

## Bangalore (Karnataka)

A project on “Development of strategy for integrated control of vectors of malaria, Japanese encephalitis (JE) and dengue” was accomplished in seven talukas comprising of 50 PHCs and 1846 villages in Mandya district of Karnataka. Based on geographical reconnaissance (GR), susceptibility of vector species, epidemiological analysis of data, control strategy for malaria, JE and dengue was suggested to the state government. Field evaluation of VectoBac against *Anopheles*, *Culex* and *Aedes* mosquitoes, in a variety of breeding habitats in Bangalore rural and urban areas was done. It was found 100% effective against anophelines for three days, for culicines up to 10 days; and against aedines up to seven days. Situation analysis of malaria was done in Bangalore (rural and urban), Kolar, Bellary, Chitradurga and Raichur districts. Trainings and workshops were organised for medical officers, entomologists and health workers, etc.

## Car Nicobar (Andaman & Nicobar Islands)

The study on duffy blood group in the primitive tribe of Andaman and Nicobar Islands has brought forward that out of four primitive tribes found in Andaman & Nicobar Islands, Jarawas are duffy negative whereas Great Andamanese, Onges and Nicobarese are duffy positive. Study on diurnally sub-periodic filarial forms revealed that the infection was among the Nicobarese (tribal) and the nocturnally periodic form was observed among the settlers and migratory labourers. The field unit was devastated by Tsunami on 26 December 2004. The staff is being utilised by periodic visits to Andamans for situation analysis of malaria.

## Chennai (Tamil Nadu)

During the year, study on bio-ecology of *An. stephensi* and its probable role in disease transmission in Chennai was completed. A report on the assessment of therapeutic efficacy of chloroquine for the treatment of vivax and falciparum malaria in Rameswaram, Ramanathapuram districts (Tamil

Nadu) indicating adequate clinical and parasitological response (ACPR) in *P. vivax* and late treatment failure in *P. falciparum* has been handed over to the officials of the Directorate of Public Health and Preventive Medicine, Govt. of Tamil Nadu. Evaluation of VectoBac tablet formulation (*Bacillus thuringiensis* var *israelensis*) and Temeguard (Temephos 50% EC) as larvicides was carried out. Other activities included technical support to various centres/institutes and collaborative research/scientific work. Health education and training programmes were undertaken as routine activities. Malaria clinic continued to function, catering to the health needs of the general public by providing prompt diagnosis and treatment.

## Haldwani (Uttaranchal)

Work on the project “In-depth study of entomological and parasitological factors responsible for malaria transmission in some areas of Bhabar region, District Nainital, Uttaranchal” was continued and completed. Reverse pattern of prevalence of *An. culicifacies* and *An. fluviatilis* (peak of *An. culicifacies* in July and *An. fluviatilis* in March). About 0.37% sporozoite rate (1/270) was found in *An. culicifacies*. In OPD, a total of 1489 blood slides were prepared and examined. Out of that 581 (417 Pv, 161 Pf & 3 mixed) were found positive for malaria showing 39 and 11% SPR and SFR, respectively. IEC activities were kept continued.

## Hardwar (Uttaranchal)

Steam distillate fraction from plant code MRCHAR/03/05 showed excellent activity against *An. stephensi*, *Ae. aegypti* and *Cx. quinquefasciatus* mosquitoes with their KDT<sub>50</sub> values of 13, 12 and 18 min respectively on 2% impregnated test papers. Four plants coded as NBDB022, NBDB041, NBDB048 and NBDB056 have been short-listed to develop as novel bio-insecticides against mosquitoes. Fraction code MRCHAR/04/04/S possessed good adulticide activity against *Cx. quinquefasciatus* with LC<sub>50</sub> and LC<sub>90</sub> values of 0.5 and 0.97 mg cm<sup>-1</sup>. Fractions MRCHAR/03/04/1 and

MRCHAR/03/04/4 of plant code MRCHAR/03/04 showed good antiplasmodial activity with their  $IC_{50}$  values of 0.62 and 1.5  $\mu\text{g/ml}$  respectively. A total of 265 samples of soil, sediment, water, human blood and human milk collected from Garhwal region were processed for determination of organochlorine residues.

### Jabalpur (Madhya Pradesh)

Laboratory bioassays were performed on field collected *An. culicifacies* to determine the efficacy of Olyset® nets after repeated washings with detergent. Support was provided to the programme by undertaking epidemic investigation in Jhabua district, situation analysis of malaria in Sidhi, Seoni and Betul districts and additionally, evaluated the pilot programme of NVBDCP for the insecticide treatment of community-owned mosquito nets in Districts Chandrapur (Maharashtra) and Mandla (Madhya Pradesh). Organised WHO sponsored international training workshop on “Rapid assessment tools for malaria in pregnancy for southeast Asia”. Also organised an Indo-US workshop on “Cerebral malaria associated neurological disorders in central India”, project funded by Fogarty International Centre. MRC clinic at Medicine Department in Medical College Hospital continued to provide diagnostic and treatment services to malaria patients

