


## Resisting Arrest: Cockroaches—Why Treatments May Not Work

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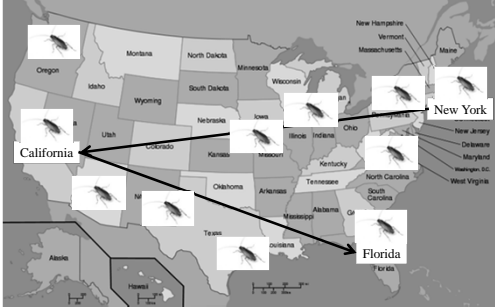


## Recent Health Department Violations Ventura County, CA

- **FEBRUARY 2014**
  - Gil's Food Market, 1220 Saticoy Street, Santa Paula
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 02/24/14; Date reopened - 02/25/14
  - Korean Barbeque Swan, Oxnard
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 02/11/14; Date reopened - 02/13/14
  - Thai House, 2311 Tapo Street, B. Simi Valley
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 02/04/14; Date reopened - 02/05/14
- **MARCH 2014**
  - Hunan Yuan, 1260 E. Newbury Park Road, Newbury Park
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 03/31/14; Date reopened - 04/03/14
  - Pookie's Thai Westlake, Thousand Oaks
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 03/12/14; Date reopened - 03/14/14
- **APRIL 2014**
  - White Sand, 394 East Main Street, Ventura
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 04/15/14; Date reopened - 04/18/14
  - Nancy's Bakery & Deli, Oxnard
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 04/14/14; Date reopened - 04/16/14
  - Huarache De Mexico, Simi Valley
    - Cockroach infestation, unsanitary conditions;
    - Date closed - 04/14/14; Date reopened - 04/15/14



## Cockroaches are Back From Coast to Coast



## Do we have cockroach problems in Florida?

**Inspectors found roaches and temperature violations at some Florida theme park restaurants**


Some theme park eateries not passing the grade

By Wendy Fran  
POSTED: 10:54 AM, Jul 25, 2014  
UPDATED: 10:33 PM, Jul 25, 2014



## NY Restaurant Review

- So today I was eating at a place I have been to a few times and the owner was telling me that they had, had some trouble with roaches.
- Not more than 30 seconds later, one is crawling right in front of me at the cash register



## Recent Cockroach Violations in Florida

**14 South Florida restaurants cited by inspectors**

February 20, 2014 | By Linda Trucillo, Staff writer

Critical violations of state sanitation and safety laws recently observed by inspectors at 14 South Florida restaurants prompted the Florida Department of Business & Professional Regulation to cite the owners and briefly suspend operations. [\(opens in new window\)](#) [\(opens in new window\)](#)

Since there are so many reports, I'm posting a few of the violations found by inspectors at each place. To see one of DCFPR's full reports, you can search our database.

**Rodents, roaches close 6 Tampa Bay restaurants**

Posted: Apr 18, 2014 6:09 PM EST  
Updated: Apr 18, 2014 6:47 PM EST


State inspectors found rodents or roaches and temporarily closed six Tampa Bay eateries on our list of restaurants with the most violations from April 7 to 13, 2014.

We've listed the restaurants that were closed below along with details about what inspectors say they found.


**Asian Bistro, 129 E. Bloomingdale Ave., Brandon**

April 10: Restaurant temporarily closed with 28 violations

- Roach activity present as evidenced by live roaches found
- 20 live & fast roaches in back of chest freezer & crawling up sides.
- One roach in ware wash area.
- One live in rice cooker which was not in use.
- Eight on table with cardboard & plastic bags.
- 20 dead roaches on floor and inside back of cooler.



**6 restaurants closed for health violations this year (DOCUMENTS)**



DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION  
OFFICIAL NOTICE  
**THIS ESTABLISHMENT IS CLOSED**  
TO PROTECT PUBLIC HEALTH AND SAFETY  
DO NOT REMOVE THIS NOTICE

A sign was posted on the front door of China on My Coffee-Café recently notifying people the restaurant had been temporarily closed by the Florida Department of Business and Professional Regulation.  
LAUREN DELGADO / Daily News

All were closed because of roach activity, according to the DBPR.


