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Public health concerns: Assessment of synanthropic status and sanitary risks of muscid flies (Insecta: Diptera) from wet markets of Kolkata Metropolitan Area, West Bengal, India

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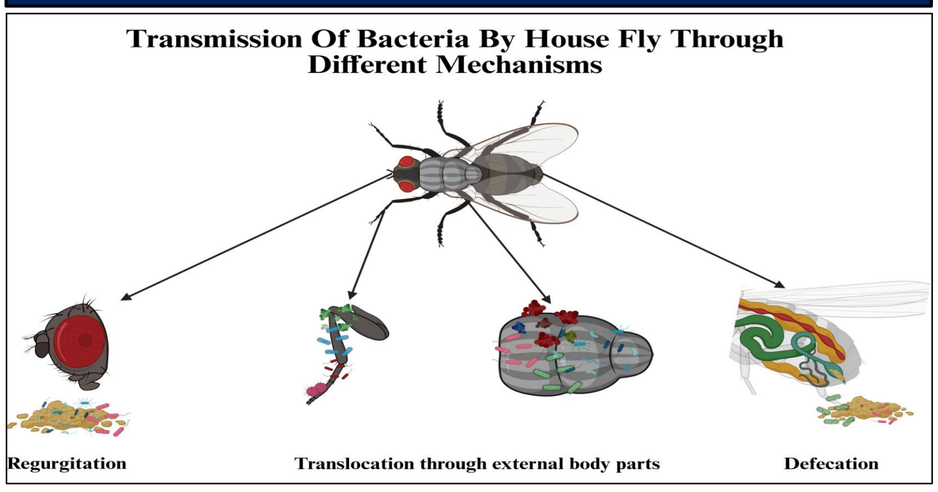
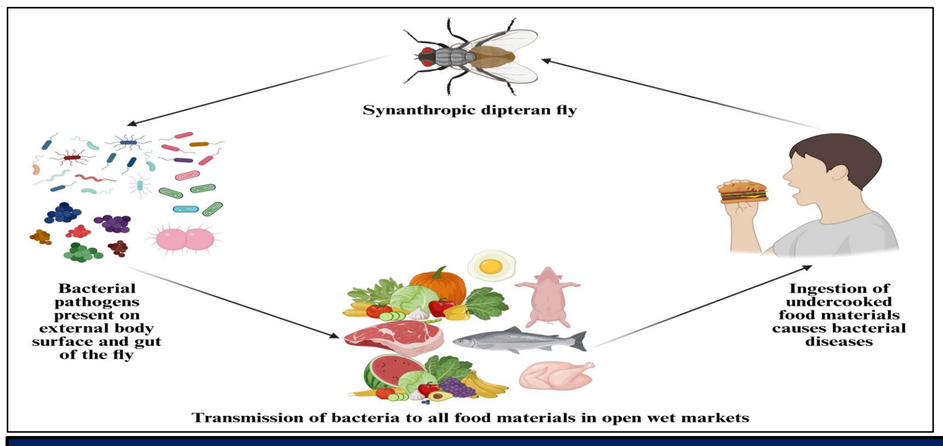
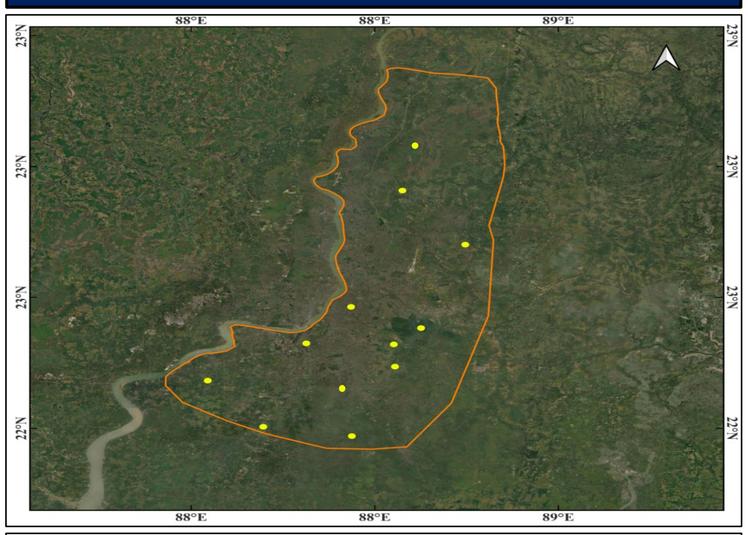
BACKGROUND OF THE STUDY



