



Evaluation of #9 Mattress Cover (Zippered M/C Stretch Polyester with Urethane) in Preventing Bed Bug (*Cimex lectularius*) Feeding

Project Code:

BBfabric08

Test Date(s):

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Report Date:

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Objectives:

To determine the efficacy of #9 Mattress Cover (zippered m/c stretch polyester w/ urethane) in preventing Bed Bug (*Cimex lectularius*) feeding.

Treatments:

1. #9 Mattress Cover (zippered m/c stretch polyester with urethane)

Materials and Methods:

The following is the Snell Scientifics Standardized Testing Method for evaluating the efficacy of pesticides. Further details related to this specific test are described following the test method summary. Select action items and illustrations have been removed from this standardized test method in an effort to make the report more precise and accurate to the test conducted. Any details removed from this test method were deemed irrelevant to the test conducted in this report.

314.1 Materials:

- 314.1.1 Glass jars – pint size jars w/ screw on lids (Illustration 314.3.1)
- 314.1.2 Cardboard – harborage inserts inside jars (Illustration 314.3.1)
- 314.1.3 Fabrics- test fabrics or zipper enclosures
- 314.1.4 Construction paper- black surface to evaluate eggs or debris from shake through method
- 314.1.5 Microscope – used to evaluate eggs and/or debris from shake through method
- 314.1.6 Feeding attractant – Human subject and/or blood membranes to attract bed bugs
- 314.1.7 Heating pad – used to increase blood membrane temperature
- 314.1.8 CO2 and regulator – standard 20 pound cylinders and gas regulator is used for anesthetizing insects (as necessary, depending on species)
- 314.1.9 Chill Table – used for some bed bug stages to keep them asleep while sorting into glass jars.
- 314.1.10 Intermediate transfer/holding chambers – used for housing insects after they have been removed from their primary breeding housing. Intermediate chambers are used to anesthetize insects and sort them into jars.
- 314.1.11 Count down timer – used to accurately measure exposure times

314.2 Methods:

- 314.2.1 Pint size jars are equipped with the test fabrics by:
- Placing the fabric over the open end of the jar and securing the outer screw on lid over the fabric (Illustration 314.3.2)
 - Removing a ¾" x 2" section from the inner lid and securing the zipper section into the opening with clear silicon (Illustrations 314.3.3 and 314.3.4)
- 314.2.2 Pint jars are equipped with cardboard inserts that provide harborage for the bed bugs and also allow access for the bed bugs to travel from the bottom of the jar to the lid/fabric area of the jar (Illustration 314.3.1)
- 314.2.3 Each jar contains approximately 20 – 200 (depending on test requirements) various size bed bugs (1st instars – adults), eggs, and debris
- 314.2.4 Various sized bed bugs allow for evaluating the possibility of different sized mouth parts feeding through the test fabrics
- 314.2.5 Bed bugs used for feed through tests are starved for at least 7 days prior to testing
- 314.2.6 To evaluate for feed through ability, the fabrics are held to human body parts or placed on blood membranes for at least 15 minutes (Illustration 314.3.5)
- 314.2.7 Following the 15 minute feeding exposure, the bed bugs can be removed from the pint jars and inspected for signs of feeding
- 314.2.8 For evaluating zipper or seam areas of an enclosures, various size bed bugs (1st instars – adults), eggs, and debris is placed inside the pint jars
- 314.2.9 Zipper or seam enclosures are held to human body parts or placed on a blood membrane to evaluate the ability of bed bugs to feed through the zippers
- 314.2.10 Following the zipper (or seam) feed-through method, the pint jars are inverted and shaken over a black surface (construction paper) for approximately 30 seconds
- 314.2.11 Debris collected on the black surface can be evaluated under a microscope to confirm if eggs were able to pass through.
- 314.2.12 If feeding through the zipper, or seam enclosure is suspected, the bed bugs can be removed from the jar and inspected under a microscope
- 314.2.13 Feeding through the test fabrics can be documented as yes/no or # fed during the 15 minute exposure
- 314.2.14 Zipper and seam enclosures are documented as the ability for bed bugs to feed through the zippers/seams (yes/no), # fed, and quantitative amounts of debris shaken through the zipper/seams enclosures (ex. # 1st instars, # eggs, ect.)
- 314.2.15 Repellency methods can be documented as repelled (yes/no), or the # of bed bugs on the fabric at different time intervals
- 314.2.16 Additional Testing Details Not Fully Described in Standard Protocols:

Test Set-Up: The evaluations in this test followed Illustrations 314.3.1 - 314.3.3

Replicates: Insect Stage Tested: Mixed Stages
of Reps: 1
of Insects/Rep: 200-300

Source of Test Specimens: Specimens were taken from lab raised colonies fed *in vitro*.

Exposure of Test Specimens: Test specimens were exposed to the human host for 10 -15 minutes.

Conditions in Test Room: Temperature: 80.3 deg F Humidity: 40.7 %

Arena details: Fabric feed Through Method:
Size of arena: ½ pint Mason jar w/lid
Arena material: clear glass
Type of cover: metal lid with fabric insert
Food/water: none provide

Confirming Pest Condition:

All bed bugs were confirmed 'alive' 2 times prior to treatment:

- 1) The bed bugs were removed from the lab colonies by transferring only live bed bugs into the pint jars.
- 2) After all bed bugs were transferred into the pint jars, they were confirmed to be alive prior to testing.

Results / Discussion:

Table 1 illustrates the efficacy of the # 9 Mattress Cover, wherein the fabric was exposed to all life stages of bed bugs and presented with a human host on the opposite side of the fabric. No life stages tested were capable of feeding on the human host through the fabric. Therefore, Bargoose # 9 fabric can be considered an effective material in preventing bed bug feeding.

Tables:

Table 1.

Number of Bed Bugs (<i>Cimex lectularius</i>) of Each Life Stage Exhibiting Feeding Behavior in Test Arenas with # 9 Mattress Cover Fabric Exposed to Host on Pint Jar (200~300 Mixed Stage Bed Bugs Per Arena)				
Rep	Time of Exposure	Stage of Bed Bug	Approx # of Stage Used	# Fed
A	15 min	1st - 2nd Instars	100	0
	15 min	3rd + Instars	50	0
	15 min	Adults	100	0

December 2008 Zipper Feed-through and Shake-through Test

Formal report from Snell Scientific LLC pending

Tested Sample-Zipper F

_____ TM#: N / A Page _____
 Project: Zipper Feed Through Species: Bed Bugs
 Arena Details: Zipper F - Middle Section of Zipper

Asterick	* =
Details:	** =

Other Details: _____

Rep #'s: A Date(s): 12/3/2008 Temp (F): 79.4 RH %: 35.2
 Rep #'s: _____ Date(s): _____ Temp (F): _____ RH %: _____

Zipper Shake Through Method: Zipper Middle Section					
Rep	Exposure Time	Bed Bug Stage	Approx # of Stage	# Shaken Thru	# Escaped
A	30 sec	Mixed	~ 200	No	0
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Zipper feed Through Method: Zipper Middle Section					
Rep	Exposure Time	Bed Bug Stage	Approx # of Stage	# Fed	# Escaped
A	15 min	Mixed	~ 200	0	0
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