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Spatiotemporal Distribution and Developmental Dynamics of *Aedes aegypti* Linnaeus [Diptera: Culicidae] and *Aedes albopictus* Skuse [Diptera: Culicidae] in Microhabitats within the University of Lagos, Nigeria

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Abstract

Arboviral infections in the tropics and subtropics have become re-emergent, with culicine mosquitoes crucial to their transmission. A four-month survey was conducted between January to April, 2025 within the University of Lagos (Akoka campus) Nigeria. A total of 483 immature stages of *Aedes* mosquitoes were collected: 358 larvae, 90 pupae, and 35 eggs. Emergence yielded 292 adults, predominantly *Aedes aegypti* (n=245), which showed significantly higher wet season productivity at 0.02 ($P < 0.05$), especially in April. In contrast, *Aedes albopictus* demonstrated no significant seasonal difference. Spatial analysis showed that Mean±Standard deviation of *Ae. aegypti* was most dominant at Students Affairs Frontage (11.0 ± 10.49), followed by New Hall (10.5 ± 24.09), and Faculty of Science (4.88 ± 5.33) with clear preference for artificial containers such as discarded tyres and ceramic plates. *Aedes albopictus* was exclusively present in the Biological Garden (2.35 ± 3.87), favoring shaded vegetated habitats. These findings emphasized ecological partitioning between the two species, and suggested potential interspecific competition in vegetated microhabitats while the seasonality and habitat specificity of *Ae. aegypti* affirmed its adaptation to urban environments and highlighted critical windows for targeted vector surveillance and control.

Keywords: Arboviruses, Culicine mosquitoes, Ecological partitioning, Microhabitats, Spatio-temporal distribution

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INTRODUCTION

Mosquitoes of the genus *Aedes*, particularly *Aedes aegypti* (Linnaeus, 1762) and *Aedes albopictus* (Skuse, 1894) (Diptera: Culicidae: Culicinae) are globally recognized as vectors of a wide range of medically important arboviruses, including dengue, chikungunya, Zika, and yellow fever. Their distribution and adaptability have become major concerns in urban and peri-urban environments, especially in tropical regions (Kraemer *et al*, 2015; Wilke *et al*, 2019; Owusu-Asenso *et al*., 2022; Bello *et al*., 2024). Both species are easily identified by their black-and-white markings, they are container breeders, with high ecological plasticity and ability to exploit artificial and natural habitats in close proximity to human habitation (Oforka*et al*, 2024). They can be distinguished by specific morphological features. *Aedes aegypti* typically has lyre-shaped white markings on the dorsal surface of its thorax, while *Ae. albopictus* displays a single white longitudinal stripe running down the center of the thorax (Gratz, 2004).

In terms of behaviour, *Aedes aegypti* prefers indoor resting sites and is primarily active during daylight hours, often biting humans indoors. In contrast, *Aedes albopictus* is more aggressive in outdoor environments and can feed during both day and dusk, making it a more versatile and opportunistic vector (Alto *et al*, 2011; Lambrechts *et al*., 2011). *Aedes aegypti* is known for its preference for indoor resting and daytime biting, while *Ae. albopictus* shows more aggressive outdoor biting behaviour and can feed during both day and dusk (Gratz, 2004; Lambrechts *et al*., 2011; Achee *et al*, 2015).

In Lagos State, recent spatial modeling and climate-based projections confirm that the environment is highly conducive to *Aedes* proliferation (Babalola *et al*., 2025). While both *Ae. aegypti* and *Ae.albopictus* are active during daylight hours, *Ae. albopictus* is particularly noted for its aggressive, opportunistic feeding behaviour targeting both animals and humans (Guarido*etal*., 2021). This zoophilic tendency increases its potential role in zoonotic virus transmission, especially in environments like research gardens and botanical facilities. Within the University of Lagos, the Biological Garden has been observed to harbour dense populations of *Aedes albopictus*, yet previous entomological surveys of the campus (Adeoye *et al*., 2012) reported only *Ae. aegypti* in very low numbers, with *Ae. albopictus* completely absent. This raises the possibility that *Ae. albopictus* may now be newly established in this microenvironment, perhaps due to recent climatic changes, shifts in human activity, or species competition, a hypothesis this study seeks to examine.

