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Mosquito Species Distribution in Hyderabad of Telangana

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ABSTRACT:

Mosquitoes are significant vectors of diseases like malaria, dengue, chikungunya, and filariasis. Understanding the distribution and prevalence of different mosquito species is crucial for effective disease control and public health management. This paper synthesizes data on the distribution of key mosquito species in Hyderabad, India, focusing on the primary vector species: Anopheles, Aedes, and Culex. The study highlights the influence of urbanization, climate, and breeding habitats on the mosquito population dynamics, providing a framework for targeted vector control strategies in the Greater Hyderabad region. The mosquito population in Hyderabad is dominated by Aedes (50.0%) and Culex (41.1%) species, with Anopheles making up a much smaller percentage (8.9%). Anopheles is controlled in Hyderabad right from Covid-19 period.

Key words: Anopheles, Culex, Aedes, Dengue, Malaria, Filaria.

INTRODUCTION:

Hyderabad, a major urban centre in India, faces a persistent public health challenge from vector-borne diseases. The city's rapid urbanization, coupled with a tropical climate, creates ideal conditions for mosquito breeding throughout the year. The three most common genera of mosquitoes found in Hyderabad are:

Anopheles: The primary vector for **malaria**.

Aedes: The primary vector for **dengue** and **chikungunya**.

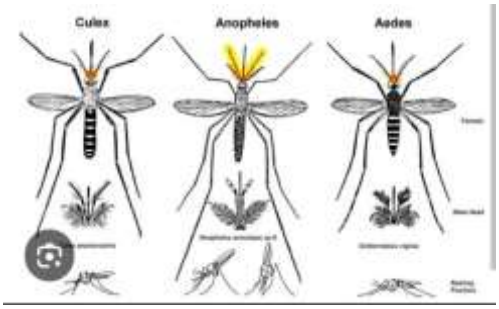
Culex: The primary vector for **filariasis** and **Japanese encephalitis**.

This paper aims to outline the distribution patterns of these mosquito species in Hyderabad and examine the factors that contribute to their prevalence.

METHODOLOGY:

This paper is a synthesis of existing literature, reports, and entomological surveillance data related to mosquito populations in Hyderabad. The analysis considers the following:

- **Species Identification:** Data on the presence and dominance of different mosquito species, including Anopheles, Aedes, Culex, and others like Mansoni.
- **Breeding Habitats:** The types of water bodies and containers where each species lays its eggs.
- **Spatial and Temporal Distribution:** How mosquito populations vary across different zones of the city (e.g., urban, suburban, and rural fringe areas) and in different seasons.
- **Environmental Factors:** The influence of temperature, rainfall, and urbanization on mosquito breeding and survival.



Common Mosquito Species and Their Characteristics:

There are thousands of mosquito species, but some of the most common types are Aedes, Culex, and Anopheles. While they may seem similar, each has distinct physical traits and behaviours.

Aedes:

Aedes mosquitoes, including the well-known Aedes aegypti, are easily identified by their bold black and white markings on their bodies and legs. Some species even have a unique lyre-shaped pattern on their thorax. Unlike most mosquitoes that are active at dusk and dawn, Aedes mosquitoes are day biters, most active in the early morning and late afternoon.

Culex;

Culex mosquitoes are often called as the common house mosquito, Culex mosquitoes are typically brown or grey in colour and lack the distinct patterns of Aedes. Their most notable features include a blunt abdomen and a proboscis (the long feeding mouthpart) that is significantly longer than their palps (a pair of sensory appendages). Their wings are covered in narrow scales and are held flat over their bodies when they're at rest.

Anopheles:

