

# The Red Imported Fire Ant VS The Green Roof

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TEXAS A&M  
**AGRILIFE**  
EXTENSION



TEXAS A&M  
**AGRI LIFE**  
EXTENSION

Headquarters  
Friendswood, Texas  
11,000 sq ft Green Roof

**Jacob White**  
CONSTRUCTION COMPANY



# Background and history

- ⦿ Design/build approach
- ⦿ Six intensive green roofs constructed
- ⦿ Roughly 1.76 acres (.71 hectare)
- ⦿ Anticipated - Energy Star and LEED certification
- ⦿ So far – three Platinum, one Silver, one Gold (pending) certifications
- ⦿ Goals
  - ⦿ Minimum 50% less energy usage
  - ⦿ Unique identity within the community
  - ⦿ Control long term costs
  - ⦿ Radically lessen impacts by and to water

# 2000 West Parkwood Friendswood, Texas



10,000 SF Gold LEED

251/253 Medical Center Blvd.  
Webster, Texas



48,000 sq ft  
Green Roofs



727.520.8181  
www.aerophoto.com

253 Medical Center Blvd

Image # 90408 6017  
Date 04.08.09

TEXAS A&M  
AGRI LIFE  
EXTENSION

12900 Gulf Freeway  
Houston, Texas



700 Medical Center Blvd.  
Webster, Texas





# JWCC Green Roof

- ⦿ Intensive Green Roof
- ⦿ 4" FE 158 Industrial Closed Cell Foam Roofing
- ⦿ 40 Mil Reinforced Poly with Geotextile Fabric – This Product Only Has Two Seams
- ⦿ Enka Retain and Drain
- ⦿ 9" of Engineered Soil
- ⦿ Plants
- ⦿ A Whole Bunch of Labor



# 4" FE 158 Industrial Closed Cell Foam Roofing



727.520.8181  
www.aerophoto.com

Green Medical Offices

Negative # 61120 497  
Date 11.20.06

TEXAS A&M  
AGRI LIFE  
EXTENSION

# Enka Retain and Drain and 40 mil Poly



727.520.8181  
www.aerophoto.com

Green Medical Offices

Negative # 61221 507  
Date 12.21.06

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AGRI LIFE  
EXTENSION

# Loading Roof



9" engineered soil



# Soil/growth media

- ⊙ Typical soil mixture
- ⊙ Expanded shale
- ⊙ Leaf mold compost
- ⊙ Enriched loam
- ⊙ Microlife
- ⊙ Eco-min
- ⊙ Depth – averages 9” – ranges 8” to 12”
- ⊙ Saturated weight = 30 pounds



