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Independent Field Study of the Green Bean Buddy Formula

American Academy of Entomological Sciences (AAES) · Report APS-110911-1032 · November 10, 2011

Study sites

- Facility A: an 11,000 sq ft state historical museum with a carpet beetle infestation (treated July 2010, monitored through July 2011).
- Facility B: a four-story hotel with a bed bug infestation; 20 rooms treated, 11 infested and 9 neighboring (monitored 2010–2011).

Reported results

- 100% kill within 30 minutes of all visible bed bugs sprayed directly.
- No live bed bugs found in any treated area during the 11-month study period.
- Museum remained materially free of carpet beetles for the following 12 months.
- Rooms returned to service within 4 hours; no odor, stains or damage observed.

Study supervisor

Jeffrey K. Brown, Ph.D., R.P.E., B.C.E., American Academy of Entomological Sciences
Field study; the report notes it is not a GLP (Good Laboratory Practices) protocol.

About this document

This report was performed for our former company in Hollywood, FL, and refers to the formula by the product name used at the time of testing. Green Bean Buddy Bug Killer uses this same formula. The former company name, street address and product name have been redacted; nothing else in the report has been changed.

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Report Date:

November 10, 2011

Study Title:

FIELD EVALUTION OF Proprietary Formula as a Direct Spray With Residual Against Current Bed Bug and Carpet Beetle Infestations

Project Number:

APS-110911-1032

Performed For:

[redacted]
[redacted]
Hollywood, FL 33020

Study Coordinator:

Jeffrey K. Brown, Ph.D., R.P.E., B.C.E.

Test Sites:

(1) State Historical Museum – Maintained by state government agency (Facility "A")
(2) Hotel/Motel – private commercially operated hospitality facility – Managed by Regional Hospitality Management Company (Facility "B")

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SUMMARY

The study consisted of a single treatment each at two (2) public facilities where [redacted] products [redacted] was applied according to label directions. Prior to application both facilities were carefully examined and CO_2 ramp pit fall traps for bed bugs and pheromone adhesive traps for carpet beetles were set. Monitoring and examination of traps confirmed a moderate to significant infestation as reported by the respective facility managers of "Carpet Beetles," Dermestidae *Anthrenus spp*., in field Facility "A" and "Bed Bugs," *Cimex lectularius*, in field Facility "B". These insects are morphologically similar and share common cuticle structure and bond chemistry.

Immediately following application at field Facility "A" the carpet beetles were observed for knockdown. Follow up observations and collections were completed at intervals of 0.5 hours, 1.0 hours, 24 hours, 48 hours, one month and every subsequent month for the next twelve (12) months.

Immediately following application at field Facility "B" the bed bugs were observed for knockdown. Follow up observations and collections were completed in 0.5 hours, 1.0 hours and in periodic intervals of 24 hours during each subsequent month for the next twelve (12) months.

Physical inspection of Facility "A" after 0.5 hours after application revealed the elimination of all visible signs of adult infestation. After 1.0 hours UV marker was observed with 350 nm ultra violet black light (UV). The noted periodic inspections of the facility and insect traps revealed that some adults continued to "invade" the facility as it was not sealed to the outside. Carcasses gave evidence

of residual kill at each subsequent periodic inspection. No material re-infestation has been revealed in any subsequent periodic monthly inspection. UV marker continued to be observed with 350 nm ultra violet black light. The failure to adequately seal Facility "A" permits ingress of carpet beetles where the residual agent of [redacted] as seen under black light has continued to provide evidence of its lethality as carcasses are observed and most heavily concentrated in areas closest to poorly sealed or unsealed thresholds and around door casings.

Physical inspection of Facility "B" after 0.5 hours of application revealed elimination of visible signs of adult infestation. After 1.0 hours of application UV marker was observed with 350 nm ultra violet black light. The periodic inspections at 24 hour intervals during subsequent months for the next twelve (12) months presented no evidence of material infestation.

There were no reports by guests at field Facility "B" of any evidence of infestation in the periods between the 24 hour intervals of periodic inspection in treated areas for twelve (12) months.

As to Facility "A", [redacted] was immediately effective against carpet beetles, *Anthrenus spp.*, and remained effective over the next twelve (12) months to the extent that no further material infestation was present.

As to Facility "B", [redacted] was immediately effective against bed bugs, *Cimex lectularius*, and remained effective over the next twelve (12) months to the extent that no further material infestation was present as reported by management and staff.

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Jeffrey K. Brown

_____ for the Academy

Jeffrey K. Brown, Ph.D., R.P.E., B.C.E.

