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# SPP ID AND CONTAINER FUMIGATION

2021 ALBANY, GA

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PERRY NETTLES

SOUTH REGION MANAGER

8-18-2021

# Goals / Objectives Today...Why are we here?

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- ▲ Start with the insect first
- ▲ Greater understanding of a few stored product pests usually associated with peanuts
  - Indian Meal Moth
  - Foreign Grain Beetle
  - Saw Toothed Grain Beetle
  - Warehouse Beetles
- ▲ Understanding “IPM” (Integrated Pest Management)
- ▲ Importance of Sanitation Practices
- ▲ Proper container fumigation techniques

# Perry Nettles

## South Region Manager Ecolab SPS

### About Me

- ▲ Born and raised in Jonesboro, AR
- ▲ Beautiful, talented wife Kim, daughter Shelby Grace, grand daughter Jocelyn
- ▲ Ordained Minister, Notary Public, Craft Beer Nerd, Saints Fan, Collector of Antique Pest Equipment

### Career Highlights

- ▲ Sanitation and PE Director at Post Cereals 10 years
- ▲ Sanitation and PE Director at Quaker Oats 2 years
- ▲ Commercial Acct Manager at Orkin Pest Control
- ▲ VP of Operations for FPS
- ▲ South Region Manager for Ecolab SPS

### Leadership

- ▲ National BOD member for Grain Elevators and Processors Society
- ▲ BOD for Tennessee Feed and Grain Assn
- ▲ BOD for the USA Rice Federation
- ▲ Associate Certified Entomologist
- ▲ Host and speaker for multiple state CEU recertification lectures
- ▲ Presents industry webinars on FSMA and GFSI

### My Passions...

- ▲ Travel
- ▲ Fishing
- ▲ Turkey Hunting
- ▲ New Orleans
- ▲ Friends and Family
- ▲ Trivia



Train people well enough so they can leave. Treat them well enough so that they don't want to.  
-Richard Branson



# Professional Background...

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- **South Region Manager for Ecolab Specialty Pest Services**
  - **Covering AR, MO, TN, MS, LA, TX, OK**
- **VP of Operations for Food Protection Services**
- **Branch Manager for Orkin**
- **Sanitation Director for Quaker Oats Cedar Rapids, IA**
- **Sanitation Director for Post Cereals**

# Pest ID

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## Pest ID Topics

- ▲ Start with the Insect First
- ▲ Insect Biology
- ▲ Three Main Groups
- ▲ Major Post Harvest Pests



# Common Stored Product Pests Across the Food Value Chain



Rice Weevil



Granary Weevil



Lesser Grain Borer



Angoumois Grain Moth



Red Flour Beetle



Confused Flour Beetle



Sawtoothed Grain Beetle



Indian Meal Moth



Cigarette Beetle



Drugstore Beetle



Warehouse Beetle



Mediterranean Flour Moth



Hairy Fungus Beetle



Foreign Grain Beetle



Flat Grain Beetle



Internal Feeding Insects

Secondary Feeding Insects

Mold Feeding Insects

Insect photos courtesy of Tomasz Klejdysz.

LEARN MORE AT:  
[www.ecolab.com/spp](http://www.ecolab.com/spp)

# Pest ID

Top 4 for today:  
**RFB/CFB, IMM, STGB, FGB**

## Common Stored Product Pests Across the Food Value Chain



Rice Weevil



Granary Weevil



Lesser Grain Borer



Angoumois Grain Moth



Red Flour Beetle



Confused Flour Beetle



Sawtoothed Grain Beetle



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Cigarette Beetle



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Warehouse Beetle



Mediterranean Flour Moth



Hairy Fungus Beetle



Foreign Grain Beetle



Flat Grain Beetle

- Internal Feeding Insects
- Secondary Feeding Insects
- Mold Feeding Insects

Insect photos courtesy of Tomasz Klejdysz.

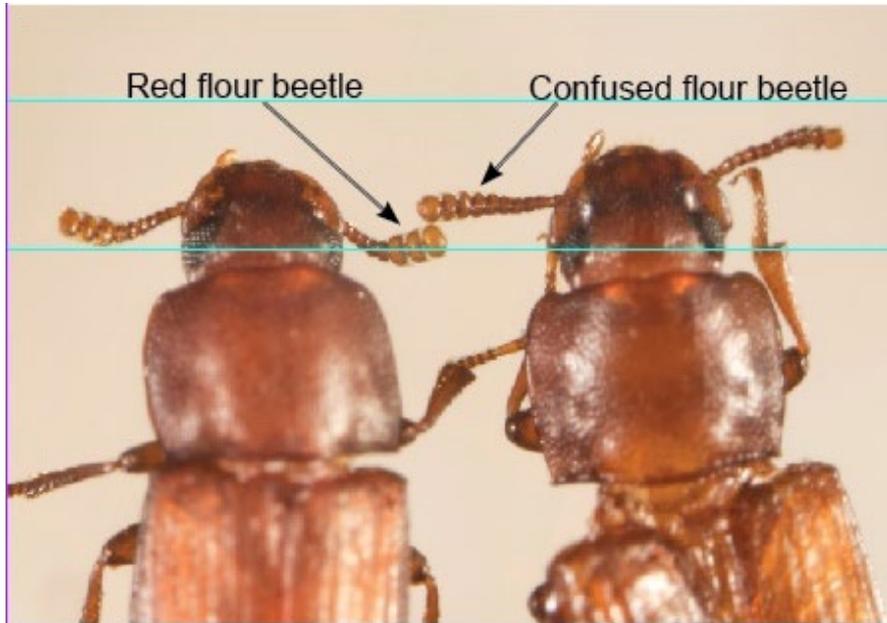


LEARN MORE AT:  
[www.ecolab.com/spp](http://www.ecolab.com/spp)

