Integrated Pest Management

A Modern and Innovative Focus

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Aportando a la Excelencia del Sector Alimentos

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Integrated Pest Management

"Integrated Pest Management (IPM) is a **decision making process** that anticipates and **prevents pest activity** and infestation by combining several techniques or materials to achieve **long-term management**, such as structural repair, maintenance, biological and mechanical control techniques, and pesticide application."

- National Pest Management Association (NPMA)

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HACCP Based IPM

1. Conduct a Hazard Analysis
2. Identify Critical Control Points (CCPs)
3. Establish Critical Limits
4. Establish Monitoring Procedures
5. Establish Corrective Actions
6. Establish Record-Keeping Procedures
7. Establish Verification Procedures

FILTH (LARGE) FLIES

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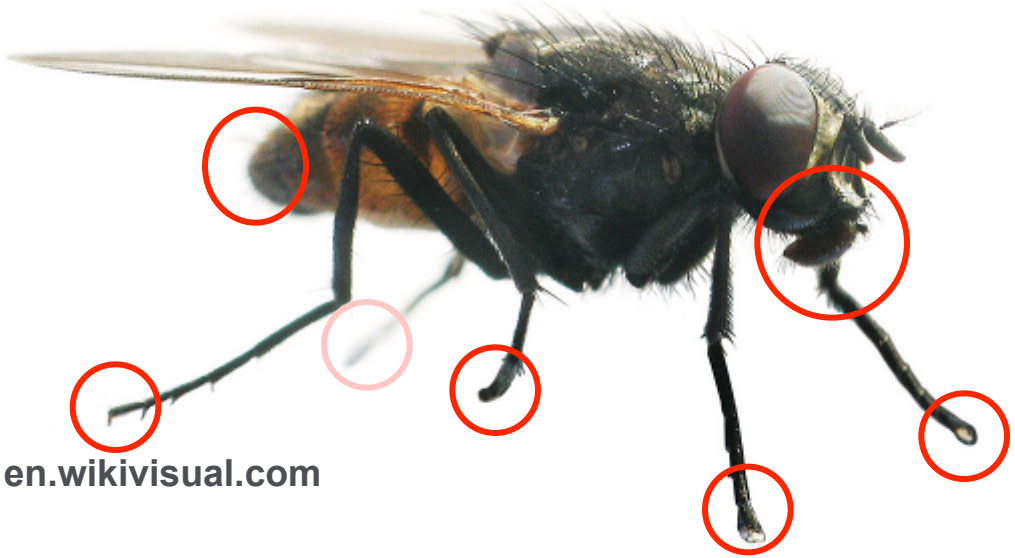
Food Safety Considerations

Filth Flies

Mechanical Transmission



en.wikivisual.com

- ***E. coli***
- ***Salmonella***
- **Dysentery**
- **Typhoid**
- **Cholera**
- **Tuberculosis**
- **Anthrax**
- **Ophthalmia**

The major danger these flies pose is transmission of pathogens through their activities. They contaminate food with their filth, and when combined with lapses in time and temperature, this can contribute to the spread of disease.