# Finished Green Roof

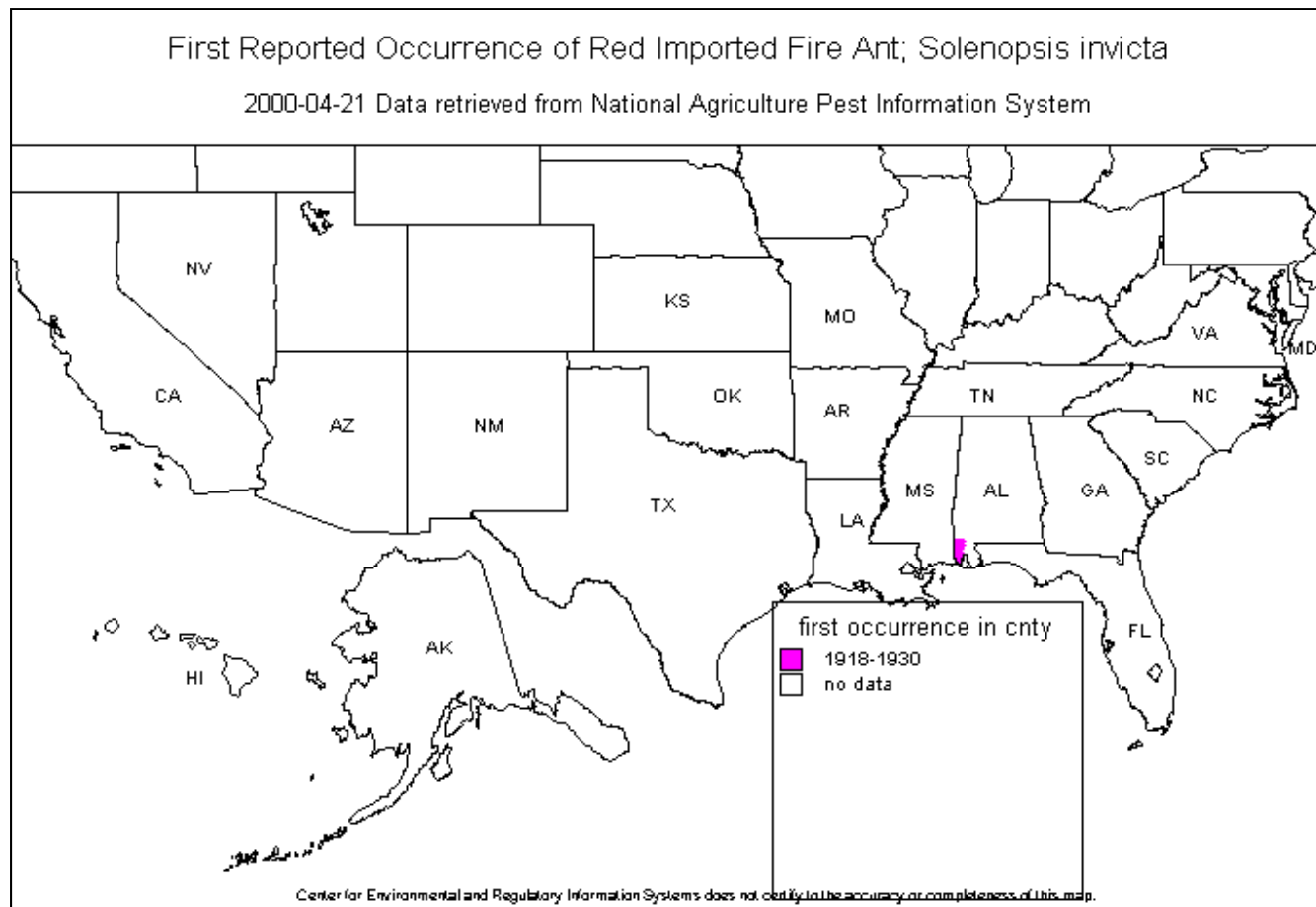


# The Red Imported Fire Ant



# U.S. Arrival & Range Expansion

<http://cars.er.usgs.gov>



# Red Imported Fire Ant Facts

## *Solenopsis invicta*

### Introduction and Spread

- 1) Fire Ants came to US in 1930's, identified in Texas in 1950's
- 2) An average "Texas" colony has > 100,000 workers
- 3) An average "Texas" colony has multiple queens
- 4) A queen can live 2-5 years
- 5) Can lay up to 1000 eggs per day
- 6) From egg to adult in about 3 weeks.
- 7) Live 6-18 weeks
- 8) Oldest workers are foragers
- 9) Polymorphic
- 10) Loves subtropical environment
- 11) Nuptial flights, migration, transport
- 12) Inflicts nasty sting

