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Fly diversity in The City of Korhogo

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Abstract

The diversity of Diptera in urban environments serves as an indicator of ecological and sanitary conditions. This study aims to characterise the taxonomic composition, abundance and diversity of flies in different neighbourhoods of Korhogo, as well as their spatio-temporal dynamics. Sampling involved visiting rubbish dumps, drains, pigsties, henhouses and cattle pens to capture adult flies using a sweep net. A total of 14,403 individuals belonging to 13 families, 19 genera and 24 species were collected. The Muscidae family largely dominates the community (50.64 per cent), followed by the Calliphoridae (24.66 per cent) and the Sarcophagidae (11.36 per cent). The most abundant species are *Musca domestica*, *Lucilia cuprina*, *Muscina levida* and *Calliphora vomitoria*. The average Shannon diversity index ($H' = 2.57 \pm 0.32$) indicates moderate diversity, whilst the evenness index ($E = 0.64 \pm 0.10$) reflects a relatively even distribution of individuals. At the neighbourhood level, Shannon indices range from 0.95 to 1.86, indicating low diversity, despite high evenness (0.85-0.89). Kruskal-Wallis tests show no significant differences between neighbourhoods ($p > 0.05$). Specific richness and abundance increase during the rainy season, with diversity peaking between March and August. The Diptera community in Korhogo is dominated by opportunistic species, influenced by seasonal variations and local environmental conditions.

Keywords: Diptera, diversity, seasonal dynamics, urban environment, Korhogo

Introduction

Urbanization is one of the main drivers of change in biodiversity on a global scale, leading to profound changes in habitat structure, microclimate and the composition of biological communities [1]. In tropical regions, rapid and often unplanned urban expansion creates heterogeneous environments comprising residential areas, markets, domestic livestock rearing areas and waste disposal sites, thereby influencing the dynamics of insect communities.

Flies (Diptera) represent one of the most diverse and ecologically important orders of insects, with over 160,000 species described worldwide [2]. They occupy a wide variety of ecological niches and perform essential functions such as the decomposition of organic matter, nutrient recycling, pollination and, in some cases, biological control [3]. However, several families of Diptera, notably the Muscidae, Calliphoridae and Sarcophagidae, comprise synanthropic species closely associated with human-modified environments and capable of acting as mechanical vectors for pathogens of medical and veterinary importance [4, 5].

Urban environments, particularly in tropical Africa, provide abundant breeding sites for synanthropic flies due to sometimes inadequate waste management and the proximity of domestic animals [6]. The abundance and diversity of dipteran species are strongly influenced by environmental factors such as temperature, humidity, the availability of organic substrates and seasonality [7]. Consequently, assessing fly diversity in urban ecosystems is essential for understanding ecological dynamics and evaluating potential health risks.

In West Africa, studies on Diptera have mainly focused on agricultural pests or disease vectors, whilst comprehensive inventories of fly biodiversity in urban environments remain rare. In Côte d'Ivoire, existing research has focused primarily on species of medical interest [8-10], leaving a knowledge gap regarding the overall diversity and community structure of Diptera in urban centres in the north of the country.

The city of Korhogo, situated in the north of Côte d'Ivoire, is characterised by a Sudano-Guinean climate marked by a distinct dry season and a distinct wet season.

It comprises a mosaic of habitats including residential neighbourhoods, open-air markets, rubbish dumps and peri-urban agricultural areas. This ecological heterogeneity could support a rich and well-structured dipteran fauna. However, to date, no study has been carried out to document fly diversity in this locality.

The aim of this study is therefore to assess the taxonomic diversity, species composition and relative abundance of flies (Diptera) in various urban habitats in Korhogo, with a view to providing data on flies in northern Côte d'Ivoire.

Materials and methods

Animal material

The animal material consisted mainly of adult flies and larvae.

Equipment

In the field, a sweep net and entomological tweezers were used to capture the flies. Pill boxes containing 70 per cent alcohol were used to preserve the flies. In the laboratory, we used a binocular magnifying glass, identification keys by Kirk, Spriggs and Sinclair (2017) ^[11], Zumpt (1965) ^[12] and Skidmore (1985) ^[13], and a camera to observe, identify and photograph the identified flies, respectively.