"The department works very closely with each establishment to ensure they understand the inspection process as well as educate them on the proper safety and sanitation procedures," Chelsea Eagle with the DBPR's communications office wrote in an email.




### 14 of 18 Recent Food Business Closures in Florida were for "Roach Activity"

#### Closed Businesses

| Business Name                 | City           | Date       | Date of Order to Vacate | Closure Conditions |
|-------------------------------|----------------|------------|-------------------------|--------------------|
| China Lake Chinese Restaurant | Miami          | 04/04/2014 | 04/05/2014              | Roach activity     |
| L'Low NY Pizza                | Orlando        | 04/04/2014 | 04/05/2014              | Roach activity     |
| Latin Caf                     | Tampa          | 04/03/2014 | 04/05/2014              | Roach activity     |
| Coral Restaurant              | Miami Beach    | 04/03/2014 | 04/03/2014              | Roach activity     |
| Don Shulas Steakhouse         | Miami Beach    | 04/02/2014 | 04/02/2014              | Roach activity     |
| Gateway Pizza and Pasta       | St. Petersburg | 04/02/2014 | 04/04/2014              | Roach activity     |
| Sunset Cafe and Caf           | Tampa          | 04/02/2014 | 04/03/2014              | Roach activity     |



Sunset Grill specializes in fresh food made with the finest ingredients. We offer a selection of steaks, sumptuous seafood, stacked sandwiches, the Chef's daily specials, and so much more!



Whether deciding between lunch and dinner, the Sunset Grill has the perfect atmosphere for a romantic date night, buttoned-up business meal, or a casual experience in your shorts and flip flops.



"A great place for a good time!"

## Let's Talk About Cockroaches Which Pest is This?

- Introduced from Pacific region (Oceania): Australia, New Zealand, and New Guinea
- Sometimes lives as vegetarian; in greenhouses damaging plants
- Large breeding population reported in a steam tunnel system at a Pennsylvania college
- Yellow markings on the body and pronotum

## Cockroaches in Florida Housing

### Jacksonville apartments 'unfit for human habitation' with roaches, bats and dangerous wiring

Posted: October 3, 2012 - 6:06pm | Updated: October 4, 2012 - 6:58am  
View this story on the All-Access Members site

By Dan Scaman

The final numbers are in on how many people were ordered to leave after Jacksonville's Drug Abatement Response Team condemned their apartments at the Shannon Ridge complex Tuesday.


What the 53 adults left behind after the city condemned 63 units in 12 of the 19 buildings at the Shenandoah Avenue complex were some homes "unfit for human habitation," according to a city news release...

JACKSONVILLE, Fla. -- Many residents returned Wednesday to the Shannon Ridge Apartments on Shenandoah Avenue off Edgewood, angry they had such short notice to evacuate and angry they had such short notice to evacuate and angry they had such short notice to evacuate and angry they had such short notice to evacuate and angry they had such short notice to keep the place up.



## Australian Cockroach

- Sometimes lives as vegetarian; in greenhouses damaging plants
- Large breeding population reported in a steam tunnel system at a Pennsylvania college
- Introduced from Pacific region (Oceania): Australia, New Zealand, and New Guinea.
- Yellow markings on the body and pronotum



## Which Pest is This?

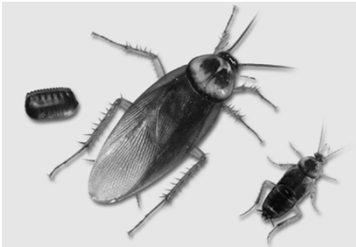
- Sailors in ships infested by this insect used gloves while sleeping to prevent fingernail gnawing
- Also known as “Bombay canary”
- Likes beer, is a born drunk
- May reproduce parthenogenetically (without males)

