Prevalence rate of filariasis:

The blood smear data were collected from the corporation of Madras city for the year 1989-91.

During the year 1989, a total of 1,10,067 blood smears were screened for microfilariae (mf). The prevalence rate of microfilaraemia and disease cases in the population studied were 0.57% and 0.17% respectively.

The prevalence of microfilariae and its intensity appeared to be age dependent. Prevalence and intensity increased monotonically throughout the child and young adult age group and attained a peak at 15-39 years of age group. Prevalence rate declined sharply from 40 years and above. The prevalence of chronic diseased cases steeply increased with age and levelled off at 40 years and above.

The mf positive carrier cases were reported throughout the year. There was no significant difference in distribution in different months in both sexes.

More number of chronic cases were reported in females than males and there was no significant difference in the distribution of these cases in the year 1989.

No chronic symptoms of filariasis were observed in children in the age group 0-4.

In the year 1990 and 1991 a total of 1,13,939 and 1,10,551 blood smears were screened. The mf rate and disease rates were found to be 0.31%,
0.21% and 0.16% and 0.133% respectively. Observations similar to 1989, were made in 1990 and 1991 also.

Carrier rate was similar in both male and female during the study period. There was apparently no relation between sex and filarial infection. However expression of disease in the form of swelling among the cases was dependent on sex. Females expressed more often than the males.

Analysis of total and differential counts in various clinical categories showed the following:

One hundred and fifteen samples from 75 persons on three different occasions viz. 0, 20 and 60 days were collected and studied for their immunological status and immune responses. They belong to three categories namely chronic cases (36), microfilariae positive carriers (19) and endemic normals (20).

The total counts in chronic patients were generally more than that of carriers and normals. Neutrophil counts were not significantly different from that of normals, whereas lymphocyte counts were significantly reduced from the normals. However, the eosinophil counts were generally raised when compared to other categories of patients.

In the mf positive carrier cases there was a reduction in the neutrophil counts. There was not much difference in the lymphocyte count compared with that of normals. However there was an increase in the eosinophil counts.
There was reduction in T-cell % as well as Absolute T cell counts (ATC) in chronic cases and mf positive carriers as compared with that of normals. The decrease in the T-cell was more pronounced in chronic cases, than in mf positive carriers.

It was observed that homologous antigen from mf of *W.bancrofti* had elicited good immune response in chronic patients when compared to mf positive carrier and endemic normals. Heterologous antigen also elicited immune response in chronic patients, which was similar to the response shown by homologous antigen. Enhanced immune response to heterologous antigen was seen in mf positive carriers, as compared to endemic normals.

Purification and characterization of homologous and heterologous antigen:

Fractionation of *S.digitata* ww antigen by DEAE Sep A-50 gave two major peaks, namely $SD_1$ and $SD_2$. However fractionation of antigen with linear increase in salt concentration gave four peaks namely $SD_2-1$, $SD_2-2$, $SD_2-3$ and $SD_2-4$ respectively.

The *W.bancrofti* mf antigen when analysed by SDS-PAGE showed polypeptide band with molecular weights of 11, 13, 31 and 53 KD.

*S.digitata* ww antigen showed approximately 18 bands with the molecular weights of 105, 100, 97, 89, 84, 77, 73, 66, 56, 49, 43, 41, 39, 33, 22, 16, 14 and 10 KD (105 to 10 KD).
However purified SD$_2$ fraction showed 6 bands with mol wts of 90, 59, 45, 36, 27 and 18 KD respectively.

Characterization of SD$_2$-4 fraction has shown the presence of only one component with the molecular weight of 25 KD.

Immune response to filarial antigen in rabbits:

The CMI response to different antigens viz. *W. bancrofti* mf antigen, *S. digitata* ww antigen and SD$_2$-4 fraction of *S. digitata* were evaluated after intramuscular injection with the respective antigens in rabbits. The LMI response was evaluated for 60 days.

