

## Evaluation of Fool-a-bug<sup>®</sup> V-m Protector as an Exclusion Device Against the Red Imported Fire Ant and the German Cockroach

Rody L. Best, Extension Assistant, and  
Bastiaan M. Drees, Fire Ant Project Coordinator, and  
Charles L. Barr, Extension Program Specialist

A dish which can, by design, exclude foraging insects and prevent recruitment would have many valuable uses. This trial was conducted in the laboratory to determine the effectiveness of the Fool-A-Bug<sup>®</sup> V-M Protector (manufactured by Alternative Control Systems Corporation, 4046 B Fernandina Road, Columbia, SC 29212-3367) (**Fig. 1**) as a foraging deterrent against the red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera: Formicidae), and the German cockroach, *Blattella germanica* (Hymenoptera: Formicidae).



**Fig.1. A Fool-A-Bug<sup>®</sup> V-M Protector Device.**

### Materials and Methods

Eight Fool-A-Bug V-M pet dishes were placed in pairs into four specially built stands (**Fig. 2**). Stands were constructed from wood and consisted of a base, two tiers, and a top. One dish was placed on a tier as it would naturally sit (raised), utilizing the flange design of the dish. This treatment will be referred to as the “Fool-A-Bug<sup>®</sup> Protector” treatment in this report. Care was taken to prevent the sides of the dish from touching the sides of the stand. The other dish was placed into a pre-cut hole on the other tier which allowed the dish to rest on the outside lip (level), which simulated a dish without the flange. This treatment will be referred to as the “level dish” in this report. The tiers were alternated so that two stands had the level dish on the first tier and the Fool-A-Bug<sup>®</sup> Protector dish on the second tier, and the other two stands had the Fool-A-Bug<sup>®</sup> Protector dish on the first tier, and level dish on the second tier. This configuration eliminated dish position on the stand as a variable.



**Fig. 2 Experimental platform for evaluating Fool-A-Bug<sup>®</sup> V-M Protector under laboratory conditions.**

## **I. Red Imported Fire Ant**

On 23 November 1998, four red imported fire ant colonies were collected from Royalty Pecan Orchard on Highway 21 in Burleson County and placed into five gallon buckets. The sides of the buckets were coated in talcum powder to prevent escape. The buckets were brought back to the lab and the ants were allowed several days to rebuild. Each colony was provided water and a small amount of crushed cat food.

### **A. Exclusion Experiment:**

On 1 December 1998, one tablespoon of talcum powder was placed into the bottom of each dish. The four stands were lowered into the five gallon buckets and placed on the top of the red imported fire ant mounds. The ants that managed to gain entry into the dish became trapped in the talcum powder at the bottom of the dish. At intervals of six hours, 1 and 3 days, the approximate number of red imported fire ants trapped in the dishes was recorded. At 7 days, dead ants were sifted out of the talcum powder and counted. The stands were removed from the buckets, and the dishes were thoroughly cleaned.

### **B. Recruitment Experiment:**

On 11 January 1999, the experiment was repeated with modification to determine the recruitment ability of the red imported fire ant into the dish. One fourth of a tablespoon of crushed IAMS<sup>®</sup> cat food was placed into the bottom of each dish. The four stands were lowered into the five gallon buckets and placed on the top of the red imported fire ant mounds. At intervals of one hour, four hours, and six hours, the approximate number of red imported fire ants occupying the dishes was recorded, as well as an approximate amount of food that had been removed.

## **II. German Cockroach**

On 26 January 1999, the sides of four five gallon buckets were thinly coated with Vaseline.

Twenty German cockroaches were placed in each bucket and given water in a baby food jar with a wick and 4 kernels of Purina brand dog food.

**A. Exclusion Experiment:**

Tanglefoot<sup>®</sup> Pest Barrier was applied to the inside of the eight Fool-A-Bug V-M Protector dishes. Tanglefoot<sup>®</sup> is a sticky solution composed of Castor oil, Natural gum resins, and vegetable wax. The dishes were placed in the four stands as described in the red imported fire ant experiment, and lowered into the four five gallon buckets. At intervals of six hours, 1, 3, and 7 days, the approximate number of German cockroaches trapped in the dishes was recorded.

**B. Food Attractant Experiment:**

On 8 February 1999, the exclusion experiment was repeated with modification to determine the effect of a food attractant on the German cockroach to gain access into the dish. One fourth of a tablespoon of crushed IAMS<sup>®</sup> cat food was placed into the bottom of each dish. The four stands were lowered into the five gallon buckets with the 20 German cockroaches. At intervals of six hours, 1, 3, and 7 days the number of German cockroaches occupying the dishes was recorded, as well as an approximate amount of food that had been removed.

Resulting insect numbers per dish were analyzed using the Student's t test ( $P \leq 0.05$ ) and paired comparison using PROC MEANS ( $P \leq 0.05$ ) for each trial and post-initiation interval.

## Results and Discussion

### I. Red Imported Fire Ant

**A. Exclusion Experiment:**

The Fool-A-Bug<sup>®</sup> Protector appeared to reduce the number of fire ants that managed to gain entry (**Table 1**). While there was no statistically significant difference between treatments ( $P \leq 0.05$ ), there was a trend and an overall 28% numerical reduction in fire ants collected at the end of day 7 in the Fool-A-Bug<sup>®</sup> Protector versus the level dishes. However, foraging workers were able to get into the Fool-A-Bug V-M Protector dish, whether level or raised; therefore, the Fool-A-Bug<sup>®</sup> Protector was unsuccessful in completely excluding the red imported fire ant. Variability in foraging pressure between laboratory ant colonies seemed to influence effectiveness, with greater differences between treatments observed in devices placed in buckets with smaller, less active ant colonies.

