2	1.0	0.3	0.0	0.0
	Curculionidae	*Dendroctonus valens*	Black turpentine beetle	4.0	0.7	0.0	0.0	0.0	0.0
	Ptinidae	*Anobium punctatum*	Common furniture beetle	0.0	0.0	2.0	0.6	0.0	0.0
	Dermestidae	*Dermestes lardarius*	Larder beetle	0.0	0.0	2.0	0.6	0.0	0.0
	Passalidae	*Odontotaenius disjunctus*	Betsy beetle	0.0	0.0	7.0	2.0	0.0	0.0
Orthoptera	Gryllidae	*Gryllus pennsylvanicus*	Fall Field Cricket	12.0	2.1	0.0	0.0	0.0	0.0
	Gryllidae	*Acheta domesticus*	House Cricket	3.0	0.5	10.0	2.9	0.0	0.0
	Gryllidae	*Teleogryllus emma*	Emma field cricket	10.0	1.7	12.0	3.4	24.0	4.3
	Tetrigidae	*Tettigidea lateralis*	Black sided pgymy grasshopper	7.0	1.2	6.0	1.7	0.0	0.0
	Tetrigidae	*Tetrix subulata*	Slender ground hopper	0.0	0.0	1.0	0.3	0.0	0.0
	Acrididae	*Caelifera viridissima*	Grasshopper	0.0	0.0	2.0	0.6	0.0	0.0
Megaloptera	Chauliodinae	*Megaloptera (naiad)*	Fish fly naiad	1.0	0.2	0.0	0.0	0.0	0.0
	Corydalidae	*Corydalus cornutus*	Eastern dobsonfly	1.0	0.2	0.0	0.0	0.0	0.0
Diptera	Calliphoridae	*Calliphora vicina*	Blue blow fly	1.0	0.2	3.0	0.9	0.0	0.0
	Muscidae	*Musca domestica*	Common Housefly	30.0	5.1	18.0	5.1	63.0	11.4
	Stratiomyidae	*Ptecticus trivittatus*	Compost House fly	3.0	0.5	3.0	0.9	0.0	0.0
	Drosophilidae	*Drosophila melanogaster*	Fruit fly	2.0	0.3	1.0	0.3	2.0	0.4
	Stratiomydae	*Ptecticus aurifer*	Soldier fly	0.0	0.0	2.0	0.6	0.0	0.0

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	Sarcophagidae	*Sarcophaga carnaria*	Flesh fly	0.0	0.0	1.0	0.3	0.0	0.0
Aranae	Zoropsidae	*Zoropsis spinimana*	Mediterranean spiny false wolf spider	1.0	0.2	0.0	0.0	0.0	0.0
	Pisauridae	*Dorlomedes tenebrosus*	Dark Fishing Spider	1.0	0.2	0.0	0.0	0.0	0.0
	Uloboridae	*Uloboruswalckenaerius*	Crib elate orb weaver	0.0	0.0	7.0	2.0	0.0	0.0
Polydesmida	Polydesmidae	*Polydesmus angustus*	Flat backed millipede	3.0	0.5	0.0	0.0	0.0	0.0
	Paradoxoso	*Oxidus gracilis*	Green house millipede	0.0	0.0	1.0	0.3	0.0	0.0
Blattodea	Blaberidae	*Blaberus gigenteus*	Giant cockroach	6.0	1.0	0.0	0.0	5.0	0.9
	Ectobeidae	*Blattella germanica*	German Cockroach	1.0	0.2	3.0	0.9	0.0	0.0
Siphonaptera	Pulicidae	*Ctenocephalides canis*	Dog flea	18.0	3.1	0.0	0.0	14.0	2.5
Hemiptera	Coreidae	*Anasa trisitis*	Squash bug	1.0	0.2	0.0	0.0	0.0	0.0
	Rhyparochromus	*Rihyparochromus pini*	Black spotted ground bug	0.0	0.0	1.0	0.3	0.0	0.0
Phasmatodea	Pseudophasmatidae	*Anismorpha buprestoides*	Southern two stripped walkingstick	0.0	0.0	1.0	0.3	0.0	0.0
			TOTAL ABUNDANCE	**585.0**	**100.0**	**350.0**	**100.0**	**555.0**	**100.0**
			MEAN ABUNDANCE	**48.8**		**29.1**		**46.8**	

Table 2: Diversity and Abundance of Arthropods Collected from Site 2, Federal University, Oye-Ekiti