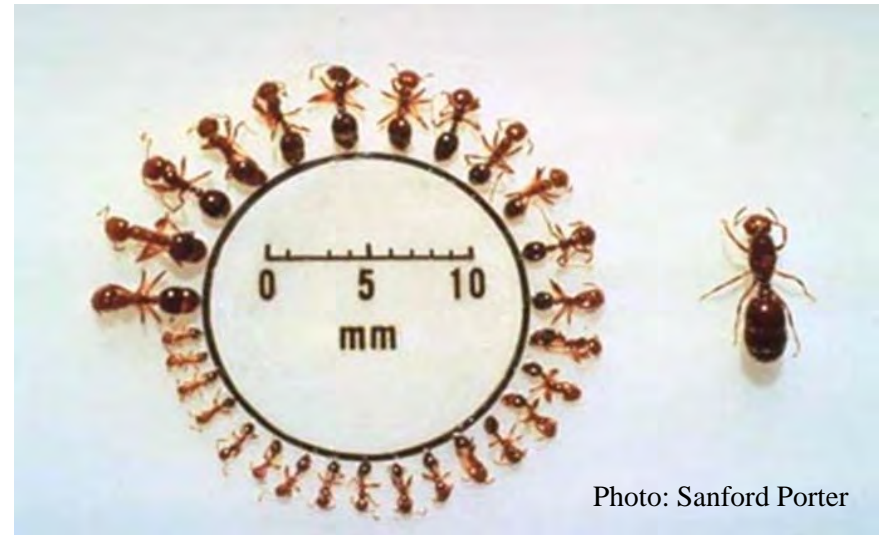
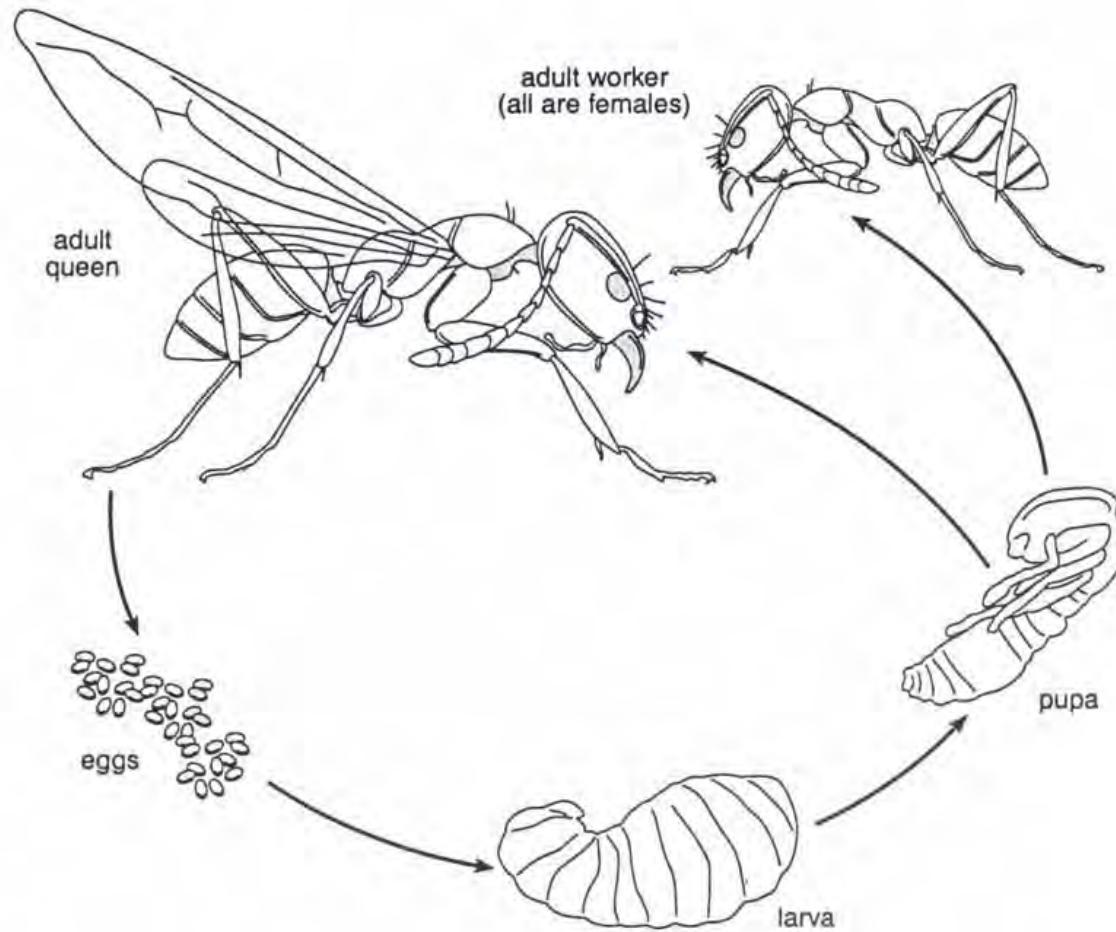


Photo: Sanford Porter



# Ant Life Cycle



# Fire Ants on a Green Roof?



# Fire ant management





## Materials and Methods

### Data

- The green roof was assessed May 3, 2011 and 9 subsequent dates for the presence fire ant.
- Foraging ant activity was checked using individual hot dog slice food lures (0.25 inch thick hot dog slices, Bar-S Jumbo Franks) placed in a grid across the green roof.
- 23 lures were used on 5/3/2011, while 34 lures were used on subsequent assessment dates.
- Food lures were checked after 60 minutes and total ants present on the lures were recorded



## Materials and Methods

### Roof treatment

- Bait stations were used so as not to directly apply a pesticide to the green roof growing media.
  - All irrigation water applied to the roof is recycled and reapplied on site through a rainwater catchment system.
  - The selection of bait stations was to reduce the chance of pesticide movement from the target site.
  - Additionally, irrigation water is applied several times per day as an energy saving passive cooling method. The frequent irrigation may have disrupted the integrity of a “unprotected” bait product.
- DuPont™ (now Syngenta) Advion® ant bait arenas (30 arenas, 0.1% indoxacarb) were positioned in a grid pattern within the confines of the green roof.



