

Testing the effectiveness of Polti Sani System for eliminating infestations due to *Cimex lectularius*

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Test setup

Considering the biological and aetiological peculiarities of this type of bug, it was decided to assess the effectiveness of the Sani System both in controlled conditions (laboratory tests), attempting to define the optimum parameters in terms of distance from the area to be treated and of speed of progress, and in real operating conditions (field tests). Thus, it was found that when using the spacer the most satisfactory results (almost immediate death of the insects) were obtained when proceeding at a speed of *not more than* 10 cm/sec.

Laboratory tests

Two different sets of tests were arranged. The first was on the mobile stages (adults and nymphs) and the second on the eggs. The tests were then both duplicated in order to investigate any differences in effectiveness due to the addition of HPMed to the flow of steam.

1 – Tests on adults and nymphs

“Induced aggregations of *Cimex lectularius* were created in situations simulating some of the contexts generally preferred by this insect for hiding, for example:

1. - Fabric/fabric (folds in mattresses, cushions, upholstery of armchairs or seating)
2. - Fabric/metal (zips, bedsteads, upholstery of seating)
3. - Wood/wood (beds, furniture, tables, structures)
4. - Wood/metal (tables, furniture, structures)

In each of these simulations, 4 adults and 4 nymphs that had just been fed were introduced. 5 days later, each single sample was subjected to treatment with the Sani System, proceeding at a rate of 10 cm/sec and at a standard distance (10 cm).

The results were examined at the end of each single test and then after an interval of 24 hours.

Test	Steam	
	Adults	Nymphs
Fabric on fabric	++++	++++
Metal on fabric	++++	++++
Wood on wood	+++-	++++
Metal on wood	+++-	++++
24 hrs later		
Fabric on fabric	++++	++++
Metal on fabric	+++-	+++-
Wood on wood	++++	+++-
Metal on wood	++++	+++-

2 – Tests on eggs

Two different situations were prepared, in order to assess the effectiveness of the Sani System on:

1. Exposed eggs (lay on fabric)
2. Protected eggs (lay on folded fabric)

4 adult specimens (1 male + 3 female) that had just been fed were introduced for each simulation. 10 days later the specimens were removed and the eggs laid were counted. Then each single test was subjected to treatment in the manner already illustrated for the tests on adults/nymphs.

Test	N° of eggs	Births					
		24hrs	48hrs	72hrs	96hrs	120hrs	144hrs
Fabric	22	-	-	-	-	-	-
Folded fabric	8	-	-	-	-	-	-

Field tests

The field tests were carried out in actual situations of infestation by *Cimex lectularius* in different contexts. The cases were chosen on the basis of the serious nature of the infestation (assessed at the time of preliminary inspection) and tackled using the following protocol.

- a) Preliminary inspection: assessment of the extent, case history, analysis of the environmental situation and development of a strategy for action
- b) First treatment, interval of 10 to 15 days and then assessment of the results obtained
- c) Second treatment, interval of 10 to 16 days and then assessment of the results obtained
- d) Third treatment, if necessary
- e) Final inspection, if required, at a distance of 10 to 15 days

The following empirical scale was used to define the extent of the infestation:

Level		Typology (spreading and pattern)	
1	Initial	A	Limited
2	Low	B	Extensive
3	Medium	C	Extensive with satellites
4	High	D	Widespread
5	Serious	E	Disturbed/scattered

Cases tackled

Case 1

Small family-run hotel, infestation in one room only. Fairly simple and linear environmental situation, but with the presence of a larger number opportunities for hiding.

Classification: 2E

Results: Two treatments with an interval of one month between them were sufficient to eliminate the infestation completely

Case 2

Four-star hotel with 2 rooms affected by the infestation. In one room an infestation classed as medium was found, while in the second room, adjacent to the first, only a few traces (excrements) were found, which had not scattered.

Classification: 3B (first room), 1A (second room)

Results: Two treatments with an interval of two weeks between them were sufficient to eliminate the infestation completely.

Case 3

Private home, medium-level infestation affecting a single room but involving many structures. Some unusually deeply concealed insects were found, in various holes within the wood structure of the bed.

Classification: 3C

Results: Three treatments with intervals of two weeks between them were sufficient to eliminate the infestation completely

Case 4

Private home, medium-level infestation limited to a single room. Complex environmental situation due to the existence of many scattered hiding places.

Classification: 3B

Results: Three treatments with intervals of two weeks between them were sufficient to eliminate the infestation completely.

Analysis of the results

The laboratory results show that, remaining within correct parameters in terms of distance and operating speed, the flow of superheated steam generated by the **Sani System is capable of eliminating all the eggs and an extremely significant proportion of the mobile stages in a single pass.**

Use of this device to counter real infestations has, moreover, made it possible to demonstrate that, in particularly complex situations and/or in the presence of materials featuring high thermal inertia, in order to guarantee a total clean-up of the surface treated it is sufficient to lower the speed of progress of the device (or, as an alternative, to carry out a second pass).

Unlike chemical products that require no less than three treatments in order to achieve complete disinfestations, the use of **Sani System has enabled the rooms treated to be cleaned up completely in a number of treatments between two and three.**

The flow of steam generated does not have sufficient pressure to cause the risk of accidental dispersion of bugs into the surrounding environment, even though the use of the accessory for “concentrating” and “increasing the power” of the flow in places where the infestation is concealed in depth, was frequently found to be decisive for a correct clean-up action.

HPMed, thanks to its surfactant, was able to cause the de-aggregation of the viscous substance that binds the eggs to surfaces, the abatement of the typical smell of these insects and elimination of the traces due to excrements.

To conclude, although the Sani System device was originally designed for a totally different use, **it has proved to be an ecological, safe, rapid and extremely effective tool for eliminating aggregations of *Cimex lectularius*** if used correctly and meticulously.