

Short Report

Collateral effects of bednets impregnated with permethrin against bedbugs (*Cimicidae*) in Papua New Guinea

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Although not known to transmit disease, bedbugs (*Cimicidae*) can be a considerable nuisance, persistent attacks leading to a loss of sleep and they can cause iron deficiency in children (VENKATACHALAM & BELDAVADI, 1962). Numerous methods have been used in attempts to control bedbugs, an exercise that 'has tested man's ingenuity for centuries' (USINGER, 1966). During a study evaluating the effect of bednets impregnated with permethrin on malaria vectors in Papua New Guinea (PNG), villagers reported that their head lice and bedbugs had been killed (MILLEN, 1986). We therefore examined the effect of impregnated bednets on the bedbug population of an infested house from the same area.

Methods

The study took place in a warehouse in the village of Vidar, 15 km north of the town of Madang, PNG. Eight young men slept in the house; 3 used bednets and all but one (who had a bed) slept on rush mats on the floor. Although they complained about being bitten by bedbugs at night they had not taken any specific measures against them. The floor of the building was in 2 solid concrete sections separated by a crack 8.8 m long, 10 mm wide and 40 mm deep. The lower 30 mm of the crack were filled with dust and dirt. In an initial survey of the building 60 bedbugs were collected from this crack by 2 men searching for 30 min and 11 were collected in a 1 h search of the rest of the building. Consequently, since it was a uniform habitat which enabled replicate samples to be made and since it seemed to harbour many of the bedbug population, subsequent samples were taken only from this crack.

Sampling was performed by 2 men for 35 min twice weekly for 3 weeks before bednets, impregnated with 0.4 g/m² of permethrin as described by SCHRECK & SELF (1985), were given to the occupants. Twice weekly samples were collected for the following 8 weeks, and in weeks 11, 14 and 20. The dust in the crack was agitated with fine entomological forceps and the disturbed bugs collected in glass vials, the number collected in each 5 min period being noted. At the end of the sampling session the bugs were replaced in the crack so that no population depletion occurred as a result of the sampling process.

Results

Fifty-seven nymph and adult bedbugs were collected on average in the samples before the introduction of treated nets. In each case a regression of the number collected per 5 min against the total collected

up to that period proved a good fit to the data (P values were in the region of 70%) and the estimated total population in the crack was only 1–8 bugs more than were caught.

In the week following the introduction of treated nets 21 bedbugs were collected, but in the subsequent 10 weeks an average of only 3 were discovered. Fifteen were collected in the sample made 14 weeks after net introduction, and 28 were collected six weeks later (Figure). The population of young men in the warehouse had changed in this period. Three of the original occupants had left (taking their nets with them) and 5 new occupants, all sleeping without nets, had taken their place.

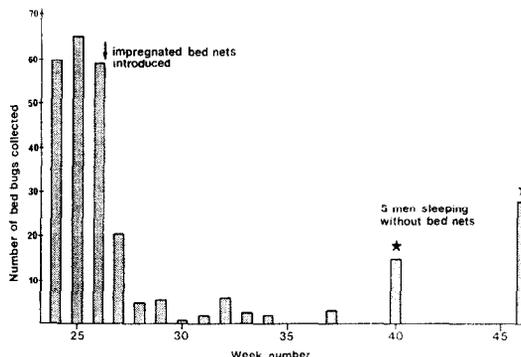


Figure. Number of bedbugs collected from the floor of a warehouse in Vidar village, Papua New Guinea, before and after the introduction of permethrin-impregnated bednets.

Discussion

Bednets impregnated with permethrin effectively controlled the bedbug population for at least 10 weeks. The arrival of the unprotected hosts with their possibly contaminated bed-linen may have been responsible for the breakdown in control after this time. Indeed villagers recently volunteered the information that both bedbugs and head lice had been absent from villages in which treated nets were used for more than a year. Their subsequent reintroduction was ascribed to the relatively nomadic sleeping habits of many women and children. The control of lice and bedbugs by impregnated bednets is one of their most positive attributes. This was the main reason why many people wanted their nets re-treated and were prepared to carry them several miles in order to have this done.

Acknowledgements

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References

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