1 Ecolab Place  
 St. Paul, MN 55102  
 U.S. 1-800-325-1671  
 CANADA: 1-800-352-5326



# Pest ID

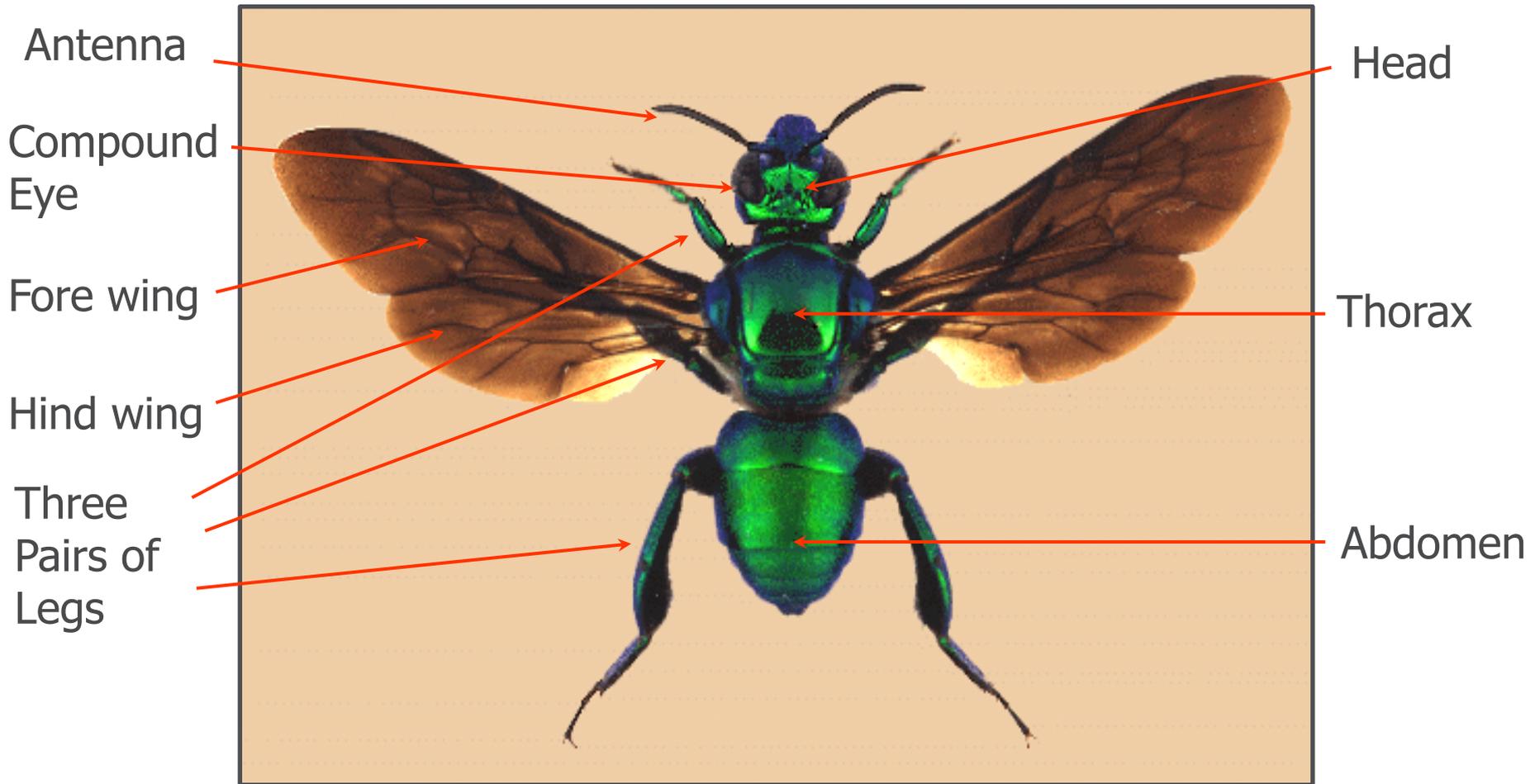


- ▲ FITI: First Identify The Insect
- ▲ This determines all appropriate next steps



- ▲ NOT FITTY CENT
- ▲ We are a lot of things in ops and pest elimination, but we are not rappers

