



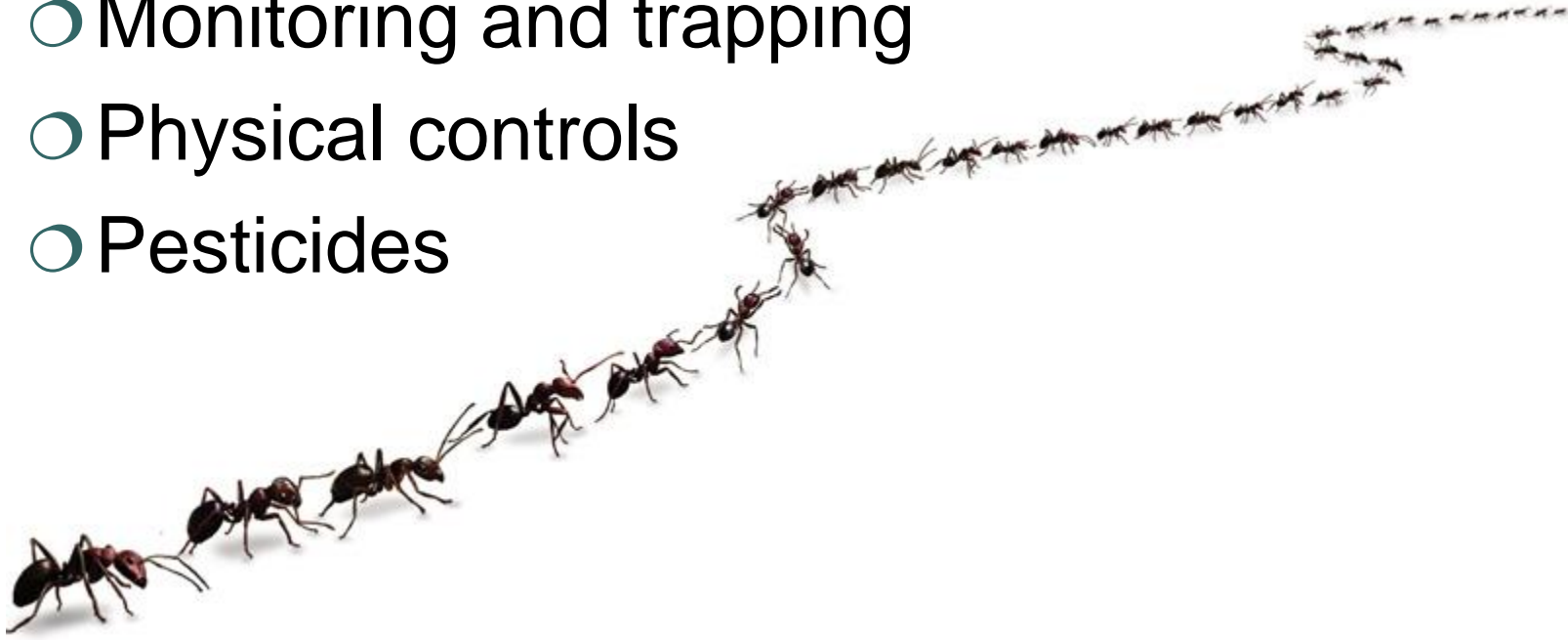
IPM in Flour Mills

Tom Beck, ACE
August 17, 2017



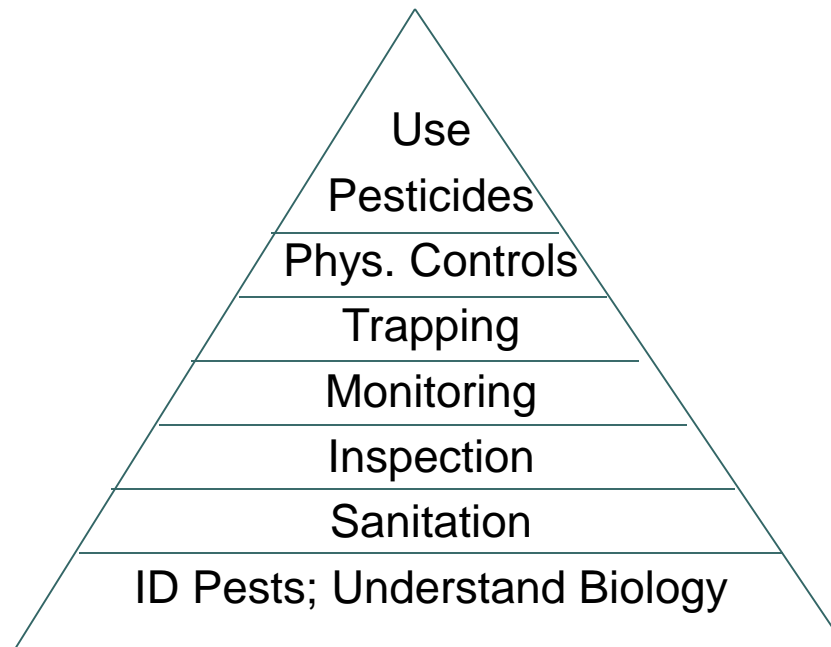
What is IPM?

- Pest ID/biology
- Sanitation
- Inspection
- Monitoring and trapping
- Physical controls
- Pesticides





Principles of Integrated Pest Management (IPM)

