

# **Desert Medicine Research Centre, Jodhpur**

## **Highlights 2006-07**

Desert Medicine Research centre, Jodhpur focused on basic, applied and operational research aspects pertaining to its identified research areas e.g. Dengue, Malaria, Hypertension, Diabetes, Tuberculosis, Vector control and Nutrition. The sequential focus remained towards studying the situation analysis, implicating disease determinants, establishing of cause & effect relationships and translational research attempts with respect to the mandatory priority areas of research. Efforts were also directed for project proposal in newer research areas of importance.

### **1. Dengue & Dengue Hemorrhagic Fever**

Observations on vectors, virus and diseased population of dengue in 5 cities and 20 villages of different representative socio-ecological zones of Rajasthan led to infer that criteria of socio-economic stratification in an urban setting and eco-epidemiological paradigms in rural areas may serve an effective & meaningful tool for development of surveillance design of dengue. During inter-epidemic period of disease, dengue virus is maintained through vertical transmission route in tree holes breeders. The initial leads indicate that peri-urban or sylvatic foci of dengue virus may play a role in amplifying endemic DF and/or in causing DHF.

A survey of 300 houses in different localities of Jodhpur town was undertaken during outbreak of dengue in October, 2006. Factors such as poor socio-economic conditions, agglomeration of housing pattern and habits of maintaining peri-domestic water containers emerged to be strongly associated with the abundance of vectors and diseased population of dengue, proving yet again the utility of socio-ecological criteria of stratification for dengue surveillance. Follow up study of same cohort of houses, showed that during winter season in January 2007, the vector and consequent extrinsic foci of dengue virus was reduced to few pockets of the study areas only. The observations supported the contention that commencement of virus activity among peri-urban foci precedes the virus activity in the city areas. Employing monoclonal antibodies, Virus typing has been done on the field collected mosquitoes from endemic areas. DEN-3 has been found to be the most common dengue strain. In one area where DHF has been reported, in addition to DEN-3, DEN-2 has also been observed. Such areas have been marked as high alert zones for a possible occurrence of DHF.

Winter season appears to be the best time to undertake preventive measure to interrupt dengue transmission. An interventional study to demonstrate model intervention programme in collaboration with Chief Medical and Health Officer and Municipal Corporation of Jodhpur is on the agenda.

In SDS PAGE assays of 788 field collected and laboratory reared *Aedes aegypti*, *Aedes albopictus* and *Aedes vittatus* from 5 districts of Rajasthan, a mid gut protein of 200 kDa molecular weight was found to be associated with the absence of virus in mosquitoes. This protein could be pursued as the marker for transmission potential in an endemic area.

Calotropin, a chemical basis of larvicidal action of latex of *Calotropis procera* could be identified as a new bio-larvicide employing HPLC and IR & UV spectroscopy. Patent has been filed for the new use of this known compound.

## **2. Malaria**

Based on the understanding of interactions of malaria cases, density of prevalent vector species and their animals and human baits of preference an equation has been developed. Computer simulations have been used to test the utility of equation model. More rigorous testing is under process for validation to offer a malaria predictive tool.

Human behavioural studies in canal irrigated and non irrigated areas of Jaisalmer district as relevant in the epidemiology of malaria showed bed nets use in canal villages is more (>30%) than the non-canal villages (<5%). In canal villages in-migration of agricultural labour and in non-canal villages seasonal out-migration of people was recorded.

## **3. Tuberculosis**

Considering the emerging problem of drug resistance in TB and the need to look for methods of shortening the time required for culture of *Mycobacterium tuberculosis* studies were undertaken using *Mycobacterium tuberculosis* H37RV. MTB colonies appeared on day 5 on LJ medium enriched with some amino-acids and other nutrients compared to 12<sup>th</sup> day in controls. Use of enriched liquid media and microscopic detection of colonies appears to be relevant area for further probe.

Effect of few plant extracts was studied on in vitro growth of *Mycobacterium tuberculosis* H37RV. It was observed that methanolic extract of *Syzygium aromaticum*, ethanolic extract of *Cuminum cyminum*, *Zingiber officinal*, *Coriandrum sativum*, & *Myristica fragrans* and methanolic & ethanolic extracts of *Punica granatam*, exhibited anti-tuberculous activity in vitro on LJ slants.

A study of new and old suspected cases of TB showed that that majority (46.8%) cases reported to DTC of their own or on the suggestions of diagnosed TB patient. 31.0% patients were referred by government hospital and 22.2% by private practitioners. Most dominating cause of delay in diagnosis/ treatment was observed to be the failure to diagnose the disease by the treating physicians. Delay in diagnosis/ treatment was more pronounced among illiterates and more low income group. Women were the most disadvantageous in both the groups.

## **4. Nutrition**

A study covering 1193 women (384 pregnant, 400 lactating and 409 non pregnant and non lactating) from 28 villages of Jodhpur district revealed Iodine Deficiency Disorder (39- 55 %) in pregnant & lactating Women compared to (42 %) in controls. Only 19.2% women consumed iodized salt. Severe Anemia (14.0 %) in pregnant women and 10.5% in lactating women was higher compared to NNMB figure of 4.3 % and 3.2 % respectively. Abortions and child deaths were pronounced among anemic mothers. Other observations included low dietary intake of cereals, fat, pulses, legumes and leafy vegetables giving rise to deficiency of protein and calories, Iron, Folic Acid and Vitamin-A. In another study covering 30 villages showed higher PCM in females, short term malnutrition in preschoolers & chronic energy deficiency in adults.

## **5. Vector Control Studies**

Studies conducted on mapping of insecticide resistance among the vectors of malaria in Rajasthan correlated percent mortalities of *An. stephensi* and *An. culicifacies* against DDT with the spray histories which appeared to have a cumulative effect on the susceptibility status of vectors.

Larvicidal potential of active principal(s) of *Solanum xanthocarpum* against important mosquito vectors was determined. Comparative susceptibility calculated on the basis of LC<sub>50</sub> value showed that larvae of *An. stephensi* were 2 to 3 times more susceptible than larvae of *Ae. aegypti* and *Cx. quinquefasciatus* respectively to fresh fruit extracts, fresh seed extracts, methanol extract of fruit epicarp.

## **6. Infrastructure Development & Research Capacity Strengthening**

Centre is now equipped with modern equipment to employ molecular biological, cell biological and bio chemical techniques to answer the questions emerging from field epidemiological studies. With the result, typing DEN viruses, resolving proteins of tissues, spectrophotometry, biochemical analysis and other associated laboratory exercises have become possible. Experimental studies employing technical protocols of these investigations have been used for development of training packages for students of Postgraduate courses of Microbiology & Bio technology and Ph. D programmes. National Level training programme for Entomological Assistants were organized sponsored by National Vector Borne Diseases Control Programme. Training for scientists, research students and technical personnel was arranged in their respective areas of specialization for advancement of their career.