# Anatomy of an Insect



Orchid Bee

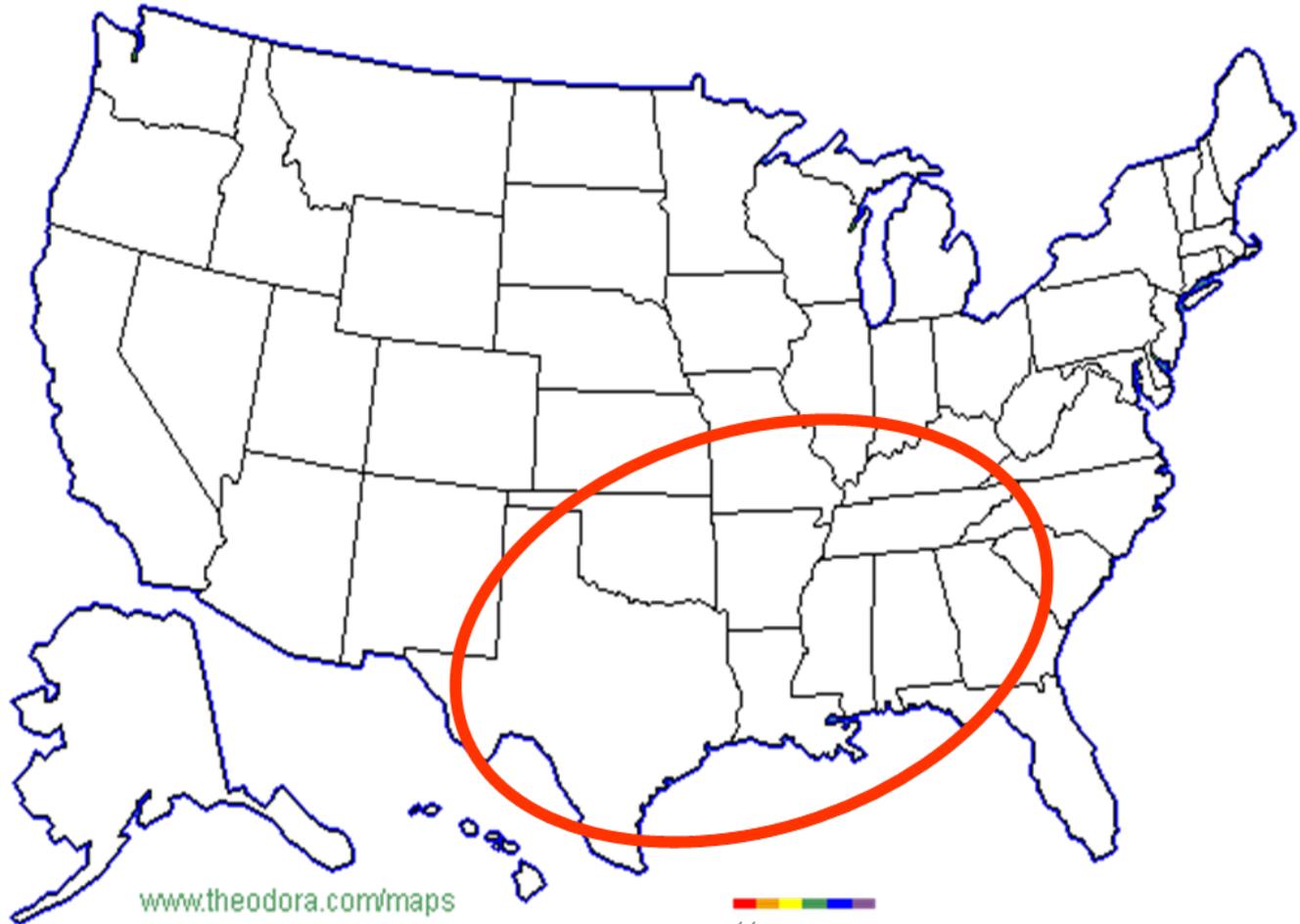
# Pest ID

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**Complete metamorphosis definition:** insect development in which egg, larval, pupal, and adult stages occur, each differing greatly in morphology



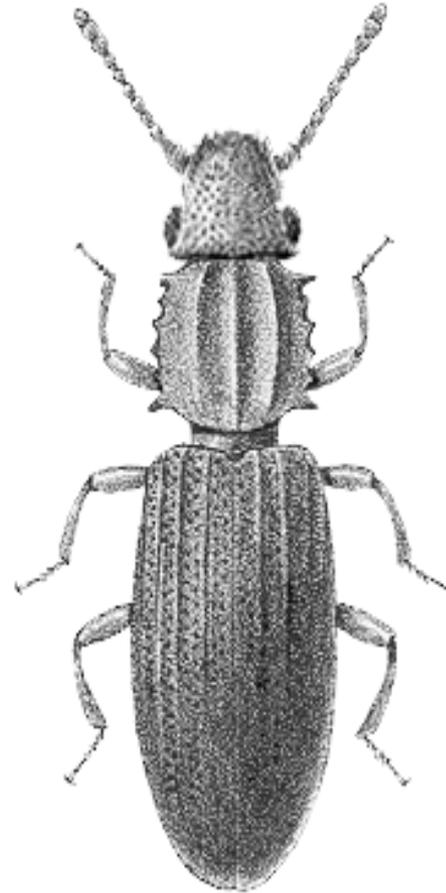
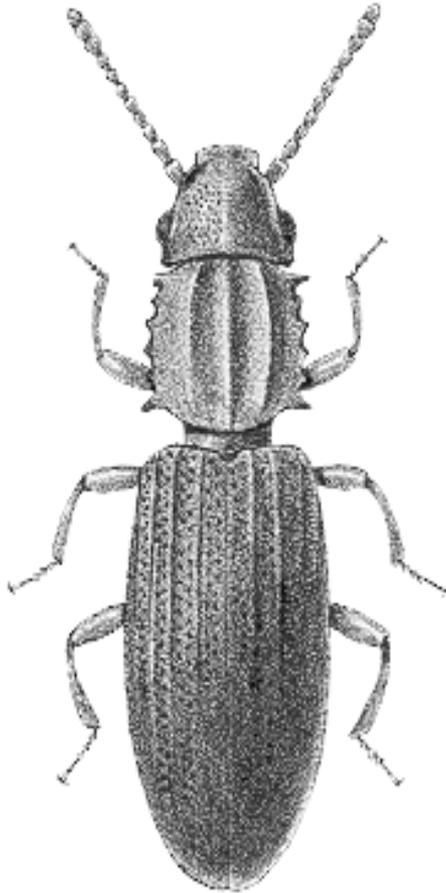
## Geography / Climate



# Who am I???

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Great Example of the small details...