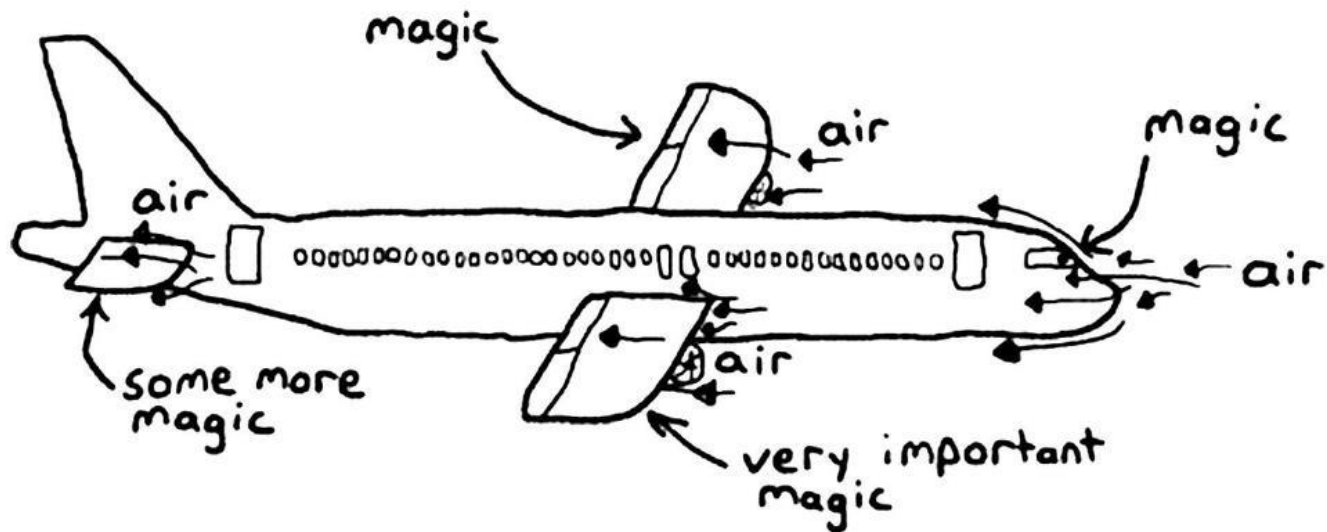




Pest ID and biology

- Correct ID
- Passing info along
- Make recommendations based on THAT pest

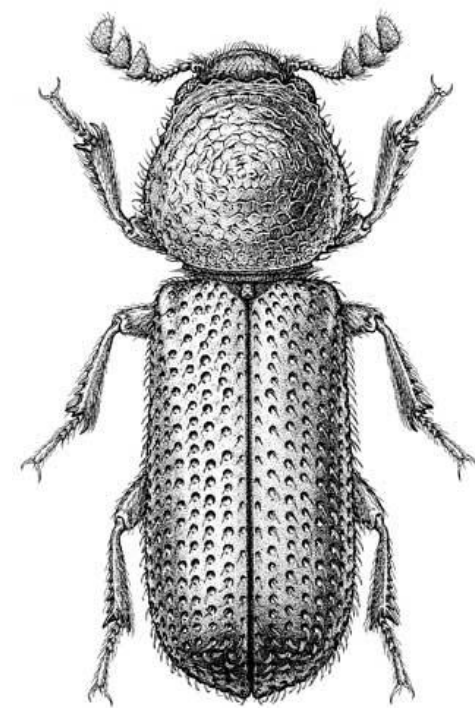
how planes fly





Lesser Grain Borer

- Considered the most damaging pest of wheat in the U.S. and the world.
- Small (0.03 inches/0.8 mm)
- Dark brown
- Head held down





Damage by Lesser Grain Borer

100 adults left in grain for 7 days and then removed
86° F (30°C)

0 days

28 days

56 days

76 days

106 days