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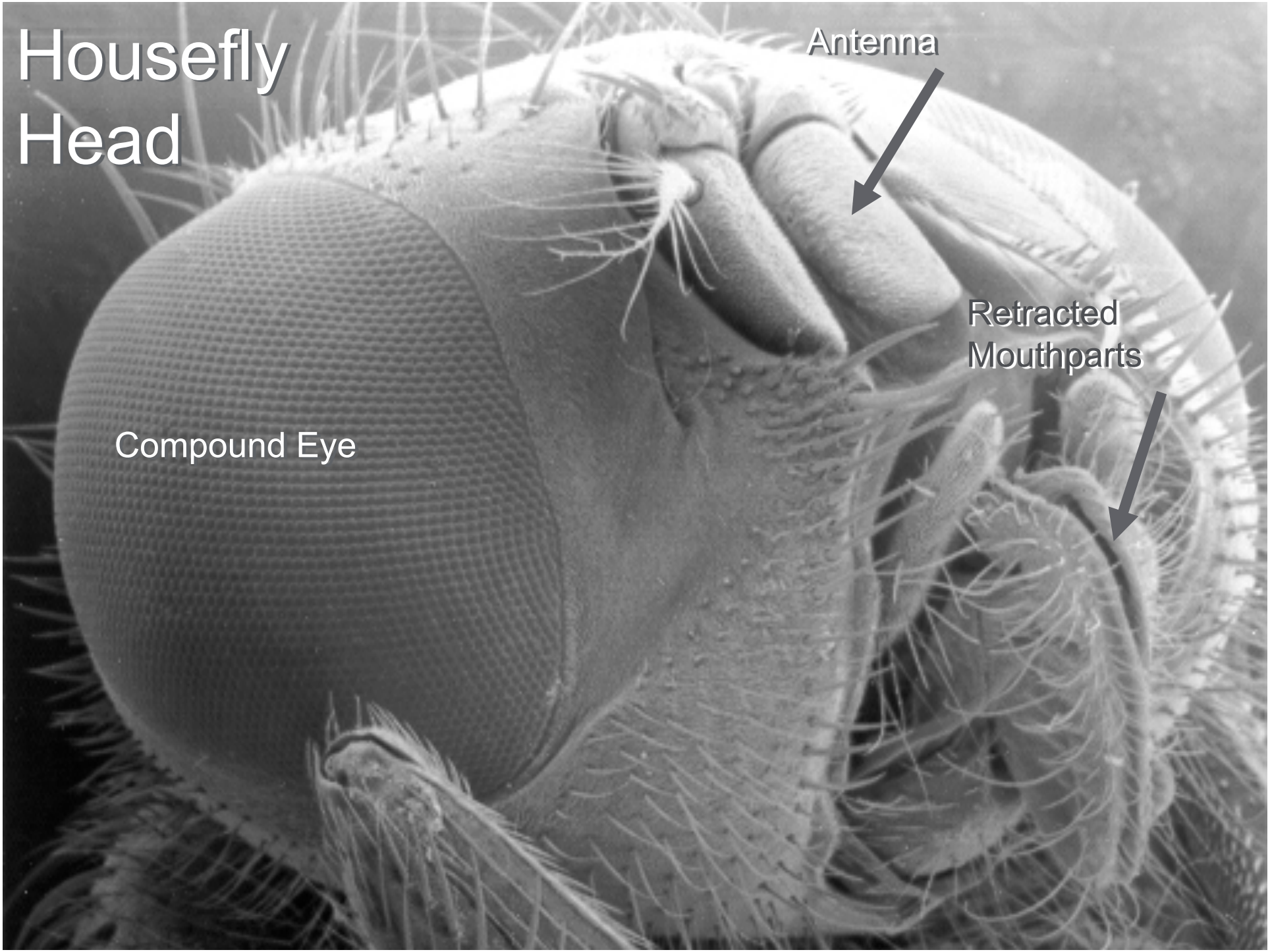
