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Quantitative relationships of the transmission dynamics of bancroftian filariasis in Sri Lanka

Quantitative aspects of the transmission dynamics in *W.bancrofti -C. quinquefasciatus* combination is important in rational planning of filariasis control programmes in Sri Lanka. One hundred and eight artificial infection experiments of *W.bancrifti-Cquinquefasciatus combination were carried out on microfilaraemics (*mf density range:0.996mf/60µl)around 22hoo, todetermine the mean mf uptake immediately after feeding and mean infective larvae (L_3) output after incubation. Observed arithmetic mean parasites /mosquito was plotted against the mean human mf density. Possible relationships were explored to determine the expected mean mf uptake and the mean L_3 output (*Y*) against the host mf density (*X*)using the hyperbolic equation.

Y(x)=(a+bx)/(1=cx)

Parameters of statistically significant relationships were estimated by maximizing the likelihood function. Degree of aggregation of variable y was measured by estimating the over-dispersion parameter'k' using the probability equation.

While mf uptake was linearly related (parameters: a=0.812; b=0.076; k=0.8723), L_3 output showed saturation (parameters: a=0.0358: b=0.0044; c=6.6;k=0.7997).

Mean mf uptate of W. bancrofti by C. quinquefasciatus is not density dependent. Infective larvae development showed the initial increase at low density and aggregation at 6.6 L_3 development affects the transmission of filariasis.

The success rate of microfilariae becoming infective larvae is higher at lower mf densities and gradually decreasing with increasing human mf density. Therefore, the annual or biannual mass drug administration to reduce the level of microfilaraemia, which might end up with low and ultra low-density carriers, may trigger a higher prevalence rate of filariasis in future Sri Lanka.