## Which Pest is This?

- More than 1 million of these insects have been found in a two-family dwelling
- Mating includes “antennal fencing” and female consumption of nutritious secretions from males.
- May leave infested locations in large migrations composed of mostly females with oothecae
- Females carry egg case (ootheca) until eggs are ready to hatch

## American Cockroach

- Sailors in ships infested by this insect used gloves while sleeping to prevent fingernail gnawing
- Also known as “Bombay canary”
- Likes beer, is a born drunk
- May reproduce parthenogenetically (without males)



## German Cockroaches

More than 1 million insects have been found in a two-family dwelling  
Mating includes “antennal fencing” and female consumption of nutritious secretions from males.

May leave infested locations in large migrations composed of mostly females with oothecae

Females carry egg case (ootheca) until eggs are ready to hatch



## American Cockroach Feeding

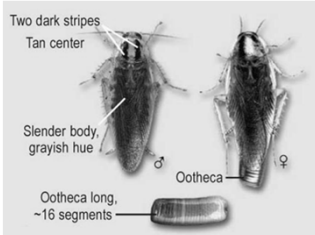


## Which Pest is This?

- First report of this pest in the U.S. was in Lakeland, Florida by Phil Koehler in 1985
- Densities of more than 250,000/ acre have been documented
- The infestation now extends from South Carolina to Texas
- Females carry egg case (ootheca) until eggs are ready to hatch

## Asian Cockroaches

- First report of this pest in the U.S. was in Lakeland, Florida by Phil Koehler in 1985
- Densities of more than 250,000/ acre have been documented
- The infestation now extends from South Carolina to Texas
- Females carry egg case (ootheca) until eggs are ready to hatch



## Reasons to Control Cockroaches

- Psychopathology
- Mechanical damage
- Allergies
- Asthma
- Transmission of pathogens
- Closure of Businesses



## Which Pest is This?

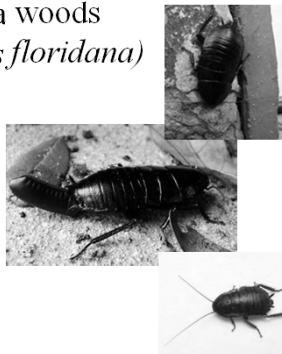
- Only species of cockroach native to Florida
- Large dark brown to black in color 1½ to 1¾ inches long
- Both sexes squirt a foul smelling fluid
  - E-2-hexanoic acid

## German Cockroach Infestations in Low-Income Apartments

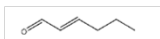


## Florida woods (*Eurycotis floridana*)

- Both sexes squirt a foul-smelling chemical
  - Like a skunk
  - Comes from glands on the underside of the abdomen
  - What triggers the spray?



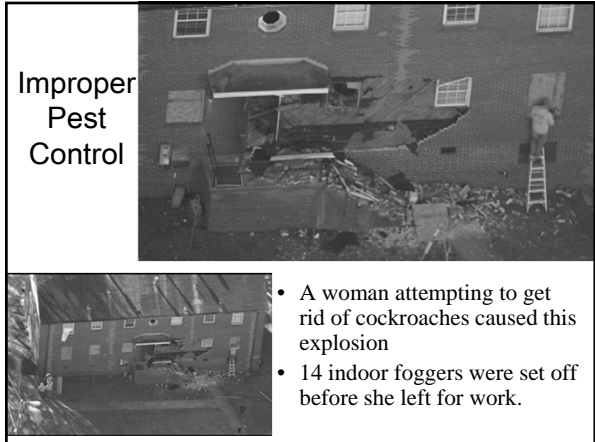
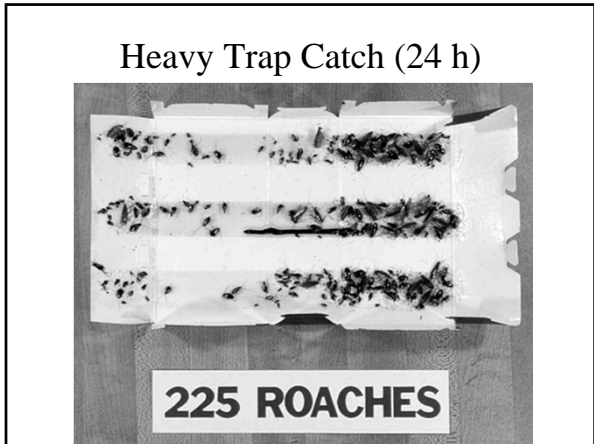
(E)-2-Hexenoic acid



