



Sponsor: Bargoose Home Textiles      Date: June 2011  
Study: Bed Bug Prevention of Mattress Covers 2011  
Trial: Bed Bug Fabric Feeding Prevention  
Test Method: 314-2.00

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**Report Title:**

Evaluation of 6 Gauge Vinyl Fabric in Preventing Bed Bug (*Cimex lectularius*) Penetration and Feeding when Presented With a Human Host

**Study:**

Bed Bug Prevention of Mattress Covers 2011

**Trial:**

Bed Bug Fabric Feeding Prevention

**Experimental Start Date:**

June 9, 2011

**Experimental Completion Date:**

June 9, 2011

**Report Date:**

June 2011

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### Objective(s):

To determine the efficacy 6 Gauge Vinyl Fabric in preventing bed bug (*Cimex lectularius*) penetration and feeding when presented with a human host.

### Test Fabrics/Encasements:

1. 6 gauge Vinyl Fabric (Snell Code: 060811-1-D-BAR)

### Materials and Methods:

The following is the Snell Scientifics Standardized Testing Method for evaluating the efficacy of fabrics and/or encasement closures when used as barriers against hematophagic arthropods. Further details related to this specific study 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 study conducted. Any details removed from this test method were deemed irrelevant to the study conducted in this report.

#### 314.1 Materials:

- 314.1.1 Fabrics- Test fabric.
- 314.1.2 Glass jar – Pint size jar w/ screw on lid.
- 314.1.3 Cardboard – Harborage inserts inside jars.
- 314.1.4 Feeding attractant – Human subject to attract bed bugs.
- 314.1.5 CO2 and regulator – Standard 20 pound cylinders and gas regulator - used for anesthetizing insects.
- 314.1.6 Intermediate transfer/holding chambers – Used for housing insects after they have been removed from their primary breeding housing. Intermediate chambers were used to anesthetize insects and sort them into jars.
- 314.1.7 Count down timer – Used to accurately measure exposure times.

314.2 Methods:

- 314.2.1 The pint size jar was equipped with the test fabric by:
  - o Placing the fabric over the open end of the jar and securing the outer screw on lid over the fabric.
- 314.2.2 The pint jar was equipped with cardboard inserts that provided harborage for the bed bugs and also allowed access for the bed bugs to travel from the bottom of the jar to the lid/fabric area of the jar.
- 314.2.3 The jar contained approximately ~500 various size bed bugs (1<sup>st</sup> instars – adults), eggs, and debris.
- 314.2.4 The various bed bug stages were necessary to evaluate the possibility of different sized mouth parts penetrating and feeding through the test fabric.
- 314.2.5 The bed bugs selected for use in the study were starved for at least 7 days prior to testing. To conduct the “feed through” evaluations against the fabric, the fabric (attached to the jar with bed bugs) was held to human body parts (inside the arm area) for 15 minutes.
- 314.2.6 The bed bugs were inspected for signs of feeding after the fabric “feed through” evaluation was complete. Indications of feeding were any “obvious feeding sensations” that were felt during the evaluations, any noticeable feed marks observed on the human, and visual signs of feeding (swelling and noticeable blood inside the abdomen) observed in the bed bugs.
- 314.2.7 Feeding through the test fabric was documented as “yes” or “no” or the actual or estimated number that fed during the evaluation.

314.2.8 Additional Testing Details Not Fully Described in Standard Protocols:

*Test Set-Up:* The evaluations in this study followed Test Photographs 1-3.

**Test System Information:**

| Test System                              | Strain      | Stage/Age | # Replicates per Substance | # Specimens per Replicate |
|--|-------------|-----------|----------------------------|---------------------------|
| Bed Bugs<br>( <i>Cimex lectularius</i> ) | Susceptible | Mixed     | 1                          | ~500                      |

*Source of Test Systems:* The test systems were laboratory reared prior to testing.

**Environmental Conditions:**

*Conditions in Laboratory:* Temperature: 78° F Humidity: 50%

## **Results / Discussion:**

The results of this study are tabulated in Table 1. Table 1 illustrates the results from the 6 gauge Vinyl Fabric “feed through” evaluation.