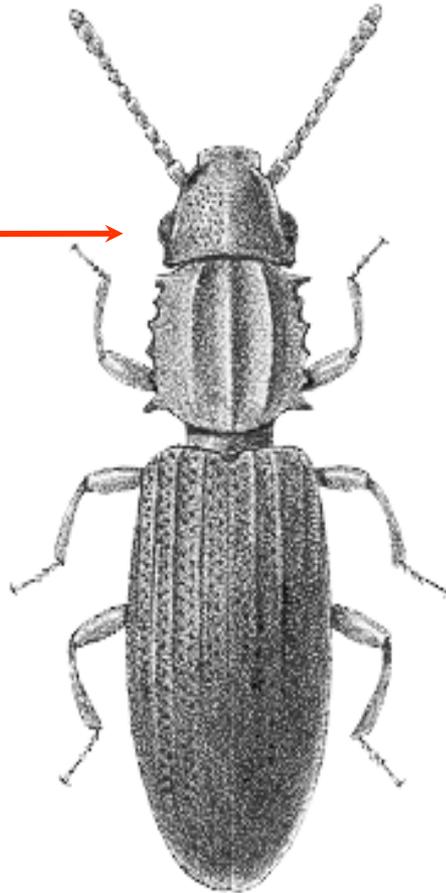
# SAW TOOTHED & MERCHANT GRAIN BEETLE

Great example of small details...

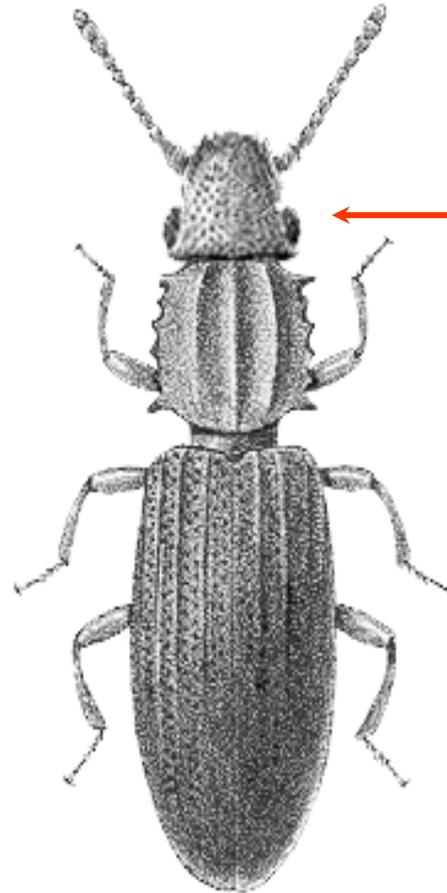
*Saw Tooth Grain Beetle*

*Merchant Grain Beetle*

Temple behind eye is nearly as long as diameter of the eye



Temple behind eye is much smaller than diameter of the eye



**I  
CAN'T  
FLY**

**I  
CAN  
FLY**

# Our Focus Today...

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# #1 Indian Meal Moth

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- Typically develop outside of food product itself
- Larvae will feed on whole or processed food
- Usually attack soft parts of grain kernels



# #1 Indian Meal Moth

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## ▲ External Feeder

- (3/8") with (2/3") wingspread.
- Head and thorax reddish-brown
- Hind wings
- Silver/gray ring of hairs on wing tips

## ▲ Behavior

- Adults fly mostly at dusk in zigzag fashion while searching for mates and food.
- Adults rest during day in dark areas.
- Minimal attraction to UV light.



# #1 Indian Meal Moth

- ▲ Larva feeds on:
  - Grains and grain-based products
  - Peanuts
  - Peanut shells
- ▲ Produce silk tunnels / Webbing
- ▲ Contaminate grain with droppings from larva



# IMM Activity

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# #1 Indian Meal Moth

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## ▲ Effective means of controlling IMM Populations:

- Sanitation
- Chemical Treatments--Fog / Fume
- Mating disruption



*Less Mating.*  
**Fewer Larvae.**  
*Less Insecticide.*  
**Reduced Infestation.**

## #2 Warehouse Beetle

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### ▲ Scavenger

- 3.5 mm (~1/8 inch).
- Color brownish-black ...brown and yellow scales on wings
- Oval shaped

