

## 1.1 Translational Research for development and testing of ICMR-DMRC module of Dengue control for Rajasthan-

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**Duration:** Three Years

**Status:** Ongoing

**Funding agency:** Indian Council of Medical Research (Extramural)

### PROGRESS

#### A. Observations on breeding of *Aedes* mosquitoes and extrinsic and virus activity in the study areas:

During reported period the surveillance of breeding of larval *Aedes* has been undertaken in 14 district headquarters and 6 rural areas. (Fig.1). The areas namely Jalore, Pali, Sirohi, Barmer, Jaisalmer, Jodhpur, Jaipur, Alwar, Dausa, Sikar, Jhunjhunu, Bikaner and Churu have been surveyed taking representative samples from all the municipal wards of these towns. Rural areas covered are Bhinmal, Sojat city, Shivganj, Balotra, Pokaran and Balesar. Work is in progress in two districts of Ganganagar and Nagaur. In all, 10,568 houses were searched which included 193 households in Jalore, 302 in Pali, 492 in Sirohi, 335 in Barmer, 307 houses in Jaisalmer, 1886 in Jodhpur, 1566 in Jaipur, 403 in Alwar, 306 in Dausa, 591 in Sikar, 429 in Jhunjhunu, 996 in Bikaner, 246 in Churu, 555 in Ganganagar, 307 in Bhinmal,

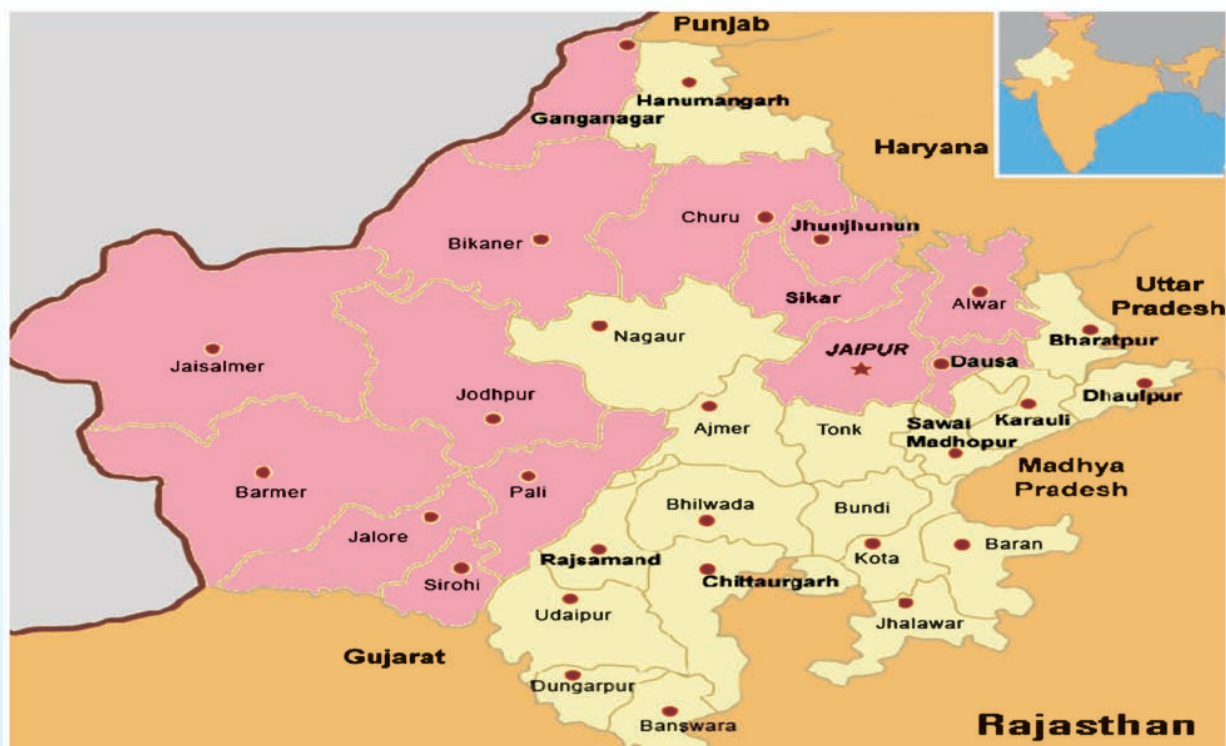


Fig. 1. Map of Rajasthan showing the areas (Pink shaded) studied during reported period.