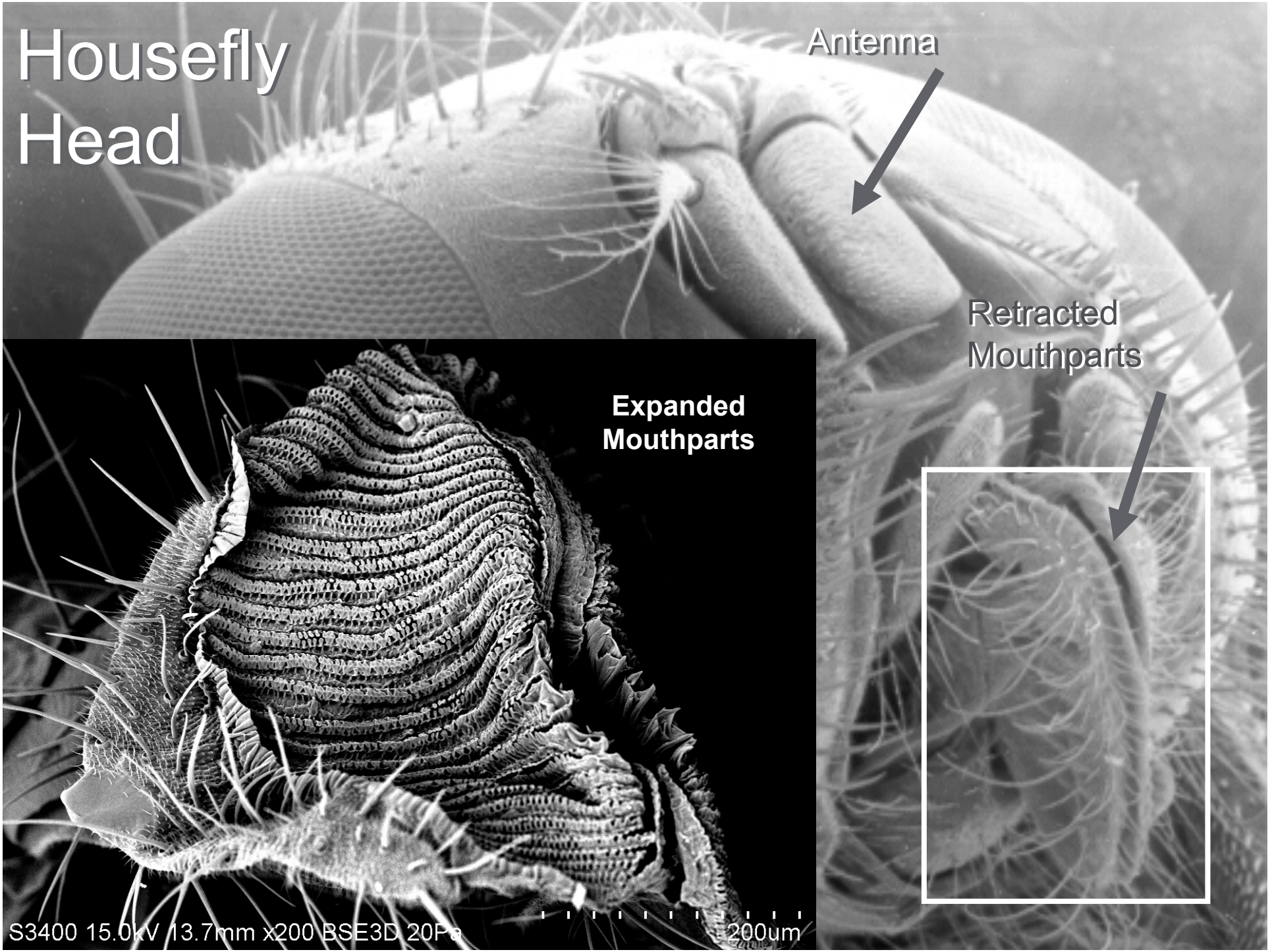
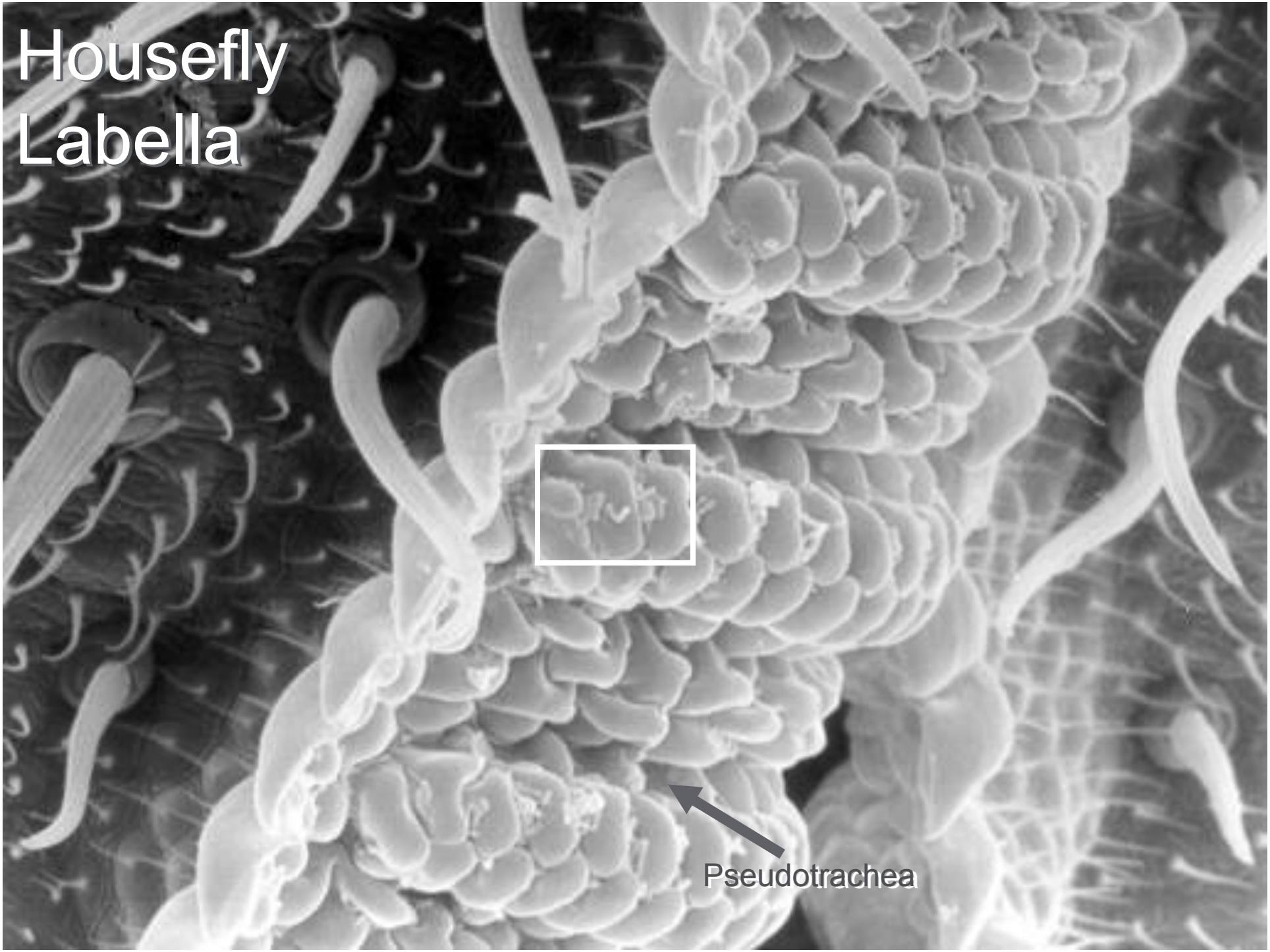