## Method of Sampling



- 1,022 apartments
- 6,146 sticky traps
- Left in apts for 24 hours

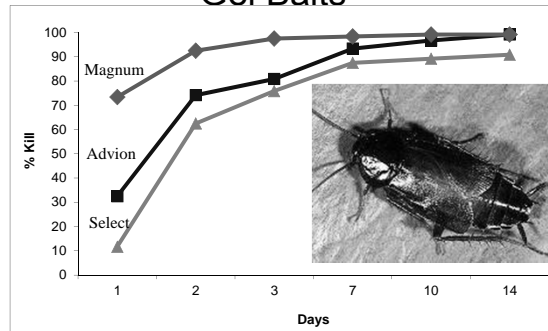


## Some Cockroach Gel Baits

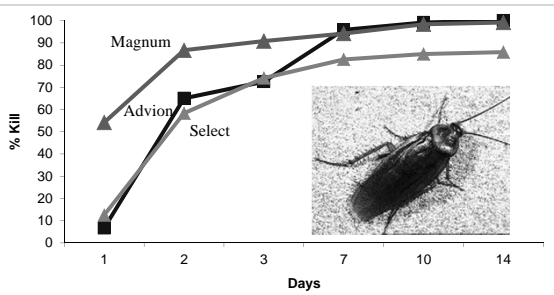
- MaxForce Magnum
  - Most powerful cockroach bait gel
  - Cockroaches eat, touch, and share it
  - Kills roaches faster than any other product
- MaxForce FC Select
  - Kills roaches by ingestion and contact,
  - Spreads from roach to roach through the Domino Effect of Fipronil.
- Advion® cockroach gel bait
  - Targets all pest species of cockroaches.
  - Provides speed and spectrum all in a single product



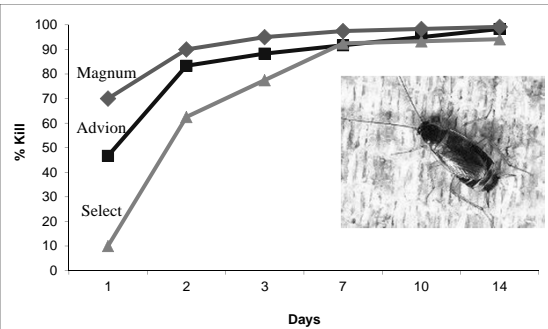
## Oriental Cockroach Kill by Gel Baits



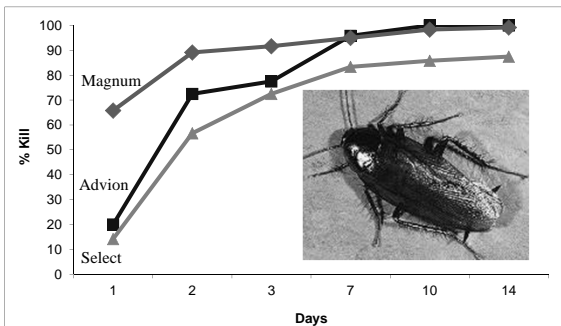
## American Cockroach Kill by Gel Baits



## Brownbanded Cockroach Kill by Gel Baits



## Smokybrown Cockroach Kill by Gel Baits

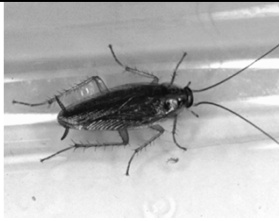


## Secondary Kill



- Most successful cockroach baits are slow acting
- Secondary kill-- insects that do not feed directly on the bait die