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME	DEC	RA	JAN	RA	FEB	RA
Diptera	Muscidae	*Musca domestica*	Common housefly	12	1.9	11.0	2.6	51.0	5.3
	Stratiomide	*Ptecticus trivittaties*	Compost fly	0	0.0	2.0	0.5	0.0	0.0
	Simuliidae	*Simulium damnosum*	Black fly	6	0.9	0.0	0.0	0.0	0.0
	Culicidae	*Culicidae (larva)*	Mosquito larva wriggler	1	0.2	7.0	1.6	0.0	0.0
	Stratiomyidae	*Ptecticus aurifer*	Soldier flies	1	0.2	1.0	0.2	0.0	0.0
Lepidoptera	Papilionidae	*Papillo polyxenes*	Butterfly	3	0.5	0.0	0.0	2.0	0.2
	Nymphalidae	*Melitaea cinxia*	Glanville fritillary	3	0.5	0.0	0.0	0.0	0.0
	Erabidae	*Estigmen acrea*	Salt marsh moth (caterpillar)	1	0.2	3.0	0.7	0.0	0.0
	Nymphalidae	*Vanessa cardui*	Painted lady butterfly	0	0.0	1.0	0.2	0.0	0.0
	Psychidae	*Psyche casta*	Common bagworm moth	0	0.0	1.0	0.2	0.0	0.0
Hymenoptera	Formicidae	*Myrmelia glucose*	Red bull ant	201	31.2	265.0	61.6	69.0	7.1
	Formicidae	*Camponotus pennylvanicus*	Black carpenter ant	380	58.9	88.0	20.5	639.0	65.8
	Formicidae	*Camponotus*	Banded sugar	12	1.9	7.0	1.6	0.0	0.0

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		consobrinus	ant						
	Formicidae	*Pachycondyla chinensis*	Army ant	2	0.3	0.0	0.0	0.0	0.0
	Braconidae	*Cotesia glomerata*	Wasps	1	0.2	0.0	0.0	0.0	0.0
	Formicidae	*Lasius niger*	Black garden ant	2	0.3	0.0	0.0	0.0	0.0
	Formicidae	*Camponotussericeventris*	Shimmery gold sugar ant	0	0.0	2.0	0.5	0.0	0.0
	Formicidae	*Camponotus americanus*	American carpenter ant	0	0.0	27.0	6.3	0.0	0.0
	Formicidae	*Solenopsis invicta*	Red bottom ant	0	0.0	0.0	0.0	131.0	13.5
	Vespidae	*Vespa orientallio*	Oriental hornet	0	0.0	0.0	0.0	2.0	0.2
Coleoptera	Coccinellidae	*Coccinella septempunctrata*	Lady bug	2	0.3	0.0	0.0	0.0	0.0
	Passalidae	*Odontotaenius disjunctus*	Field beetles	4	0.6	6.0	1.4	0.0	0.0
	Carabidae	*Trechus obtusus*	Ground beetle	3	0.5	0.0	0.0	0.0	0.0
	Carabidae	*Carabius nemoalis*	Beetle	0	0.0	0.0	0.0	63.0	6.5
Orthoptera	Gryllidae	*Teleogryllus emma*	Emma’s field cricket	2	0.3	0.0	0.0	4.0	0.4
	Gryllidae	*Gryllus campestris*	European field cricket	2	0.3	0.0	0.0	2.0	0.2
	Gryllidae	*Gryllus pennsylvanicus*	Field cricket	3	0.5	0.0	0.0	5.0	0.5
	Gryllidae	*Grylodes sigillatus*	Tropical house cricket	1	0.2	1.0	0.2	0.0	0.0
Blattodea	Ectoridae	*Blattella germanica*	German	1	0.2	2.0	0.5	1.0	0.1
	Blattidae	*Periplaneta americana*	Smoky	0	0.0	0.0	0.0	2.0	0.2
Hemiptera	Neptidae	*Ranatra fusca*	Brown	1	0.2	0.0	0.0	0.0	0.0
	Cicadellidae	*Homalodisca vitripennis*	Grassy	1	0.2	1.0	0.2	0.0	0.0
Aranae	Arachnidae	*Araneus ejusmodi*	Orb	0	0.0	0.0	0.0	0.0	0.0
	Uloboridae	*Uloborus walckenarius*	Feather legged spider	0	0.0	4.0	0.9	0.0	0.0
Ixodida	Ixodidae	*Ixodes scapularis*	Eastern	0	0.0	1.0	0.2	0.0	0.0
			TOTAL ABUNDANCE	**645**	**100**	**430**	**100**	**971**	**100.0**
			MEAN ABUNDANCE	**71.55556**		**47.77778**		**107.8889**	

The Total Abundance and Monthly Mean Abundance of Insect orders in Site 1 are as presented in Table 1. Across the sampling period, Hymenoptera had the highest abundance of 1083 individuals (Table 1) while Hemiptera and Phasmatodea had the lowest abundance of 1 respectively (Table 1). The highest mean abundance was recorded in December 2024 (48.8) while the lowest mean abundance was recorded in January 2025 (29.1) (Table 1).