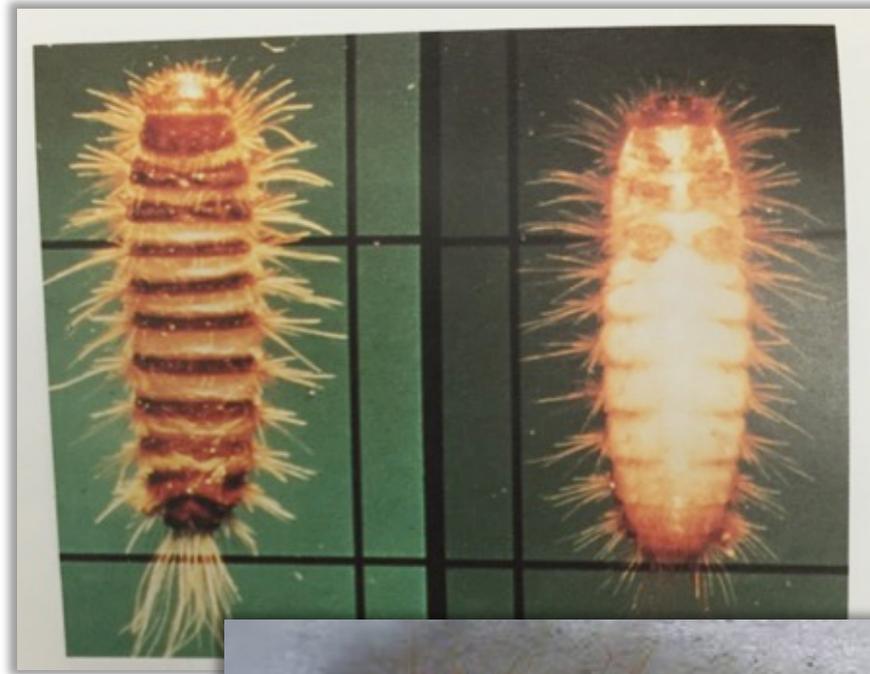
### ▲ Behavior

- Adults are good fliers. Attracted to lights
- Attack damaged product stored in a warehouse



# Warehouse Beetle - Larvae

- ▲ Obvious segmentation due to dark bands
- ▲ Light in color on underside
- ▲ Many hairs on body
- ▲ Can be very harmful:
  - Young animals
  - Children



## #2 Warehouse Beetle: Scavenger

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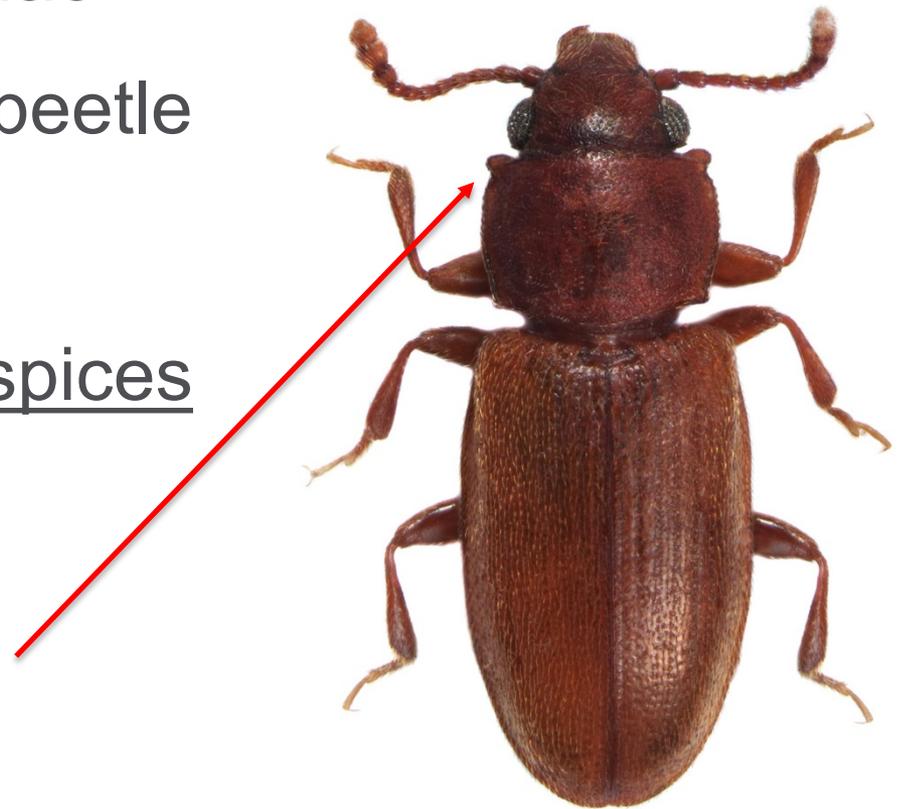
- ▲ They Eat: Pollen, dead insects, and dried animal carcasses, their larvae feed on a wide range of food...such as peanuts



## #3 Foreign Grain Beetle

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- ▲ Rust red in color and has a three segmented antennae
- ▲ Mistaken for a red flour beetle
- ▲ It is 1/16" in length
- ▲ Feeds on moldy grains/spices
- ▲ Has a prominent eye
- ▲ Nodes on thorax