128 days





Flour Beetles

- Most important stored product pest
 - Not just a scavenger but likes high grade fresh flour
 - Can be found inside equip
- Infest wide variety of plant and animal materials
- Recorded feeding on 246 different commodities





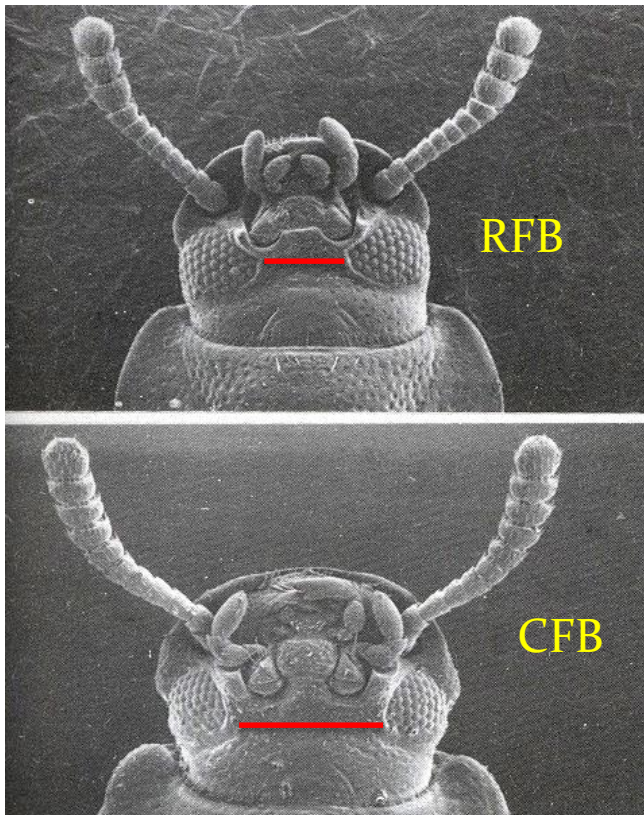
Flour Beetles vs. others

- To distinguish flour beetles from all other stored product insects, look at the eyes from the side
- Red brown color
- Last segments of antennae are clubbed
- Average of 400 eggs





