

History of Medical Entomology in Sri Lanka

Division of Medical Entomology

Medical Entomology formally commenced in the then Department of Medical and Sanitary Services (DM&SS) with the establishment of the Division of Medical Entomology (DME) after the arrival of Mr Henry Francis Carter from the University of Liverpool around 1920. He was appointed as malariologist and carried out pioneer work on malaria vectors in Ceylon. He realised the urgency to work out the taxonomy of anopheline fauna of Ceylon and this was his first study. It resulted in the pioneer publication on the Taxonomy of Anopheline fauna of Ceylon {Carter H.F., 1950b. ceylon mosquitoes; List of species and names of mosquitoes recorded from Ceylon. Ceylon J.Sc. (B) 24 (2): 85-115 }

Investigations on filariasis had also commenced in the 1920s. However, around 1933, following investigations by Dr W.P.L Dassanayaka, Medical Officer, Filariasis control, Carter widened the scope of the DME to include vector studies of filariasis. At that time, Brugian filariasis was thought to have a wider distribution than bancroftian filariasis. With the discovery of more bancroftian filariasis areas, Carter extended his mosquito taxonomic work to culicine mosquitoes and developed keys to identify them. In addition to establishing the taxonomy of mosquito fauna he investigated filariasis transmission, dissecting *Culex fatigans* (*Cx quinquefasciatus*) and *Mansonia* to identify the stages of development of the filarial larvae (Carter H.F. and D.P.Wijesundara 1948, Notes on some Ceylon culicine mosquitoes. Ceylon J.Sc. (B) 23(3) : 135 – 151)

In 1938, the Medical laboratories of the Department of Medical and Sanitary Services were housed at Torrington square, Colombo. There were three sections, (1) the laboratory of the Anti malaria Campaign headed by Dr. K.J.Rusomjee, the superintendent, (2) the Division of Sanitary Engineering headed by Mr. L.N. Worth, the Sanitary Engineer and (3) Division of Medical Entomology (DME), headed by Mr. Carter and his new designation was Medical Entomologist (ME) . He was assisted by DR.

G.F. Bertholomeusz and Dr. P.L.F. de Livera and they were designated as Medical Assistants in Entomology.

In order to carry out the field work of mosquito sampling the Department recruited a category of officers designated Entomological Assistants (EAA) parallel in status to Sanitary Inspectors (present Public Health Inspectors, PHII). Initially the cadre of EAA was 21 and about ten of them were stationed in the Medical Officer of Health (MOH) divisions in the filarial endemic areas, each under the MOH but directly working for the Medical Entomologist. A few EAA were engaged in malaria activities in the Anti-Malaria Campaign. The main duties of the EAA assigned to filariasis entomology were indoor collection of mosquitoes (*Cx quinquefasciatus* and others) and outdoor cattle baited trap collections (*Mansonia*, *Anopheles* species and others). Live mosquitoes collected were dispatched in cages daily by train to the DME laboratory in Colombo. A team of four to five Laboratory Assistants, the present Medical Laboratory Technologists (MLTT), identified the mosquitoes and dissected them for filarial developing stages. Larval surveys were also carried out by them and reported to the MOOH. The DME occupied the old Public Health Museum building situated adjoining the old MRI building.

In 1939 Dr S.Rajendram, who was assistant to Dr Rustomjee at the AMC, Colombo was placed at the Malaria Field Training Centre, Kurunegala where medical officers and sanitary inspectors were trained in malaria control methods. Dr P.L.F de Livera who was assisting Mr Carter at the Division of Medical Entomology, Torrington Square was placed at the Malaria Field Training Centre as Medical Assistant in Entomology. Dr G.F. Bartholomeusz held the same position in Colombo. EA Mr K.Saravanamuttu was attached to the Malaria Field Training Centre while EA Mr M.D.R. Karunaratna worked under Dr de Livera in the Anti-Malaria Unit, Kurunegala.

In 1939 Mr P.Anthonipillai, EA in charge of Malaria Observation Station Jaffna conducted an investigation into the prevalence of eye flies, *Syphunculina* in his area in addition to his duties. Special investigations pertaining to typhus fever were carried out at Embilipitiya where the mite *Trombicula diliensis* was collected by senior EAA Mr JLN Fernando and Mr S.C. Coomaraswamy.

In 1940 the DME was brought to the old building of the Public Health Museum adjoining the Bacteriological Institute, Borella. Dr S.H. Jayewickreme, a Zoology graduate with PhD was appointed Research Officer.

Mr. Carter retired in 1948 when Ceylon gained independence. In the DME there were three other staff members, two medical officers, Dr Dabrera and Dr G.F Bartholomeusz and the third Dr S.H. Jayewickreme, a graduate in Zoology with PhD.

With the departure of Carter the DME remained under the sole staff member Dr Bartholomeusz whose designation was Medical Officer in Charge. Dr Dabrera left to join another division within the DM&SS and outside Medical Entomology. Dr Jayewickreme was appointed Specialist Officer in Entomology, Medical Research Institute (MRI) to initiate the Department of Entomology. While the DME occupied the top floor of the building, Entomology Unit of the Medical Research Institute under Dr Jayewickreme occupied the ground floor.

Dr Jayewickreme had varied research interests mainly mosquito ecology. His successful colonization of *Mansonia* in 1952 was a first report in science. He was involved in Forensic entomology determining the age of fly larvae to estimate the time of death in homicidal cases. He had the services of two EAA and two laboratory assistants. Dr Jayewickreme died in July 1952. With his death the DME was incorporated into the Department of Entomology, MRI thus terminating the DME in 1953.

