JSIANE : Vol. 2, Issue 4, 2022, Page 38–40 ISSN (Online) 2583-2093

Journal of Science Innovations and Nature of Earth

Journal homepage : www.jsiane.com

EVALUATION OF *Aedes aegypti* (DIPTERA: CULICOIDEA: CULICIDAE) BREEDING IN CONTAINERS IN AGRA, INDIA: A CASE STUDY

Seema Yadav and Rajvir Singh Ojha
Department of Zoology, R.B.S College Agra,(U.P.)
Dr. Bhimrao Ambedkar University, Agra, Uttar Pradesh
Email- seemasikera14@gmail.com

Abstract

The kinds of breeding containers made out of the various materials that can be discovered in urban and suburban settings are presented below. Regarding the various kinds of materials, I have displayed the percentages of each container type that was noticed during the course of the research. Plastic, ceramic and metal containers, rubber, glass, and cement are the sorts of containers that were divided into these six groups. In comparison to the other types of containers, over half of the ones that tested positive for the presence of drugs were made of plastic or cement. They made up eighty percent of the total and were found in greater quantities than any other fundamental ingredient.

Keywords: *Aedes aegypti*, arbovirus, dengue

Received 10.10.2022 **Revised 15.11.2022** **Accepted 01.12.2022**

Introduction

Worldwide, dengue fever is the mosquito-borne disease that affects the most people and is moving at the fastest rate. It is present in practically all tropical and subtropical countries around the world, and its distribution spans the entire planet. Human ecology is to blame for the spread of dengue vectors, as it is responsible for the formation of an environment that is mosquitogenic. This predicament is being brought about either directly or indirectly by man. Containers are almost certainly the single most critical feature that determines whether or not *Aedes* species will breed. Considering that the majority of larval homes within and close to human settlement are man-made containers. The Aedes mosquito is a source of concern for public health due to its function as a vector in the transmission of diseases such as dengue fever, malaria, filariasis, yellow fever, and Japanese encephalitis, as well as chikungunya virus and zika virus (zikv). The dengue virus is the one that affects people the most frequently, and it is passed on to people through infected female *Aedes aegypti* mosquitoes. Dengue control is now confined to the decrease of the population that is at risk of infection with dengue and chikungunya. This is due to the fact that a viable vaccine for dengue has not yet been developed. Vector. The problem of diseases transmitted by vectors, in particular dengue, which is mostly a disease of metropolitan areas (Dutta and Mhanta, 2006).

Temperature, precipitation, and humidity all have an impact on the population of the *Aedes aegypti* mosquito. As a result of a boost in the number of vectors in the environment, dengue infections were most commonly seen during or after periods of rainfall (Pandya, 1982). The thirteen genera that make up the family Culicidae, the genus *Aedes* is the only one that is considered harmful due of the substantial risk that it poses to public health anywhere in the world. *Aedes aegypti*, one of the most common species of *Aedes*, has a wide geographic distribution and can thrive in both temperate and tropical climate zones. It is one of the most common species of *Aedes.* As a result, the current research will make a contribution to determining some of the *Aedes* type of breeding habitats of the dengue vectors in Agra, which is crucial for the formulation of an efficient mosquito control programme to be implemented in the future. The primary goals of this research were to determine the possible types of breeding environments for mosquitoes and to classify the different species of mosquito larvae. Who has the upper hand in terms of dominating the style of housing found inside residential zones in Agra's urban and suburban sections.The sampling was done by dipping, either with a pipette or a dipper, depending on the sorts of containers being used. All of the potential breeding grounds for mosquito larvae were categorised into one of eight distinct container types: a plastic container, a plastic pail, a bottle, an earthen plate, something natural, a vase, a can, or a concrete tank. It was determined that a total of 260 containers could serve as viable breeding grounds. They are spread from person to person by the bites of mosquitoes belonging to the genus *Aedes* (Ahmed, 1997). It is estimated that at least 500 million people worldwide suffer from mosquito-borne diseases and dengue fever each year. Mosquito-borne diseases continue to be the top cause of death and illness worldwide (Madhumathy *et al.*, 2007). In a great number of developing nations, the prevalence of these diseases has led to significant economic loss, high death rates, low levels of productivity, and social prejudice. One of the most successful strategies for preventing the spread of diseases that are

carried by mosquitoes is known as "larval control," also known as "source reduction" or "suppression" (Singh *et al*.,2006). This mosquito control method has proven to be essential as the primary factor in the success of eradication efforts targeting mosquito-borne diseases in the majority of developed countries in Europe, such as Turkey (Kitron and Spielman,1989; Mwangangi *et al*.,2009). As a result, this study was initiated with the purpose of determining the species diversity as well as the density of mosquitoes within the containers that they choose for nesting. In terms of the proliferation of vectors, human ecology is to blame for the construction of a mosquitogenic environment; man is either directly or indirectly responsible for the development of such a circumstance (Dutta 2006). Climate plays a role in the transmission of mosquito-borne diseases such as malaria and dengue fever, which are currently a problem across the entirety of India. Since 2005-2006, Dengue and Chikungunya have taken the lead in Marathwada as the most common and widespread infections (Laxmikant Shinde 2011).

