

Breeding of Dengue Vector *Aedes aegypti* (Linnaeus) in Rural Thar Desert, North-western Rajasthan, India

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Aedes aegypti, the vector of dengue fever, is widely present in India^{1,2}, including the Thar desert in north-western Rajasthan. Jalore town in the Thar desert experienced the first-ever epidemic of dengue fever in 1985. Entomological studies carried out in Jalore during 1990 and subsequently in 1996 observed extensive breeding of *Aedes aegypti*^{3,4}. Recently, dengue fever again struck the Thar, this time in Jodhpur district, warranting a serious review of the vector ecology in the region, particularly in view of the prodigious breeding of *Aedes aegypti* in discarded household and community-based underground water reservoirs called *tankas*, of which thousands are formed in different forms in the Thar³. These *tankas*, which originally attracted only the malaria vector *Anopheles stephensi* as long as the water remained potable, started breeding *Aedes aegypti* only after being discarded by local populations in the wake of the recent availability of conduit-based water supply under Indira Gandhi Nahar Pariyojana (IGNP canal project). It is, therefore,

considered worthwhile to highlight the association of *Aedes aegypti* and *tankas* in sustaining the vector population under extreme xeric conditions.

A total of 33 villages in the three districts of Jodhpur, Jaisalmer and Sri Ganganagar (now incorporated partly in the newly created Hanumangarh district) were surveyed for the presence of *tankas* (Table 1). Compared to those of Jodhpur and Jaisalmer, most villages in Sri Ganganagar are highly irrigated and adequately supplied with the conduit-water system. Four major types of water storing facilities were identified which supported the breeding of *Aedes aegypti*. About 13.6% of the *tankas*, which constituted 77.1% of the four water bodies, were found to be breeding *Aedes aegypti*. It is noteworthy that the typical century-old traditional earthen-type *tanka* was almost invariably present in most villages of Jodhpur (88.8%) and Jaisalmer (85.7%) but less so in Sri Ganganagar (17%) where canal-based water storage sources

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had greatly reduced the existence of the *tankas*. As many as 11 (24.4%) out of a total of 45 community *tankas* existing peripherally in Kanasar village were abandoned for want of proper water storage facility and rendered uncared for by the villagers. All such *tankas*, wherein the water turned turbid in course of time including vegetation growth, *Aedes aegypti* was invariably found to breed, replacing in the process its earlier and original occupant, the malaria vector *Anopheles stephensi*. The first instar larvae abounded the most (52.3%),

while the fourth instar larvae (7.8%) was present the least, followed by pupae (2.5%). This situation clearly indicated a sustained breeding of *Aedes aegypti* in the *tankas*. Cement tanks, invariably constructed in close vicinity of bore-wells, for cattle drinking bred *Aedes aegypti* as soon as the water there turned turbid due to prolonged use by cattle, sometimes with *Anopheles subpictus*. None of the *beris*, another type of earthen reservoir in the desert environment, supported the breeding of *Aedes aegypti*.

Table 1. Distribution of different kinds of tankas and beris in various villages in three districts currently under varying degrees of irrigation and/or conduit water supply from canals

District	No. of villages	No. of villages with different types of 'tankas'												Beris			Cement tanks		
		Typical intra-domestic earthen tankas			Metallic mobile tankas			Central community tankas			Peripheral village tankas assembly								
		-	+	++	-	+	++	-	+	++	-	+	++	-	+	++	-	+	++
Sri Ganganagar	17	9	5	3	4	13	0	0	17	0	17	0	0	17	0	0	2	12	3
Jodhpur	9	1	5	3	0	8	1	0	9	0	0	8	1	8	1	0	0	7	2
Jaisalmer	7	1	6	0	0	7	0	0	7	0	0	6	1	6	1	0	0	6	1
Total	33	11	16	6	4	28	1	0	33	0	17	14	2	31	2	0	2	25	6

- = Absence of breeding habitat

+ = Presence of breeding habitat, with potable water breeding *Anopheles stephensi*

++ = Presence of abandoned breeding habitat positive for *Aedes aegypti* breeding

Conclusion

The dengue vector, *Aedes aegypti*, has so far been collected from the Thar desert only from townships and/or desert fringe areas in the vicinity of urban environment, breeding mostly in household pitchers and cement tanks^[2,4,5]. The breeding of *Aedes aegypti* in

the *tankas* in the rural areas of the Thar desert is considered to be a rather recent phenomenon, possibly due to the easy accessibility of newly provided conduit-water supply to villages, which has led to the abandoning of the traditional water reservoirs.

References

- [1] Kalra NL, Wattal BL and Raghvan NGS. Distribution pattern of *Aedes aegypti* in India and some ecological considerations. Bull Ind Soc Mal Comm Dis, 1968, 5: 307-334.
- [2] Kalra NL, Kaul SM and Rastogi RM. Prevalence of *Aedes aegypti* and *Aedes albopictus* vectors of DF/DHF in north, north-east and central India. Dengue Bulletin, 1997, 21: 84-92.
- [3] Chouhan GS, Rodrigues FM, Sheikh BH, Ilkal MA, Khangaro SS, Mathur KN, Joshi KR and Vaidhye NK. Clinical and virological study of dengue fever outbreak in Jalore city, Rajasthan, 1985. Indian J Med Res, 1990, 91: 414-418.
- [4] Joshi V, Mathur ML, Dixit AK and Singhi M. Entomological studies in a dengue endemic area Jalore, Rajasthan. Indian J Med Res, 1996, 104: 161-165.
- [5] Tyagi BK. A note on the breeding of vector mosquitoes in cement tanks and pit latrines. J Appl Zool Res, 1994, 5: 149-151.