The escalation of *Aedes*-borne diseases in Nigeria is a growing public health concern (NCDC, 2023; Adesola *et al*, 2024). Yet, localized mosquito surveillance has been uneven, and University environments, despite being densely populated and ecologically complex, remain largely unexamined in this regard. Prior studies at the University of Lagos have detected *Ae. aegypti* only in trace quantities and made no report of *Ae. albopictus* (Adeoye *et al*., 2012). However, preliminary field observations now suggest that*Ae. albopictus* may not only be present on campus but dominant in selected places, raising significant epidemiological concerns.

Considering that *Ae. aegypti* is highly anthropophilic and *Ae. albopictus* is both anthropophilic and zoophilic, their relative abundance in campus microhabitats has direct implications for the types of arboviruses likely to thrive in the area (Ogbonna *et al*., 2019; Guarido*etal*., 2021). Despite numerous entomological studies in West Africa (Owusu-Asenso *et al*., 2022; Konkon*etal*., 2023;): campus-scale studies comparing these species in Nigeria remain limited. This knowledge gap significantly weakens preparedness and control strategies for arboviral diseases in academic institutions. Entomological surveillance studies across Nigeria and West Africa have made important contributions to understanding *Aedes* distribution, insecticide resistance, and disease risk (Konkon*etal*., 2023; Bello *et al*., 2024; Babalola *et al*., 2025;). However, these insights often overlook localized environments like universities, where dense human activity, frequent movement, and unregulated water retention provide ideal conditions for mosquito proliferation. With *Aedes albopictus* recently observed in the Biological Garden where it had previously never been recorded, this study provides the first documentation of its establishment within the University of Lagos Akoka campus. Due to its aggressive feeding on both humans and animals and its potential to displace *Aedes aegypti*, this shift in vector ecology warrants urgent attention (Murdock *et al*, 2017).

This study aimed to assess the spatiotemporal distribution and developmental dynamics of *Ae. aegypti* and *Ae. albopictus* in various outdoor microhabitats within the University of Lagos. Findings from this study will offer critical data for campus health officials, contribute to nationwide vector surveillance efforts, and help clarify which arboviruses may be most likely to emerge or spread if vector abundance continues unchecked. Additionally, the use of spatial mapping and microhabitat analysis will support evidence-based control measures, aligning with modern integrated vector management approaches (Ngugi *et al*., 2017; Myer *et al*., 2020).

MATERIALS AND METHODS

Study area and duration

This study was conducted within the University of Lagos campus, Akoka, Nigeria, geographically positioned at coordinates 6°30'N and 3°24'E (Ogunyebi*et al*., 2018). The campus comprises a blend of academic office buildings, landscaped gardens, and residential blocks. These provide variant microhabitat types for mosquito bio-ecological conditions Microhabitats within these locations were selected based on their consistent potential for water accumulation (Adeoye *et al*, 2012).

Sampling procedure and mosquito collection techniques

The larval sampling of *Aedes* populations was carried out between the hour of 7:50am -12pm over two distinct seasons; dry (January - February) and wet (April - May) to assess microhabitat dynamics and seasonal variability in species composition. Sampling focused on known mosquito breeding sites across vegetated patches, shaded zones, and artificial containers found within the study area. The weekly sampling ensured consistent monitoring of both transient and stable aquatic habitats. At each microhabitat, depending on the visual assessment of water volume and population density within the site, two to three dips were performed per location (Focks, 2003).

Captured specimens were gently transferred into plastic containers filled with site water to minimize physiological shock and retain microbial composition crucial for larval viability. Samples were subsequently transported to the entomology laboratory. Physicochemical parameters were measured for the habitat water sampled using HANNA Multimeter (HI 9813-6). Breeding containers were housed in aerated, mesh-enclosed compartments.