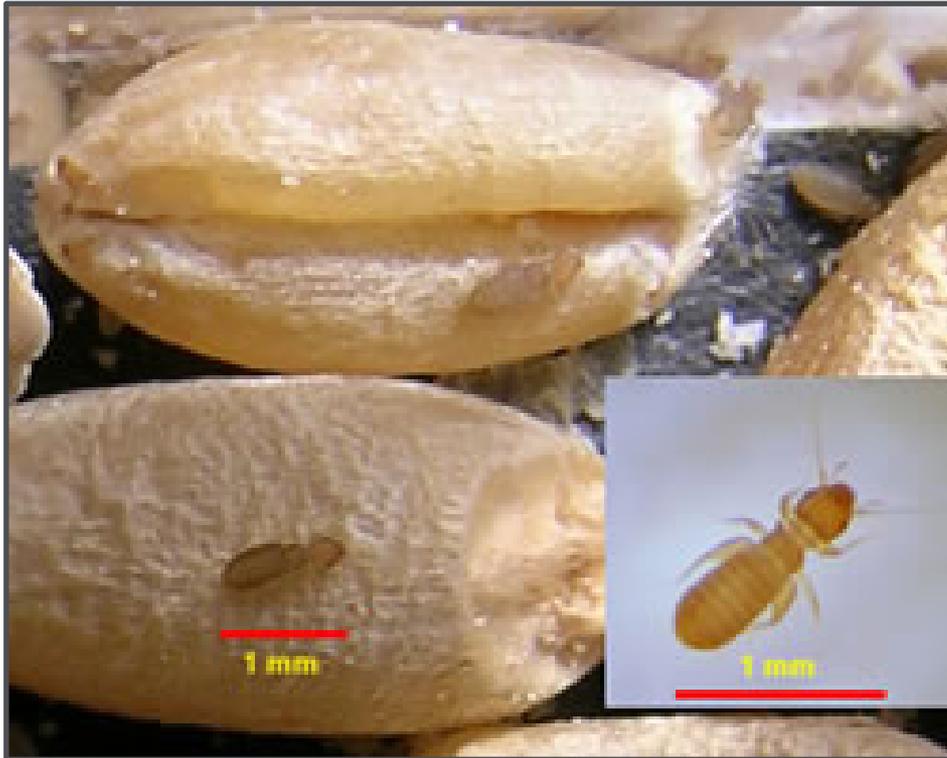
## #4 Sawtooth Grain Beetles

- ▲ Feed on oats, rice, and cracked wheat, **peanuts**
- ▲ May hide during the day inside equipment or a commodity
- ▲ Very flat and can crawl up slick surfaces – can access food with ease
- ▲ Will gnaw into paper materials to lay eggs



## # 5 Psocids (bonus)

### ➤ Love damp locations



# Integrated Pest Management (IPM)

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## Implementing IPM in your facility is vital

1. Identify Pest / Insect
2. Learn Pest Biology
3. Monitor and Count Pest Population
4. Set Thresholds
5. Choose Tactics / Implement a Program
6. Evaluate Results



# 1. Identify and Understand

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- Identify the pest accurately ...(Very Important)
- Study the environment of the pest
- Helpful tools- Flashlight, Magnifying Glass, Camera (phone)



# 1. Identify and Understand

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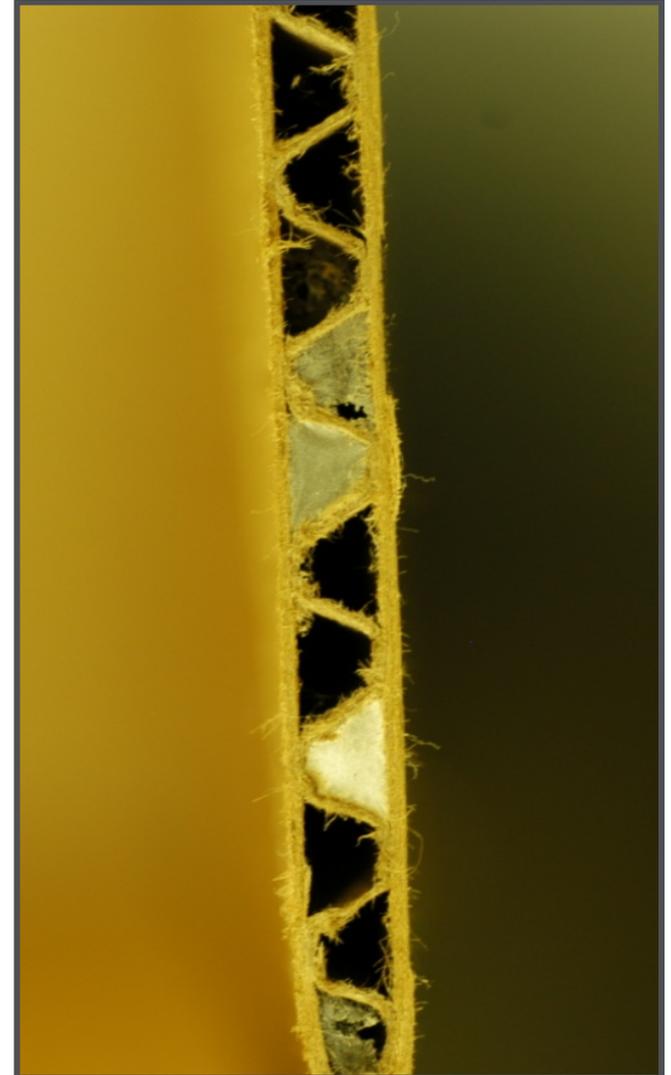
Successful fighting is – good lighting.