In Site 1, Hymenoptera was consistently the most dominant insect order across all three months. In December, it accounted for approximately 58% of the total insect population, increasing to 65% in February. Other groups such as Diptera and Orthoptera contributed to a moderate portion of the total abundance, while orders like Megaloptera and Phasmatodea appeared only sporadically or were absent altogether. The data suggest that Site 1 supports a relatively stable population of Hymenoptera throughout the study period, whereas other orders exhibited fluctuations likely due to temporal niche dynamics or seasonal environmental changes.. The Total Abundance and Monthly Mean Abundance of Insect orders in Site 2 are as presented in Table 2. Across the sampling period, Hymenoptera had the highest abundance of 1828 individuals (Table 2) while Ixodida had the lowest abundance of 1 respectively (Table 2). The highest mean abundance was recorded in February 2025 (971) while the lowest mean abundance was recorded in January 2025 (430) (Table 2).

Site 2 showed an even stronger dominance of Hymenoptera, with this order comprising 84% of the insect community in

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December and 83% in February. Other orders, including Diptera, Coleoptera, and Orthoptera, were present in lower numbers. In contrast to Site 1, Site 2 demonstrated lower species diversity due to the overwhelming presence of Hymenoptera, which may be an indicator of habitat conditions that favor the foraging or nesting requirements of this group, such as the availability of flowering plants or nesting substrates.

Table 3: Diversity Indices of Arthropods collected from Site 1

Order	Taxa	Individuals	Dominance_D	Simpson 1-D	Shannon_H	Evenness_e^H/S	Margalef	Fisher_Alpha	Berger - Parker
Lepidoptera	3	68	0.6535	0.3465	0.6426	0.6338	0.474	0.6421	0.7941
Hymenoptera	3	1083	0.3635	0.6365	1.049	0.9596	0.2862	0.3767	0.4137
Coleoptera	3	143	0.3436	0.6564	1.083	0.985	0.403	0.5368	0.4126
Orthoptera	2	3	0.5556	0.4444	0.6365	0.9449	0.9102	2.622	0.6667
Megaloptera	3	129	0.38	0.62	1.031	0.9346	0.4115	0.549	0.5039
Diptera	1	1	1	0	0	1	0	0	1
Aranae	3	16	0.398	0.602	0.983	0.891	0.721	1.09	0.438
Polydesmida	3	15	0.4756	9.5244	0.8532	0.7824	0.7385	1.128	0.6
Blattodea	2	4	0.63	0.38	0.56	0.88	0.72	1.59	0.75
Siphonaptera	2	32	0.5078	0.4922	0.6853	0.9922	0.2885	0.4729	0.5625
Hemiptera	1	1	1	0	0	1	0	0	1
Phasmatodea	1	1	1	0	0	1	0	0	1

The Diversity Indices of Insect Orders Obtained from site 1 are as presented in Table 3. Coleoptera had the highest Shannon and Simpson Index values (1.083, 0.6564) respectively while Blattodea had the lowest Shannon and Simpson Index values (0.56, 0.38) respectively (Table 3). However Siphonaptera had had the highest evenness value (0.9922) respectively while Lepidoptera had the lowest evenness Index values (0.6338) (Table 5). The Diversity Indices of Insect Orders Obtained from site 2 are as presented in Table 4. Hymenoptera had the highest Shannon and Simpson and Evenness Index values (1.052, 0.636, 0.9545) respectively while Coleoptera had the lowest Shannon and Simpson and Evenness Index values (0.619, 0.3284, 0.619) respectively (Table 4).