Post-emergence adult mosquitoes were harvested using a custom-built suction device constructed from borosilicate glass tubing and preserved using 70% ethanol in a 5ml EDTA K3 sample bottle size. Species identification was based on thoracic colouration patterns and confirmed under a dissecting microscope, using morphological keys as described by (Ayorinde *et al*., 2016; Chukwuekezie *et al*., 2018 and Martinet *et al*., 2021). Male and female mosquitoes were separated using standard keys involving antennal and palp length variations (Wilke *et al*, 2016). Twenty individuals were randomly selected from each species,for morphometric assessment. Anatomical measurements were conducted manually using a transparent millimeter rule. Four anatomical traits were measured:

Wing length, (from the alular notch to the distal apex).

Body length (from the head tip to the end of the abdomen)
Thorax length (the dorsal segment) and
Hind leg length (comprising the femur, tibia, and tarsus).

Morphometric ratios calculated include:

Wing to body ratio: $\frac{\text{wing length}}{\text{body length}}$

Hind leg to body ratio: $\frac{\text{hind leg length}}{\text{body length}}$

Thorax to body ratio: $\frac{\text{thorax length}}{\text{body length}}$

Statistical analysis

All quantitative data collected during field sampling and laboratory assessments were entered into spreadsheets using Microsoft Excel 2013 and data were analyzed using SPSS version 27. Descriptive Statistics were computed for larval and pupal abundance, adult emergence, sex ratios, and anatomical measurements. Independence sample t-test was applied to evaluate the interaction effects of season and species population. One-way ANOVA was computed for habitat type on adult emergence rates, Duncan post hoc test was used to identify specific group differences where ANOVA results were significant. Physicochemical parameters of the water were analyzed using Pearson correlation coefficients to determine Significance difference at $p < 0.05$.

RESULTS AND DISCUSSION

Seasonal emergence patterns of *Aedes* mosquitoes from January to April

During the dry season, mosquito emergence was minimal. In January, only two females of *Ae. albopictus* were recorded in the early period, with no males or *Ae. aegypti* individuals observed. Late January showed no emergence of either species. February marked a slight increase in *Ae. albopictus* activity, with early February yielding 3 males and 7 females, and late February recording 3 males and 11 females. *Aedes aegypti* remained absent throughout the dry season **(Table 1).** In contrast, the wet season exhibited a peak rise in mosquito emergence. March began with no recorded individuals in the early period, but late March saw a sharp increase: 6 female *Ae. albopictus*, and a notable surge in *Ae. aegypti* with 35 males and 80 females. April continued this trend. Three (3) female *Ae. albopictus* individuals were recorded in Early April, alongside 10 male and 21 female *Ae. aegypti*. By late April, emergence peaked with 5 male and 7 female *Ae. albopictus*, and 43 male and 56 female *Ae. aegypti*. In total, 292 mosquitoes emerged during the study period.

Table 1: Monthly adult emergence of *Aedes* mosquito populations

Season	Month	Period	Species	Sex	Population
Dry	January	Early	*Ae. albopictus*	Male	0
				Female	2
			Ae. aegypti	Male	0
				Female	0
		Late	*Ae. albopictus*	Male	0
				Female	0
			Ae. aegypti	Male	0
				Female	0
	February	Early	*Ae. albopictus*	Male	3
				Female	7
			Ae. aegypti	Male	0
				Female	0
		Late	*Ae. albopictus*	Male	3
				Female	11
			Ae. aegypti	Male	0
				Female	0
Wet	March	Early	*Ae. albopictus*	Male	0
				Female	0
			Ae. aegypti	Male	0
				Female	0
		Late	*Ae. albopictus*	Male	0
				Female	6
			Ae. aegypti	Male	35
				Female	80
	April	Early	*Ae. albopictus*	Male	0
				Female	3
			Ae. aegypti	Male	10
				Female	21
		Late	*Ae. albopictus*	Male	5
				Female	7
			Ae. aegypti	Male	43
				Female	56
Total					292