Red & confused flour beetle eyes



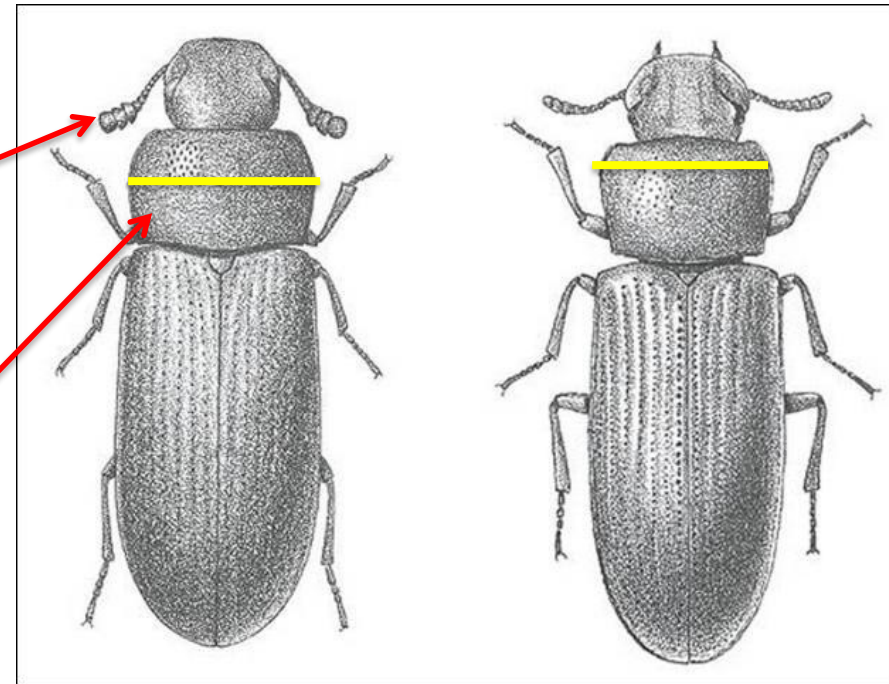
○ Best characteristic:
eyes

- RFB – eyes from beneath are close together
- CFB – eyes are more widely separated



Defining Characteristics

- RFB - last three segments of antennae form a small club
- CFB – antennae not formed into a club
- RFB – thorax widest in the middle
- CFB – thorax widest at the top, near head





Flat and Rusty Grain Beetles

Cryptolestes spp.

- Body 1.5-2 mm long; oblong, flattened, light brown
- Head and prothorax account for $\frac{1}{2}$ the body length
- Antennae are filiform (bead-like) and long





Indianmeal Moth



- Major pest of nuts, pet food, bird feed, animal feed, etc.
- Complete metamorphosis in about 30 days
- Larvae = damaging stage
 - Direct feeding damage
 - Food contaminants
 - Larval silk clogs systems
- Females lay about 160 eggs in seven days



Dermestid Beetles

Warehouse, Carpet, Larder, Hide, etc.

- Associated with food products, dead insects, animal products
- Distinctive long-lived larvae
 - Complete metamorphosis takes 3 months to 3 yrs
- Chewing mouthparts
- Cast larval skins are potential allergens
- Adults lay about 100 eggs





Commensal rodents

<http://r4nt.com>

<http://freefallrae.blogspot.com>



House Mouse



Roof Rat



Norway Rat



Principles of IPM

- Pest ID/biology
- **Sanitation**
- Inspection
- Monitoring and trapping
- Physical controls
- Pesticides

Dust Mite



Bookworm



Louse



Flea



Maggot



Bed Bug



Black Ant



Red Ant



Tick



Sanitation

Sanitation is a dynamic and ongoing function and cannot be sporadic or something that can be turned on once a day, once a week, etc. Therefore, another definition could be: "sanitation is a way of life".*

- Since it is impossible to eliminate all spillage or every crack/crevice, thorough periodic cleaning is necessary.
- Cleaning must include the interiors and exterior
- Sanitation includes employees!



"Quality Protection for the Food"



Outside facility too...

