SUMMARY

1. The objectives of the present study are to evaluate the efficacy of several parameters related to the transmission dynamics of bancroftian filariasis, such as potential transmission index, annual transmission potential and determination of age composition of vector in two different situations, one urban and the other rural.

2. The extent and intensity of filarial transmission in an urban (Calcutta) and a rural area (Memari, 80 km from Calcutta, in the district of Burdwan) of West Bengal were compared, where endemicity rate was calculated to be 7.3% and 2.0% respectively.

3. Indoor resting mosquitoes were collected from 42 fixed human habitations in the morning hours during April 1987 through March 1989, employing a total of 672 man-hour in each study area. Species of mosquitoes was identified and only C. quinquefasciatus were dissected and examined for the presence of filarial parasites.

4. Altogether 7 species of mosquitoes of 4 genera and 13 species of 5 genera were available in Calcutta and Memari respectively. Out of 13956 and 11745 mosquitoes of different species collected, 93.8% and 70.4% were C. quinquefasciatus in Calcutta and Memari respectively which indicates that the filarial vector dominates over the other species of mosquitoes in both the areas.
5. The total number of C. quinquefasciatus and man-hour density was higher in Calcutta (13099 and 19.5) than those at Memari (8274 and 12.3).

6. In Calcutta, C. quinquefasciatus is more prevalent in the rainy (35.5%) and winter seasons (34.4%) than in the summer (30.4%) but at Memari, the prevalence is higher in the winter (40.9%) than those in the rainy (26.5%) and summer seasons (32.6%).

7. Total number of shelters with 10 or more C. quinquefasciatus detected in two years was higher in Calcutta (56) than that at Memari (19).

8. Taking both the years together, number of shelters with infected and infective mosquitoes was higher in Calcutta (350 and 36) than those at Memari (239 and 11) which indicate that people of the urban shelters are more exposed to infected and infective mosquitoes.

9. Average infection rate did not differ significantly between Calcutta (3.1%) and Memari (3.4%). In both the study areas, no seasonal variation in infection rate was noted being 3.1%, 2.8% and 3.2% in the rainy, winter and summer seasons respectively in Calcutta and the corresponding figures in the rural area were 3.5%, 2.6% and 3.2% respectively.
10. Average infectivity rate was higher in Calcutta (0.32%) than that at Memari (0.14%). The rate was 0.5%, 0.1% and 0.35% in the rainy, winter and summer seasons respectively in Calcutta and 0.3%, 0, and 0.2% respectively at Memari, indicating higher rate in the rainy and summer seasons than the winter in both the study areas.

11. Potential transmission index (PTI) based on developmental and matured larvae of W. bancrofti were significantly higher in Calcutta (0.02 and 0.0045) than those at Memari (0.01 and 0.001). The index on developmental stage larvae was 0.042, 0.013 and 0.014 in the rainy, winter and summer seasons respectively in Calcutta and 0.013, 0.005 and 0.012 respectively at Memari. So, in Calcutta, PTI is higher in the rainy season but at Memari, it was higher in the rainy and summer seasons in comparison to other seasons. The index on matued larvae was 0.007, 0.0016 and 0.004 in the rainy, winter and summer seasons respectively in Calcutta and 0.002, 0 and 0.001 respectively at Memari. So, PTI was higher in the rainy and summer seasons in comparison to the winter in both the study areas. As PTI is higher, the probability of filarial transmission is higher in the urban than in the rural microenvironmental settings.

12. All the man-landing mosquitoes were collected off human baits both indoors and outdoors throughout day and night, twice a month from September 1986 to August 1987 in both the study areas.
Mosquitoes collected in each hour was kept separately, dissected and examined for the presence of filarial parasites.

13. Altogether 6 species of 4 genera and 13 species of 5 genera of mosquitoes landed on man-baits in Calcutta and Memari respectively. *C. quinquefasciatus* is most dominating in 24 hour catch, comprising 65.6% in Calcutta and 70.2% at Memari. The filarial vector is more active during night both in Calcutta and Memari (98.0% and 94.2%) than day time (2.0% and 5.8%). Night catch reveals that the filarial vectors constitute 95.0% and 69.7% of the total mosquitoes in Calcutta and Memari respectively.