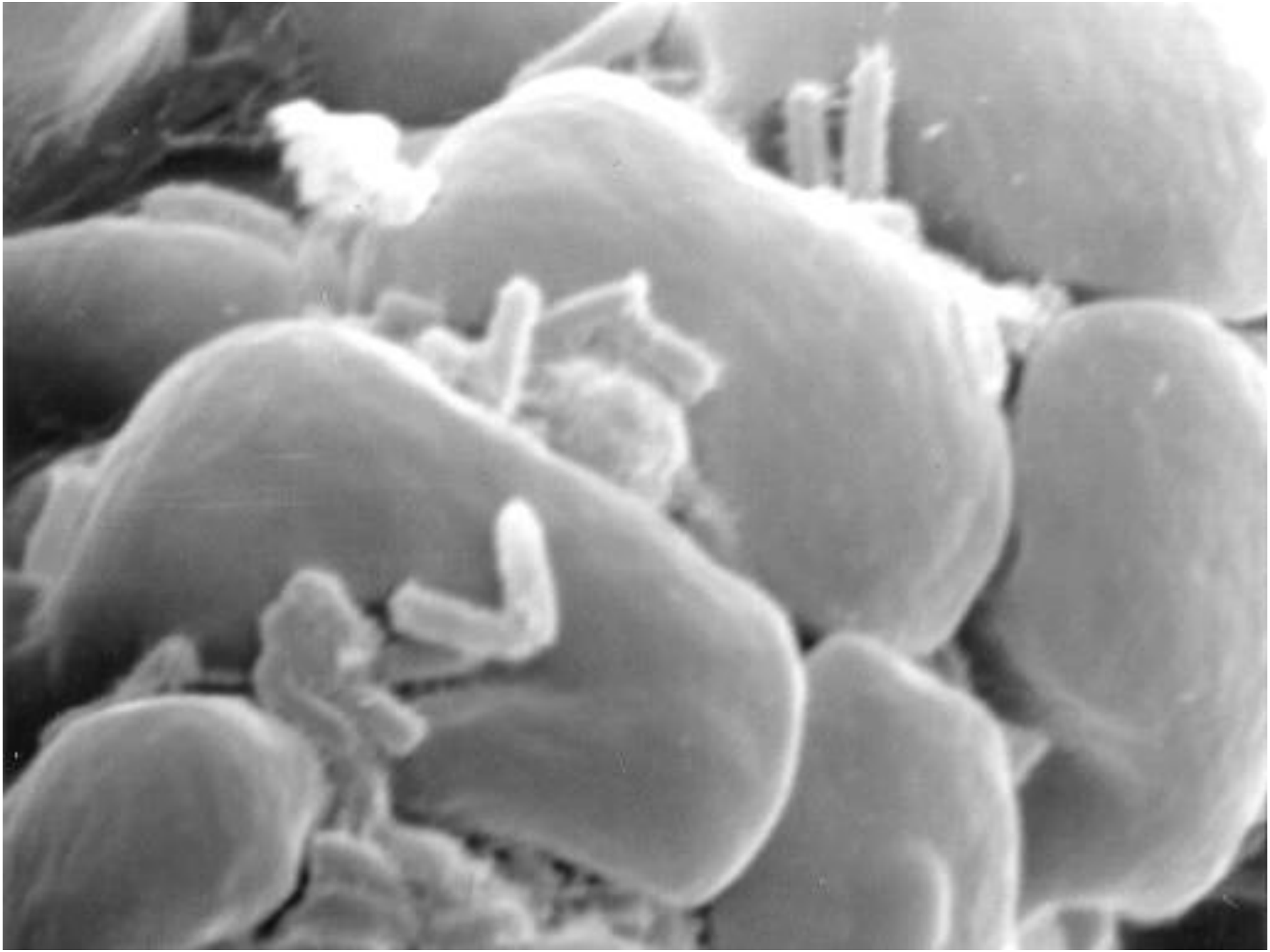
Dirty
Mouth?
www.forestryimages.org