Methods

Study site

The studies were carried out in the city of Korhogo (9°34' N - 5°37' W). The climate is of the dry Sudanese tropical type, with two distinct seasons: the rainy season runs from mid-April to October and the dry season from November to mid-April. The average annual temperature ranges between 24°C and 36°C. The soils generally have low humus content and are of moderate fertility. Furthermore, on the outskirts of the town, there is a high concentration of poultry, cattle, sheep, goat and pig farming. This municipality is one of the country's major market garden production areas.

Fly collection

To assess fly diversity in the city of Korhogo, samples were taken from several neighbourhoods, namely Téguré, Kassirimé, Cocody, Natio, Petit Paris, Soba and Haoussabougou. Each neighbourhood was visited twice a month throughout the 12 months of the year. Sampling involved visiting rubbish dumps, drains, pigsties, chicken coops and cattle pens to capture adult flies using a sweep net.

Mounting and identification of flies

The flies were mounted by sorting them to separate them from other insects caught in the sweep net. Suitable entomological pins were used to mount the flies. In practice, the pin is inserted vertically into the right-hand half of the scutum. It protrudes approximately one centimetre above the fly to allow it to be grasped.

Furthermore, the insect must not be pinned too low on the pin, as space must be left for the labels. The wings are spread slightly apart so that the rear of the body is visible.

The specimens were mounted on a polystyrene base to allow the legs to be spread out more effectively, rather than left hanging, which could risk them breaking during handling. The fly specimens were mounted and identified to genus or species level.

Analysis of fly diversity

Diversity is defined as the degree of heterogeneity within a population ^[14]. To assess fly diversity, several estimators were used. Species richness and diversity indices (α -diversity and β -diversity) were calculated. α -diversity provides information on intra-habitat diversity. β -diversity, on the other hand, involves comparing species diversity between habitats or along environmental gradients.

Specific richness (S)

Specific richness (S) corresponds to the total number of fly species sampled in a given habitat ^[15]. It is very rare to record all insect species in a natural habitat (due to limitations arising from sampling effort, which is often insufficient). However, it is possible to overcome this constraint by using estimation methods which, based on a sample, allow the expected species richness to be determined as if exhaustive sampling had been carried out. The biodiversity analysis software EstimateS (Version 7.0) ^[16] was therefore used to estimate the expected species richness in the habitats studied.

$$S = \Sigma \text{ Species}$$

Biological diversity indices

Diversity - α (alpha)

Shannon index (H')

Species diversity can be assessed using a diversity index that takes into account both species richness and the abundance of the various species (species richness does not take species abundance into account). The Shannon index (H') takes into account the number of taxa found within a plot.

However, it disregards rare species present in the habitat ^[17]. It is zero when there is only one taxon and reaches its maximum value when all taxa have the same abundance. This index was calculated using the EstimateS software (Version 7.0), according to the following formula:

$$H' = -E ((N_i / N) * \log_2 (N_i / N))$$

Where:

N_i : the number of individuals of a given species, where i ranges from 1 to S (the total number of species); N : the total number of individuals.

Equitability index (E)

Also known as the evenness index, equitability (E) measures the even distribution of species. It enables the comparison of stands comprising different numbers of taxa ^[18]. Its purpose is to assess the balance of the populations present.

$$E = H' / H' \text{ max}$$

Where:

$$H' \text{ max} = \log_2 S \text{ [19].}$$

S represents total species richness.

E approaches 0 when a single taxon dominates a stand, and is equal to 1 when all taxa have the same abundance.

Diversity - β (Beta)

The Jaccard similarity index, or P-diversity, is a measure of biodiversity that involves comparing species diversity between two ecosystems. This involves comparing the

number of taxa that are unique to each ecosystem. It is calculated using the following formula:

$$J = \frac{a}{(a + b + c)}$$

Where:

a: number of species common to two sites or habitats.

b: number of species unique to site or habitat 1.

c: number of species unique to site or habitat 2.

Statistical analysis of the data

The data collected were analysed using version 7.1 of the STATISTICA software and version 5.2.1 of the R software. Analysis of variance (ANOVA) and Duncan's test at a 5 per cent significance level were used to analyse and compare the diversity and abundance of bees. The graphs were created using Microsoft Excel.