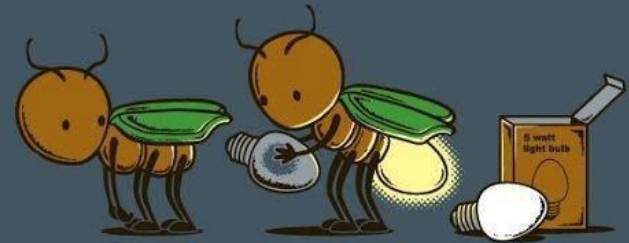
- Grounds
 - Trees
 - Shrubs
 - Lawn care
- Trash bins
- Rodent and bird control
- General outside sanitation





Principles of IPM

- Pest ID/biology
- Sanitation
- **Inspection**
- Monitoring and trapping
- Physical controls
- Pesticides





Signs of Pest Activity

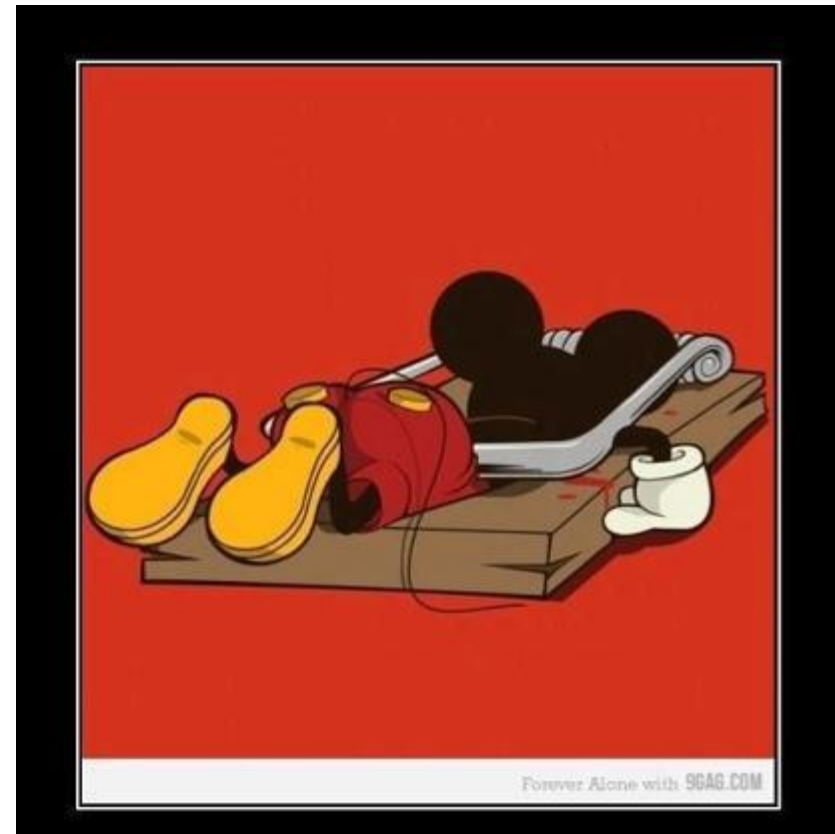
- Trails in product dust
- Webbing
- Cast skins, insect fragments
- Dead insects
- Insect damaged kernels (IDK)
- Frass
- Physical damage to packages/products
- Odors
- “Conducive conditions”





Principles of IPM

- Pest ID/biology
- Sanitation
- Inspection
- **Monitoring and trapping**
- Physical controls
- Pesticides





Insect Traps

- Dome traps
- Sticky traps
 - Floor
 - Hanging
- Pheromone baited
 - Sex
 - Aggregation
- Food baited





Rodent Traps

- Multi catch/trap door style
- Wind-up style (Ketch-All and others)
- Snap traps
- Glue boards