## Mechanisms of Secondary Kill

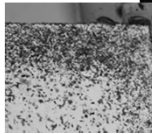


- Trophallaxis- mouth to mouth (ants only)
- Coprophagy- consumption of feces
- Cannibalism- consumption of conspecifics
- Emitophagy- consumption of vomit

## German Cockroach Cannibalizing Nymph Killed with Bait

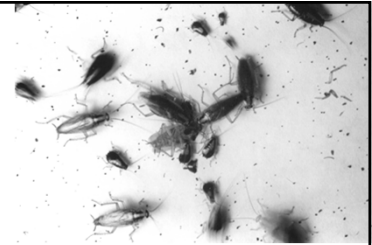


## Coprophagy-- Eating Feces Kills German Cockroaches



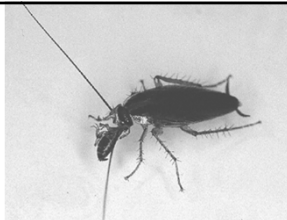
- Adults eat bait
- Adults return to harborage and poop
- Their poop is contaminated with toxicants in bait
- Young cockroach nymphs eat the contaminated poop

## Emito(vomit)phagy Kills German Cockroaches



- Cockroaches eat the bait
- Cockroaches get sick and die
  - Gut contents are regurgitated (vomited)
- Other cockroaches eat the vomit
- Those cockroaches die

## Cannibalism Kills German Cockroaches



- Cockroaches eat toxic bait
- They return to harborages
- Other cockroaches eat (cannibalize)
  - Them as they die
  - Their dead bodies
- Those cockroaches are poisoned and die


## 3 Factors That Can Cause Gel Bait Failure?

- Technician error
  - Improper placement (resistance to work)
  - Buildup of old bait (not spending time to remove it)
- Insecticide resistance (enzymes deactivate AI)
  - Usually not for baits
- Bait Aversion
  - Components in Gel Baits
    - Active ingredients
    - Sugars
    - Gelling agents
  - Sugar (glucose) aversion
  - Gelling agent aversion


### Technician Error

Proper Bait Placement is Work

Before bait placement

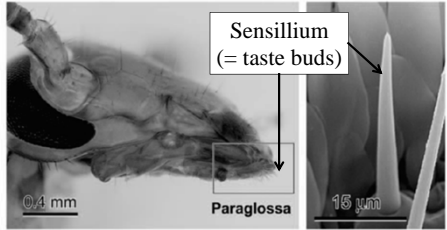


Bait placement under counter is difficult



Removal of old bait is even more difficult


### Cockroach Taste Bud (sensillum) on the Paraglossa



- Normal cockroaches
  - Sweet, but not bitter, sensillum stimulated by glucose
- Bait-averse cockroaches
  - Both sweet and bitter sensillum stimulated by glucose

### Cockroach Bait Aversion

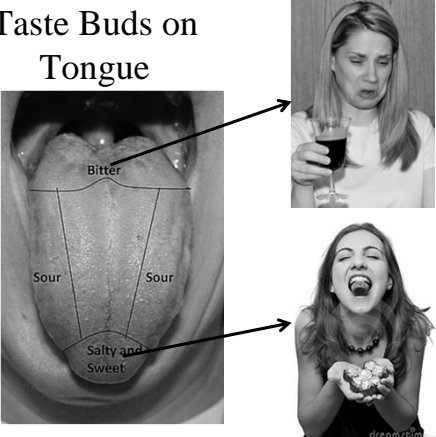
- Cockroaches taste the bait
- Sensors on cockroach tongue (paraglossae) detect bitterness and sweetness
  - Glucose stimulates sweet sensors (all cockroaches)
  - Glucose stimulates bitter sensors (bait averse cockroaches)
- Cockroach refuses bait due to stimulation of bitter sensors on tongue



### Solution to Gel Bait Problems

- Granular bait
  - Different food products than Gel Baits
  - No gelling agent
- Easy placement so it can be removed and does not get old
  - Glue board
- What are some Granular Baits?
  - Where can you put the granular baits?


