



International Journal of Mosquito Research

ISSN: 2348-5906

CODEN: IJMRK2

IJMR 2024; 11(5): 15-16

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www.dipterajournal.com

Received: 17-07-2024

Accepted: 23-08-2024

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Studies on the breeding potential and entomological indices of dengue vectors in urban Chirimiri area District Manendragarh Chirimiri Bharatpur Chhattisgarh

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DOI: <https://doi.org/10.22271/23487941.2024.v11.i5a.800>

Abstract

A survey of the several mosquito breeding sites in the Chirimiri urban region was conducted between January 2023 to August 2023. Every aspect of the breeding sites was examined and assessed. Larvae of mosquitoes were gathered and analyzed from various well-chosen nesting locations. The *Aedes* and *Culex* genera' larvae were discovered in breeding grounds.

Keywords: Larvae, mosquitoes, breeding sites, survey

1. Introduction

The Manendragarh Chirimiri Bharatput (MCB) district's are at Chirimiri City, which is in the northern part of the state of Chhattisgarh. Its geographic coordinates are 23124.83°E. The Municipal Corporation Chirimiri is in charge of governing Chirimiri. The population as per the 2011 India census is 264,575. The Municipal Corporation of Chirimiri City is responsible for managing the 45 metric tons of solid trash that are created daily. Chirimiri experiences 1399 (55.09) mm of annual rainfall on average, with lowest and highest temperatures recorded at 0.9 and 44 °C, respectively. Under these circumstances, research on mosquito-borne infectious illnesses like dengue, malaria, chicken pox, and other health-related problems becomes crucial given the demographic and environmental factors. Successfully combat illnesses brought on by mosquitoes. It is crucial to research mosquito breeding grounds in order to manage it [1]. In the current setting, it is necessary to regularly monitor and analyze the bionomics of disease vectors due to the shifting ecological and environmental factors [2]. Anywhere there is standing water, mosquitoes congregate there to spawn. Refers to the locations where mosquito eggs, larvae, and pupae are located during their breeding cycle. Controlling beetles and their larvae is less difficult than controlling adult mosquito vectors. Obtaining data on mosquito breeding sites becomes essential for this kind of research [3]. Despite this, Chirimiri is among the cleanest cities. However, there are other similar water sources in this area that are utilized for trash disposal. Are there locations as well? Additionally, wastes are transported biologically via them. Mosquitoes love such areas as ideal nesting habitats [4]. Examining the mosquito breeding sites for all of their features, such as type (temporary or permanent), water level, cleanliness of the water, larval body position, etc., is crucial. For mosquito breeding grounds and populations to be effectively controlled locally, that kind of study is required.

In this regard, large breeding grounds for *Aedes aegypti* and *Aedes albopictus*, two mosquito species that transmit dengue, were investigated in Juba, Cid City, and the Philippines [2]. These mosquito species are the source of vector-borne illnesses in those areas. This work was important for the program there on vector control. In a similar manner, Thiruvananthapuram conducted a study on breeding sites in containers, specifically focusing on *Aedes* (*Stegomyia*) *aegypti* and *Aedes* *bopictus*, the dengue vector. Bhilai, Chhattisgarh, conducted entomological research on the dengue outbreak [11]. These kinds of investigations are useful in our understanding of epidemic illnesses spread by mosquitoes.

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Owing to *Aedes* and *Culex*'s extensive breeding range of containers, removing these containers or changing breeding locations are effective management measures ^[5].

2. Materials and Methods

The two sample breeding locations are pondi Chowk in the Chirimiri urban area and its surrounding areas, and bada bazar and its surrounding area. Larvae of mosquitoes were gathered between January 2023 to August 2023. After being gathered, the larvae were sent to the lab and kept in 70% ethanol. The larvae of every mosquito were first counted. Subsequently, Barraud P.J. 1934 identified mosquito larvae using a visual guide ^[5]. Major diagnostic characteristics, including the head, antennae, thorax, abdomen, siphon, and saddle, were used to identify mosquito larvae. Larva morphological analysis was conducted using the Barraud P.J. 1934 key ^[5].

3. Results and Discussion

Throughout the duration of the investigation, larvae were gathered from used tires and containers at specific sampling locations. From where all of the breeding sites' larvae were discovered. Tires and plastic barrels are the major sources of stagnant water that hold garbage. Sample site 1 is a sort of sewer that continuously collects garbage from the homes. The drain is approximately 25 feet long and 5 feet deep, with water levels rising year-round. Additionally, wastes are transported biologically via them. These locations are ideal mosquito breeding grounds. Examining the mosquito breeding sites for all of their features, such as type (temporary or permanent), water level, cleanliness of the water, larval body position, etc., is crucial. For mosquito breeding grounds and populations to be effectively controlled locally, that kind of investigation is required ^[6]. This ditch is a breeding ground for mosquitoes. A short, fusiform characteristic that is characteristic of the *Culex* genus is present in the visibly enlarged mid-respiratory siphon of the 40 larvae that were recovered from this drain. Only 36 of them belonged to *Culex gelidus*, and 4 to *Culex tenuipalpis*. Consequently, it was noted that *Culex gelidus* dominated species at sampling location 1. Sample Site 1's plant flora offers the best compatibility for mosquito breeding because it shields the insects from predators and foes while also regulating water flow ^[7, 8, 9]. The second sample site was bada bazar and the area around it. There is a pond nearby, so there is moisture in the air. Additionally, there is a slaughterhouse nearby, and its waste builds up in the nearby pits, which serves as a mosquito breeding ground. During the research period, larval samples were also obtained from these pits. The two most common species in the samples that were gathered were *Culex whitmorei* and *Aedes albopictus*. Bada bazaar Chowk. Larval samples were taken from water kept in plastic containers, cooler tanks, old tires, and pits next to taps in the homes in this area. The samples that were gathered contained just the *Aedes albopictus* and *Culex whitmorei* species. An significant dengue vector, *Aedes albopictus*, breeds in both natural and artificial environments. It breeds in the cut holes in bamboo, the axils of leaves, the pits in tree trunks, and the cracks in rocks. It is mostly found in forested places. Despite being dominating and procreating in their native environments, they were shown to efficiently breed in garbage tires and containers during the research period. Mostly, *Aedes albopictus* spreads chikungunya and dengue. Therefore, it is essential to repair potholes, eliminate containers and old tires,

and avoid water collection in potholes in order to effectively manage dengue and chikungunya in the research region ^[10, 11].

4. Conclusions

There were *Aedes albopictus* and *Culex gelidus* species in ditches and containers, although *Culex gelidus* was more commonly found there. Since *Aedes albopictus* is primarily found in domestic containers and water tanks, a thorough investigation into its role in the transmission of dengue fever is necessary.

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