

# COMMUNICABLE DISEASES

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## 1.1 Mapping of risk of Dengue Hemorrhagic Fever (DHF) through dengue virus typing in *Aedes* mosquitoes of different settings of Rajasthan

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### OBJECTIVES

1. Isolation of circulating Dengue virus types (DEN-1, 2, 3 & 4) among *Aedes* mosquitoes (*Aedes aegypti* & *Aedes albopictus*) of different districts of Rajasthan and mapping of circulating DEN types in study settings.
2. Characterization and typing of viruses from human patients of DHF reported from the same study settings.
3. Extrapolation of results of heterogeneity of circulating virus types (Extrinsic and Intrinsic) over study settings and prediction of risk areas for prospective emergence of DHF.

### PROGRESS

Total numbers of 23 different districts have been covered for the collection of mosquito immatures. All the domestic as well as peri-domestic containers available in a selected house were searched for *Aedes* breeding. Total number of systematically sampled 14031 houses was screened in these districts of which 5.3% were positive for the breeding of *Aedes* mosquitoes. *Aedes* larvae were collected from .0.containers found positive for breeding which were then brought to the laboratory for virus isolation studies. Of the total 92,831 containers surveyed, 1929 containers were found to be positive. The key containers observed positive for *Aedes* breeding were cement tanks and clay pots. The details of entomological observations are depicted in Table 1.

**Table 1: Details of entomological investigations in study villages (During Study Period)**

S. No.	Districts	Total houses surveyed	Total houses +ve for breeding	% +ve	No. Of Containers examined	% Of Positive Containers	% +ve
1	Jalore U	193	15	7.77	1301	51	3.92
2	Pali U	302	40	13.24	2355	82	3.48
3	Sirohi U	492	56	11.38	1179	68	5.76
4	Barmer U	335	29	8.65	1521	56	3.68
5	Jaisalmer U	307	12	3.90	1539	37	2.40
6	Jodhpur U	1904	373	19.59	10748	537	4.99
7	Jodhpur R	208	37	17.78	1274	53	4.16
8	Jaipur U	1576	370	23.47	7857	445	5.66
9	Alwar U	403	52	12.90	2044	51	2.49
10	Dausa U	306	30	9.80	1931	31	1.60
11	Sikar U	591	105	17.76	3446	105	3.04
12	Jhunjhunu U	429	69	16.08	2830	105	3.71
13	Nagaur R	475	22	4.63	3445	23	0.66
14	Bhilwara U	937	33	3.52	7200	36	0.5
15	Tonk U	502	21	4.18	4470	22	0.49
16	Chittorgarh U	881	37	4.19	6584	38	0.57
17	Rajsamand U	560	30	5.35	4746	32	0.67
18	Banswara U	442	8	1.80	3558	10	0.28
19	Dungarpur U	418	14	3.34	3320	16	0.48
20	Pratapgarh U	362	20	5.52	3089	22	0.71
21	Kota U	952	40	4.20	7160	41	0.57
22	Bundi U	594	38	6.39	4489	44	0.98
23	Bharatpur U	862	26		6745	24	0.35
		14031	1477	10.52	92831	1929	2.07