Results

Overall taxonomic diversity

In this study, 14,403 insects were collected from the sampled neighbourhoods. These insects belong exclusively to the order Diptera, suborder Cyclorrhapha, and to 13 families. These families are represented by 19 genera and 24 species. The most dominant families are the Muscidae, Calliphoridae, Sarcophagidae and Stratiomyidae. At the species level, *Musca domestica* was the most prevalent, followed by *Lucilia cuprina*, *Muscina levida* and *Calliphora vomitoria* (Table 1).

Species diversity of flies

At family level, the greatest diversity is found among the Muscidae, with 7 species (29 per cent), followed by the Calliphoridae, which comprises 4 genera (16 per cent), and the Sarcophagidae and Glossinidae, each with 2 species (8 per cent). All other families are each represented by a single genus, accounting for 4 per cent.

Species richness of flies by neighbourhood

Téguéré

In this neighbourhood, the Muscidae were the most abundant, accounting for 60.35 per cent; followed by the Calliphoridae at 19.19 per cent; the Sarcophagidae at 12.69 per cent; the Stratiomyidae at 7.39 per cent; and the Fanniidae at 0.36 per cent.

In terms of species, *Musca domestica* was the most abundant, followed by *Muscina levida*, *Calliphora vomitoria*, *Hermetia illucens*, *Sarcophaga carnaria*, *Muscina stabulans*, *Neomyia viridescens*, *Sarcophaga bulata*, *Cynomya mortuorum* and *Fannia canicularis*, which was the least abundant. (Table 2).

Kassirimé

At this site, the insects captured were predominantly represented by the following families, in order of relative abundance: Muscidae 44 per cent; Calliphoridae 28.57 per cent; Sarcophagidae 14.13 per cent. Stratiomyidae 5.54 per cent; Dolichopodidae 4.44 per cent. The least abundant families were Asilidae 1.84 per cent; Diopsidae 0.75 per cent and Tephritidae 0.39 per cent.

The most abundant species were *Musca domestica*, *Lucilia cuprina*, *Muscina levida*, *Muscina stabulans*, *Calliphora vomitoria*, *Sarcophaga carnaria*, *Sarcophaga bulata* and

Hermetia illucens. The least abundant species were *Cynomya mortuorum*, *Pyrellia viridia*, *Dolichopus aethiopsis*, *Neomyia viridescens*, *Damalis scutellata*, *Diopsis apicalis* and *Bactrocera dorsalis*. (Table 2).

Cocody

Here, the individuals captured belonged to the following families, ranked according to relative abundance: Muscidae 58.51 per cent; Calliphoridae 30.63 per cent; Sarcophagidae 12.09 per cent; Stratiomyidae 1.41 per cent; Asilidae 1.07 per cent; Tephritidae 0.96 per cent. The Glossinidae and Fanniidae were the least abundant families, each accounting for 0.56 per cent.

Musca domestica, *Lucilia cuprina*, *Muscina levida*, *Muscina stabulans*, *Calliphora vomitoria*, *Sarcophaga bulata*, *Sarcophaga carnaria*, *Pyrellia viridia*, *Cynomya mortuorum*, *Hermetia illucens*, *Damalis scutellata*, *Bactrocera dorsalis*, *Neomyia viridescens*, *Fannia canicularis* and *Glossina palpalis* are the species captured in the Cocody district, listed in order of abundance. (Table 2)

Soba

The most abundant families in Soba were the Muscidae (50.66 per cent), Calliphoridae (25.80 per cent) and Sarcophagidae (12.90 per cent). The Stratiomyidae family was the least abundant, at 10.62 per cent.

At the species level, the most abundant species were: *Musca domestica*, *Lucilia cuprina*, *Hermetia illucens*, *Muscina levida*, *Muscina stabulans*, *Calliphora vomitoria*, *Sarcophaga bulata*, *Sarcophaga carnaria* and *Pyrellia viridia*. Conversely, *Cynomya mortuorum* and *Neomyia viridescens* were the least abundant species, respectively. (Table 2).

Petit Paris

The percentages of families in Petit Paris were 45.76% for the Muscidae, 22.37% for the Calliphoridae, 9.1% for the Sarcophagidae, 4.03% for the Stratiomyidae, 10.33% for the Glossinidae, 7.67% for the Tabanidae, 0.73% for the Simuliidae, and 0.17% for the Fanniidae.