Study Supervisor

OBJECTIVE

To evaluate the efficacy of an EPA section 25(B) direct spray formulation for the knockdown, prevention and mortality of carpet beetles, *Anthrenus spp.*, and bed bugs, *Cimex lectularius.*

This is not a GLP (Good Laboratory Practices) study or protocol.

MATERIALS AND METHODS

As to field Facility "A" – [redacted] supplied eleven (11) quart bottles of [redacted] knock down and preventive formula.
As to field Facility "B" – [redacted] supplied eight (8) quart bottles of [redacted]

Per label directions each bottle was equipped with a trigger sprayer that permitted both stream and fan spray and without filters.

Field Facility "A" is a state government maintained historical museum. This multi-story building underwent considerable renovation after severe hurricane damage in 2005. As a consequence of the hurricane damage this building had been left open to the elements and as a result suffered a severe infestation of carpet beetles. This building is of approximately 11,000 square feet.

Many rooms and hall ways are carpeted. Other floor surfaces are ceramic and many are still of original hardwood construction. Many of the artifacts are historical treasures that are irreplaceable. Many artifacts are made of fabrics and textiles and consist of period clothing, military uniforms and household linens.

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Periodic tours are undertaken by school children and visitors from the general public.

After renovation a licensed state pest control contactor had been employed to provide pest control services. Beginning in 2008 and for more than two years various professional means had been undertaken to eliminate the carpet beetle infestation but without success. In early 2010 as part of the State's extensive renovation project following the hurricane damage, massive floor to ceiling antique velvet curtains had been cleaned and refurbished at a cost of several thousands of dollars. The museum's intent was to eliminate the carpet beetle infestation so as to protect the irreplaceable artifacts and newly refurbished curtains and at the same time provide a toxic free environment for both present and future generations of museum visitors.

In July of 2010 this field Facility was treated according to label directions. A single pass of the bottle equipped with the trigger sprayer was made over fabrics and textiles at a distance of approximately 24 to 30 inches at a rate of approximately 3 to 4 feet per second. This provided for an application rate of approximately one (1) gallon of finished product per 1,200 square feet of surface area and included application to all fabrics and textiles. Treatment included the spraying of all carpeting, upholstered historical artifacts of furniture, clothing and window coverings. A single pass of all cracks, crevices, junction points and baseboards were treated with a stream spray at a distance of approximately 30 inches at a rate of approximately 3 to 4 feet per second.

Upon drying overspray on dark objects appear to have a very light "gray" haze which was removed with a dry cloth. There was no other visible evidence of application without the use of black light.

Application was made in July 2010. Observations continued through July 2011.

This facility was returned to service within four (4) hours after service.

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Facility "B" is a commercial hospitality facility offering overnight and extended stay single room accommodations, meeting facilities and other guest services to the general traveling public. This field facility is professionally managed with onsite and regional support supervision. It is a structure of four (4) stories providing single rooms each of approximately 300 square feet. Each room is carpeted, has one to two queen sized beds with box springs and mattresses. Each bed is provided with a head board affixed to the wall. Each room contains a chest of drawers that is supported by legs which rest on the floor. Bearing walls are placed one on top of another without concrete separation. All but end rooms share at least two common walls, one on each side, ceiling and floor joists, except for bottom and top floors which have but one adjacent room above or below, respectively. End rooms share one common wall. Electrical lines are placed in the wall voids and run from room to room.

Rooms are serviced by daily housekeeping. Housekeeping employs standard hospitality style wheeled service carts that are pushed from room to room. Carpets are vacuumed with a common machine that is used from room to room.

Soiled bed clothing, towels, and wash clothes are gathered daily from each room, placed in common service carts and moved from room to room until filled. Filled service carts are then moved to an onsite laundry facility where they are unloaded from the service carts and placed into washing machines and dryers.

Service staff has been trained to examine the beading on mattresses, in and around box springs, head boards and other common locations where bed bugs might be found. Staff takes reports from guests regarding suspected infestation.

Licensed commercial pest control operators had been used to examine, confirm and treat for bed bug infestation.

In December 2010 numerous discoveries of re-infestation in rooms recently treated and the discovery of infestation in rooms sharing common walls, floors and ceilings with rooms known to possess infestation caused the management of this field Facility to seek independent evaluation.

Upon examination, extensive bed bug infestation was confirmed by visual sighting through thorough and rigorous physical inspection and through the placement of Bug Dome traps.