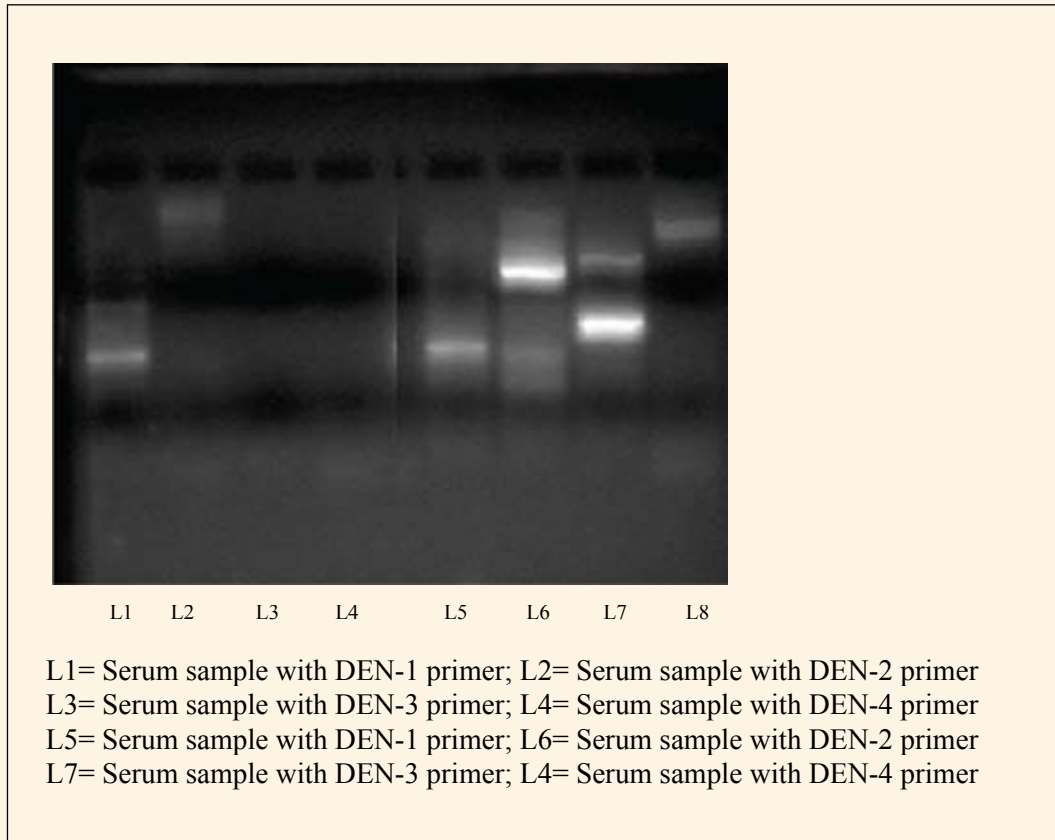
*U: Urban, R: Rural*

The field collected larvae were reared into adult mosquitoes in laboratory. Adults were subjected to Indirect Fluorescence Antibody Test (IFAT) to detect presence of dengue virus. Of 14031 houses surveyed in 23 districts, 1477 were found positive for breeding of *Aedes* mosquitoes. Of these, 1020 (7.2%) houses were positive for dengue virus presence. Percentage of houses positive for dengue virus ranged from 15.8% in Jaipur urban district to 1.1% in Dungarpur district. In 14031 houses, as many as 92831 domestic containers were examined for breeding of which 1079 (1.1 %) were positive for the presence of dengue virus (Table 2).

**Table 2: Details of *Aedes* breeding and virus positivity at houses and container level in *Aedes* mosquitoes of study villages**

S.no	Districts	Total houses surveyed	Total houses +ve for breeding	Total houses +ve for virus	% of virus +ve houses	No. Of Container	Virus +ve containers	% virus +ve containers
1	Jalore U	193	15	10	5.18	1301	11	0.84
2	Pali U	302	40	20	6.62	2355	25	1.06
3	Sirohi U	492	56	41	8.33	1179	45	3.81
4	Barmer U	335	29	20	5.97	1521	21	1.38
5	Jaisalmer U	307	12	9	2.93	1539	9	0.58
6	Jodhpur U	1904	373	251	13.18	10748	284	2.64
7	Jodhpur R	208	37	29	13.94	1274	31	2.43
8	Jaipur U	1576	370	250	15.86	7857	251	3.19
9	Alwar U	403	52	42	10.42	2044	42	2.05
10	Dausa U	306	30	23	7.51	1931	23	1.19
11	Sikar U	591	105	68	11.50	3446	72	2.08
12	Jhunjhunu U	429	69	63	14.68	2830	68	2.40
13	Nagaur R	475	22	6	1.26	3445	6	0.17
14	Bhilwara U	937	33	22	2.34	7200	22	0.30
15	Tonk U	502	21	19	3.78	4470	20	0.44
16	Chittorgarh U	881	37	26	2.95	6584	26	0.39
17	Rajsamand U	560	30	13	2.32	4746	13	0.27
18	Banswara U	442	8	8	1.80	3558	8	0.22
19	Dungarpur U	418	14	5	1.196	3320	5	0.15
20	Pratapgarh U	362	20	16	4.41	3089	17	0.55
21	Kota U	952	40	36	6.06	7160	36	0.50
22	Bundi U	594	38	21	3.53	4489	21	0.46
23	Bharatpur U	862	26	22		6745	23	
		14031	1477	1020	7.26	92831	1079	1.16

In 14031 houses surveyed during reported period, 92831 containers examined, 3843 larvae were collected and reared into adult mosquitoes. Maximum mosquito infections were observed in Barmer district, where 53.3% laboratory reared adults showed presence of virus where as least mosquito infectivity was observed in Dungarpur district (11.8 %). The virus positive mosquitoes were subjected to PCR for type specific virus isolations. RNA extraction was made for all the individual virus positive mosquitoes and preserved at -75°C. The extracted RNA are being subjected isolation employing Polymerase Chain Reaction (PCR). Both human sera and mosquitoes of house where dengue cases were reported, were subjected to type specific virus isolations (Fig.1)



**Fig. 1.** PCR assay of human serum and mosquitoes of a dengue affected house