Pearson correlation analysis conducted to examine the relationships among five water quality parameters (: pH, conductivity (µS/cm): total dissolved solids (TDS, g/L): salinity (ppt): and temperature (°C): based on 14 observations **(Table 2)** revealed strong and statistically significant positive correlations among conductivity, TDS, and salinity. Conductivity was highly correlated with TDS (0.998, $p < 0.01$) and salinity (0.998, $p < 0.01$): while TDS also showed a strong correlation with salinity (0.996, $p < 0.01$). pH had weak correlations with all other parameters, coefficients ranged (0.006 - 0.028). Temperature had weak negative correlations with the other variables, especially with pH (–0.384), However, they were not statistically significant **(Table 3).**

Table 2: Microhabitat Physico-chemical parameters and emerging populations

Location	MicroHabitat	Site	Season	Month	PH	Cond. (us/cm)	TDS (g/l)	Salinity (ppt)	Temp(°c)	Early Month	Emergence		Late Month	Emergence	
											Ae. albopictus	*Ae. aegypti*		*Ae. albopictus*	*Ae. aegypti*
B. garden	glass tank	T	Dry	Jan.	8.8	8.38	7.28	4.48	28.6	5	2	0	3	0	0
B. garden	glass tank	T	Dry	Feb.	8.4	16.61	15	9.28	28.5	12	10	0	21	14	0
B. garden	glass tank	T	Wet	Mar.	7.5	7.11	5.82	3.79	28.2	17	0	0	30	6	0
New Hall	ceramic plate	T	Wet	Mar.	8.2	14.34	13	7.9	28.7	-	-	-	115	0	115
Sofoluwa park	Tyre	T	Wet	Apr.	8.7	13.6	12.3	7.45	31	12	0	7	4	0	4
B. garden	glass tank	T	Wet	Apr.l	7.8	5.45	4.18	2.86	31.1	-	-	-	21	12	0
B. garden	Rubber container	T	Wet	Apr.	7.9	2.93	2.2	1.5	31	3	3	0	-	-	-
DLI	tyre	T	Wet	Apr.	8.1	4.21	3.21	2.19	28.6	33	0	7	11	0	11
DSA Frontage	Tyre	T	Wet	Apr.	7.3	2.34	1.72	1.18	31.4	6	0	6	38	0	38
Faculty of Sci.	Tyre	T	Wet	Apr.	8.6	7.2	6.21	4.46	31.2	6	0	3	26	0	26
Edu. Faculty	Tyre	T	Wet	Apr.	8.2	2.05	1.49	1.03	30.6	40	0	8	32	0	2
New Hall	Ground Pond	P	Wet	Apr.	6.3	14.08	12.7	7.73	31.5	-	-	-	0	0	1
New Hall	Rubber container	T	Wet	Apr.	7.1	10.58	9.94	5.72	31.4	-	-	-	24	0	10
High rise	Tyre	T	Wet	Apr.	8.2	9.87	9.34	5.31	30.6	-	-	-	23	0	7

Keys: T- Temporary, P- permanent.

Table 3: Correlation analysis of physicochemical parameters of Breeding sites

Correlations

	pH	**Cond. (us/cm)**	**TDS (g/l)**	**Salinity (ppt)**	**Temp.(°c)**
pH	1				
Cond. (us/cm)	0.011	1			
TDS (g/l)	0.006	0.998**	1		
Salinity (ppt)	0.028	0.998**	0.996**	1	
Temp.(°c)	-0.384	-0.204	-0.179	-0.194	1

*Correlation was significant at the 0.01 level (2-tailed)

Body proportion ratios were calculated for *Ae. albopictus* and *Ae. aegypti* based on measurements from twenty individuals per species (**Table 4**). *Aedes albopictus* showed a wing-to-body ratio of 0.48, hind leg-to-body ratio of 1.26, and thorax-to-body ratio of 0.17. *Aedes aegypti* had a wing-to-body ratio of 0.50, hind leg-to-body ratio of 1.30, and the same thorax-to-body ratio of 0.17. *Aedes aegypti* has longer wings and hind legs, while both species share similar thorax proportions. The differences may reflect adaptations to their respective habitats vegetated for *Ae. albopictus* and urban for *Ae. aegypti*.