As regards species, the most abundant were, in order: *Musca domestica*, *Glossina palpalis*, *Lucilia cuprina*, *Muscina levida*, *Tabanus bovinus*, *Stomoxys calcitrans*, *Calliphora vomitoria*, *Sarcophaga bulata*, *Sarcophaga carnaria*, *Hermetia illucens*, *Calliphora vicina*, *Pyrellia viridia*, *Cynomya mortuorum* and *Muscina stabulans*. *Musca autumnalis*, *Neomyia viridescens*, *Simulium damnosum* and *Fannia canicularis* were the least abundant species, respectively. (Table 2).

Haoussabougou

Only three families were recorded at this site, with the Muscidae family once again being the most abundant at 67.47 per cent; followed by the Calliphoridae family at 17.60 per cent; and the third family was the Sarcophagidae, which was the least abundant at 14.91 per cent.

In terms of species: *Musca domestica*, *Muscina levida*, *Calliphora vomitoria*, *Sarcophaga carnaria* and *Neomyia viridescens*. (Table 2).

Natio

The most abundant families were the Muscidae, accounting for 47.73 per cent, followed by the Calliphoridae at 26.95 per cent; the Sarcophagidae at 8.94 per cent; the

Stratiomyidae at 7.99 per cent; the Tabanidae at 4.19 per cent; the Glossinidae at 3 per cent; and the Agromyzidae at 1.08 per cent. The least abundant family at this site was the Fanniidae, accounting for 0.12 per cent.

As regards species, the most abundant were, in order: *Musca domestica*, *Lucilia cuprina*, *Hermetia illucens*, *Muscina levida*, *Calliphora vomitoria*, *Sarcophaga carnaria*, *Muscina stabulans*, *Tabanus bovinus*, *Sarcophaga bullata*, *Calliphora vicina*, *Cynomya mortuorum*, *Pyrellia viridia*, *Glossina palpalis*, *Neomyia viridescens*, *Musca autumnalis* and *Stomoxys calcitrans*. *Ophiomyia spencerella* and *Fannia canicularis* were the least abundant species, respectively. (Table 2).

Biological diversity of flies by neighbourhood

The Shannon diversity indices calculated were $H' = 1.42$ in the Téguré neighbourhood, $H' = 1.85$ in Kassirimé, $H' = 1.85$ in Cocody, $H' = 1.24$ in Soba, $H' = 1.86$ in Petit Paris, $H' = 0.95$ in Haoussabougou and $H' = 1.83$ in Natio.

The Kruskal-Wallis test ($P = 0.18$) showed that there is no significant difference between the indices of the different neighbourhoods (Table III). The index values obtained in these neighbourhoods are relatively low. There is therefore low diversity at the study sites.

As regards the equitability index, it was 0.88 in Téguré, 0.89 in Kassirimé, 0.89 in Cocody, 0.89 in Soba, 0.85 in Petit Paris, 0.87 in Haoussabougou and 0.88 in Natio. The equitability indices for these three localities are very similar; the insect fauna of these neighbourhoods is well-organised and well-structured. Species abundance is broadly the same across these seven neighbourhoods. The Kruskal-Wallis test shows that there is no significant difference in equitability between the neighbourhoods ($P = 0.11$) (Table 3).

Discussion

The results show that the fly fauna recorded in the city of Korhogo belongs exclusively to the order Diptera, suborder Cyclorrhapha, and comprises 13 families, 19 genera and 24 species. This relatively high taxonomic diversity may be explained by the Diptera's strong capacity for ecological adaptation to tropical urban environments, characterised by a plentiful supply of organic resources and a diversity of microhabitats. The predominance of the families Muscidae, Calliphoridae and Sarcophagidae observed in this study is similar to the findings of several studies conducted in West and Central Africa. In Côte d'Ivoire, Kouassi *et al.* (2020) [20] demonstrated that the families Muscidae and Calliphoridae dominate fly communities in urban environments, due to their affinity for household waste, decomposing organic matter and excrement. Similarly, Ouédraogo *et al.* (2019) [21] in Burkina Faso reported a high abundance of *Musca domestica* and *Lucilia cuprina* in urban and peri-urban areas, highlighting the role of human activities in shaping dipteran communities.