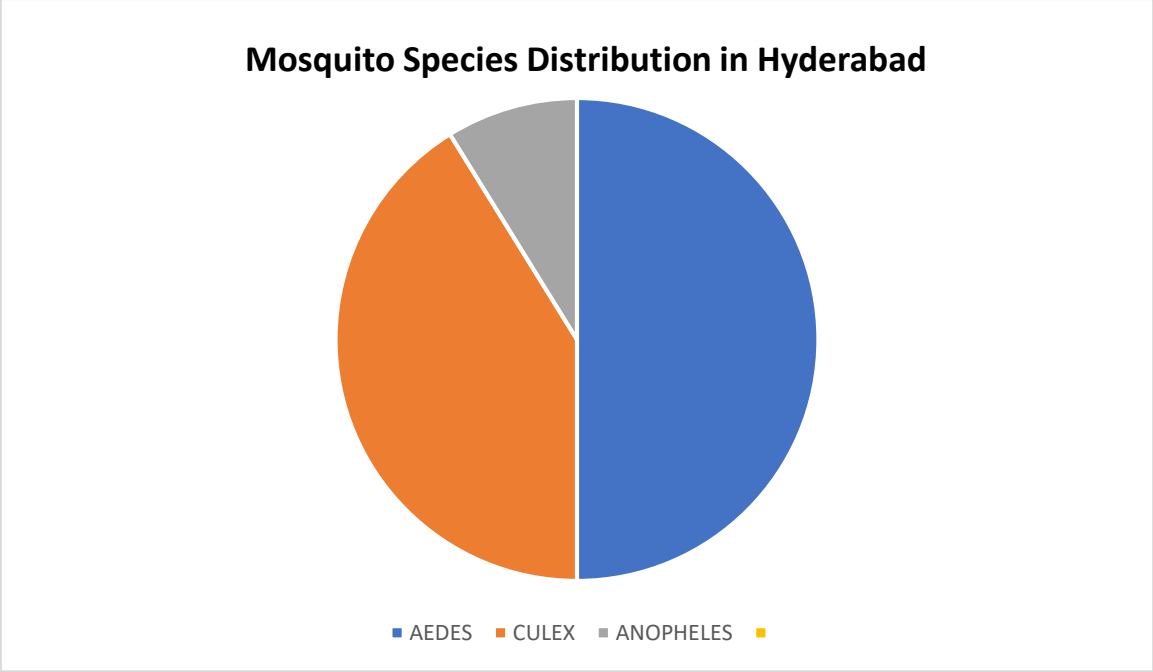
Anopheles mosquitoes are best recognized by their unique resting posture; they hold their bodies at a distinct angle to the surface they are on. A key physical trait is their palps, which are nearly as long as their proboscis. They also have a spotted appearance on their wings due to patches of dark and light scales. Additionally, their larvae lack a respiratory siphon, causing them to rest parallel to the water's surface to breathe.

RESULTS AND DISCUSSIONS:

Table-1: Distribution mosquito species in Hyderabad.

S. No	Area of the Hyderabad City	Mosquito Species	Scope of Disease
01	Lakdikapool	Aedes	Dengue and chikungunya
02	Jodimetla	Aedes	Dengue and chikungunya
03	Shaheenagar	Aedes	Dengue and chikungunya
04	Kingkoti	Culex	Filariasis
05	Shaikpet	Aedes	Dengue and chikungunya
06	Moulali	Culex	Filariasis
07	Kukutpalli	Culex	Filariasis
08	Chintalkunta	Aedes	Dengue and chikungunya

S. No	Area of the Hyderabad City	Mosquito Species	Scope of Disease
09	Tellapur	Aedes	Dengue and chikungunya
10	Annaram	Culex	Filariasis
11	Masabtank	Aedes	Dengue and chikungunya
12	Ranigunj	Aedes	Dengue and chikungunya
13	Kompalli	Culex	Filariasis
14	Jubilee Hills	Aedes	Dengue and chikungunya
15	Meerpet	Culex	Filariasis
16	Bandlaguda	Aedes	Dengue and chikungunya
17	Kate Dan Rajendranagar	Aedes	Dengue and chikungunya
18	Badangpet	Culex	Filariasis
19	Nacharam	Anopheles	Malaria.
20	Tarnaka	Aedes	Dengue and chikungunya
21	Langer house	Culex	Filariasis
22	Kothapet Green Hills Colony	Culex	Filariasis
23	Moosarambagh	Culex	Filariasis
24	Nagole	Aedes	Dengue and chikungunya
25	Banjarhills	Aedes	Dengue and chikungunya
26	Mehadipatnum	Culex	Filariasis
27	Langer house	Aedes	Dengue and chikungunya
28	Mallapur	Anopheles	Malaria.
29	Banjara Hills Road No.1	Culex	Filariasis
30	Nallakonta	Culex	Filariasis
31	Tankbund	Aedes	Dengue and chikungunya
32	Warasiguda	Aedes	Dengue and chikungunya
33	Safilguda	Culex	Filariasis
34	Malkajgiri	Culex	Filariasis



It is derived from the table- 1, that three mosquito species are dominating in Hyderabad whose distribution is mentioned below.