Housefly Head
Antenna
Retracted Mouthparts
Compound Eye

Housefly Head




Housefly
Labella
Pseudotrachea



Fly Speck

Spots of gut content deposited from the fly's mouth and anus

New Stealth Technology Lab Tests

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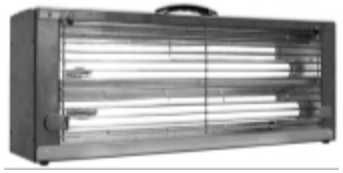
Principles of Operation

General Trap Designs

- Wall-Mounted
  - Most prevalent models
  - Diverse use in general and industrial applications

- Ceiling-Hung
  - Can emit insect-attracting light up to 360°
  - Hung above door-jamb levels to avoid traffic – best for high-fliers



- Portable
  - Tend to be used on an as-needed bases to address temporary problems (e.g., drop ceilings; spp monitoring in warehouses).

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Principles of Operation

Trapping and Containment

- Electrocution
  - Occurs at a grid composed of alternately charged rods
  - Insect falls into a collection drawer; risk of scattering insect debris
- Adhesives
  - Insect captured on a tacky surface; remains until disposal
  - Little risk of scattering insect debris
- Stunning
  - Low-voltage grid with a glueboard trapping device
  - Little risk of scattering insect debris