Table 4: Descriptive analysis of monthly variations of *Aedes* populations

Mosquito	Months	N	Mean	Std. Deviation	Std. Error	95% Confidence limit	
						Lower Bound	Upper Bound
Aedes albopictus	January	8	0.25	0.707	0.25	-0.34	0.84
	February	8	3	4.071	1.439	-0.4	6.4
	March	8	0.75	2.121	0.75	-1.02	2.52
	April	8	1.88	2.8	0.99	-0.47	4.22
Aedes aegypti	January	8	0	0	0	0	0
	February	8	0	0	0	0	0
	March	8	14.38	29.208	10.327	-10.04	38.79
	April	8	16.25	22.083	7.807	-2.21	34.71

The t-test revealed no statistically significant difference between the groups, with a Sig. (2-tailed) value of p = 0.068. The mean difference was –12.375, with a standard error of 6.315. The 95% confidence interval (–25.795 – 1.045) includes zero, further confirming the absence of a significant effect.

For *Aedes albopictus* **(Table 5),** the highest mean count was recorded in February (M = 3.00, SD = 4.071): while the lowest was in January (M = 0.25, SD = 0.707). The overall mean across the four months was 1.47 (SD = 2.794). In contrast, *Ae. aegypti* was absent in January and February (M = 0.00): but showed a sharp increase in March (M = 14.38, SD = 29.208) and April (M = 16.25, SD = 22.083): with an overall mean of 7.66 (SD = 19.071). Levene's test yielded a significance value of p = 0.01, which $p<0.05$, the assumption of equal variances was violated. Consequently, the row labeled "Equal variances not assumed" was referenced for interpretation

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	February	8	3	4.071	1.439	-0.4	6.4
	March	8	0.75	2.121	0.75	-1.02	2.52
	April	8	1.88	2.8	0.99	-0.47	4.22
Aedes aegypti	January	8	0	0	0	0	0
	February	8	0	0	0	0	0
	March	8	14.38	29.208	10.327	-10.04	38.79
	April	8	16.25	22.083	7.807	-2.21	34.71

The t-test revealed no statistically significant difference between the groups, with a Sig. (2-tailed) value of p = 0.068. The mean difference was –12.375, with a standard error of 6.315. The 95% confidence interval (–25.795 – 1.045) includes zero, further confirming the absence of a significant effect.

Seasonal variation in mosquito abundance was evaluated for *Ae. albopictus* and *Ae. aegypti* across dry and wet seasons **(Tables 6 and 7).** For *Ae albopictus*, the mean abundance during the dry season (M = 1.63, SD = 3.16) was marginally higher than in the wet season (M = 1.31, SD = 2.47). Levene's test confirmed homogeneity of variance (F = 0.171, p = 0.683): and the independent samples t-test revealed no statistically significant difference between seasons (t (30) = 0.313, p = 0.757). The mean difference of 0.313 (SE = 1.002) and the 95% confidence interval [-1.735, 2.360] suggested that seasonal conditions did not significantly influence *Ae. albopictus* abundance. In contrast, *Ae. aegypti* showed a marked seasonal shift. It was entirely absent during the dry season (M = 0, SD = 0): but exhibited a substantial increase in the wet season (M = 15.31, SD = 25.03). Levene's test indicated unequal variances (F = 30.134, p < 0.001): and Welch's t-test confirmed a statistically significant difference in abundance between seasons (t (15) = -15.312, p = 0.027). The mean difference of -15.312 (SE = 6.258) and the 95% confidence interval [-28.651, -1.974] reflect a strong seasonal dependency, with wet conditions favoring the proliferation of *Aedes aegypti*.