325 in Sojat city, 410 in Shivganj, 417 in Ballot, 294 in Pokaran and 208 in Balesar for dengue vector breeding. Maximum breeding was observed in Sojat city (32.3%). In Jalore town, out of 193 houses searched, 15 (7.7 %) were positive for Aedes breeding which included 0.84% of containers positive for presence of dengue viral antigen. In Pali, 302 houses included 1.0% containers showing virus activity; in Sirohi town 492 houses showing 1.4% containers infectivity; in Barmer 335 houses with 1.3% container infectivity; in Jaisalmer 307 houses with 0.5% infectivity; in Jodhpur 1886 houses with 2.7% containers infectivity; in Jaipur town 1566 houses showing 3.2% containers infectivity; in Alwar 403 houses showing 2.0% containers infected; in Dausa of 306 houses studied, 1.1% containers showed virus positivity; in Sikar 591 houses with 2.07% infectivity; in Jhunjhunu 429 houses with 2.4% containers infectivity; in Bikaner town 996 houses showing 0.98% containers infectivity; in Churu 246 houses showing 0.49% infectivity; in Ganganagar 555 houses with 1.76% infectivity; in Bhinmal 307 houses showing 0.85% containers infectivity, in Sojat city 325 houses with 3.97% container infectivity, in Shivganj 410 houses showing 0.80% infectivity, in Balotra 417 houses with 0.42% containers infected and in Balesar 208 houses showing 2.43% virus activity in laboratory reared Aedes mosquitoes (Table 1).

Table 2 depicts details of containers examined and virus detected in each of the study towns. In Jalore town, 193 houses studied included 1301 containers examined for Aedes breeding, of which 51 were positive for vector breeding. Out of these 51 containers, only 11 (0.8%) were positive for dengue virus. In Pali town, of 2355 containers examined, 3.4% were positive for breeding and of these only 1.0% showed virus activity. In all, 61,423 containers in 10,568 houses of 20 studies have been searched out of which only 1153 (1.87%) containers were virus positive.

### **B. Development of early warning system of virus activity in study areas:**

The larvae of Aedes mosquitoes collected from different study settings were reared into adults in laboratory conditions and were subjected to virus isolations using Indirect Fluoresce Antibody Test (IFAT) in individual mosquito head squashes (Fig. 2). The positive and negative mosquitoes were subjected to Real Time PCR for confirmation of IFAT positive results (Fig. 3).

### **C. Interventions suggested:**

Based on the observations generated on the extrinsic virus activities within dengue vectors, in 20 district towns and rural areas, we have communicated to the district Chief Medical & Health Officer (CMHOs) of all the 20 districts about new knowledge generated by us. The full details of household, key containers in which virus activity was observed and suggestion to apply larvicide in different type of containers were intimated to respective district CMHO.

**Table 1. Household level details of breeding positive containers and virus activities detected in 14 district towns and 6 rural areas**

Study Area	No. of Houses surveyed	No. Breeding +ve	% Breeding +ve	Containers for Virus +ve	% Virus +ve	Total mosquitoes assayed	Positive for Dengue Virus	% +ve
Jalore	193	15	7.7	11	0.84	168	27	16.07
Pali	302	40	13.2	25	1.06	209	40	19.13
Sirohi	492	53	10.7	45	1.46	335	88	26.26
Barmer	335	29	8.6	21	1.38	82	44	53.65
Jaisalmer	307	12	3.9	9	0.58	44	16	36.36
Jodhpur	1886	363	19.2	283	2.76	876	214	24.42
Jaipur	1566	373	23.8	256	3.29	916	195	21.28
Alwar	403	52	12.9	42	2.05	98	27	27.55
Dausa	306	30	9.8	23	1.19	80	24	30.00
Sikar	591	98	16.5	72	2.07	190	48	25.26
Jhunjhunu	429	92	21.4	68	2.40	150	34	22.66
Bikaner	996	97	9.7	59	0.98	200	41	20.5
Churu	246	7	2.8	7	0.49	40	12	30
Ganganagar	555	70	12.6	56	1.76	145	34	23.44
Bhinmal (R)	307	29	9.4	20	0.85	60	12	20
Sojat City (R)	325	105	32.3	94	3.97	205	56	27.31
Shivganj (R)	410	26	6.34	20	0.80	75	23	30.66
Balotra (R)	417	13	3.11	11	0.42	50	9	18
Pokaran (R)	294	6	2.04	0	0	20	0	0
Balesar (R)	208	37	17.7	31	2.43	85	23	27.05
<b>Total</b>	<b>10,568</b>	<b>1547</b>	<b>14.6</b>	<b>1153</b>	<b>1.87</b>	<b>4028</b>	<b>967</b>	<b>24</b>

R- (Rural areas)

**Table 2. Details of containers positive for breeding and virus in 14 district towns and 6 rural areas**

Study areas	Total Household surveyed	Total containers examined	Total containers positive for breeding	% of +ve	Containers +ve for virus	% +ve for virus
Jalore	193	1301	51	3.92	11	0.84
Pali	302	2355	82	3.48	25	1.06
Sirohi	492	3065	82	2.67	45	1.46
Barmer	335	1521	56	3.68	21	1.38
Jaisalmer	307	1539	37	2.40	9	0.58
Jodhpur	1886	10241	493	4.81	283	2.76
Jaipur	1566	7775	484	6.22	256	3.29
Alwar	403	2044	51	2.49	42	2.05
Dausa	306	1931	31	1.60	23	1.19
Sikar	591	3474	104	2.99	72	2.07
Jhunjhunu	429	2830	105	3.71	68	2.40
Bikaner	996	5999	106	1.76	59	0.98
Churu	246	1417	7	0.49	7	0.49
Ganganagar	555	3180	73	2.29	56	1.76
Bhinmal (R)	307	2346	40	1.70	20	0.85
Sojat City (R)	325	2365	147	6.21	94	3.97
Shivganj (R)	410	2487	25	1	20	0.80
Balotra (R)	417	2568	16	0.62	11	0.42
Pokaran (R)	294	1711	7	0.40	0	0
Balesar (R)	208	1274	53	4.16	31	2.43
<b>Total</b>	<b>10,568</b>	<b>61,423</b>	<b>2050</b>	<b>3.33</b>	<b>1153</b>	<b>1.87</b>