Rodent Bait Stations





Considerations

- Placement
- Sanitation
- Inspection
- Re-evaluation

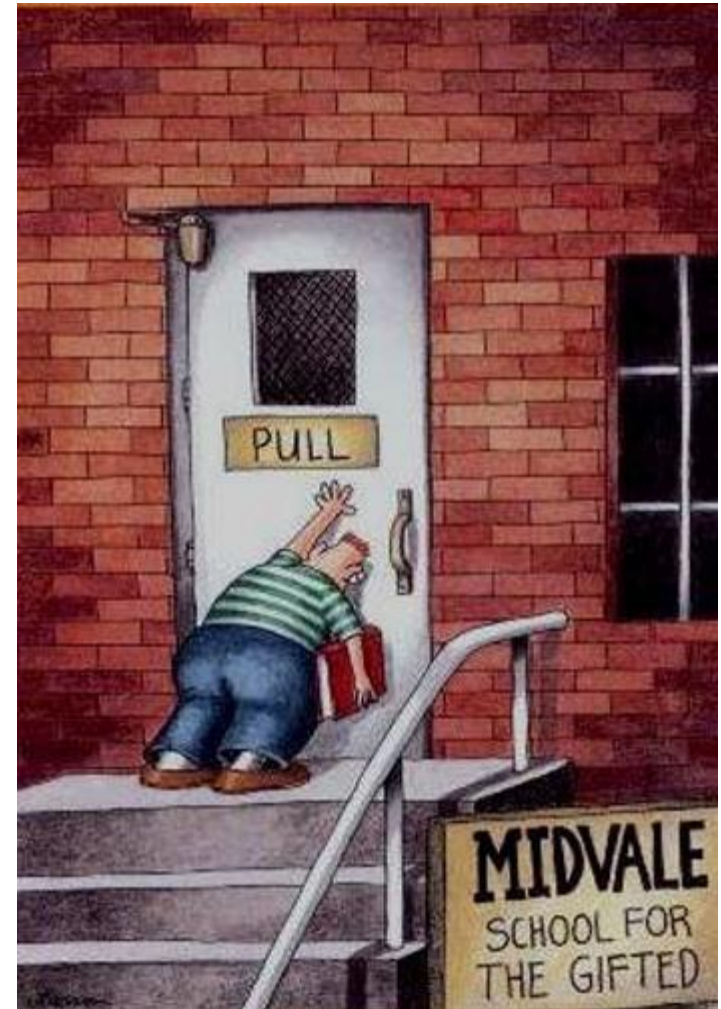


"Quality Protection for the



Principles of IPM

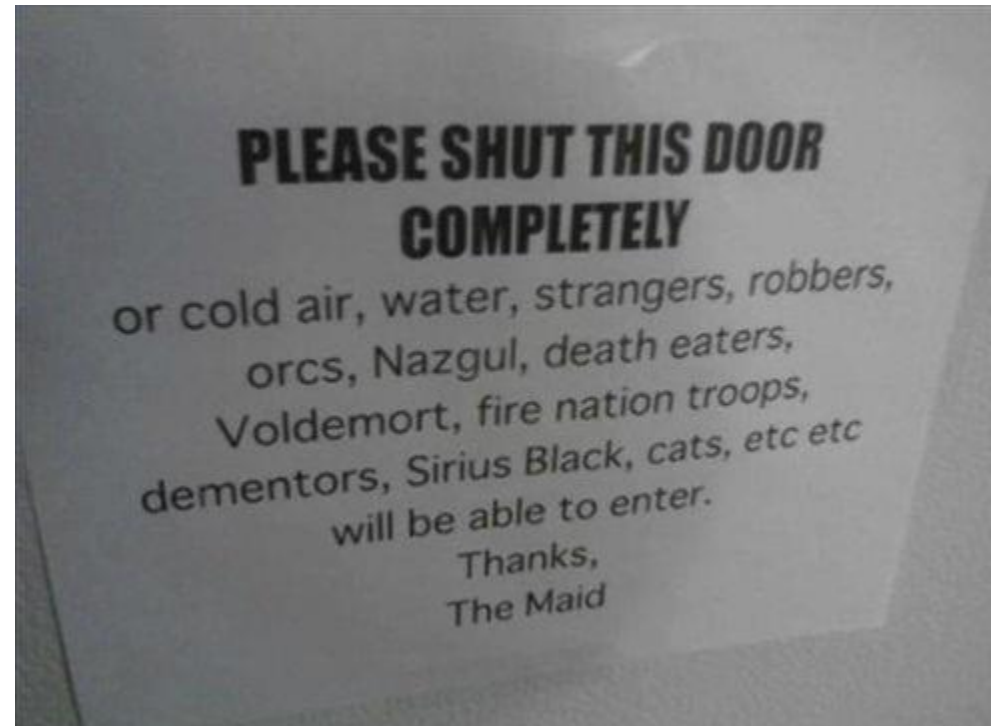
- Pest ID/biology
- Sanitation
- Inspection
- Monitoring and trapping
- **Physical controls**
- Pesticides





