

## Letter to the editor

# The first Chikungunya case from Sonipat district near the national capital city of Delhi, India

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Chikungunya, a mosquito-borne disease, is caused by chikungunya virus (CHIKV), an alphavirus belonging to the *Togaviridae* family. After a gap of about 32 years, the infection re-emerged in India in 2005 [1,2]. In 2005-2006, the years of emergence, several areas in southern India were affected by a chikungunya outbreak [3]. However, in 2006, chikungunya cases were reported for the first time from northern India, where 52 cases were detected from the Delhi region [<http://www.nvbdc.gov.in>]. These cases probably originated from elsewhere as local transmission of CHIKV had not yet been established in Delhi. It is noteworthy that the area has high potential for CHIKV transmission as the two known vectors, *Aedes aegypti* and *Aedes albopictus*, are prevalent in Delhi [4]. From the surrounding areas of Delhi (*i.e.*, Sonipat, Gurgaon, Faridabad and Noida), people in large numbers come to Delhi for work every day and therefore constitute an important epidemiological sector for the disease. Such a large-scale population movement between cities masks the importance of the source and the origin of infections such as chikungunya and dengue, which is vital in planning control strategies.

Sonipat is an urban township of Haryana state about 70 km from Delhi. The population of Sonipat district is about 1.7 million, which is important from the point of view of the occurrence of dengue fever cases. During a dengue vector survey conducted in Sonipat district on 24 September 2008, the survey team encountered a patient with symptoms related to Chikungunya: joint pains, fever, severe pain in fingers and muscles, and mild headache [<http://www.nvbdc.gov.in/doc/facts>]. The patient

was a 25-year-old female from Saragthal, an agricultural village, about 32 km away from Sonipat city. Investigation revealed negative results for malaria infection, so a blood sample of the patient was taken on 24 September 2008, which was tested for IgM antibodies against dengue and chikungunya virus using IgM Capture ELISA method (National Institute of Virology, Pune, India). The sample was found to be positive for IgM antibodies against chikungunya virus. This was the first case of chikungunya reported from a northern state. An interview with the patient revealed that she had never traveled outside her village for the past one month. Only one member of her family travelled every day to work in Delhi, but this person had no symptoms of chikungunya.

An entomological survey was conducted after a week of detection of the case, on 3 October 2008, in Saragthal village. A total of 248 houses and 992 containers were examined to measure the mosquito larval population [5]. The house index (HI), container index (CI) and Breteau index (BI) were 4.8, 1.4 and 5.6, respectively (Table1). Breeding of *Ae. aegypti* was detected in cisterns (35.7%), large cement tanks (14.3%), earthen pots (28.6%) and plastic drums (21.4%). About a year later another entomological survey was performed on 28 July 2009 in the same village, which revealed HI, CI and BI as 15.9, 7.7 and 18.2, respectively, an increase by about 5- to 6-fold in all the breeding indices. The highest breeding prevalence was found in domestic coolers (37.5%) followed by earthen pots (25%), drums (12.5%), cement tanks (12.5%) and cisterns (12.5%). During the same period, a survey for *Aedes* was also

**Table 1:** *Aedes aegypti* breeding indices in Sonipat district.

Locality	Date of Collection	House Index	Container Index	Breteau Index
Saragthal Village	03.10.2008	4.8	1.4	5.6
Sonipat Town	21.07.2009	22.5	12.6	22.5
Saragthal Village	28.07.2009	15.9	7.7	18.2

conducted in Sonipat town which showed high vector breeding indices. In both urban and rural surveys, domestic coolers were found to contribute the most to *Aedes* breeding. In Sonipat town 44.5% and in Saragthal village 37.5% of the coolers were found positive for the breeding of *Ae. aegypti*. Although in Sonipat town the *Aedes* breeding indices were much higher than in Saragthal village, there was no case of chikungunya in the town.

It was reported [6] that *Ae. aegypti* was the predominant mosquito species in the chikungunya affected districts of Andhra Pradesh, Karnataka, and Maharashtra states of India, while *Ae. albopictus* was either absent or poorly prevalent during the outbreak period of October 2005 through March 2006. The high density of *Ae. aegypti* and 23 isolations of CHIKV from adult mosquitoes indicate that this species is the main vector. The breeding indices of *Ae. aegypti* in most localities of Andhra Pradesh, Karnataka and Maharashtra during chikungunya outbreak were highly variable. The HI and BI varied from 10 to 60 and 13 to 75 in Andhra Pradesh, 20 to 70 and 40 to 200 in Karnataka, and 10 to 30 and 30 to 50 in Maharashtra, respectively [6]. These variations seen in the *Aedes* breeding indices during the transmission periods indicate that the entomological criteria based on breeding indices may not be a very reliable method to assess the field situation for an impending outbreak due to chikungunya virus.

So far large-scale epidemics of chikungunya have not been reported from northern India; however, cases of chikungunya infection have been reported from Delhi, Haryana and Uttar Pradesh [<http://www.nvbdc.gov.in>]. Co-infections of chikungunya and dengue virus have also been reported from Delhi [7]. We report the first case of Chikungunya, detected from Sonipat district. The prevalence of vector mosquitoes in the area was an indicator of the crude relationship of CHIKV infection and vector indices in the northern parts of

India where an outbreak of CHIK has not been reported so far. It may therefore, be worthwhile to establish a linear relationship between the vector's breeding indices, virus infection rates in *Aedes* mosquitoes, and the occurrence of human cases of chikungunya for its predictive efficiency.

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