## Materials and Methods

### Treatment specifics

- The roof was ~ 10,000 sq. ft., the total active ingredient (0.21 oz) contained within the 30 bait arena's was approximately equal to the active ingredient in a 1.5 pound (0.25 oz) product per acre broadcast application of the Advion® fire ant bait (0.045% indoxacarb).
- Assessments of fire ant activity on the green roof indicated the continued presence of a population of fire ants. So a fall broadcast application of the Advion® fire ant bait (1.5 - 2 pounds product/acre) was applied to the grounds around the Jacob White Headquarters.



## Materials and Methods

### Grounds treatment

- Total mound counts were taken on September 22, 2011 before fire ant bait applications and on 4 subsequent dates.
- To determine if a mound was active, visible fire ant mounds were checked using the minimal disturbance method, i.e., mounds were probed with a shovel and if no fire ants appeared after 15 seconds, the mound was considered inactive.
- The fire ant bait product was evenly spread with Scotts® HandyGreen® II Hand-Held Spreader set on smallest opening. In addition to the broadcast application on October 21, 2011, Advion® fire ant bait (0.5 oz/mound) was uniformly distributing around the active mounds with active brood (4 weeks later).



# Materials and Methods

## Statistics

- A T-test statistical analysis was used to compare the mean numbers of worker ants observed at lures before and after the arena bait station treatment.
- The mean and 95% Confidence Intervals (CI) for each sampling was estimated and displayed on a time series graph. No overlap among 95% CI indicates significant differences, and overlap indicates no significant differences.
- Enabling the comparison of post-treatment dates to pre-treatment numbers which in this case are consider a Control



Representative food lure with foraging fire ants as found on green roof during fire ant activity assessments and example of DuPont™ Advion® ant bait arenas placement atop green roof. Galveston County, 2011



# Bait Stations



Approximate locations of 34 food lures for the assessment of red imported fire ant foraging on green roof, Galveston, Co. 2011.



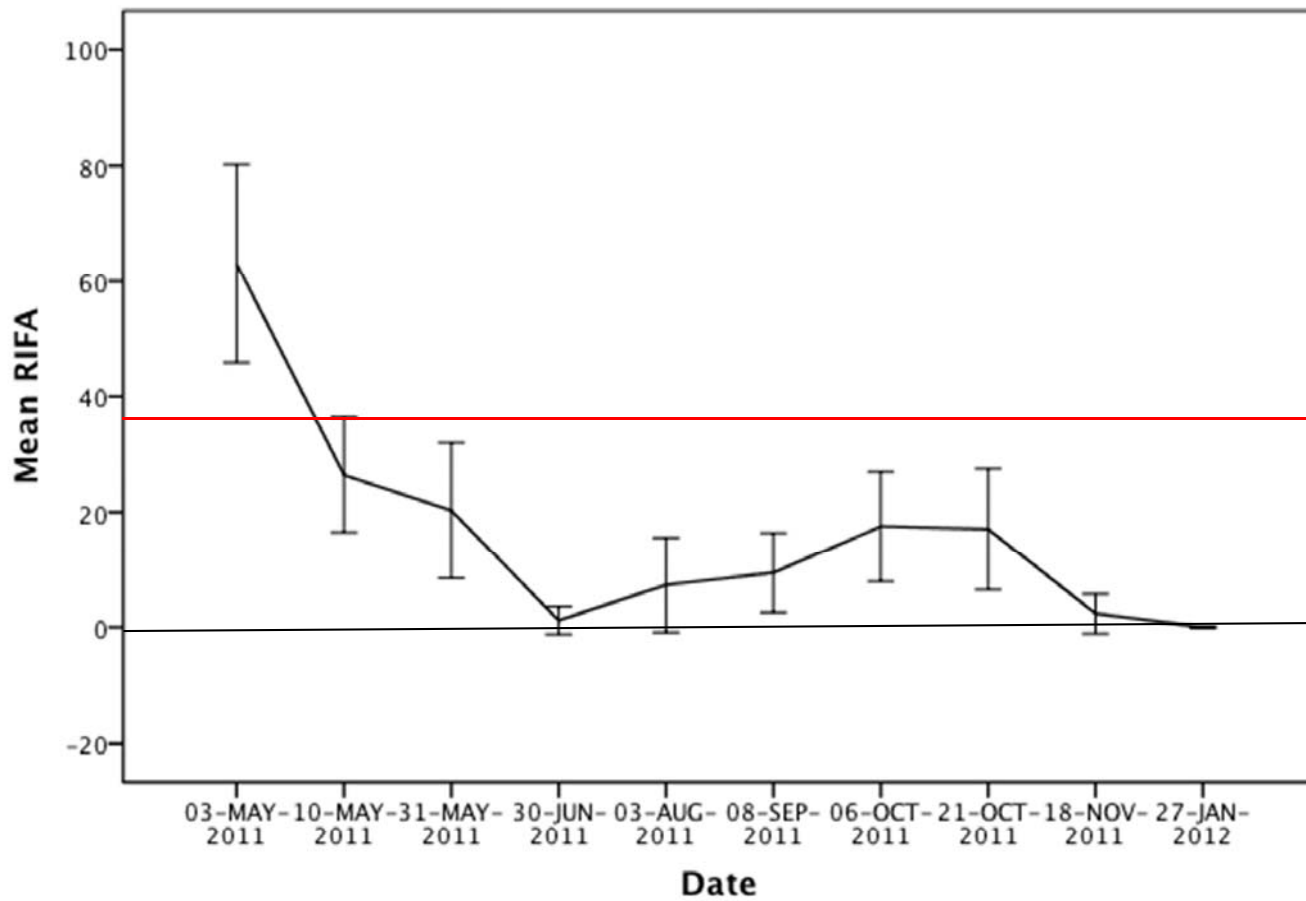
Approximate locations  
of 30 DuPont™ Advion®  
ant bait arenas on green  
roof, Galveston County,  
2011.