## 2. Learn Insect Biology...IMM for example

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- ▲ As an example...
  - 30-day development time (25°C, 77°F)
  - Multiple generations per year (1-8)
  - When ready to pupate, larvae have a 'wandering phase' during which they leave food
  - Larvae spin silk cocoons in cracks and crevices in which they pupate
  - Diapause in larval stage in a dense cocoon (hibernaculum)



# 3. Monitor the Pest

## Use pheromone monitors, and glue boards

- Pest Population
- Trend Reports



## 4. Set Thresholds

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- ▲ **Action threshold:**  
Unacceptable pest level – do something
- ▲ Sometimes the action threshold may be **zero!**
- ▲ Action thresholds vary by pest, site, and season

**How many  
pests need to  
be present  
before  
action  
is taken?**

## 5. Choose Tactics

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# “P ... E ... S ... T”

- ▲ **Prevention:** Sanitation, Exclusion, Pesticide Treatments
- ▲ **Eradication / Elimination:** Foggings / Fumigation
- ▲ **Suppression / Reduction:** Eliminate food source, crack and crevice treatments
- ▲ **Treat the situation:**  
“Insects are a system of a condition”

## 5. Implement the IPM Program

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- ▲ Make sure you have taken initial steps
  - Identification and monitoring
  - Set action thresholds
  - Know what control strategies will work
- ▲ Select effective and least harmful methods!
- ▲ Observe all local, state, federal regulations!

## 6. Record and Evaluate Results

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- ▲ Know what worked and what did not
- ▲ Some aspects may be slow to yield results
- ▲ Might be ineffective.
  - NOT successful every time
- ▲ Use gained knowledge in future planning efforts



# Sanitation

## SANITATION IS PEST ELIMINATION!



# Sanitation Program

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- ▲ A viable sanitation program is a required prerequisite program under FSMA
- ▲ The program requires management's commitment for resources and funding
- ▲ Sanitation is a structured program
  - Master Cleaning Schedule
  - Clear Written Procedures
  - Trained Personnel
  - Supervision
  - Education / Training



# Sanitation Program

- Sanitation is key in controlling Stored Product Pests
  - Implement master cleaning schedules
  - Document all cleaning practices performed
  - Clean racking thoroughly, in, around and under
  - Use vacuums, brooms, surface cleaners, etc.
  - Make sure all cleaning equipment is thoroughly cleaned everyday



# Sanitation / Peanuts

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- ▲ Proper cleaning of the bins between use is essential
- ▲ A residual application of Tempo can be considered
- ▲ Periodic application of pyrethrum and Methoprene (Diacon) is helpful
- ▲ Mating disruption in warehouse (non-refrigerated)
- ▲ Cold storage (45° F) for finished product significantly reduces insect potential

# Sanitation / Peanuts

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- ▲ Sanitation is the key to success
- ▲ Cracks and crevices in floors and structures should be eliminated
- ▲ Product debris and dead insects on upper ledges and electrical control systems needs to be addresses frequently
- ▲ Use of and IGR is essential
  - They disrupt how insects grow and reproduce.

In Closing...

# SANITATION IS PEST CONTROL!



# Safety Comes First!



# Container Fumigation

## SAFETY...SAFETY...SAFETY

- What is fumigation? Fumigation 101
- Basic steps to fumigate a container
- Options of products
- Pros and cons of those products
- Answer any questions



# Container Fumigation

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## Fumigation:

The process where a fumigant which is a chemical at a pressure and temperature that can exist at a gaseous state in a sufficient concentration that will remain lethal to a given pest.



# Container Fumigation--Safety

## Safety First!

- Placards
- “Danger Tape”
- Locks
- PPE
- Training



# Container Fumigation --Safety

## Safety First!

- Location, Location, Location!
  - Safe area to conduct fume
  - Security needed
- Container Inspection
  - Inspect Inside & Out
  - Sealing is critical



# Container Fumigation - Sealing



# Container Fumigation - Sealing



# Container Fumigation - Sealing

- ▲ Critical Areas to watch
  - Doors
  - Monitoring / Fume lines
  - Flooring
  - Ceiling



# FMP—Details needed before you begin

## Project details: FMP (Fume Management Plan)

- Fumigation license required / respective training
- Proper PPE
- Safe area to conduct fume
- Export Permit / paper-work / SDS
- Customer Request. What Chemical is best?
- Customer Preference. Partnership
- Communication exchange a must
- Proper follow up