**B. Recruitment Experiment:**

If fire ants were able to get into the Fool-A-Bug V-M Protector dish as the Exclusion Experiment showed, could they recruit other ants to a food source? Results demonstrate that the Fool-A-Bug<sup>®</sup> Protector was successful in significantly reducing the number of ants recruited to the Fool-A-Bug<sup>®</sup> Protector versus the level dishes (**Table 2**). Observations

showed that ants were able to remove the food in the level dishes much faster, even establishing feeding trails along the walls of the dishes. A much slower rate of removal of food from the raised, properly placed Fool-A-Bug<sup>®</sup> Protectors was observed. In fact, only one feeding trail was observed. However, the data collected from this experiment also showed that the Fool-A-Bug<sup>®</sup> Protector was unsuccessful in completely preventing recruitment, suggesting that this device can play a role as a part of an Integrated Pest Management (IPM) Program to aid in reducing fire ant access to items placed in the bowl. However, this trial was conducted for a maximum of 6 hours, and should be repeated to confirm these results over a longer period of time.

## II. German Cockroach

### A. Exclusion Experiment:

As in the Fire Ant Exclusion Experiment, German cockroaches were able to enter the Fool-A-Bug<sup>®</sup> Protector and whether level or raised; the Fool-A-Bug<sup>®</sup> Protector was unsuccessful in completely excluding the German cockroach. Unlike the fire ant exclusion experiment however, the Fool-A-Bug<sup>®</sup> Protector was not found to numerically reduce the number of cockroaches getting into the Fool-A-Bug<sup>®</sup> Protector versus the level dish (Table 3).

### B. Food Attractant Experiment:

Cockroaches were observed in both level dishes and Fool-A-Bug<sup>®</sup> Protectors at different times and, although the removal of food was difficult to monitor due to their small consumption rates, no visible difference was observed. Results from this experiment failed to document that the Fool-A-Bug<sup>®</sup> V-M Protector completely prevented the German cockroach from being attracted to food placed in the dish (Table 4).

**Table 1. Fire Ant Exclusion Experiment-** Mean number of red imported fire ants, *Solenopsis invicta* Buren, counted in Fool-A-Bug<sup>®</sup> Protectors versus level dishes following exposure of the device to laboratory colonies (4 replicates).

<u>Dish</u>	<u>6 hours</u>	<u>1 day</u>	<u>3 days</u>	<u>7days</u>
level dish	13.50	35.00	64.25	346.25
Fool-A-Bug <sup>®</sup> Protector	10.25	20.75	46.00	249.50
Probability*	0.6351	0.3698	0.5702	0.6207
t-statistic	0.2319	0.0694	0.0621	0.0990
DF= 6.0				

\*No significant differences between means using the Students *T* test (P#0.05) and paired comparison using PROC MEANS (P#0.05).

**Table 2. Fire Ant Recruitment Experiment-** Mean number of red imported fire ants, *Solenopsis invicta* Buren, counted in Fool-A-Bug<sup>®</sup> Protectors versus level dishes following exposure of the device to laboratory colonies (4 replicates).

<u>Dish</u>	<u>1 hour</u>	<u>4 hours</u>	<u>6 hours</u>
level dish	62.50	58.75*	35.00*
Fool-A-Bug <sup>®</sup> Protector	11.25	15.25*	11.00*
Probability	0.0053	0.0155	0.0413
t-statistic	0.0075	0.0667	0.1088
DF = 6.0			

\*Significantly different means in columns using the Student's *T* test and PROC MEANS by paired comparison (p#0.05).

**Table 3. German Cockroach Exclusion Experiment-** Mean number of German cockroaches, *Blattella germanica*, counted in Fool-A-Bug<sup>®</sup> Protectors versus level dishes following exposure of the device to laboratory colonies (4 replicates).

<u>Dish</u>	<u>6 hours</u>	<u>1 day</u>	<u>3 days</u>	<u>7days</u>
level	0.00	0.25	0.25	0.25
Fool-A-Bug <sup>®</sup> Protector	0.00	0.75	0.75	0.75
Probability	0.00	0.3903	0.3903	0.3903
t-statistic*	-----	0.3910	0.3910	0.3910
DF=	0.00	6.0	6.0	6.0

\*No significant differences between means using the Students *T* test (P#0.05) and paired comparison using PROC MEANS (P#0.05).

**Table 4. German Cockroach Food Attractant Experiment-** Mean number of German cockroaches, *Blattella germanica*, counted in Fool-A-Bug<sup>®</sup> Protectors versus level dishes following exposure of the device to laboratory colonies (4 replicates).

<u>Dish</u>	<u>6 hours</u>	<u>1 day</u>	<u>3 days</u>	<u>7days</u>
level dish	0.00	0.50	1.00	0.75
Fool-A-Bug <sup>®</sup> Protector	0.25	0.00	0.75	0.75
Probability	0.3559	0.1340	0.7049	1.000
t-statistic*	0.3910	0.1817	0.7608	1.000
DF= 6.0				

\*No significant differences between means using the Students *T* test (P#0.05) and paired comparison using PROC MEANS (P#0.05).