Grounds around Jacob White Construction Headquarters where the broadcast application of the DuPont™ Advion® fire ant bait was applied, Galveston, Co. 2011.



## Average number of fire ants per lure

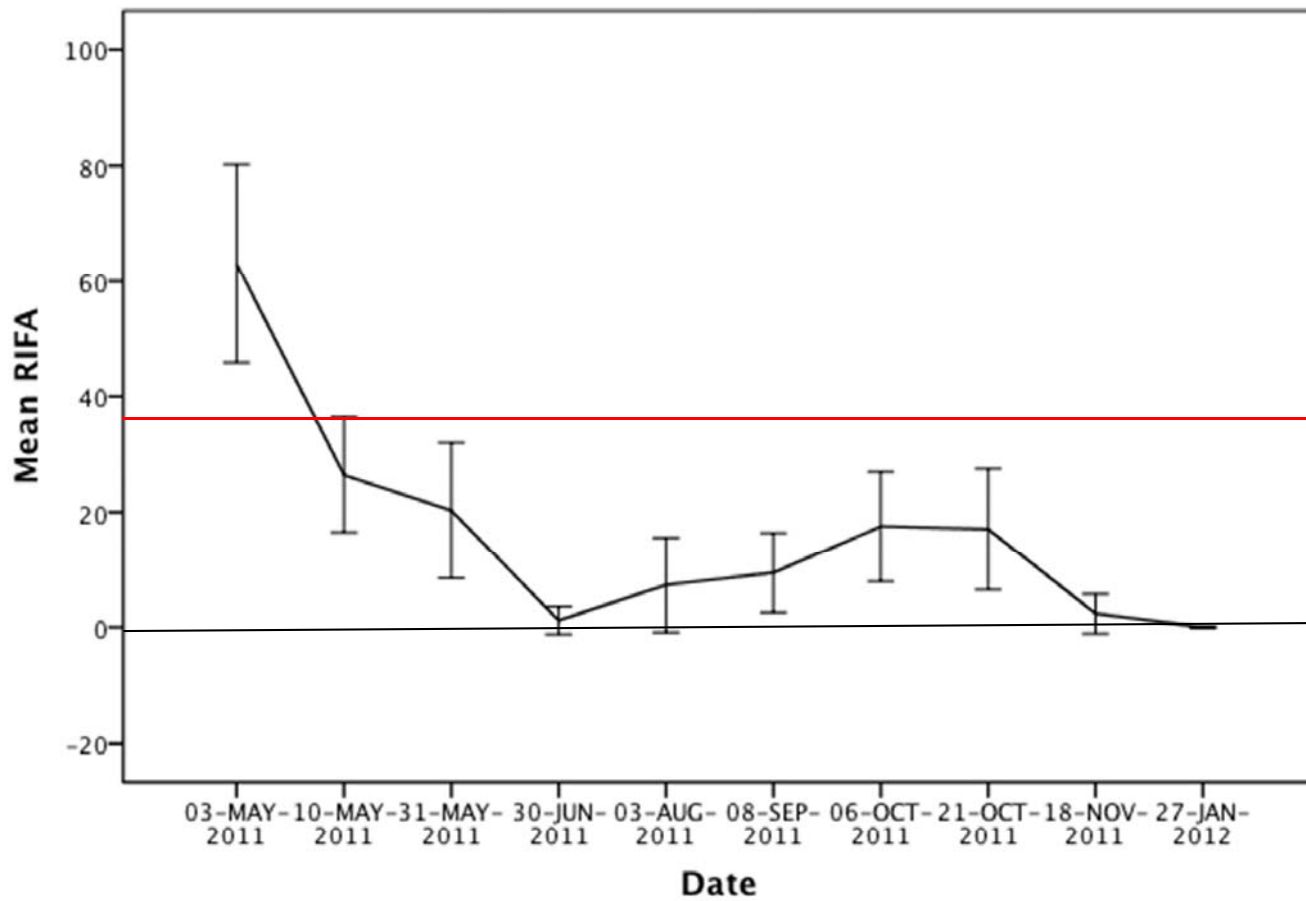


Error bars: 95% CI

# Fire ant management

- Lure (34) dates / fire ant counts
  - 5/3/2011
    - Roof
    - only 23 lures
  - 5/10/2011
    - Roof
  - 5/31/2011
    - Roof
  - 6/30/2011
    - Roof
  - 9/8/2011
    - Roof
  - 9/22/2011
    - 60 mounds on ground (visual count)
  - 10/6/2011
  - 10/22/2011
- Advion applications dates
  - 5/3/2011
    - 30 stations - roof
  - 5/31/2011
    - 12 stations - roof
  - 6/30/2011
    - 2 stations - roof
  - 9/8/2011
    - 13 stations – roof
  - 9/22/2011
    - 1.5 lbs product per acre applied to ground
  - 10/21/2011
    - 30 stations – roof
    - Spot treat with bait 20 fire ant mounds on ground