### Taste Buds on Tongue



### 3 Granular Baits

#### Peridomestic Cockroach Control

- MaxForce Complete Granular Insect Bait
  - Hydrmethynon
  - Labeled for indoor and outdoor use
- Advion Insect Granule Bait
  - Indoxacarb
  - Labeled for pests around the perimeter of building
  - Weather resistant
- Intice Granular Bait
  - Boric acid
  - Labeled for indoor and outdoor application





## MAXFORCE® COMPLETE Brand GRANULAR INSECT BAIT

FOR INDOOR AND OUTDOOR CONTROL OF ANTS, CRICKETS AND ROACHES<sup>1</sup>  
FOR USE IN AND AROUND STRUCTURES AND RESIDENTIAL AREAS  
RECOMMENDED FOR USE BY COMMERCIAL APPLICATORS

**Active Ingredients:**  
Hydramethylnon<sup>2</sup>, tetrahydro-5, 5-dimethyl-2(1H)-pyrimidinone, (3-(4-(trifluoromethyl)phenyl)-1-(2-(4-(trifluoromethyl)phenyl)ethenyl)-2-propenylidene) hydrazone ..... 1.00%

**Other Ingredients:** ..... 99.00%

Total 100.00%

<sup>1</sup>CAS No. 67485-29-4  
EPA Reg. No. 432-1255 EPA Est. No.

This Maxforce® Complete Brand Granular Insect Bait controls:  
Roaches<sup>3</sup>  
Crickets  
Silverfish  
Firebrats  
Ants

Including the following ant species:  
Acrobat  
Argentine  
Big Headed  
Carpenter  
Cornfield  
Field  
Fire<sup>4</sup>  
Ghost  
Harvester  
Odorous House  
Pavement  
Pharaoh  
Thief

<sup>3</sup>German, American, Oriental and Smokey Brown Roaches  
Native and imported fire ants.

## InTice® granular bait

Kills Ants, Roaches, Crickets, Mole Crickets, Silverfish, Sowbugs, Pillbugs, Earwigs, Centipedes and Millipedes  
Weather/Moisture Resistant Bait  
For Indoor and Outdoor Use • Ready-to-Use Bait

Active Ingredient: Orthoboric Acid ..... 5% EPA Reg. No. 73079-2  
Other Ingredients ..... 95% EPA Est. No. 73079-MO-1  
Total ..... 100% Net Contents: 1 lb, 1.2 lbs,  
4 lbs, 5 lbs, 20 lbs, 40 lbs

Manufactured By: **Rockwell Labs Ltd**  
North Kansas City, MO 64116  
toll free: 864 788 4101 • www.rockwelllabs.com

**Indoor Application:** Apply bait only in areas inaccessible to children and pets, or in tamper-resistant bait stations. Apply bait at a rate of 6 oz (1.25 cups) per 100 square feet. Using a hand shaker or duster, apply bait in attics, crawl spaces, trash closets, utility closets, dropped ceilings, on dirt or gravel cellar floors, under and behind appliances and vending machines, in wall voids and voids under and behind cabinets, sinks and tubs, in drawer wells, garbage chutes, pipe chases, elevator pits, around drains, around electrical conduits and in cracks and crevices where insects may harbor. Focus application in areas where insects or their signs are seen. Reapply bait after one week if infestation is still present. A power duster may be used to apply bait in appropriate areas, such as attics.

**Turf Application:** Apply bait evenly over the affected area using a hand shaker or mechanical spreader at a rate of 2 lbs per 1000 square feet or 90 lbs per acre. The product should not be watered in. For mole cricket treatments, results will be best if the area is irrigated prior to bait treatment. Mole crickets typically come to the surface to feed in the evening.

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**Other Ingredients:** ..... 99.00%

Total 100.00%

<sup>1</sup>CAS No. 67485-29-4  
EPA Reg. No. 432-1255 EPA Est. No.