Table 6: Seasonal Group Statistics of *Aedes* populations

Mosquito	**Season**	N	**Mean**	**S.D**	**S.E**
Aedes albopictus	Dry	16	1.63	3.16	0.79
	Wet	16	1.31	2.469	0.617
Aedes aegypti	Dry	16	0	0	0
	Wet	16	15.31	25.033	6.258

Table 7: *Aedes* population comparison via Independent Samples T-Test

Species	**Variances**	**Levene's Test for EVA**		**t-test for Mean Equality**					
		F	Sig.	D.F	Sig. (2-tailed)	Mean Difference	S.E	95% CI	
								Lower	Upper
Aedes albopictus	EVA	0.171	0.683	30	0.757	0.313	1.002	-1.735	2.36
	EVnA			28.343	0.758	0.313	1.002	-1.74	2.365
Aedes aegypti	EVA	30.134	0	30	0.02	-15.312	6.258	-28.093	-2.532
	EVnA			15	0.027	-15.312	6.258	-28.651	-1.974

During the dry season, mosquito activity was relatively low. In January and February, only larval stages were collected in early months, with no eggs or pupae observed. The total number of specimens collected early in the dry season was minimal (17 in total): with low emergence rates. *Aedes albopictus* was slightly more represented during this period, emerging in both months, while *Ae.aegypti* did not emerge at all. In the late dry season collections, a modest increase was noted in larval presence in February, but pupae remained absent, and egg counts were zero throughout.

In contrast, the wet season showed a significant rise in mosquito abundance and diversity of life stages. In early March and April, not only did larval counts increase sharply (16 and 82, respectively): but pupal stages also began to appear, especially in April. This corresponds with favorable environmental conditions for mosquito breeding such as higher humidity, stagnant water availability, and warmer temperatures (Ghamba *et al*., 2023; Babalola *et al*., 2025). Consequently, emergence rates increased, particularly in April, where early-month emergence reached 34 individuals, including both male and female *Ae. aegypti*. These findings are consistent with Bagny *et al*. (2009): who reported similar seasonal surges in *Aedes* populations in Mayotte, with *Ae. aegypti* dominating during wetter periods.

The late wet season (March and April) revealed the highest density and diversity of mosquito developmental stages. Egg, larval, and pupal stages were all represented, with April showing peak collection values (179 specimens). Notably, *Ae. aegypti* dominated the emergent population during this period, with 78 males and 136 females recorded. *Aedes albopictus* was also present but in lower numbers. This suggests that*Ae. aegypti* may be better adapted to breeding during the wet season or have a higher reproductive potential under such conditions (Obame-Nkoghe*et al*., 2024). Overall, the findings demonstrate that mosquito breeding and emergence are strongly seasonal, with wet months being significantly more productive than dry ones. *Aedes aegypti* exhibited higher emergence success, particularly in late wet months, while *Ae. albopictus* was more consistently present across seasons but in smaller numbers. The absence of eggs in early collections and their appearance in April further emphasizes the link between rainfall and mosquito oviposition (Chukwuekezie *et al*., 2018).

Adult emergence data confirmed a total of 292 emerged mosquitoes, comprising 30 *Ae. albopictus* (11 males, 19 females) and 245 *Ae. aegypti* (88 males, 157 females). Emergence was especially pronounced in March and April, coinciding with increased larval and pupal densities. The dominance of *Aedes aegypti* in both abundance and emergence highlights its stronger ecological affinity for the wet season microhabitats within the study area (Bello *et al*., 2024).

Aedes aegypti exhibited clear seasonal dominance, with significantly higher productivity during the wet months (P = 0.02): consistent with its well-documented proliferation during periods of increased rainfall and availability of artificial containers (Bagny *et al*., 2009; Babalola *et al*., 2025;). Microhabitat analysis revealed distinct ecological preferences between the two species. *Aedes aegypti* was more abundant in artificial containers such as ceramic plates and tyres, habitats typically located in open (Table 8), human-dominated environments like New Hall, DSA Frontage, and the Faculty of Science. In the opposite, *Aedes albopictus* was predominantly confined to vegetated, shaded environments, particularly the Biological Garden, and was associated withwater holding structures in these areas, including glass tanks and rubber containers. This aligns with global observations that *Ae. albopictus* prefers less disturbed environments and thrives in vegetated areas with moderate shade and moisture (Adeleke *et al*., 2015; Obame-Nkoghe *et al*., 2024;).The research results suggested that *Ae. albopictus* prefers glass tanks, while *Ae. aegypti* shows a strong affinity for ceramic plates (Table 2). This species-specific habitat preference may inform targeted vector control strategies (Ibrahim *et al*., 2025). An ecological concern was the consistent presence of *Aedes* *albopictus* throughout both dry and wet seasons, although at lower densities. This persistence suggests that*Ae. albopictus*, an invasive species, is becoming established in this environment. Its niche overlapped with *Ae. aegypti*, raising important questions regarding interspecific competition, particularly in shared larval habitats. In other regions, *Ae. albopictus* has been known to displace native *Ae. aegypti* populations under certain ecological conditions (Murrell and Juliano, 2008): which could result in shifts in arboviral disease transmission dynamics.