The fabric “feed through” method was used to evaluate if bed bugs (*Cimex lectularius*) could penetrate and feed through the test fabric when a human host was present.

The results of the study showed that the 6 gauge Vinyl Fabric has the ability to prevent bed bug penetration and feeding when used as a barrier between bed bugs (*Cimex lectularius*) and humans.



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**Tables:**

**Table 1.**

| <b>Fabric Feed Through Method: 6 gauge Vinyl Fabric</b> |                      |                      |                 |              |                  |                                |
|---|----------------------|----------------------|-----------------|--------------|------------------|--------------------------------|
| <b>Rep</b>  | <b>Exposure Time</b> | <b>Bed Bug Stage</b> | <b>Approx #</b> | <b># Fed</b> | <b># Escaped</b> | <b># Blood Spots on Fabric</b> |
| A   | 15 minute            | Mixed                | ~ 500           | 0            | 0                | N / A                          |

## Appendix A: Photographs

**Photograph 1.**      Inside View of Bed Bug Jar



**Photograph 2.** 6 gauge Vinyl Fabric Secured to Jar



**Photograph 3.**      6 gauge Vinyl Fabric being Exposed to Human Host







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**Appendix B: Raw Data**

Snell Scientifics LLC: Additional Test Details - Non GLP Tests 06/08/2011

Sponsor: Bargoose Home Textiles  
 Study: Bed Bug Prevention of Mattress Covers 2011

Contact: Diane Rattner

Files: Data File: BargooseBBFabric11  
 Worksheet: BB Fabric  
 Report File: BargooseFabricCIMXLE11

Test Products Received: 06/08/2011

The Evaluations in this Study Followed TM#: 314-2.00

- Trial/Details: **Bed Bug Fabric Feeding Prevention**
- Fabric sections are to be sealed into pint jar lids
  - Enclose unfed bedbugs inside jar (at least 7 day unfed)
  - Expose jar to human body part for 15 minutes
  - Monitor for any feeding

Species/Replicates:

| Test Species           | Stage/Age | # Reps | # per Rep | # per Product | # Test Products | Total # Specimens | # Test Arenas |
|------------------------|-----------|--------|-----------|---------------|-----------------|-------------------|---------------|
| Bed Bugs (susceptible) | Mixed     | 1      | ~ 500     | N/A           | 2               | ~1000             | 2             |

Source of Test Specimens: Laboratory reared

Insect Exposure time: Fabric feeding - 15 minutes to body part

Observation Times: Feed through: 15 minutes

Test Products:

1. 6 gauge Vinyl Fabric, (Snell Code: 060811-1-D-BAR)
2. 70 GSM Propylene, (Snell Code: 060811-2-D-BAR)

Additional Test Details Preparer: Todd Smith

Preparer Signature: T.S. Date: 06/09/11

Primary Researcher Signature: [Signature] Date: 06/09/11



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Study / Trial: Bed Bug Prevention 11 Test System: Bed Bugs  
 Sus. Strain

Asterisk: \* =  
 Details: \*\* =

Arena Details: Fabric sealed on a pint jar containing Bed Bugs

Other Details: \_\_\_\_\_

Rep #'s: A 06/07/11 Date(s): 06/07/11 Temp (F): 78 RH %: 67%  
 Rep #'s: \_\_\_\_\_ Date(s): \_\_\_\_\_ Temp (F): \_\_\_\_\_ RH %: \_\_\_\_\_

Fabric: 6 gauge Vinyl Fabric

| Fabric Feed Through Method: 6 gauge Vinyl Fabric |               |               |          |          |           |                         |
|--|---------------|---------------|----------|----------|-----------|-------------------------|
| Rep  | Exposure Time | Bed Bug Stage | Approx # | # Fed    | # Escaped | # Blood Spots on Fabric |
| A  | 15 min        | Mixed         | ~500     | 0        | 0         | 0                       |
| Initials   |               |               |          | TS       |           |                         |
| Date:  |               |               |          | 06/07/11 |           |                         |