### Nadiad (Gujarat)

Health impact assessment of Sardar Sarovar water resources development project during the pre-irrigation phase made a significant progress. Disease prevalence assessment and entomological surveillance were the main activities. A collaborative study titled, ‘Randomised village-scale evaluation to compare the efficacy of lambda-cyhalothrin CS with lambda-cyhalothrin WP used in indoor residual spraying for malaria vector control’ was initiated with support of WHO Pesticide Evaluation Scheme. New larvicide formulations (pyriproxyfen and VectoBac WDG) were evaluated in the field for mosquito larval control. Therapeutic efficacy study detected high level of chloroquine resistance in *P. falciparum* in malaria epidemic affected areas in Kheda and Anand districts. Technical support was given to the NVBDCP in epidemiological investigations of malaria, whereas work of malaria epidemic containment in various districts in Gujarat was also undertaken. Observation

of antimalaria month and setting up new hatcheries for mass breeding of larvivorous fish were also undertaken. Scientists also participated in major meetings to plan or review the activities of the malaria programme on the request of the Gujarat government. Organised several training programmes for state health personnel.

### Panaji (Goa)

Susceptibility status of Panaji and Candolim strains of malaria vector *An. stephensi* to DDT, malathion and deltamethrin revealed that both the strains are susceptible to deltamethrin but highly resistant to both DDT and malathion. GR of breeding habitats was done in the entire city of Panaji to assess the mosquitogenic potential of the breeding sites preferred by anophelines, culicines and aedines. Spot intervention measures were instituted by the NVBDCP, Goa team. The stratification of the city is being done to prioritise malaria control on the basis of situation analysis. Therapeutic efficacy of chloroquine in uncomplicated malaria revealed that ACPR was 15.7%, while failure rate was high (84.3%). The national programme has withdrawn chloroquine from Panaji and introduced SP in that area. Malaria clinic continued to provide EDPT to general public and private practitioners. Work is underway to estimate malaria burden in Jharkhand state. Training programmes were organised for students and professionals.

### Rourkela (Orissa)

The work on development of a site for malaria vaccine trials was continued in Sundargarh district. Evaluation of Olyset® nets impregnated with permethrin revealed that even after 20 washes the efficacy of Olyset® nets was 80-95% against *An. culicifacies* and 100% against *An. fluviatilis*. Evaluation of bio-efficacy, persistence and impact of mosquito nets treated with tablet formulation of deltamethrin (K-O Tab) on malaria transmission was done. Independent assessment of the operational feasibility of the introduction of rapid diagnostic kits and blister combi packs for strengthening the early diagnosis and prompt treatment (EDPT) under EMCP in Sundargarh district, Orissa was done. Also concurrent evaluation of the pilot programme for the insecticide treatment of community-owned mosquito nets in Districts Nayagarh and Keonjhar (Orissa), Purulia (West Bengal) and Visakhapatnam (Andhra Pradesh) was carried out.

### Shahjahanpur (Uttar Pradesh)

Field trials of pyriproxifen (0.5G) was carried out in various mosquito breeding habitats of district Shahjahanpur. The compound was applied in three dosages 2 g/m<sup>3</sup>, 4 g/m<sup>3</sup> and 10 g/m<sup>3</sup> of water capacity of breeding sites. The compound was tested against mosquito immatures of *Cx. quinquefasciatus* and *An. culicifacies*. Successful inhibition of adult emergence was obtained with all three doses in various mosquito breeding sites. The effect was more pronounced on the larva to pupal metamorphosis. Analysis of malaria in Shahjahanpur district to identify transmission risk factors and GR for planning vector control was also studied. Situation analysis of malaria was undertaken in Jharkhand. IEC activities were also undertaken.

### Shankargarh (Uttar Pradesh)

Malaria clinic continued to serve as a source of sentinel site for monitoring of trend of malaria in Shankargarh PHC and surrounding areas. In the year 2003, the SPR showed a rising trend (22.1%) and in 2004, the SPR has gone up to 45.4%. Malariogenic stratification of Allahabad district is being attempted

based on physiography, vector distribution and parasite load.

### Sonapur (Assam)

The major thrust areas of research included: (i) the situation analysis of malaria endemic districts of Assam to recommend situation-specific intervention strategies to contain the spread of drug resistant malaria; (ii) to ascertain the treatment seeking behaviour and health care access in ethnic communities of Assam; (iii) to ascertain the therapeutic efficacy of sulphadoxine-pyrimethamine (SP) as primary treatment in districts under alternate therapy replacing chloroquine; (iv) to characterise the malaria parasite strains prevalent in the region for genetic diversity; and (v) to ascertain the therapeutic efficacy of alpha-beta arteether in pediatric malaria for treatment of *P. falciparum* malaria. Other activities included health education and capacity building measures, observation of antimalaria month, and mass propagation and distribution of larvivorous fishes (Guppy) in town areas of Assam. Technical support to the malaria control programme is being provided through World Bank assistance for transfer of technology (TOT) on ITNs to the northeastern states of India.