Material and Method

The research was carried out in forty different areas of the district, often known as clusters, and it was based on the daily reporting of dengue cases in Agra from those areas. Each cluster consisted of twenty homes in the immediate vicinity of the verified case. An entomological survey was performed in residential and peridomestic areas to look for breeding *Aedes* mosquitoes in order to analyse the prevalence of *Aedes* larvae and evaluate the areas of the district most at risk for dengue/DHF outbreaks. Vegetation and trees have been grown in the regions surrounding the university, providing perfect breeding grounds for mosquitoes.Thavara *et al*. (2004), Preechaporn *et al.* (2007) and Thenmozhi *et al.* (2007) are three examples of researchers who published their findings. During the course of the survey, each and every container and tree hole that was within reach was investigated. The collection of larvae was done indoors by dipping the containers, either with a pipette or a dipper depending on the type of container and the location. The information regarding the level collected was entered in the survey forms that were pre-designated and pre-tested. The taxonomic key was utilised in order to determine the identity of the larvae. The information was evaluated, and various indicators, such as the house index (HI) and the breteau index, were calculated (BI). Calculations were done on the container index (CI). Calculation of breeding preference ratio is another method of evaluation. The significance of the observed differences in breeding behaviour between urban and rural regions throughout the summer months was investigated using the chi-square test. The findings of this investigation were comparable to those reported by (Lee, 1990; Hishamudin and Chen *et al.*, 2005). It was determined and recorded how many containers, what kinds of containers, and what the water conditions were like in the containers that could serve as breeding sites. The study facility provided a safe environment for the gathered larvae and pupae to mature into adults. A subsequent step involved pinning and later species-identifying the newly emerged adult mosquitoes.

Results and Discussion

In the Agra district, a survey was conducted to look for potential breeding homes for mosquito larvae in both manufactured and natural containers. Due to the fact that the containers were left outside, it was discovered that the natural environment provides the ideal breeding homes for mosquitoes. According to the results of our research, larvae of the mosquito species *Aedes aegypti* and *Aedes albopictus* were discovered in grassy fields located close to the R.B.S. Campus in Agra. The evaluation of the taxonomic keys allowed for the determination of the adult mosquitoes' taxonomic classification as well as their morphology. The thorax of an *Aedes* mosquito has a distinctive pattern that is made by spots of black, white, and silvery colours. According to Kalra (1997), *Aedes aegypti* populations are more stable and are spread in urban, semiurban, and rural settings. The physical characteristics that allowed for the identification of *Aedes aegypti* were as follows: the mesonotum was characterised with a pair of sub midline yellowish lines; the tibia lacked rings; and the clypeus had two specks of white scales.

Conclusion

In conclusion, the hatchlings of the *aegypti* mosquito were found in the greatest numbers in the containers made of cement and plastic material, whereas they were found in the fewest numbers in the canisters made of rubber and glass. The containers made of plastic material and plastic material had the highest number of immature stages.

References

Ahmed, R., Ismail, A., Saat, Z. and Lim, L.H. (1997). Detection of dengue virus from field *Aedes aegypti*and *Aedes albopictus* adults and larvae. *Southeast Asian J Trop Med public Health*, 28: 38.

Chen, C.D., Seleena, B., Masri, M.S., Ching, Y.F., Lee, H.L., Nazni, W.A. and Sofian-Azirun, M. (2005). Dengue vector surveillance in urban residential and settlement areas in Selangor, Malaysia. *Tropical Biomedicine*, 22(1): 45-52.

Dengue haemorrhagic fever : Diagnosis, treatment, prevention and control. Geneva: world health Organization1997:page48.

Dutta P.,Mahanta J.(2006) . Potential vectors of dengue and the profile of dengue in the North- Eastern region of India;An epidemiological perspective . Dengue Bulletin, 30:234-242.

Kalra, N.L., Kaul, S.M. and Rastogi, R.M. (1997). Prevalence of *Aedes aegypti* and *Aedes albopictus* vector of DF/DHF in north, northeast and central India. *Dengue Bull*., 21: 84-92.

Kitron U. and Spielman A. (1989). Suppression of transmission of malaria through source reduction: anti Anopheline Measures applied in israel, the United States and Italy. Rev Infect Dis., 11(3), 391-406.

Lee, H.L. and Hishamudin, M. (1990). Nationwide *Aedes* larval survey in urban towns of Peninsular Malaysia (1988-1989). *Tropic Biomedicine*, 7: 185-188.

Lee, H.L. and Hishamudin, M. (2005). Nationwide *Aedes* larval survey in urban towns of Peninsular Malaysia (1988-1989). *Tropical Biomedicine*, 22(1): 39-43.

Laxmikant V. Shinde.(2011). Outbreak of dengue in rural area of Bhokardan (M.S.) India Bioscience Discovery,Vol.2 No.1, 90-93.

Mwangagi J.M., Muturi E.J. and Mbogo C.M. (2009). Seasonal mosquitoes larval abundance and composition in Kibwezi, Lower Eastern Kenya.J. Vector Borne Dis.46, 65-79.

Pandya, G. (1982). Prevalence of dengue infection in India, *Defence Science Journal,* 32: 359-370.

Singh R.K., Dhiman R.C. And Mittal P.K.(2006). Mosquito larvicidal properties of Mormordica charantia Linn (Family:Cucurbitaceae).J. Vect. Borne Dis.43, 88-91.

Thavara, U., Tawatsin, A. and Chompoosri, J. (2004). Evaluation of attractants and egg-laying substrate preference for oviposition by *Aedes albopictus* (Diptera: Culicidae). *Journal of vector Ecology*, 29(1): 66-72.

Thenmozhi, V., Hiriyan, J.G., Tewari, S.C., Samuel, P.P., Paramasivan, R., Mani, T.R. and Tyagi, B.K. (2007). Natural vertical transmission of dengue virus in *Aedes albopictus* (Diptera:Culicidae) In Kerala, a Southern indian state. *Japanese Journal of infectious Disease*. 60: 245-249.

Yap, H.H. (1975). Distribution of *Aedes ae*gypti (Linnaeus) and *Aedes albopictus (*Skuse) in small towns and villages of villages of Penantantg Island, Malaysia-an ovitrap survey. *Southeast Asian Journal of Tropical Medicine and Public Health,* 6(4): 519-524.