Table 4: Diversity Indices of Arthropods collected from Site 2

Order	Taxa	Individuals	Dominance_D	Simpson 1-D	Evenness_e^H/S	Margalef	Fisher_Alpha	Berger - Parker
Diptera	3	92	0.4067	0.996	0.9025	0.4423	0.5942	0.5543
Lepidoptera	3	14	0.398	0.9923	0.8991	0.7578	1.171	0.5
Hymenoptera	3	1828	0.364	1.052	0.9545	0.2663	0.3505	0.4601
Coleoptera	2	78	0.6716	0.619	0.619	0.4591	0.6194	0.8077
Orthoptera	3	20	0.465	0.8457	0.7761	0.6676	0.9778	0.55
Blattodea	3	6	0.3889	1.011	0.9165	1.116	2.388	0.5
Hemiptera	2	2	0.5	0.69	1	0.44	0	0.5
Aranae	1	4	1	0	1	0	0.428	1
Ixodida	1	1	1	0	1	0	0	1

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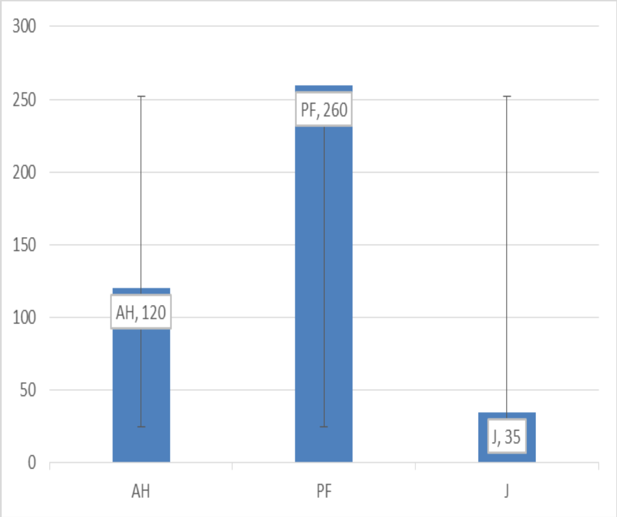

Figure 1: Distribution of Arthropod order based on number caught by each of the three sampling methods (December-February).

The distribution of Arthropod order based on number caught by each of the three sampling methods (December-February) is as presented in Figure 3. Pitfall trap caught the highest number of insects (260) while Jarring caught the lowest number of arthropods (35) (Figure 1).

Discussion

The findings indicate that Pitfall Trap method is the most efficient method for insect collection in the study sites as compared to active hunting and jarring methods. Pitfall Trap method captured the highest total number of insects particularly Hymenoptera and Orthoptera. This suggests that Pitfall Trapping is a superior method for capturing these orders, possibly due to their behavior and habitat preferences which is in line with a study by Peixoto *et al.*, 2024. Pitfall Trapping appears to be particularly effective for capturing ground-dwelling insects, such as Hymenoptera and Orthoptera, which are often found in soil and vegetation. This is likely due to the fact that Pitfall Traps are designed to capture insects that fall into them, making them more effective for insects that are active on or near the ground (Bertoia *et al.*, 2023). Active hunting also recorded a considerable number of individuals notably from Lepidoptera and Hymenoptera suggesting its effectiveness in targeting flying or visually conspicuous insects. Jarring (J), however, was the least effective method in terms of overall insect capture, suggesting that it may be unsuitable for many insect groups or that its selectivity is too narrow for general survey purposes. In this study, results obtained indicate that Site 2 had a greater abundance of insects than site 1 while Site 1 had a greater diversity than site 2. This indicates that the community structure of insects in Site 1 and 2 within Federal University Oye-Ekiti main campus is greatly influenced by habitat quality, level of disturbance and the local microclimate. Site 1 is largely undisturbed and it probably supports many plants, a thick layer of leaves and few signs of human activity which leads to a variety of niches for insects. However, Site 2 had moderate human impact, the number of insects was highest but there were far fewer types of insects. Results further revealed that Hymenoptera was the most dominant order in both Site 1 and 2. Their dominance is reflected in their ecological importance and the variety of species they encompass; making them a vital part of the insect world (Blaimer *et al.,* 2023). Diversity indices provided further insight into the ecological structure of the insect communities. While Hymenoptera was the most abundant order, its Shannon Index value and Simpson Index indicate lower species diversity due to dominance by a few species. In contrast, Coleoptera and Araneae displayed higher diversity and evenness values. suggesting a more balanced representation of species within that group. Araneae, though fewer in total individuals, showed high evenness and diversity, indicating stable population structures. Rarer taxa such as Phasmatodea, Plecoptera, and Lasioderma recorded low diversity values, which is expected given their minimal presence in the sample.

Conclusion

The study concludes that sampling methods influences the types of insects collected. Integrating a variety of techniques enhances robustness of collections, hence results obtained in this study is sufficient to represent biodiversity status of Site 1 and Site 2 in Federal University Oye- Ekiti main campus. Further studies should be carried out in other locations within the University campus as well as at other seasons in the year.

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