R- (Rural areas)

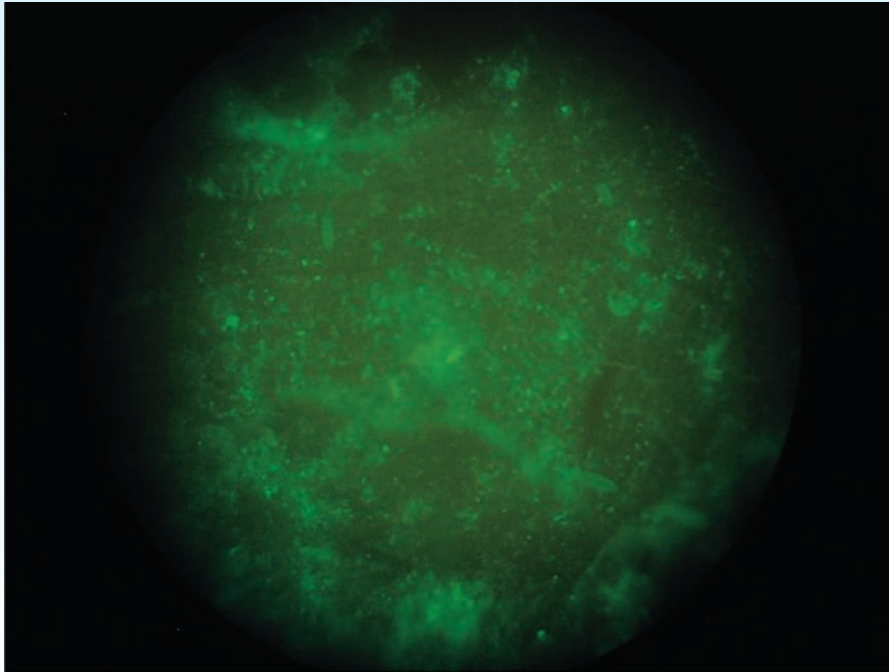


Fig. 2. A micro photograph of mosquito head squash showing positive IFAT

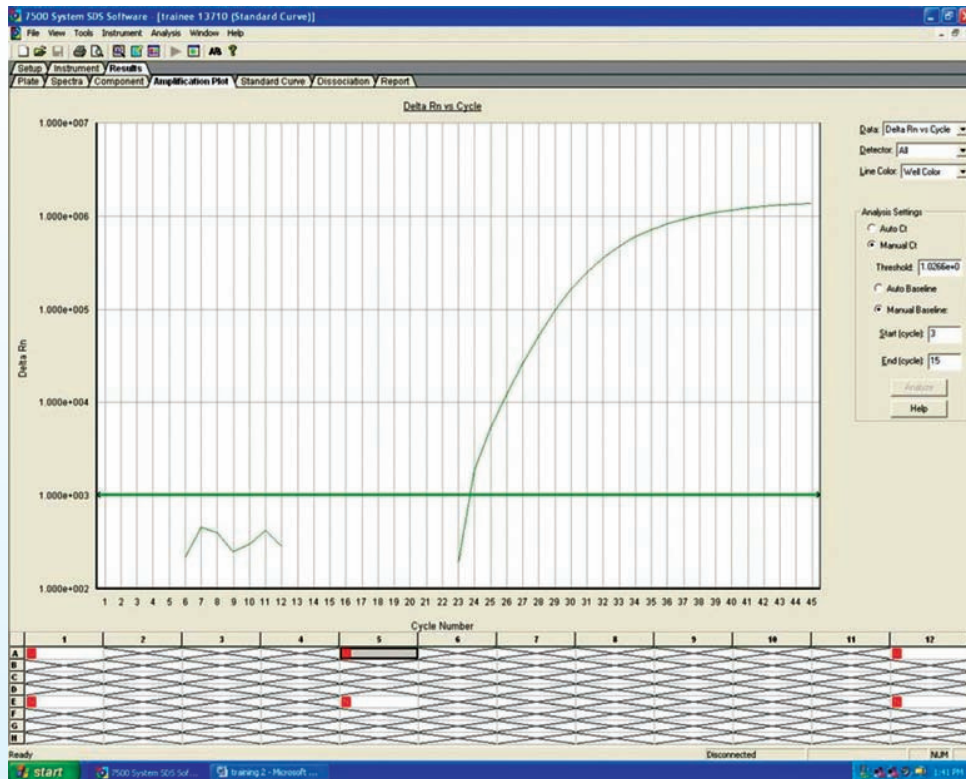


Fig. 3. RT-PCR curve showing presence of virus in mosquito samples