The marked presence of *Musca domestica*, *Muscina stabulans* and *Stomoxys calcitrans* at the sites studied confirms the synanthropic nature of these species. These flies are closely associated with human habitats, where they find conditions favourable to their reproduction and feeding. According to Abdoul *et al.* (2021) [22] in Niger, *M. domestica* is considered the most ubiquitous species in African cities, capable of colonising markets, abattoirs and residential areas alike.

The capture of species from the families Calliphoridae (*Lucilia cuprina*, *Calliphora vicina*, *C. vomitoria*) and

Sarcophagidae (*Sarcophaga carnaria*, *S. bullata*) may be explained by the presence of fresh, decomposing animal remains in the study areas. These families are known for their major role in the degradation of protein-rich organic matter and are fairly abundant in African urban and peri-urban environments. Our results are consistent with those of Adu-Bobi *et al.* (2022) [23] in Ghana and Nigeria, who reported a similar composition of necrophagous flies in large urban agglomerations.

Furthermore, the presence of families of medical and veterinary significance, such as the Glossinidae (*Glossina palpalis*, *G. morsitans*), the Simuliidae (*Simulium damnosum*) and the Tabanidae (*Tabanus bovinus*), could be explained by the fact that, despite urbanisation, cattle farming and market gardening are still practised right in the heart of the city of Korhogo.

These results are similar to those reported by Silué *et al.* (2021) [24] in northern Côte d'Ivoire, where species of tsetse flies and black flies were recorded on the urban outskirts.

The presence of families such as the Tephritidae, Agromyzidae and Dolichopodidae—flies typically associated with marshy and agricultural habitats—among the insects captured could be explained by the existence of low-lying areas, patches of savannah and inner-city market gardens, as highlighted by Traoré *et al.* (2023) [25] in Mali. Analysis of species richness shows a clear dominance of the Muscidae family, which exhibits the greatest diversity with 7 species, accounting for 24 per cent of all recorded species. This high representation of Muscidae highlights their role as bioindicators of urban and tropical environments. This result may be explained by the fact that flies find conditions particularly favourable to their development in human settlements, notably the abundant presence of organic waste, animal droppings and household residues. Our findings corroborate those of Kouassi *et al.* (2020) [20] in Côte d'Ivoire and Ouédraogo *et al.* (2019) [21] in Burkina Faso, who also observed high species richness of Muscidae in urban environments.

The Calliphoridae family ranks second, with three genera, accounting for 14 per cent of the total species richness. This relatively high level of diversity could be explained by the necrophagous lifestyle of these species, which are closely associated with decomposing animal matter; this also explains the predominance of this family in the Petit Paris neighbourhood, which is home to the abattoir. These results are similar to those of Adu-Bobi *et al.* (2022) [23] in Ghana, who state that Calliphoridae constitute one of the most diverse groups in urban areas due to their high dispersal capacity and broad ecological range. The Sarcophagidae and Glossinidae, with two species each (9 per cent), exhibit average species richness. The presence of the Sarcophagidae confirms their adaptation to peri-urban environments, whilst that of the Glossinidae reflects the existence of cattle parks and wetlands.

Our results differ from those of Silué *et al.* (2021) [24], who showed that the Glossinidae are heavily affected by urbanisation, with their diversity declining considerably in urban areas, whilst increasing in rural and forested habitats. Overall, the distribution of species richness observed in the city of Korhogo reveals a community structure dominated by the Muscidae, Calliphoridae and Sarcophagidae, whilst other groups remain poorly represented.

This pattern demonstrates the combined influence of human activities, the availability of food resources and local climatic conditions on fly diversity.