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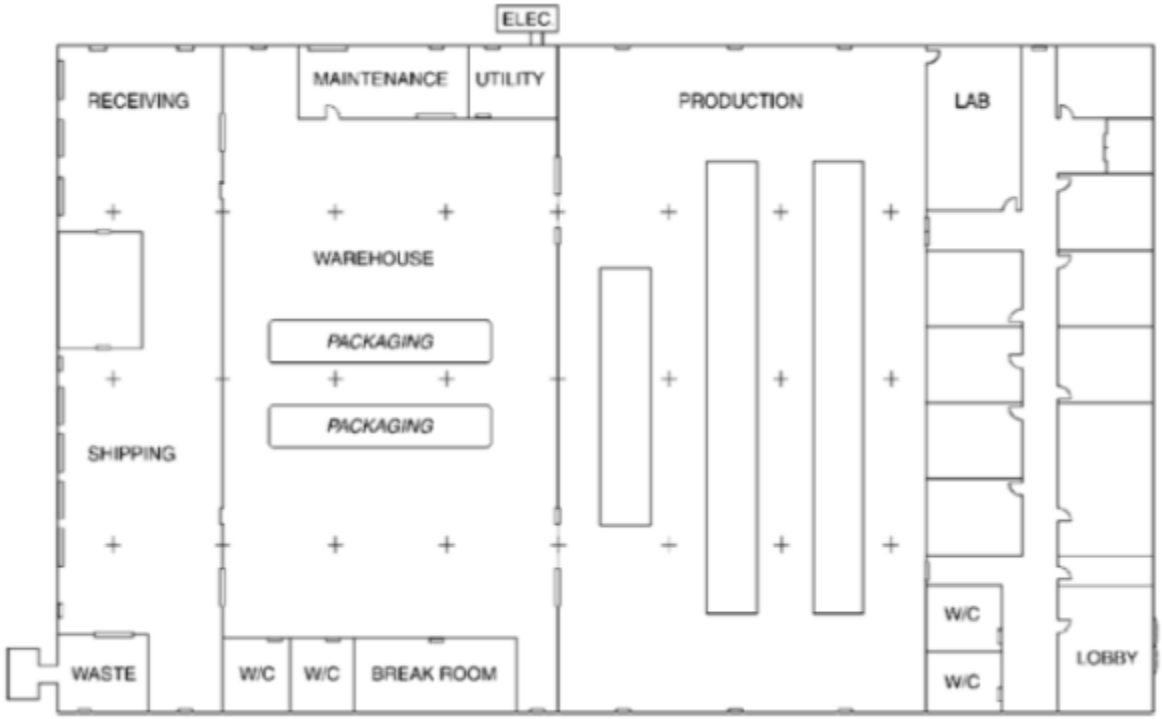
Designing and Installing and ILT System

Facility Diagram

- Obtain a diagram of the facility.
  - Architectural and engineering prints are especially helpful
  - Reference for quality assurance, pest control and maintenance programs
  - Locate ILTs for scheduled servicing and any required maintenance.



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Designing and Installing and ILT System

Surveying and Inspecting

- Begin facility survey around the building exterior
  - Trash collecting or staging areas (dumpsters and compactors), pallet stacks, foundation pads or perimeters, air handling units, utility access points, exhaust and intake fan housings and roofs
  - Identify areas of standing water.

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Additional Considerations for Flying Insect Control

- Exclusion Strategies
  - Temperature controlled vestibules, positive air pressure, window and door screening for personnel and truck doors, screening of housings for air intake and exhaust fans, caulking of structural gaps at the foundation, roof, door jambs and walls, strip curtains (plastic or chain) or air doors for active doorways.
- Lighting
  - Wherever possible, facilities should use sodium vapor lighting (versus mercury vapor) for exterior purposes and in interior areas where light may be visible from the outdoors.
- Window Tinting
- Exterior Structure Color – limit white and yellow colors
- Grounds – minimize insect-friendly habitats

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RODENTS

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Common Rodents

House Mouse
Mus musculus

Food-Borne Pathogens

- ***Escherichia coli***
- ***Salmonella spp.***

Other Pathogens

- **Amoebic Dysentery**
- **Anthrax**
- **Cholera**
- **Diphtheria**
- **Hantavirus**
- **Hepatitis**
- **Lyme Disease**
- **Ophthalmia**
- ***Shigella***
- ***Streptococcus***
- ***Tuberculosis***
- **Typhoid Fever**