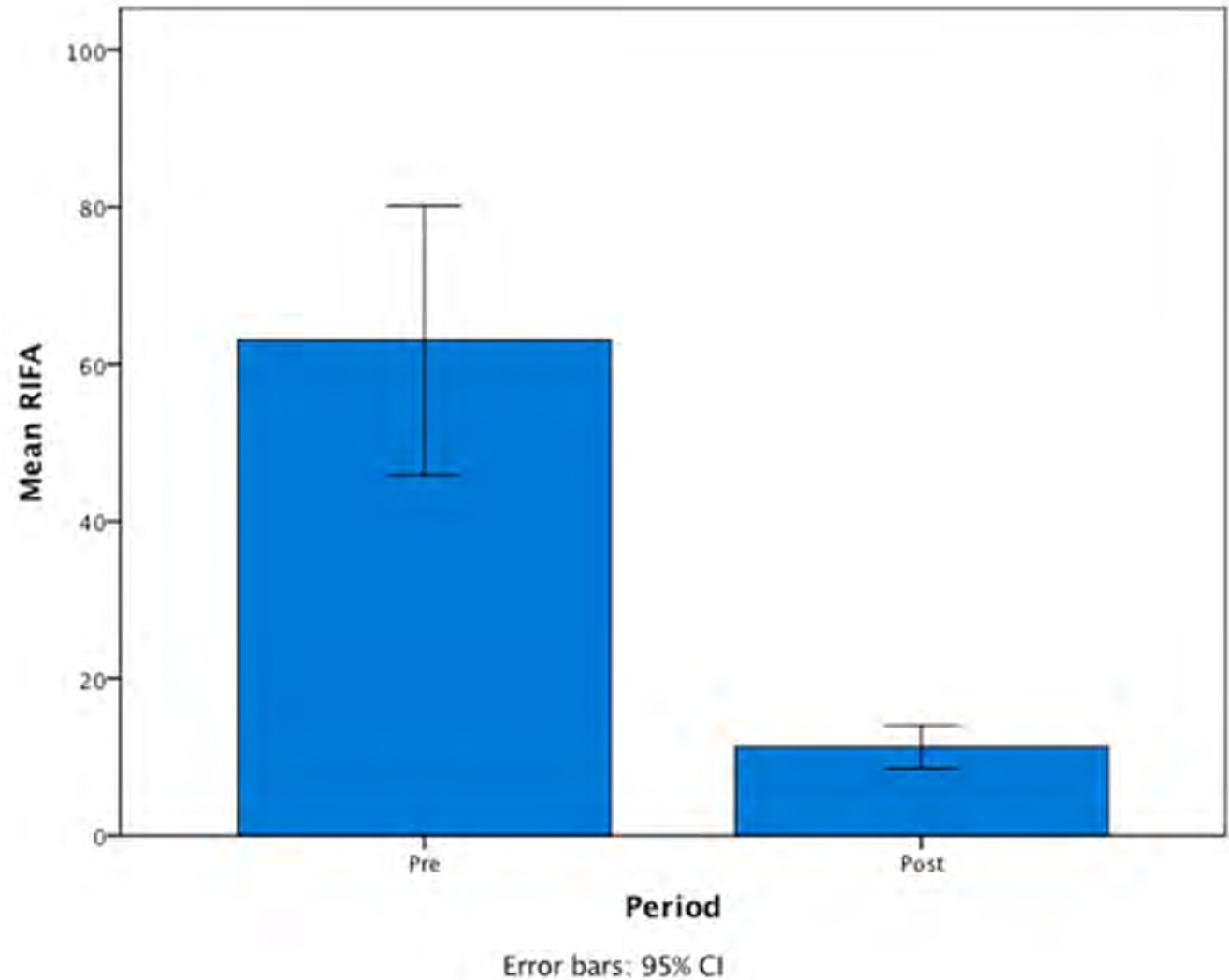
## Average number of fire ants per lure

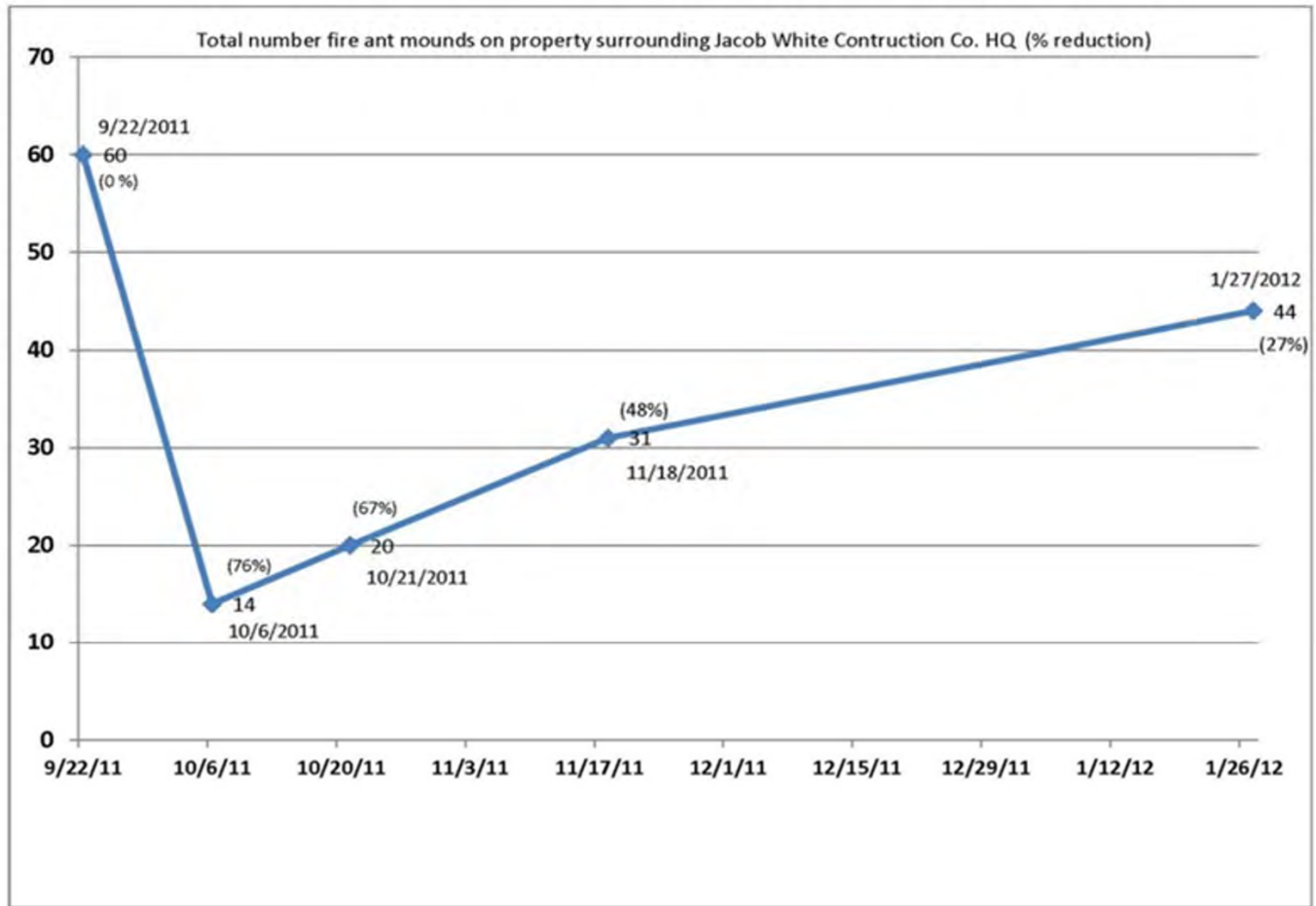


Error bars: 95% CI



**Figure 8:** Analysis of mean number of red imported fire ants (RIFA) on food lures over