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[redacted] was applied to infested rooms and to uninfested rooms sharing a common wall with infested rooms, ceiling or floor joist in accord with *Instructions for Use* and as provided by label directions.

A single pass from the quart bottle equipped with the trigger sprayer was made over fabrics and textiles at a distance of approximately 24 to 30 inches at a rate of approximately three (3) to four (4) feet per second. This provided for an application rate of approximately one (1) gallon of finished product per 1,200 square feet of surface area and included application to all fabrics and textiles. Treatment included the spraying of all carpeting, upholstered furniture, all sides of box springs, all sides' mattresses and window coverings, and bed frames including plastic snaps. Headboard and headboard support was removed and these areas were sprayed with a single pass at a distance of approximately 24 to 30 inches moving at approximately 3 to 4 feet per second. No furnishings were removed. A single pass of all cracks, crevices, junction points and baseboards where carpeting met walls were treated with a stream spray at a distance of approximately 30 inches at a rate of approximately 3 to 4 feet per second.

No odor was present, no stains or damage to any materials was observed. After completion of application, several rooms were darkened and black lights (Ultra violet light, UV) were introduced of approximately 350 nm. "Sparkle" or glow" was visible at a distance of approximately 6 to 8 inches where product had been applied on textile surfaces.

Upon drying overspray on dark objects appear to have a very light "gray" haze which was removed with a dry cloth. There was no other visible evidence of application without the use of black light.

In December 2010, application of [redacted] was made to a total of twenty (20) rooms. [redacted] was applied to eleven (11) infested rooms. Application with [redacted] was made to nine (9) uninfested rooms with neighboring wall, above or below target room. Observations continued through October 2011. Supervised trained site staff continued daily application. Trained bed bug dogs made once yearly inspection.

Rooms were returned to commercial guest service within four (4) hours of treatment.

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Results

No odor was present, no stains or damage to any materials was observed. After completion of application, several rooms were darkened and black lights (Ultra violet light) were introduced of approximately 350 nm. "Sparkle or glow" was visible at a distance of approximately six (6) to eight (8) inches where product had been applied on textile surfaces.

Table 1 (Hospitality Facility)

Monthly periodic on site monitoring of Bug Dome traps and once a year inspection with trained bed bug dogs physical inspection provide the following:

Room #	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
L = living M = moribund 0 = no evidence											
1	**M**	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	**M**	0	0	0	0	0	0
3	**M**	0	0	**M**	0	0	0	0	0	0	0
4	**M**	0	0	0	0	0	0	0	0	0	0
5	**M**	0	0	0	0	0	0	0	0	0	0
6	**M**	0	0	0	0	0	0	0	0	0	0
7	0	**M**	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0
12	**M**	0	0	0	0	0	0	0	0	0	0
13	**M**	0	0	0	0	0	0	0	0	0	0
14	**M**	0	0	0	0	0	0	0	0	0	0
15	**M**	0	0	0	0	0	**M**	0	0	0	0

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16	**M**	0	0	0	0	0	0	0	0	0	0
17	0	**M**	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0
20	**M**	0	0	0	0	0	0	0	0	0	0

Table 1 shows knockdown and mortality of bed bugs in which the area has been sprayed with [redacted] on initial application in January 2010. No further application was made. Mortality in subsequent months occurred in rooms that had been initially treated but had not been subsequently treated. No other pesticides were introduced to these areas. These rooms were released to the general inventory within four (4) hours of treatment.

Designation is either "L" to signify any living bed bug or "**M**" to signify moribund or mortality, bed bug found. Because this is a field test where the total number of bed bugs is initially unknown, a percentage of kill to total population is undeterminable and therefore this study does not make reference to whole numbers.

Table 1 records only living or moribund bed bugs that were found upon examination during the term of the study. Upon application, 100% kill occurred within 0.5 hours of application on bed bugs sprayed directly that were observed visually and no live bed bugs were subsequently found in any area treated where [redacted] was first applied during the subsequent eleven (11) month study period.

Conclusions

[redacted] was effective against carpet beetles, *Anthrenus spp.*, and bed bugs, *Cimex lectularius.* When spraying bed bugs with the test substance [redacted] was complete as to all visually observable bed bugs in the treated area. [redacted] was also a successful killing agent to the extent that the treated area remained materially free of carpet beetles and bed bugs for the subsequent eleven (11) months.

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[redacted] was an effective preventive against bed bugs, *Cimex lectularius*. No area became materially infested with bed bug infestation after having been treated to the extent that the treated area remained materially free of bed bugs for the subsequent eleven (11) months.

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