Norway Rat
Rattus norvegicus

Roof Rat
Rattus rattus

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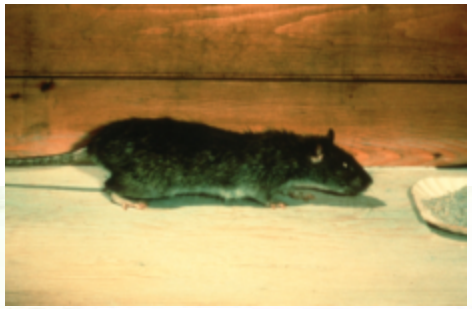
Habits and Behaviors

- Entry/Exploration
  - Mice ¼” entry
  - Rats ½” entry
  - Rats are neophobic (wary)
  - Mice are inquisitive



Prevention and Control: Rodents

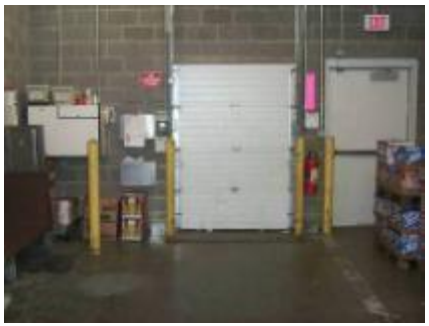
Sanitation

- Locate and eliminate exterior breeding and harborage sites, food sources and reduce attractive odors



Exclusion

- Reduce rodent entrance opportunities

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Prevention and Control: Rodents

Mechanical Control

- Capture or kill rodents before and after they get inside

Chemical Control

- Rodenticide application outside

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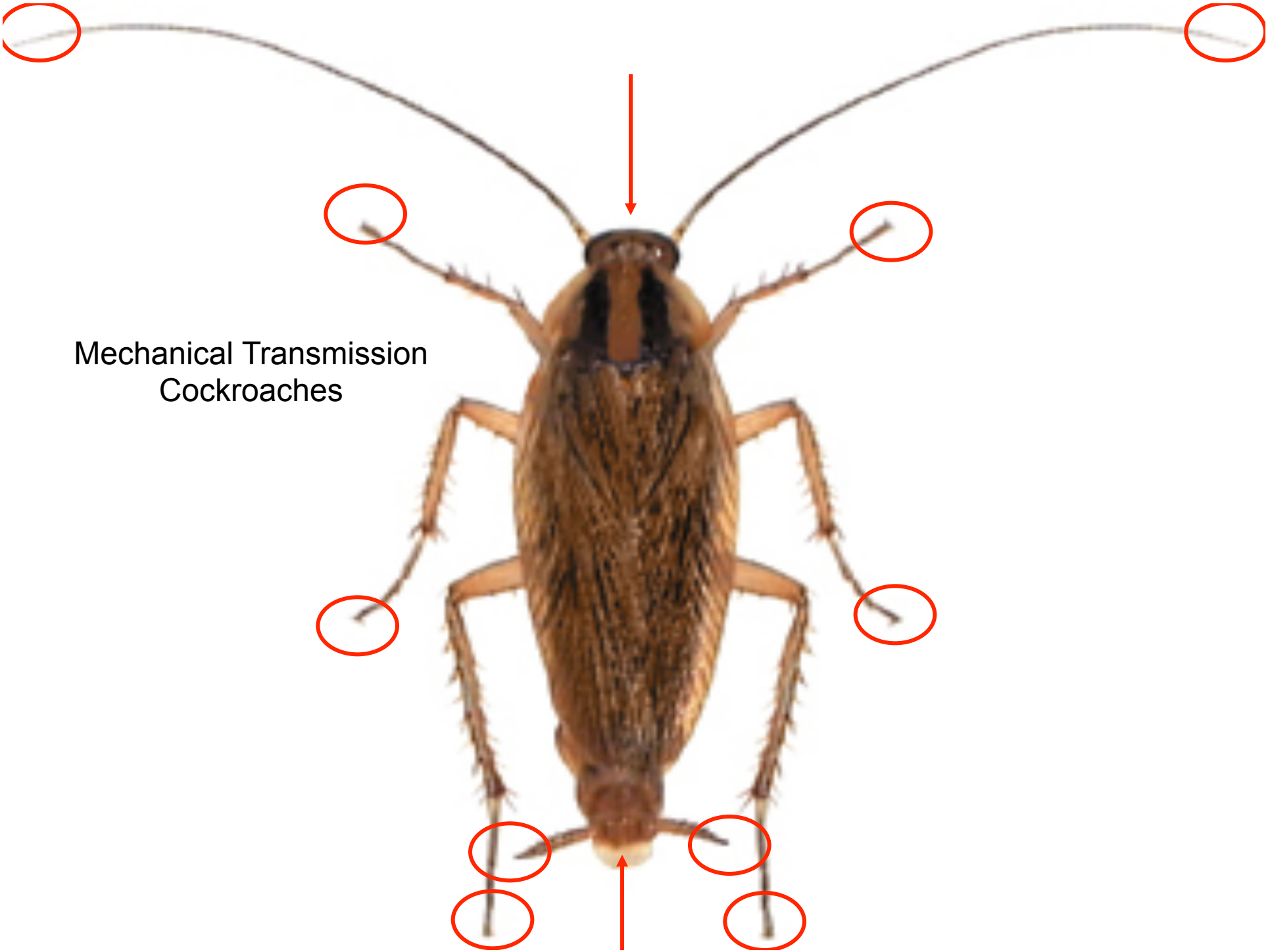
COCKROACHES