The LMI response to *W. bancrofti* mf antigen appeared in 15 days of immunization and reached its peak in 40 days. Thereafter there was a decline in the response. However it remained significantly higher than the normals. Similar response was seen in animals immunized with *S. digitata* ww antigen and SD$_2$-4 fraction of *S. digitata* ww.

Humoral immune response to different antigens viz., *W. bancrofti* mf, *S. digitata* ww and SD$_2$-4 fraction of *S. digitata* was evaluated by IHA test in rabbits, after intramuscular injection with respective antigens. IHA titre was evaluated after 0, 15, 20, 25, 30, 40, 50 and 60 days.

After immunization with *W. bancrofti* mf antigen, a rise in IHA antibody titre was noticed in 15 days, which reached its maximum around 40
days. Thereafter, there was decline in the antibody titre. However it remained significantly elevated above the normals.

Similar observations were made, with *S. digitata* w/w antigen and SD$_2$-4 fraction.

The antigenic components of *W. bancrofti* mf, *S. digitata* w/w, SD$_2$-4 fraction were analysed by immunodiffusion test.

Atleast three antigenic components were found in *W. bancrofti* mf antigen when tested against its antiserum. On the other hand three to four major and many minor precipitin lines were found between *S. digitata* w/w antigen and its antiserum.

Only one antigenic component was present in *S. digitata* SD$_2$-4 fraction, when tested with its antibody (antiserum).

When the relationships of various antigens of *S. digitata* and *W. bancrofti* mf, were analysed it was found that the specific cross-reacting antigens of these species were present in the cuticle.

Studies on the utility of homologous and heterologous antigens in the diagnosis of filarial antibodies in the patients sera showed the following:

In CIE, using *W. bancrofti* mf antigen, filarial antibodies could be detected in 44% of chronic cases, 85% of mf positive carriers and 20% of endemic normals, where as with *S. digitata* w/w antigen antibodies could be detected in 75% of chronic patients, 65% and 35% of carriers and endemic
normals respectively. Using SD₂-4 antigen, antibodies could be detected in 60%, 45% and 15% of chronic, carrier and endemic normals respectively.

Thus it is seen that antibodies could be detected in more number of patients' sera using antigen derived from *S. digitata* ww than from *W. bancrofti* mf antigen.

In the ELISA system, more number of positive cases were detected in chronic and carrier cases. Using *S. digitata* ww antigen 80%, 84% and 20% of chronic, mf positive carrier and endemic normals showed antibody positivity respectively. Whereas SD₂-4 fraction gave 91%, 80% and 20% antibody positivity in chronic, carriers and endemic normals respectively.

ELISA test was more sensitive than CIE.

Using CIE test, filarial antigen, was detected in 61% of the chronic cases, 77% mf positive carriers and 13% of endemic normals. No antigen was detected in non-endemic and intestinal nematode infected patients' sera.

Using antisera against heterologous antigen the circulating antigen was detected in 66% of chronic, 73% of mf positive carriers and 25% of endemic normals. Antigen was not detected from non-endemic and intestinal nematode infected patients' sera.

Using antisera to SD₂-4 fraction, antigen was detected in 55% of chronic cases 68% of mf positive carriers and 20% of endemic normals. None of the non-endemic and intestinal nematode infected patients' sera were positive for antigen.
Simple Co-agglutination test was done to detect antigen from filarial patients' sera using antisera against *W.bancrofti* mf and *S.digitata* ww antigens.

With antisera to *W.bancrofti* mf antigen, 72%, 60% and 39% of chronic, carrier and endemic normal sera showed the presence of antigen. On the other hand 79%, 75% and 46% of these cases gave antigen positivity using *S.digitata* ww antisera. However, using antisera to SD$_2$-4 fraction 75%, 54% and 10% of these cases showed antigen positivity.

The detection of antigen was more pronounced using antisera to *S.digitata*, than using homologous antisera.