Table 8: Dominate breeding sits of *Aedes aegypti*and their abundance

Aedes aegypti	Predominate Microhabitat	Early Month	Late Month
New Hall	ceramic plate	-	115
Sofoluwa park	Tyre	7	4
DLI	tyre	7	11
DSA Frontage	Tyre	6	38
Faculty of Sci.	Tyre	3	26
Education F.	Tyre	8	2
New Hall	Ground Pond	-	1
New Hall	Rubber container	-	10
High rise	Tyre	-	7

Table 9: Dominate breeding sits of *Aedes albopictus*and their abundance

Aedes albopictus	Predominate Microhabitat	Early Month	Late Month
B. garden	glass tank	2	0
B. garden	glass tank	10	14
B. garden	glass tank	0	6
B. garden	glass tank	-	12
Biological garden	Rubber container	3	-

Table 10: Total Aedes mosquitoes' emergence in both seasons

Species	Dry season	Wet season
Aedes albopictus	26	0
Aedes aegypti	21	245

Although *Ae. aegypti* remains dominant overall, the colonization of strategic breeding sites (glass tanks & rubber containers) by *Ae. albopictus* highlights its adaptive capacity and potential for future expansion (Table 9). Some studies, however, suggest that coexistence is possible due to behavioural divergence and habitat partitioning (Egid *et al*., 2022). This provided the need for enhanced vector control efforts prior to and during the wet season, when mosquito proliferation and disease transmission potential are highest (Mukhtar and Ibrahim, 2022; Bello *et al.,* 2024)

There's a strong influence of seasonality, microhabitat conditions, and spatial variation on the distribution and development of *Aedes* mosquitoes within the University of Lagos. While *Ae.aegypti* demonstrated clear dominance in abundance and emergence, particularly during the wet season and in artificial container habitats (Table 10), the persistent and targeted presence of *Ae. albopictus* in vegetated microhabitats raises important ecological and public health concerns.Given that *Ae. albopictus* is an invasive species with competitive potential (Westby *et al*.,2021; Rau *et al*.,2023), its co-occurrence with *Ae. aegypti* in certain breeding environments could signal future ecological shifts. Continuous monitoring of both species is therefore essential not only to track changes in population dynamics but also to inform targeted vector control interventions. Emphasis should be placed on managing microhabitats such as tyres, ceramic plates, and vegetated areas, which serve as breeding hotspots. These insights are crucial for developing seasonally timed, habitat-specific mosquito control strategies, especially in densely populated urban environments where arbovirus transmission risks are high.

CONCLUSION

The four-month study on the spatio-temporal distribution of *Aedes* mosquito populations at of the University of Lagos Akoka campus demonstrated distinct ecological and microhabitat preferences between *Aedes aegypti* and *Aedes albopictus.* While the former was dominant in variant microhabitat types with significant seasonal productivity especially in student-prone environments, the latter showed no seasonal variation and was restricted to shaded/vegetation environments, breeding only in artificial containers. Hence, *Aedes aegypti* remains the dominant species on campus compared with *Aedes albopictus* population within the same campus. Vector control efforts must therefore take cognizance of the seasonal variation, solid waste management, and land use alterations against *Aedes* mosquito populations, with proportionate impact on their respective arboviral infections

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