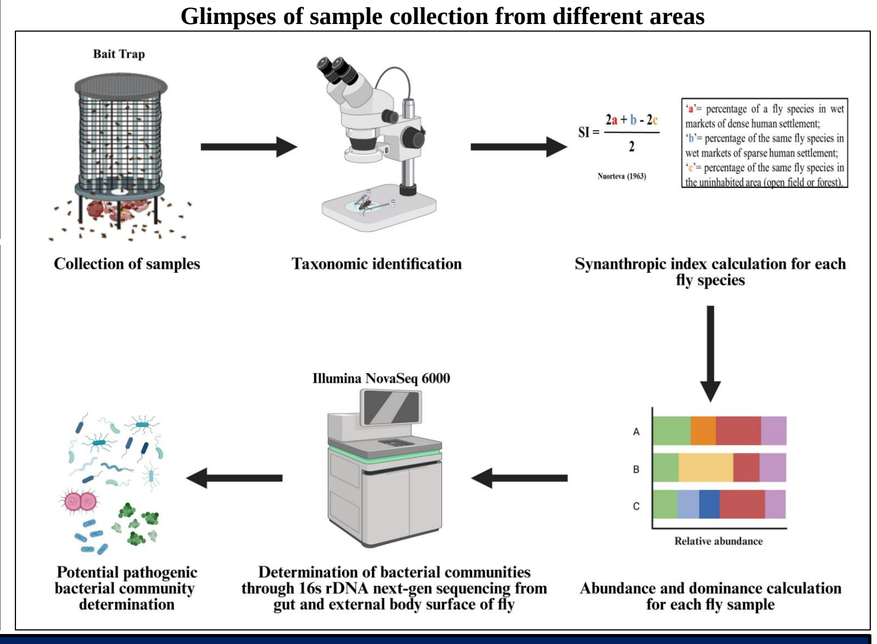


STUDY AREA



MATERIAL & METHODS

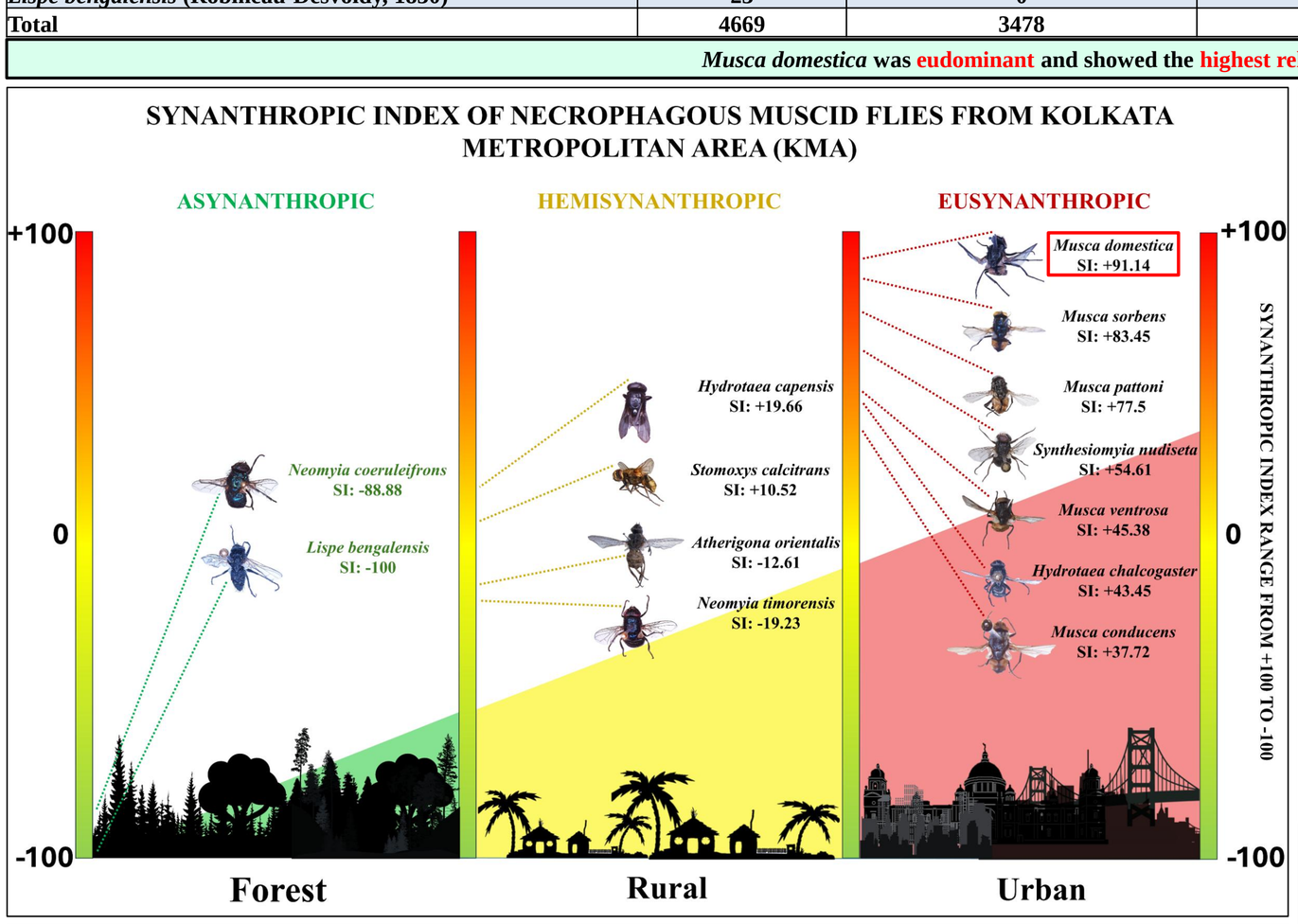
Glimpses of sample collection from different areas