14. *C. quinquefasciatus* is exophagous both in Calcutta (51.3%) and Memari (58.7%)

15. In Calcutta, biting propensity of filarial vectors was higher in the rainy season (41.9%) than those in the winter (27.0%) and summer (31.0%). At Memari, no seasonal variation was noted (32.9% in the rainy, 33.7% in the winter and 33.3% in the summer seasons).

16. Combining indoors and outdoors, peak biting hour of *C. quinquefasciatus* was noted between 1 and 2 am in both the study areas. Biting propensity was the highest in the 3rd quadrant of night both in Calcutta (42.8%) and at Memari (40.6%).
17. The lower extremity of the human body is the most preferred biting site of C. quinquefasciatus both in urban (55.9%) and rural areas (63.6%).

18. Average infection rate of man-landing C. quinquefasciatus was higher in Calcutta (1.3%) than that at Memari (0.4%). Infection rate was 1.8%, 0.6% and 1.1% in the rainy, winter and summer seasons respectively in Calcutta and 0.6%, 0.3% and 0.3% respectively at Memari.

19. Average infectivity rate of man-landing mosquitoes was higher in Calcutta (0.3%) than that at Memari (0.13%). The rate was 0.3%, 0.3% and 0.4% in the rainy, winter and summer seasons respectively in Calcutta and 0.2%, 0.13% and 0.05% respectively at Memari.

20. As in both the study areas, human being was exposed to the highest number of infective mosquitoes and infective larvae in the 3rd quadrant of night, it was considered that the 3rd quadrant is the peak period for filarial transmission.

21. Average daily biting rate and average annual biting rate were higher at Memari (284.16 and 103718.4) than those in Calcutta (151.31 and 55228.15).

22. Expected annual infective biting rate was higher in Calcutta
(177.3) in comparison to Memari (137.0).

23. Annual transmission potential was significantly higher in Calcutta (319.17) than that at Memari (222.65). It was more or less equal indoors (300.67) and outdoors (338.67) in Calcutta but at Memari, it was higher outdoors (437.22) than indoors (57.28). Transmission potential was 133.87, 85.26 and 100.75 in the rainy, winter and summer seasons respectively in Calcutta and 125.75, 81.19 and 17.26 respectively at Memari. So, it was higher in the rainy season than the others in both the study areas.

24. To determine age composition, ovarioles of 1200 mosquitoes were examined in one year in each area. On the basis of number of follicular dilatations the parity status was assessed.

25. Average duration of gonotrophic cycle was 4.5 days in the laboratory.

26. Proportion parous was almost equal in Calcutta (0.53) and at Memari (0.49). Proportion parous was higher in the winter than the other seasons both in Calcutta (0.58) and at Memari (0.57).

27. Daily survival rate of C. quinquefasciatus in Calcutta (0.87) did not differ significantly from that of Memari (0.85). It was also higher in the winter than in the other seasons both in Calcutta (0.91) and at Memari (0.91).
28. Daily mortality rate was also more or less same in Calcutta (13%) and at Memari (15%). The rate was higher in the summer than in the other seasons both in Calcutta (19%) and at Memari (22%).

29. Presumptive mortality between two successive parous states showed identical spectrum in Calcutta and at Memari.

30. The present study indicates that Calcutta is more endemic for bancroftian filariasis than Memari as the endemicity rate is higher in Calcutta in comparison to Memari. But the figure in the rural area is not negligible. Entomological and Parasitological investigations reveal that number of shelters with 10 or more vectors, shelters with infected and infective mosquitoes, infectivity rate of both indoor-resting and man-landing mosquitoes, potential transmission index, infective biting rate and annual transmission potential are higher in the urban area, than those in the rural one, indicating a higher probability of filarial transmission in the urban area than in the rural one. But the parameters, like, infection rate of indoor-resting mosquitoes, proportion parous, daily survival rate and daily mortality rate are almost equal in those two areas and moreover, man biting density was higher at Memari than that in Calcutta.

It is apparent that though the urban area is more endemic and probability of transmission is higher than the rural one,
the rural area is also becoming potentially dangerous regarding filarial transmission day by day due obviously to indiscriminate urbanization. During the formulation of control strategies, the rural areas should be incorporated along with the urban one in such a programme.

The parameters selected (PTI, ATP and age determination of the vector) can thus effectively be employed in assessing the transmission dynamics of bancroftian filariasis in selected areas.