Dr. Samarawickrema resumed his duties assisting in the main activities of the DME. These were

(a) participation and supervision of mosquito identification and dissection of *Cx quinquefasciatus*, *Mansonia* and *Anopheles* sampled and sent different MOH areas for filarial infections

(b) *Aedes aegypti* surveillance in ships arriving in Colombo port from East Africa. Surveillance of Colombo seaport for *Aedes* vectors

(c) rat flea surveys in the Colombo port for *Xenopsylla cheopis* index in the surveillance for plague

(d) other special surveys.

A staff of 10 EAA and 5 laboratory assistants carried out the field and laboratory work respectively. In 1953 Dr. Samarawickrema received a fresh appointment as a

research officer in the MRI . Dr. Samarawickrema was on study leave in London from 1956 to 1959.

One field experiment initiated and carried out by Dr Bartholomeusz was an indoor residual spray trial in four villages in Induruwa to control *Mansonia* vector of brugian filariasis. Induruwa was an endemic area at the time with high *Mansonia* breeding associated with aquatic plants.

Dr Bartholomeusz had retired in 1957. Another medical officer Dr Mrs K.Gunawardena had been posted to the Department. Dr.Thevasagayam was transferred to the MRI in the absence of Dr Samarawickrema. The entomology unit in the FTC Kurunegala was closed. In 1959 Dr. Thevasagayam had left the Department of Health Services to join the Department of Agriculture. Eventually he left the country when he received an assignment in the World Health Organization in 1961 in Malaysia.

Dr. Samarawickrema returned from study leave in October 1959 and in January 1960 he was appointed as the head of the Department of Entomology, MRI.. Dr Mrs Gunawardena remained as the other staff of the Department of Entomology. It took some time to recruit another research officer. However, in the meantime W.J. Niles, the senior Medical Laboratory Technologist (MLT) was promoted as a research officer. He had his own programme of research mainly on experimental transmission of filarial parasites in mosquitoes. He also assisted Professor A.S.Dissanaike in the Faculty of Medicine, University of Ceylon, Colombo in a project on experimental radioactive tagging of filarial larvae and also in a transmission study involving *Cardiofilaria nilesi* named after him.

Dr. Samarawickrema applied his laboratory research which enabled the estimation of monthly survival rates of the vector mosquito populations. In particular in *Cx quinquefasciatus* populations, it was possible to estimate the duration each larval stage of *Wuchereria bancrofti* in nature. These results were later confirmed with mark – release – recapture experiments using poster paint and radioisotopes. Later these mark – release – recapture experiments using radioactive isotopes were extended to study flight range and natural survival rates of *Cx quinquefasciatus*.

With chikungunya first and then dengue prevalent in the country from 1963 routine surveillance was directed at *Aedes aegypti* and *Ae albopictus* continuously in the airport and seaport and urban areas in the Colombo district where cases were reported. Subsequently, 1976 when physicians in hospitals reported deaths among children suffering from encephalitis spot surveys of their rural homes showed ecotypes suitable for Japanese encephalitis (JE). The first of these ecotypes was found near Gampaha with all the essentials for JE epidemics. Within the next two years the country had the first epidemic of JE.

In 1968 the Department of Health Services and the MRI recruited another research officer, Nalini Weerakkody (later Nalini Jayasekera) a graduate in Zoology. After an orientation period she fitted into the department and shared in all the activities. During the year 1976 -1977 the research unit carried out monthly sampling of *Cx quinquefasciatus*, *Aedes aegypti* and *Ae albopictus* in twenty urban areas distributed throughout the country. Jayasekera continued this study when Samarawickrema was away in 1977.

Dr Mrs Gunawardena retired in 1974. In 1975 MRI recruited another medical officer Dr C.L.Mendis. In 1976, Nalini Jayasekera and C.L.Mendis received scholarships for higher studies in United Kingdom. Both returned in 1977 having obtained MSc in Medical Parasitology

In September 1977 Dr. Samarawickrema was released from the MRI for a two year assignment in the WHO Western Pacific Region as Entomologist to a Filariasis Project in Samoa. He returned to his position in the MRI in March 1980. He initiated a research project on the uptake and development of different densities microfilariae of *Wuchereria bancrofti* by laboratory bred *Cx quinquefasciatus* .Nalini Jayasekera took over this study when Dr.Samarawickrema was recalled in October 1980 to join a WHO project at the Institute for Medical Research in Kuala Lumpur, Malaysia.

Dr. Samarawickrema resigned from his post in the MRI. At the time all three entomologists who were recruited in 1951-1952 were serving the WHO. Dr. C.L.Mendis was appointed as Head of the Department in 1980 and he left to join Anti Filariasis Campaign as Director in 1982.

Mrs Nalini Jayasekera joined the MRI on the 1st of August 1969 as a research Officer in Entomology and worked as an Entomologist upto 31st December 1990. She was appointed as Head of Entomology Department in 1982 and was made acting Head of dept. of Entomology & Parasitology in 1990.

She revised and compiled a much needed checklist of mosquitoes for Sri Lanka which was published by UNESCO-NAB National Committee of Sri Lanka 1981.

When Sri Jayawardenapura was in the process of being established as the New Capital of Sri Lanka during 1981 – 1982, she carried out extensive mosquito surveillance studies in this area with a view of launching appropriate mosquito control programmes. Her main field of research was on vectors of Dengue, JE & Filariasis.

As Entomologist of the MRI, she actively collaborated with the Anti Malaria Campaign and Anti Filariasis Campaign on a WHO funded programme on mosquito borne disease problems in newly irrigated areas in Mahaweli system C and Kirindi Oya during 1985 – 1986. She played a key role as a member of the Advisory committee on communicable disease at the Ministry of Health that determine Ministry policy on vector borne disease of Sri Lanka.

Dr. Mrs Shirani Gunawardena was appointed as a Medical Officer in 1989 and served the department until she migrated to Australia in 2003.