**GENERAL INFORMATION**  
Maxforce® Complete Brand Granular Insect Bait is a ready-to-use product for use indoors and outdoors and around buildings, on lawns, and other non-crop areas<sup>3</sup> such as residential areas, the non-food/non-feed areas of institutional and commercial establishments including warehouses, restaurants, food processing plants, supermarkets, hospitals, nursing homes, motels, hotels, apartment buildings, schools, laboratories, computer facilities, pet shops, zoos, sewers, highway rights-of-way and medians, traffic islands, utility rights-of-way (including power lines, pipelines, aqueducts) managed turf areas (non-crop<sup>4</sup>) (including school yards, playgrounds, athletic fields, amusement parks, picnic areas, recreation areas, office parks, industrial grounds, airports, shopping centers, public parks, arboretums, public gardens, monument sites, cemeteries and mausoleums, golf courses, race tracks, fairgrounds, outdoor amphitheaters, sod farms, and ornamental nurseries). The use of this product on pasture and rangeland is unlawful. Do not graze or feed lawn or sod clippings to livestock. Maxforce® Complete Brand Granular Insect Bait contains a special blend of foods, combined with the delayed-action stomach poison, hydramethylnon. The delayed action of the active ingredient allows foraging ants to bring the bait back to the nest so that the entire colony, including the queen, is destroyed. When properly used, this bait will control many of the following insects, including ants, cockroaches<sup>5</sup>, crickets, and silverfish before they can enter a structure. Do not apply other insecticides (such as aerosols, sprays, etc.) on top of or in close proximity to Maxforce® Complete Brand Granular Insect Bait, as it will reduce the effectiveness. Expect to see fewer insects within a week.  
<sup>2</sup>Do not use on other non-crop areas in California.

## Advion® Insect granule

**Insecticide**  
INTENDED FOR USE BY COMMERCIAL APPLICATORS ONLY.

A granular insecticide bait for use to control crickets, including mole crickets, on lawns in residential, commercial, public and institutional landscaped areas, golf courses, parks, recreational areas, and sports and/or athletic fields; cockroaches, and listed crawling nuisance or occasional invader insect pests in crawl spaces, attics, basements of buildings or structures.

**Active Ingredient:**  
Indoxacarb  
(S)-methyl 7-chloro-2,5-dihydro-2-[[[methoxy]carbonyl]([4(trifluoromethyl)phenyl]amino)]carbamoyl]indene-1,2-yl] [1,3,4-oxadiazine-4a-ylidene]carboxylate ..... 0.22%

**Other Ingredients** ..... 99.78%

Total 100.00%

**INDOOR APPLICATION**  
Advion Insect Granule may be used to control house crickets, field crickets, earwigs, silverfish and ants (except red imported fire ants, harvester ants, carpenter ants and pharaoh ants) in crawl spaces, basements and attics of residential, industrial and commercial buildings or structures. Advion Insect Granule will kill cockroaches that consume the bait granules when placed in crawl spaces and basements of residential, industrial and commercial buildings or structures, but this type of application alone is not intended to provide complete control of an indoor cockroach infestation.

| Application Site  | Rate (lb/1000 sq ft) | Rate (lb/acre) |
|---|----------------------|----------------|
| Lawns (residential, commercial, public and institutional) | 1.5                  | 150            |
| Recreational areas (golf courses, parks, athletic fields) | 4.5                  | 450            |
| Public and institutional landscaped areas                 | 4.5                  | 450            |

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Kills Ants, Roaches, Crickets, Mole Crickets, Silverfish, Sowbugs, Pillbugs, Earwigs, Centipedes and Millipedes  
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4 lbs, 5 lbs, 20 lbs, 40 lbs

Manufactured By: **Rockwell Labs Ltd**  
North Kansas City, MO 64116  
toll free: 864 788 4101 • www.rockwelllabs.com

**Use Restrictions**  
In food areas of restaurants, residential health care, educational, daycare, agricultural buildings, animal rearing and handling establishments, food handling and food processing establishments, this product may only be applied as a crack and crevice treatment. Any product remaining outside of cracks and crevices must be cleaned up and removed.