Table 1: List of fly species captured in the sampled neighbourhoods

Order	Families	Species
Diptera	Muscidae	<i>Musca domestica</i>
		<i>Stomoxys calcitrans</i>
		<i>Muscina stabulans</i>
		<i>Musca autumnalis</i>
		<i>Muscina levida</i>
		<i>Pyrellia viridia</i>
	Calliphoridae	<i>Neomyia viridescens</i>
		<i>Lucilia cuprina</i>
		<i>Calliphora vomitoria</i>
		<i>Calliphora vicina</i>
	Sarcophagidae	<i>Cynomya mortuoorana</i>
		<i>Sarcophaga carnaria</i>
	Glossinidae	<i>Sarcophaga bullata</i>
		<i>Glossina palpalus</i>
	Glossinidae	<i>Glossina morsitans</i>
		<i>Ophiomyia spencerella</i>
	Agromyzidae	<i>Damalis scutellata</i>
	Asilidae	<i>Tabanus bovinus</i>
	Tabanidae	<i>Tabanus bovinus</i>
	Tephritidae	<i>Bactrocera dorsalis</i>
	Stratiomyidae	<i>Hermetia illucens</i>
	Dolichopodidae	<i>Dolichopus aethiops</i>
	Diopsidae	<i>Diopsis apicalis</i>
	Fanniidae	<i>Fannia canicularis</i>
	Simuliidae	<i>Simulium damnosum</i>

Table 2: Specific fly populations by neighbourhood

Neighbourhood	Families	Species	Percent
Téguéré	Muscidae	<i>Neomyia viridescens</i>	6,14
		<i>Musca domestica</i>	31,93
		<i>Muscina levida</i>	10,7
		<i>Muscina stabulans</i>	6,45
		<i>Pyrellia viridia</i>	5,14
			60,36
	Calliphoridae	<i>Lucilia cuprina</i>	5,98
		<i>Calliphora vomitoria</i>	8,97
		<i>Cynomya mortuorum</i>	4,25
			19,2
	Sarcophagidae	<i>Sarcophaga bulata</i>	5,87
		<i>Sarcophaga carnaria</i>	6,82
Soba	Muscidae		12,69
		<i>Fannia canicularis</i>	0,37
		<i>Hermetia illucens</i>	7,39
	Calliphoridae	<i>Neomyia viridescens</i>	2,78
		<i>Musca domestica</i>	25,86
		<i>Muscina levida</i>	9,25
		<i>Muscina stabulans</i>	8,06
		<i>Pyrellia viridia</i>	4,71
			50,66
	Calliphoridae	<i>Lucilia cuprina</i>	14,27
		<i>Calliphora vomitoria</i>	7,53
		<i>Cynomya mortuorum</i>	4
			25,8
Cocody	Muscidae	<i>Sarcophaga bulata</i>	5,81
		<i>Sarcophaga carnaria</i>	7,09
			12,9
	Stratiomyidae	<i>Hermetia illucens</i>	10,62
	Muscidae	<i>Neomyia viridescens</i>	0,84
		<i>Musca domestica</i>	30,75
		<i>Muscina levida</i>	11,24
		<i>Muscina stabulans</i>	10,12
		<i>Pyrellia viridia</i>	5,56
			58,51
	Fanniidae	<i>Fannia canicularis</i>	0,56
	Calliphoridae	<i>Lucilia cuprina</i>	18,27
		<i>Calliphora vomitoria</i>	7,36
		<i>Cynomya mortuorum</i>	5
			30,63
	Sarcophagidae	<i>Sarcophaga bulata</i>	6,3

