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Effects of the environmental factors on *Aedes* mosquitoes: A review

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Abstract
The environmental factors are the most important abiotic factors affecting the life span of dengue disease mosquitoes. Dengue disease has become a major global health problem and it is signaled that environmental changes will be influence the mosquitoes spreading, which can be allow these mosquitoes to bring now pathogens in population. Changes in environment will impact on various components of these factors, but human style and the situation of the local habitat remain far more influential in view of the distribution of *Aedes aegypti* and causes of dengue disease under any considered environmental scenario.

Keywords: *Aedes aegypti*, Dengue, Environmental factors, Pathogen

1. Introduction
Dengue fever and dengue hemorrhagic fever are the very common arboviral disease. There are estimated that approximately 50 million cases of dengue infection occur overall the world every year and causing 25000 death [1]. The world health organization (WHO, 2014) estimated that malaria and dengue give up to 17.0% of the global lead of infection disease [2]. In the tropical and subtropical region, reappearance of dengue for the past few decades has changed dengue disease into a serious public health problem of large scale in the worldwide [3, 4]. In the south East Asian regions are that 52% of the global population at the risk of dengue fever and dengue hemorrhagic fever. However all the four serotypes of dengue have been surrounding in this area, ecological and climatic factors are influenced the seasonal prevalence of dengue mosquitoes, *Aedes aegypti* on the basis of which in these regions are divided into four zones with different DF/DHF transmission [1].
Dengue disease is a climate sensitive with are important effects caused by temperature and rainfall through both direct and indirect path [5, 6]. Biophysical functioning of the mosquito and the breeding habitat are affected by meteorological fluctuates such as temperatures and rainfall [7]. Rainfall increase mosquito density by providing breeding habitat [8], and temperature influences mosquito hatching rate, development period [9], and Survival [10]. Temperature further affects viruses transmission dynamic by reducing the extrinsic incubation time [11] reported that the extrinsic incubation time for the DEN-2 serotype decreases from 12 days at temperature $\leq$ 30°C to 7 days at 32-35°C.
Generally, *Aedes aegypti* were reported nearby the anthrophilic area as the light range of Aedes mosquitoes are about 500m [12] while Aedes albopictus are usually reported outdoors and indoors in natural and artificial containers [13]. In urban region, the increasing numbers of dengue cases have been highly associated with increasing number of vector breeding habitat [14].

2. Geographical Distribution: Originating in Africa, *Aedes aegypti* probably invades other transcontinental via trading and transport ships that resupplied in Africa ports during the fifteen through seventeenth centuries [7, 15]. Currently *Aedes aegypti* is widespread in Asia [16] and following epidemic dengue activity experienced in south-east Asia [17]. Although *Aedes aegypti* currently has a wide distribution in maximum tropical and subtropical region. The current distribution on does not reflect the maximum range of its potential distribution as defined by historical records. Where the species has previously displayed a much larger geographical distribution where Australia, North America and Europeisparticularly evident [18].

3. Temperature: The minimum temperature tolerance for *Aedes aegypti* to develop is 16℃, while 34℃ is the maximum [7]. The life cycle period from hatching to adult emergence was lower at higher temperature and correlated between density and food supply [19]. So while temperature does affect larval breeding time and survival rate [7, 19, 20], temperature only is generally not a suitable prediction for larval richness [20]. In laboratory experiments, the absolute minimum temperature that cold –acclimatized unfavorable condition Aedes albopictus eggs can resist can be as minimum as -12℃ [8], but Aedes albopictus eggs has been survivorship in the field when shortly exposed to these temperatures [21]. Extremely high and low temperature affect mosquito survival and breeding population.

4. Spatial distribution: Aedes species to thrive in urban area that can be endophillic and endophagic allowing Aedes species to reap the benefit of with rain water for breeding [22]. Aedes japonicus may be not included from rock pool habits, showing that a temperature limit may prohibit Aedes Japonicus population from occupying southern area of the US with comparatively high summer temperature [23]. Although the two subspecies of Aedes recognized present time evolved morphological and behavioral differences, there is no indication of breeding separation between them a likely exception [24]. A more successful approach in from of indirectly as reported by for human behavior traits was to construct a naturalistic model near by the organism or its key microhabitat in this process water containers where eggs are deposited and larvae develop [27].

5. Elevation: The result noticed generally dengue prevalence was spread at low elevation. It was point out lower elevation less than 500 meter have reasonable to high vector in habitants [25]. Beside it was indicated low elevation in urban area may spread mosquito breeding spaces [26]. People lives at low and warmer region are defenseless to dengue transfer [27].

6. Rainfall: Rainfall helps in creation of mosquito breeding sites and blushing off the immature stages of mosquitoes. Exceed rainfall can develop the breeding habitats of mosquitoes and dry condition can either eliminate and provide several new breeding sites in large water bodies for example lake and rivers. The population of mosquitoes is affected by the amount intensity and duration of rainfall [28]. Rainfall also helps in raise in relative humidity and changes temperature, which affects the life time of mosquitoes, hence transmission of disease [29].

7. Relative Humidity: It relative humidity is less than 60%, the life period of mosquitoes is reduced which in turn reduces disease transmission. Relative humidity (60-80%) is considered to be as well as possible for effective transmission of malaria [30].

8. Predation: These Predators are below common in open peri-domestic areas and hence wooded areas appear to show as barrier to Aedes albopictus growth [31, 32]. These species are a normal freshwater invertebrate's carnivore species in South Africa in different of water types as well as container habitats that is like other notonectidae species, has a feeding preference for mosquito larvae and different small invertebrates in the water column [33, 34].

9. Parasitism: It is not clear that climate or land use change may affect on gregarine parasites but [35] noticed that the during of tree holes highly decreased intensity and frequency of parasitism by Aedes bareeti, showing that climate changes towards dryness may decrease parasitism and increased Aedes Populations.

10. Conclusion

The life cycle of Aedes mosquitoes are directly influenced by environmental factors including as temperature, rainfall, humidity and other components. Various environmental factors affect the incidence of the vector-borne disease. Rainy season affects the frequency of the activity of dengue mosquitoes. Aedes vectors and dengue transmission are sensitive of minimum and maximum temperature, the value of the tolerance high and low temperature different by dengue vector and virus. Thus the condition of environmental factors affects the virus, dengue vector and human behavior directly and indirectly.

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