RESULTS & DISCUSSION

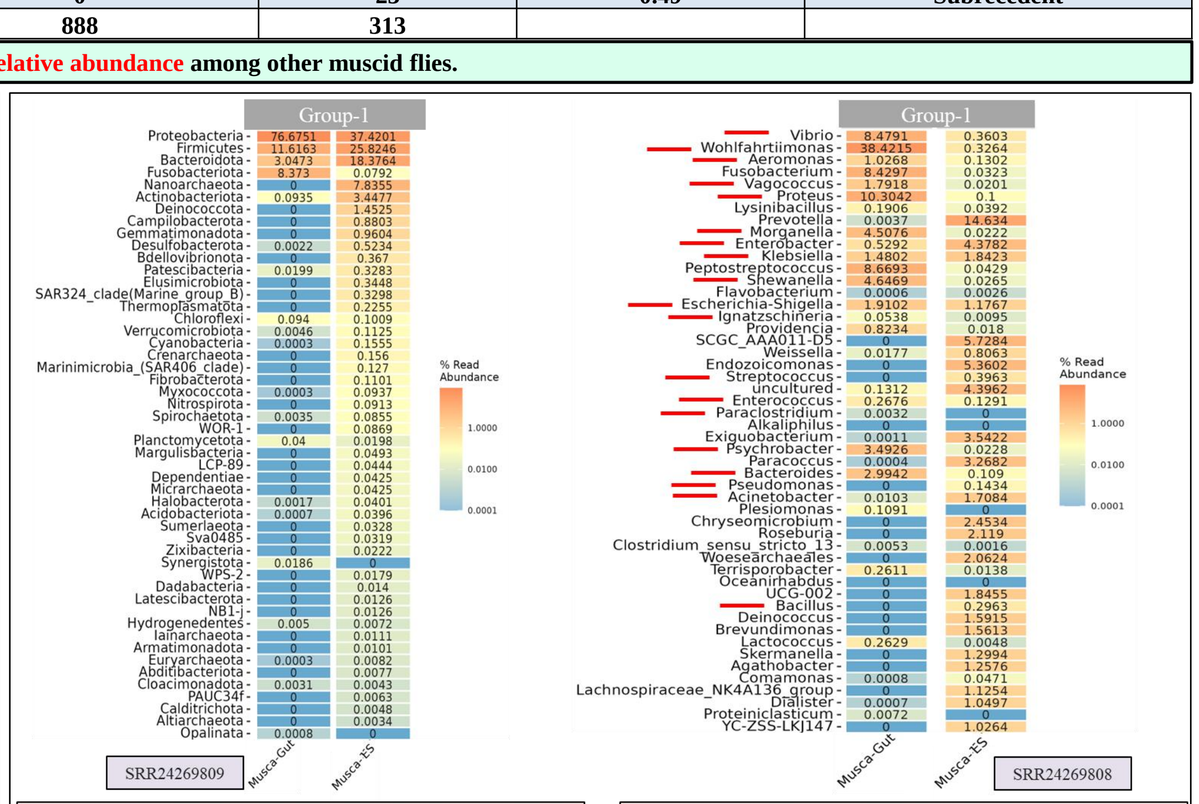
Necrophagous fly Species	Abundance (N)	Wet market in urban area	Wet market in rural area	Wild/Uninhabited	Relative Abundance	Dominance (Skubala, 1999)
Musca domestica Linnaeus, 1758	2688	2354	300	44	57.57	Eudominant
Musca sorbens Wiedemann, 1830	843	645	171	27	18.05	Eudominant
Musca pattoni Austen, 1910	240	168	60	12	5.14	Dominant
Musca ventrosa Wiedemann, 1830	195	90	69	36	4.17	Subdominant
Musca conducens Walker, 1859	57	19	27	11	1.22	Recedent
Synthesiomyia nudiseta (Wulp, 1883)	228	111	87	30	4.88	Subdominant
Hydrotaea chalcogaster (Wiedemann, 1824)	183	57	99	27	3.91	Subdominant
Hydrotaea capensis (Wiedemann, 1818)	27	6	13	8	0.57	Subrecedent
Atherigona orientalis Schiner, 1868	107	19	37	51	2.29	Subdominant
Stomoxys calcitrans (Linnaeus, 1758)	38	6	20	12	0.81	Subrecedent
Neomyia timorensis (Robineau Desvoidy, 1830)	13	3	3	7	0.27	Subrecedent
Neomyia coeruleifrons (Macquart,1851)	27	0	2	25	0.57	Subrecedent
Lispe bengalensis (Robineau-Desvoidy, 1830)	23	0	0	23	0.49	Subrecedent
Total	4669	3478	888	313		