U. S. Department of Justice / Drug Enforcement Administration		OMB APPROVAL No. 1117 - 0004
<b>APPLICATION FOR PERMIT TO EXPORT CONTROLLED SUBSTANCES</b> PURSUANT TO SECTION 1003(a), (b), (c) & (d), TITLE III, P.L. 91-513 <small>(Read instructions on reverse before completing)</small>		See reverse for Privacy Act
<b>TO:</b> DRUG ENFORCEMENT ADMINISTRATION OFFICE OF DIVERSION CONTROL INTERNATIONAL DRUG UNIT (ODOI) WASHINGTON, D.C. 20537	DATE A 03 Apr, 2000 EXPORTER'S APPLICATION NUMBER B 15	
Application is hereby made pursuant to the provisions of the Controlled Substances Import and Export Act and the regulations prescribed thereunder for a permit to export as follows:		
1. NAME OF CONSIGNEE Emerald Isle Pharmaceuticals, Inc.	2. ADDRESS OF CONSIGNEE 317 St. Patrick Lane Cork, Ireland	
3. BUSINESS OF CONSIGNEE Pharmaceutical Distributor	4. FOREIGN PORT OF ENTRY (City & Country) Dublin, Ireland	
5a. PORT OF EXPORTATION (City & State of last U.S. Customs port) Chicago Illinois	5b. NAME OF EXPORTING CARRIER OR VESSEL (Air, Ship) Air Freight	5c. APPROX. DATE OF EXPORTATION 15 May, 2000
6. FOREIGN IMPORT LICENSE OR PERMIT FILED HEREWITH: NO. 00-05 DATED 17 May, 2000		
7a. NAME AND QUANTITY OF DRUG PREPARATION TO BE EXPORTED (Enter names as shown on labels, numbers and sizes of packages, strength of tablets, capsules, etc., CSA Drug Code, and NDC Number)	7b. CONTROLLED SUBSTANCE CONTENT OF DRUG OR PREPARATION TO BE EXPORTED (expressed as acid, base or alkaloid (Enter name of controlled substance contained in the drug, compound, or preparation))	7c. DATE EXPORTED AND ACTUAL QUANTITY (Compiled by registrant at time of export) DEA PERMIT No.:
Dilaudid  2 Bottles 500 Tablets/Bottle 4mg/Tablets  CSA Drug Code 9150 NDC # 0001-0002-03	Hydromorphone HCl - 4 grams Hydromorphone Base - 3.560 grams	
<b>NOTICE:</b> Controlled Substances may not be exported by mail or parcel post.		
<b>AFFIDAVIT</b> The packages to be exported are labeled in conformance with 21 C.F.R. Part 1302 and to the best of my knowledge and belief, the importing country has instituted and maintains a system for the control of these substances, the drugs are consigned to a holder of such permits or licenses as may be required under the laws of the country of import, the substances are to be applied exclusively to medical or scientific uses within the country of import, there is an actual need for the controlled substances for medical or scientific uses within such country, and the substances will not be re-exported therefrom; except, in the case of bulk cocaine alkaloid, the substance will be processed within the country of import and the products therefrom may be re-exported in accordance with Paragraph 1, Article 31 of the Single Convention on Narcotic Drugs, 1953.		
NAME OF EXPORTER C Frost Laboratories	ADDRESS OF EXPORTER D 1212 Snow Road Winter Park, MN 55713	
EXPORTER'S TELEPHONE NO. E 605-987-0509	EXPORTER'S DEA REGISTRATION NO. F PF1234567	SIGNATURE AND TITLE OF PERSON MAKING APPLICATION G International Export Manager
DEA USE ONLY	APPROVED EXPORT PERMIT NUMBER	DATE EXPORT PERMIT NUMBER ISSUED
DEA Form (Sept. 1987) - 161		Previous edition dated 9/75 is OBSOLETE.

# Fumigant Product / Chemical

## ▲ Chemical Options...

*Phosphine*



*Methyl Bromide*



*Sulfuryl Fluoride*



# Fumigant Product / Chemical

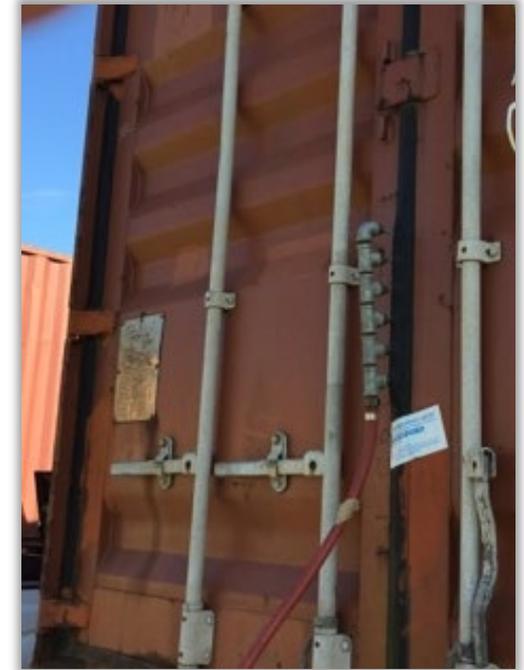
## ▲ #1) Aluminum Phosphide:

- Proper temperature is important
  - Lower temp longer hold times needed
- Effective on wide range of SPP / Rodents
- Multiple forms available
  - Pellets or Tablets
  - Fumi-Cel
    - 3-6 bags per 1k cubic ft
  - Eco2Fume™



# Fumigant Product / Chemical

## #2) Methyl Bromide:



# Fumigant Product / Chemical

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- **#2) Methyl Bromide:**
- ***International / Export Use acceptable***
- **All life stages:** Eggs to adult
  - Wide spectrum of insects
- **Rapid Penetration and Aeration:** rapidly distributes into pest harborage areas and quickly aerates upon ventilation.
- **No Commodity Effects**—No product damage
- **Downside:** Complex set up (at times).

# Fumigant Product

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- **#3) Sulfuryl Fluoride**
- **Broad Spectrum--all life stages**
- **Rapid Penetration and Aeration--rapidly distributes into pest harborage areas and quickly aerates upon ventilation.**
- **No Commodity Effect- Does** not affect commodity flavor, quality, color or processing characteristics.
- **Low Reactivity**-odorless, colorless gas. **Noncorrosive**-no risk of damage to equipment, electronics or buildings

## In Closing...

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Questions??



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# THANK YOU!!!

Perry Nettles- Regional Manager

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**Contact information:**

[douglas.rawlings@ecolab.com](mailto:douglas.rawlings@ecolab.com)

330-466-4590