nine assessment periods (May 10, 2011 – January 27, 2012), Galveston County, 2011. No overlap among 95% CI indicates significant differences, and overlap indicates no significant differences



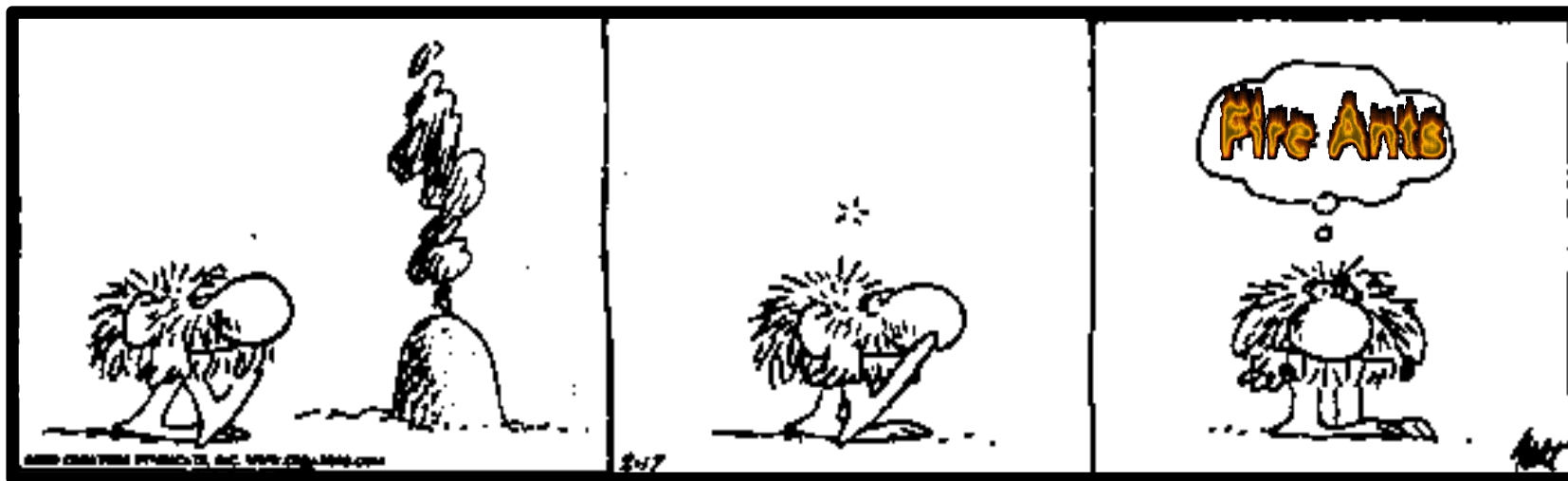


# Fire Ants on Green Roof





# Questions ????



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<http://fireant.tamu.edu>

[http://www.extension.org/fire\\_ants](http://www.extension.org/fire_ants)

<http://doctorfireant.blogspot.com>