Physical controls

- Keep the outside out and the inside in
- Close the openings
 - Doors and windows
 - Screens
 - Vent openings
 - Cracks, structural deficiencies
- Other physical options
 - Air curtains
 - Modified atmospheres





Principles of IPM

- Pest ID/biology
- Sanitation
- Inspection
- Monitoring and trapping
- Physical controls
- Pesticides



**DDT... FOR CONTROL
OF HOUSEHOLD PESTS**



Prepared by the
Bureau of Entomology and Plant Quarantine
Agricultural Research Administration,
United States Department of Agriculture, and
the United States Public Health Service
Federal Security Agency
Washington, D. C. • Issued March 1942





Pesticide Technology

- Definition: Anything that claims to kill, control, repel, or mitigate a pest...(insect, rodent, plant disease, others)
- No reference to toxicity, although most do have some toxic effect
- Classification:
 - “Restricted Use”
 - “General Use”



Pesticide Toxicology Review

- Three routes of exposure
 - Inhalation
 - Contact
 - Ingestion
- Different types of application/formulations
 - Fumigation
 - Fog
 - Bait
 - Crack and crevice



Fumigant vs. Fog

- An airlike substance which expands freely to fill any space available, irrespective of its quantity
- Substance possessing perfect molecular mobility and the property of indefinite expansion, as opposed to a solid or liquid



- A substance enclosed under pressure and able to be released as a fine spray, typically by means of a propellant gas
- A cloud of vaporized liquid



Turbocide Advanced Fogging Products – CO₂ delivery

- Py 75
- Py 75+IGR
- IGR
- Vap 20





New Product



SDS ([HTTP://WWW.BUGFREEGRAINS.COM/-/MEDIA/FILES/BUGFREEGRAINS-NA/US/SDS/CENTYNAL EC INSECTICIDE SDS PDF.PDF](http://www.bugfreegrains.com/-/media/files/bugfreegrains-na/us/sds/centynal%20ec%20insecticide%20sds.pdf))

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New Product

Maxforce® FC Magnum Roach Killer Bait Gel



Load your gun with the most powerful cockroach bait gel ever.

- With the fastest results and best overall control, your customers will see results the same day
- Superior contact kill with ContactX™ technology—controls roaches whether they eat the bait or not
- Maxforce FC Magnum has an effective residual of up to one year or until the bait is completely consumed, so a single application provides your customers with long-term protection
- Low toxicity to non-target animals—ideal for use in sensitive areas
- 10% more bait per reservoir—each reservoir contains 33 grams of bait and is individually packaged with EPA label directions



New Product



SDS ([http://www.bugfreegrains.com/-/media/files/bugfreegrains-na/us/sds/diacon IGR PLUS SDS PDF.PDF](http://www.bugfreegrains.com/-/media/files/bugfreegrains-na/us/sds/diacon%20igr%20plus%20sds.pdf))

SPECIMEN LABEL ([http://www.bugfreegrains.com/-/media/files/bugfreegrains-na/us/specimen labels/diacon IGR PLUS SPECIMEN LABEL PDF.PDF](http://www.bugfreegrains.com/-/media/files/bugfreegrains-na/us/specimen%20labels/diacon%20igr%20plus%20specimen%20label.pdf))

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No Magic Bullet

Remember main principles

- Integrated approach
- Sanitation
- Exclusion
- Harass/train pests to move
- Understand pressure and appropriate devices
- Everyone has a part to play



Except this one!



Questions?



www.BlogPestControl.com



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