**Application Directions**  
**Sites and Species**  
Use Sites: In and around residential, multi-family, commercial, industrial, municipal, institutional, research, recreational, health care, educational, daycare, hospitality and agricultural buildings and other man-made structures, garages, home greenhouses, transport vehicles, sewers, animal rearing and handling establishments and food handling and food processing establishments. Turf sites include lawns, ornamental turf, parks, playing fields, right-of-ways, and golf courses.

**Listed Species:** Ants: Odorous House, Argentine, Carpenter, Pavement, Little Black, Pharaoh, Crazy, Acrobat, Rover, Big-Headed, White-Footed, Ghost, Cornfield, and Thief; Roaches: German, American, Brown-Banded, Smokey Brown, Brown, Asian, Wood and Oriental; Crickets: House, Field, Camel, Ground, and Mole; Others: Silverfish, Earwigs, Sowbugs, Pillbugs, Centipedes and Millipedes.

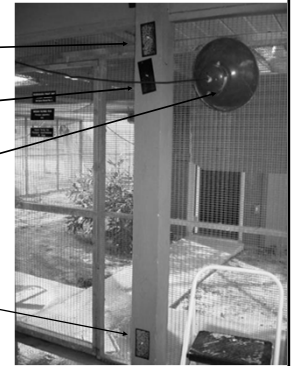


### Broadcast treatment around perimeter of buildings



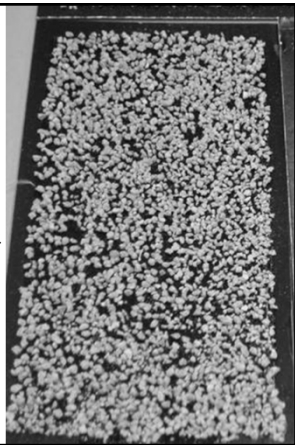
### Bait card placement

- Bait cards with Mole cricket bait
- Control bait card
- Heater for bats
- Bait cards with Mole cricket bait



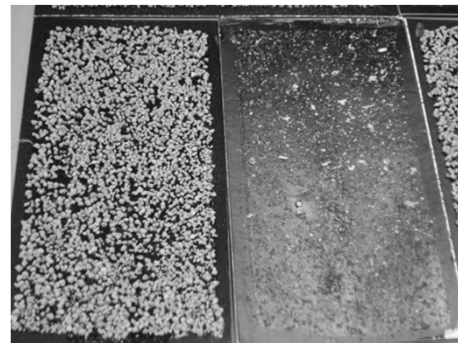
### Bait Card

- Advion Granular Insect Bait
- Cockroach Sticky Trap
- Advantages
  - Relatively large amount of material could be placed
  - Placement on vertical surfaces
  - Bait could be removed before it gets old

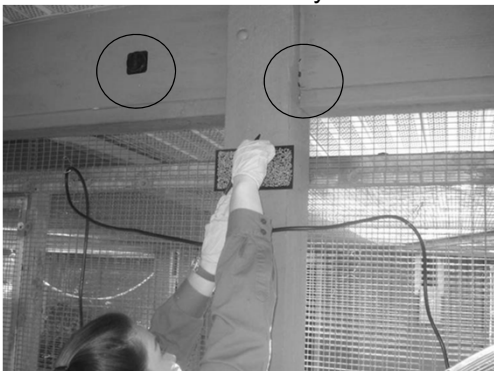


### Bait Card:

Before      After 24 hours



### Bait card placement In Lubee Bat Conservancy



### Integrated Cockroach Control

- Baits:
  - Overcome problems with resistance
  - Eliminate insecticide contamination
  - Decrease preparation time
- Sprays
  - Residual on surfaces
  - Treat areas where there is competing food
- Dusts
  - Eliminate cockroaches from voids/cracks
  - Move cockroaches from hard to treat areas