Fabric: 70 GSM Propylene

| Fabric Feed Through Method: 70 GSM Propylene |               |               |          |          |           |                         |
|--|---------------|---------------|----------|----------|-----------|-------------------------|
| Rep  | Exposure Time | Bed Bug Stage | Approx # | # Fed    | # Escaped | # Blood Spots on Fabric |
| A  | ~5 min        | Mixed         | ~500     | 40+      | 0         | 0                       |
| Initials                                     |               |               |          | TS       |           |                         |
| Date:  |               |               |          | 06/07/11 |           |                         |

Researcher(s):  
 Name: Eric Snell Signature: [Signature] Date(s): 06/07/11 Role: Primary  
 Name: Todd Smith Signature: [Signature] Date(s): 06/07/11 Role: Date Recorder



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**Appendix C: Test Substance Receiving Log**

**Snell Scientifics, LLC. Test Substance Receipt Log**

| Arrival Date | Test Substance Sponsor/ Study | Substance Snell Sci. Code: | Test Substance (Trade name, % AI, formulation) | Lot/Batch # | EPA # | Amnt. Rec'd | Container Type | Shipper | Packaging Condition | Photo Taken (y/n) | MSDS Provided (y/n) | MSDS Down-loaded (y/n) | MSDS Logged (y/n) | Storage Location | Initials |
|--------------|-------------------------------|----------------------------|--|-------------|-------|-------------|----------------|---------|---------------------|-------------------|---------------------|------------------------|-------------------|------------------|----------|
| 6/8/2011     | Bargoose BB Fabric 11         | 060811-1-D-BAR             | 6 gauge Vinyl Fabric                           | N/A         | N/A   | 1 Fabric    | N/A            | UPS     | Good                | Y                 | N                   | N                      | N                 | D                | SP/LL    |
| 6/8/2011     | Bargoose BB Fabric 11         | 060811-2-D-BAR             | 70 GSM Polyurethane                            | N/A         | N/A   | 1 Fabric    | N/A            | UPS     | Good                | Y                 | N                   | N                      | N                 | D                | SP/LL    |



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PS Internet Shipping: Shipment Label

[https://www.ups.com/uis/create?ActionOriginPair=print\\_\\_Receipt...](https://www.ups.com/uis/create?ActionOriginPair=print__Receipt...)

**UPS Internet Shipping: View/Print Label**

- Print the label(s):** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
- Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
- GETTING YOUR SHIPMENT TO UPS**  
**Customers without a Daily Pickup**  
 Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.  
 Hand the package to any UPS driver in your area.  
 Take your package to any location of The UPS Store<sup>®</sup>, UPS Drop Box, UPS Customer Center, UPS Alliances (Office Depot<sup>®</sup> or Staples<sup>®</sup>) or Authorized Shipping Outlet near you. Items sent via UPS Return Services<sup>SM</sup> (including via Ground) are also accepted at Drop Boxes.  
 To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.  
  
**Customers with a Daily Pickup**  
 Your driver will pickup your shipment(s) as usual.

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| <p>1 LBS<br/>1 OF 1</p> <p>DIANE RATTNER<br/>316 BARGOOSE HOME TEXTILES<br/>96 ATLANTIC AVENUE<br/>LYMBROOK NY 11563</p> <p><b>SHIP TO:</b><br/>ERIC SNELL<br/>770-358-4591<br/>SNELL SCIENTIFICS, LLC<br/>188 VEGA ROAD<br/>MEANSVILLE GA 30256-2410</p> | <p><b>GA 302 0-01</b></p>  | <p><b>UPS GROUND</b></p> <p>TRACKING #: 1Z 03E 07A 03 9065 3503</p>  | <p>BILLING: P/P</p> <p>Reference# 1: Fabric Samples for Testing<br/> <small>US 13.1.13 WXPNSG 15 DA 04/2011</small></p>  |
|---|---|---|--|