The Red Imported Fire Ant vs The Green Roof

Paul R. Nester, Ph.D.
Extension Program Specialist - IPM
Texas A&M AgriLife Extension Service
Houston/Metro Area
p-nester@tamu.edu
Headquarters
Friendswood, Texas
11,000 sq ft Green Roof
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
12900 Gulf Freeway
Houston, Texas

24,000 SF Gold LEED
700 Medical Center Blvd.
Webster, Texas

Coming Soon 30,000 SF Gold LEED
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
Enka Retain and Drain and 40 mil Poly
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

First Reported Occurrence of Red Imported Fire Ant, Solenopsis invicta

2000-04-21 Data retrieved from National Agriculture Pest Information System

Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of this map.
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) Polymorphich
10) Loves subtropical environment
11) Nuptial flights, migration, transport
12) Inflicts nasty sting

Photo: Sanford Porter
Ant Life Cycle

- Eggs
- Larva
- Pupa
- Adult worker (all are females)
- Adult queen
Fire Ants on a Green Roof?
Fire ant management

Fire ants on hot dog lure
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 ????

p-nester@tamu.edu
281-855-5639
http://fireant.tamu.edu
http://www.extension.org/fire_ants
http://doctorfireant.blogspot.com