		<i>Sarcophaga carnaria</i>	5,79
			12,09
	Glossinidae	<i>Glossina palpalis</i>	0,56
	Stratiomyidae	<i>Hermetia illucens</i>	1,41
	Tephritidae	<i>Bactrocera dorsalis</i>	0,96
Kassirimé	Asilidae	<i>Damalis scutellata</i>	1,07
	Muscidae	<i>Neomyia viridescens</i>	3,6
		<i>Musca domestica</i>	16,33
		<i>Muscina levida</i>	9,79
		<i>Muscina stabulans</i>	9,49
		<i>Pyrellia viridia</i>	4,8
			44,01
	Calliphoridae	<i>Lucilia cuprina</i>	15,53
		<i>Calliphora vomitoria</i>	8,54
		<i>Cynomya mortuorum</i>	4,8
			28,87
	Sarcophagidae	<i>Sarcophaga bulata</i>	6,09
		<i>Sarcophaga carnaria</i>	8,04
			14,13
	Diopsidae	<i>Diopsis apicalis</i>	0,75
	Stratiomyidae	<i>Hermetia illucens</i>	5,54
	Tephritidae	<i>Bactrocera dorsalis</i>	0,4
	Asilidae	<i>Damalis scutellata</i>	1,85
	Dolichopodidae	<i>Dolichopus aethiopsis</i>	4,45
Petit Paris	Muscidae	<i>Neomyia viridescens</i>	1,7
		<i>Stomoxys calcitrans</i>	6,67
		<i>Musca domestica</i>	19,9
		<i>Muscina levida</i>	8,13
		<i>Muscina stabulans</i>	3,53
		<i>Musca autumnalis</i>	2,16
		<i>Pyrellia viridia</i>	3,66
			45,75
	Calliphoridae	<i>Lucilia cuprina</i>	10,07
		<i>Calliphora vomitoria</i>	4,7
		<i>Calliphora vicina</i>	4,03
		<i>Cynomya mortuorum</i>	3,57
			22,37
	Fanniidae	<i>Fannia canicularis</i>	0,17
	Sarcophagidae	<i>Sarcophaga carnaria</i>	4,37
		<i>Sarcophaga bulata</i>	4,56
			9,1
	Glossinidae	<i>Glossina palpalis</i>	10,33
	Tabanidae	<i>Tabanus bovinus</i>	7,67
	Simuliidae	<i>Simulium damnosum</i>	0,73
	Stratiomyidae	<i>Hermetia illucens</i>	4,03
Haoussabougou	Muscidae	<i>Neomyia viridescens</i>	6,99
		<i>Musca domestica</i>	32,39
		<i>Muscina levida</i>	28,09
			67,47
	Calliphoridae	<i>Calliphora vomitoria</i>	17,6
Natio	Sarcophagidae	<i>Sarcophaga carnaria</i>	14,91
	Muscidae	<i>Neomyia viridescens</i>	2,68
		<i>Musca domestica</i>	28,23
		<i>Muscina levida</i>	7,35
		<i>Musca autumnalis</i>	2,28
		<i>Muscina stabulans</i>	4,11
		<i>Pyrellia viridia</i>	3,08
			47,73
	Calliphoridae	<i>Lucilia cuprina</i>	14,54
		<i>Calliphora vomitoria</i>	5,23
		<i>Calliphora vicina</i>	3,95
		<i>Cynomya mortuorum</i>	3,23
			26,95
	Sarcophagidae	<i>Sarcophaga bulata</i>	4,07
		<i>Sarcophaga carnaria</i>	4,87
			8,94
	Stratiomyidae	<i>Hermetia illucens</i>	7,99
	Glossinidae	<i>Glossina palpalis</i>	3
	Agromyzidae	<i>Ophiomyia spencerella</i>	1,08
	Fanniidae	<i>Fannia canicularis</i>	0,12
	Tabanidae	<i>Tabanus bovinus</i>	4,19

Table 3: Values for the various fly diversity indices by neighbourhood

Clues	Téguéré	Soba	Cocody	Kassirimé	Petit Paris	Haoussabougou	Natio
Dominance D	0,2778	0,3223	0,1911	0,1911	0,2078	0,44	0,1975
Simpson 1-D	0,7222	0,6777	0,8089	0,8089	0,7922	0,56	0,8025
Shannon H	1,424	1,241	1,859	1,859	1,863	0,9503	1,831
Equitability J	0,8849	0,895	0,8942	0,8942	0,8478	0,865	0,8805

Conclusion

This study highlights a high level of diversity amongst fly communities in the city of Korhogo. A total of 14,403 individuals belonging to 13 families, 19 genera and 24 species were recorded, indicating a relatively high level of species richness. The families Muscidae, Calliphoridae and Sarcophagidae were the most well-represented, with a strong dominance of *Musca domestica*.

The results show a very high abundance of flies in the city, distributed across different neighbourhoods. The greatest diversity and abundance were observed in the neighbourhoods with the most rubbish, notably Petit Paris, Cocody, Natio, Kassirimé and Téguéré. Analysis of diversity indices revealed diversity that was generally low to moderate across the neighbourhoods, with no significant differences between them. However, high equitability values indicate a relatively even distribution of species within the fly communities.

Neighbourhoods characterised by a high presence of organic waste and human activity exhibited the highest abundances, highlighting the influence of environmental and anthropogenic conditions on the structure of fly populations. These results provide an important database for monitoring Diptera biodiversity and for implementing strategies for urban environmental management and the prevention of health risks associated with these insects.

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