Chapter 4
Urbanization and the Mosquito Population:
Threats to Human Health

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ABSTRACT

Mosquitoes have always been a source of threat to human health because of their ability to transmit deadly diseases. Despite several efforts to curb their population, they have managed to survive and spread havoc. Urbanization has emerged to be one of the major contributors to their reproductive success followed by climate change. Urbanization has stimulated opportunistic breeding behaviour in mosquitoes by generating a vast array of temporary breeding habitats. The effect has been compounded by climate change allowing the mosquitoes to breed throughout the year and spread to regions which were previously inhospitable to them. Further, a study of mosquito breeding behaviour shows that gravid females follow several visual and olfactory cues to select their breeding habitats to ensure the well-being of their young ones. Thus, study of mosquito breeding habitats in urban areas helps to identify their markers to be used in mosquito larval source management. Similar problems can be largely overcome in the future by taking a more inclusive approach during town planning.

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INTRODUCTION

Mosquitoes have always been an important topic of research because of their ability to transmit deadly diseases that cause millions of human deaths annually. The female members of the species spread the diseases. The physiology of the female mosquitoes is such that they require animal blood for the maturation of their eggs. This triggers their blood-feeding drive as a result of which they visit their animal hosts regularly (Kolimenakis et al., 2021). Humans are their easy target since they remain confined to their habitats. Moreover, the tendency of humans to modify their surroundings indirectly encourages the mosquito population to multiply. Literature reveals that the mosquitoes have evolved with the burgeoning human population and have travelled worldwide, taking the help of the airways and waterways mainly used for trading in the earlier days. Thus, humans have unknowingly helped the mosquito population thrive, flourish, evolve, and disperse across continental barriers (Biswal, 2018; Wang et al., 2020; Kolimenakis et al., 2021).

Apart from the medical issues related to mosquitoes, they are a source of agony for their bites and painful human experiences, both indoors and outdoors, especially in the tropical and sub-tropical countries. With time, they have evolved into domestic insects encountered in every household (Augustina et al., 2021). Studies on mosquito-biting behavior show that they prefer to hide in the dark corners of human homes or livestock sheds and bite at their appropriate periods. It needs to be mentioned that mosquitoes have broadly been classified into day-biting and night-biting mosquitoes based on their activity timings (Karlekar and Andrew, 2016). Research on their biting behavior has revealed that it is related to the transmission of parasites or has driven a host-parasite association.

The last few years have witnessed human population growth at alarming rates and the simultaneous bloom of urbanization. Recent studies show that the growth of towns and cities has taken place neglecting several ecological factors, including the potential breeding habitats of mosquitoes (Rose et al., 2020). The survival and expansion of the mosquito population have intrigued the scientific community to delve deeper into the lifecycle and the breeding habitat ecology of mosquitoes (Zahouli et al., 2017). Though the primary aim of such studies was to identify the vulnerable points in their lifecycle that could be manipulated or targeted, they reveal the tremendous abilities of the mosquitoes to adjust and adapt to their changing surroundings that have, in a way, ensured their breeding success (Zahouli et al., 2017). This has resulted in the development of unhealthy cities with dire consequences for the human population; the problem has been compounded by climate change, which is also a by-product of population growth (Rose et al., 2020). The current chapter discusses the aspects that have prevented the mosquitoes from being obliterated.