Musca domestica **was eudominant and showed the highest relative abundance among other muscid flies.**



Musca domestica **was eusynanthropic (+91.14) and showed a strong preference for dense human settlement (Nuorteva, 1963).**

The Shapiro-Wilk test differed significantly from normality, W(39) = .32, p < .001.
The Kruskal-Wallis H test indicated that there is a non-significant difference between the abundance of flies and environment between the different groups, $\chi 2(2) = 0.21$, p = .898, with a mean rank score of 25.88 for urban, 27.24 for rural, and 24.88 for wild.
The PCA revealed that *M. domestica* and *M. sorbens* have a strong correlation with the market areas of the urban environment.



Heat map of bacterial phyla with their relative abundance found in the gut and external body surface of *Musca domestica.*

Heat map of bacterial genera with their relative abundance found in the gut and external body surface of *Musca domestica.*

Pathogenic bacterial genera like *Vibrio, Aeromonas, Enterobacter, Vagococcus, Proteus, Escherichia-Shigella, Ignatzschineria, Pseudomonas, Acinetobacter, Klebsiella, Morganella*, etc. were identified from both the external body surface and gut of *Musca domestica*.

CONCLUSION

This study highlights the strong association between muscid flies, particularly *Musca domestica*, and human-influenced environments in the Kolkata Metropolitan Area, as reflected by its high synanthropic index and relative abundance. The detection of multiple pathogenic bacterial genera on both the external body surface and within the gut of *M. domestica* underscores its role as a significant mechanical vector of disease. These findings emphasize the importance of targeted sanitation and fly management strategies in wet markets to mitigate health risks without disrupting the ecological balance by indiscriminately eradicating the entire fly community.

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All the authors have declared no conflict of interest.

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1. Nuorteva, P. (1963). Synanthropy of blowflies (Diptera: Calliphoridae) in Finland. Annales Entomologici Fennici. 29: 1–49.
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3. Pictorial illustrations are created in: https://BioRender.com

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