Mechanical Transmission
Cockroaches



Mechanical Transmission

- Food-Borne Pathogens
  - *Escherichia coli*
  - *Salmonella spp.*
  - *Bacillus subtilis*
  - *Clostridium perfrigens*
  - *Serratia marcescens*
  - *Pseudomonas aeruginosa*
- Other Pathogens
  - *Alcaligenes faecalis*
  - *Campylobacter jejuni*
  - *Clostridium spp.*
  - *Enterobacter aerogenes*
  - *Klebsiella pneumoniae*
  - *Mycobcterium lebrae*
  - *Shigella dysenteriae*
  - *Staphylococcus spp.*

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Prevention and Control

- Eliminate harborage areas, food, and water by
  - Correcting Structural Deficiencies
  - Improved Sanitation
  - Communication
  - Employee Awareness
  - IPM

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STORED PRODUCT PESTS: TYPES

- **Beetles**
  - Confused Flour Beetle
  - Red Flour Beetle
  - Sawtoothed Grain Beetle
  - Merchant Grain Beetle
  - Warehouse Beetle
  - Cigarette Beetle
  - Drugstore Beetle
  - Hide Beetle
  - Lesser Grain Borer
  - Foreign Grain Beetle
- **Moths**
  - Indianmeal Moth,
  - Angoumios Grain Moth
  - Mediterranean Flour Moth
- **Mites**
  - Grain, Mold
- **Booklice**




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ROOT CAUSES OF STORED PRODUCT PESTS

- Introduction
  - Infested material being brought into the facility
- FIFO Failure
  - Lack of proper product rotation
- Sanitation
  - Spillage in hard-to-clean places
  - Processing Equipment
  - Cleaning Equipment

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PHEROMONE MONITORING

- What is pheromone monitoring?
- Monitoring is the placement of pheromone traps to target specific insects by means of sex or aggregation lures. Used as a visual aid at the location to determine the level of a stored product pest infestation.
- Monitoring only shows a small percentage of the actual population in an area. Proper placement determines the effectiveness of the program.

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Roles and Responsibilities

To support successful **Integrated Pest Management** (IPM), **partnership** is required between the plant and a pest service provider.

Food or Beverage Plant

- Accessibility for regular communication with pest service provider
- Adequate facility accessibility
- Fix conditions that could lead to pest-related activity, in a timely manner

Pest Service Provider

- Communicate regularly with key plant contact(s)
- Perform services agreed to in the contract
- Document conditions and recommend corrective actions; perform regular program reviews
- Provide training to facility staff

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QUESTIONS?

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