Anopheles stephensi, a major urban malaria vector, was a significant concern in Hyderabad. This species is known to breed in man-made containers, such as overhead water tanks and ground-level water containers, which are abundant in urban and suburban areas. Its ability to thrive in artificial containers makes it particularly well-suited to urban environments.

Aedes aegypti and **Aedes albopictus**, the main vectors of dengue and chikungunya, are also widespread. They are "container breeders" and primarily use small, clean water sources like discarded tires, flower pots, coolers, and other man-made containers. The distribution of these species is directly linked to human activity and sanitation practices.

Culex quinquefasciatus, often called the southern house mosquito, is one of the most abundant mosquito species in the city. This species thrives in stagnant, polluted water, such as open drains, cesspools, and sewage pits, making it a common nuisance and a major vector for diseases like filariasis in areas with poor drainage infrastructure.

Out of 34 mosquito species so far collected in various areas of Hyderabad, 17 species i.e. 50.0% belongs to Aedes and 14 species i.e. 41.1% belongs to Culex. Where as only 03 species i.e. 8.9% belongs to the species Anopheles. These findings indicate that, there is an alarming risk for the spread of Dengue fever, chikungunya and other Aedes mosquito borne diseases.

In addition to Dengue and chikungunya, Filariasis cases may rise due to the more prevalence of Culex mosquitoes in Hyderabad. Moreover, it is further noticed that, there is a significant drop in the distribution of a vector of malaria i.e. Anopheles in Hyderabad during 2025 studies.

As the people of metro city like Hyderabad are using mosquito repellents and mosquito killers during night time, Anopheles number and distribution might have broadly affected. Our study on mosquito distribution in Hyderabad revealed that, malaria is minimised and has no significant concern in Hyderabad city and its outskirts.

Aedes species in Hyderabad have more acclimatized due diurnal habitat and rigorous day time working nature habits of Hyderabad people. Culex species is increasing rapidly in Hyderabad and surpassing Anopheles due to over population, stagnant and polluted water, such as open drains, cesspools, and sewage pits.

CONCLUSION AND SUGGESTIONS:

Conclusion:

The mosquito population in Hyderabad is dominated by Aedes (50.0%) and Culex (41.1%) species, with Anopheles making up a much smaller percentage (8.9%). This distribution suggests a significant public health risk from diseases transmitted by Aedes and Culex mosquitoes, such as dengue, chikungunya, and filariasis.

The study indicates that malaria, which is transmitted by Anopheles mosquitoes, is not a major concern in Hyderabad, likely due to the widespread use of mosquito repellents and the decline of the Anopheles population. Conversely, the high prevalence of Aedes species is linked to the diurnal habits of the city's population, while the rise of Culex mosquitoes is attributed to factors like overcrowding and the presence of stagnant, polluted water.

Our sincere gratitude to the Malaria controlling authorities including GHMC for their seamless strenuous efforts in controlling Anopheles mosquitoes in Hyderabad.

Suggestions:

Based on the findings, the following actions are recommended:

Public Awareness Campaigns: Educate the public about the breeding habitats of Aedes and Culex mosquitoes. Emphasize that Aedes mosquitoes are day-biters and that stagnant, clean water (e.g., in flower pots, discarded tires) is their primary breeding ground.

Source Reduction: Focus on eliminating breeding sites. This involves regularly cleaning drains, covering water storage containers, and properly disposing of solid waste that can collect rainwater. The municipality should prioritize cleaning and treating stagnant water bodies and open drains.

Integrated Vector Management: A comprehensive strategy that can be implemented includes, larvicide (applying chemicals to kill larvae in water), fogging in high-risk areas, and promoting the use of personal protective measures like insect repellent and long-sleeved clothing during the day, especially given the high prevalence of day-biting Aedes mosquitoes.

Surveillance and Monitoring: Continuous monitoring the mosquito species distribution in different parts of Hyderabad will help in identifying hotspots and tailoring control measures effectively.

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