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## Unwanted Visitors

### Protecting Coffee Warehouses from Pests

by Missy Henriksen



People are not the only ones attracted to the delicate aromas of food and the sweet flavors of coffee beans; the same odors that tempt our palates also appeal to pests. Because of the diseases pests carry and the damage they can cause to products and property, it's important that those involved in food processing and warehousing understand the importance of proactive pest management so that their inventory, product quality and reputation are protected.

## THE GMPs AND PEST MANAGEMENT

As if the reasons above aren't important enough considerations, the warehousing section of the Good Manufacturing Practices (GMPs) of Title 21, in the Code of Federal Regulations, requires that the "storage (and transportation) of finished food shall be under such conditions that will protect food against physical, chemical, and microbial contamination, as well as against the deterioration of the food and the container." This government mandate includes the elimination of pests and other debris that have the potential to contaminate the food supply. While not all warehouses that store coffee must comply with

the GMPs, they offer best management practices of sorts that should be considered by those involved with raw material food storage and those who use such services.

As part of adherence to these standards, whether voluntary or mandated, most pest management professionals will include the following Integrated Pest Management (IPM) steps in protecting warehouses from pests. These include:

### 1 Facility Inspection

The pest management professional will work with the on-site facility manager for a comprehensive sanitation and pest control report. The report will identify acceptable and deficient areas. The inspection will be done on a regular basis.

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## 2 Recommendations for Pest Prevention

Armed with knowledge from the findings of the inspection, the professional will make recommendations to facility managers to minimize pest entry points and reduce harbor-age areas. IPM includes many non-chemical strategies and is a common-sense solution for businesses looking to address pest problems.

## 3 Pesticide Treatment Practices

Often, the most effective way to treat for pests is with the application of registered pesticide products applied by a licensed pest professional. Sometimes this will involve direct application of effective materials and sometimes, especially with raw ingredients in the food industry, fumigation is required.

## 4 Evaluating the Program

Pest control is not an item that can be checked off a “to do” list once. Proper pest management includes an ongoing relationship between a facility manager and a pest management professional. Both parties must work together to protect food, property and people against the diseases and dangers that pests present.

## COMMON PESTS IN FOOD WAREHOUSES

Traditionally, food warehouses will store a wide variety of food products, many of which come from locations around the globe. In the case of coffee, of which an estimated 90 percent comes from developing countries, it is not uncommon for coffee beans to have been treated for insects prior to their shipment to the United States or even treated upon their arrival. Such shipments usually offer a certificate that states the inventory is pest-free. Even though shipments marked as pest-free may arrive at a warehouse, it is important they remain that way once they are stored. Warehouses must be vigilant to prevent against some of the pests most notorious for finding their way to food sources.

## Stored Product Pests

A variety of insects are grouped together and classified as stored product pests—those that, as their name implies, infest mostly packages and inventories of packaged food. Stored product pests include Indianmeal, peanut/rice and coffee moths; red flour and warehouse beetles; coffee berry borer; and coffee bean weevils. These infest a host of products including flour, cereal, herbs and spices, and, of course, coffee. While these pests don’t transmit disease, they can contaminate food supplies. In the coffee warehouse, important pests to recognize are the coffee berry borer (*Hypothenemus hampei*), coffee bean weevil (*Araecerus fasciculatus*) and coffee moth (*Auximobasis coffeella*), a small moth whose caterpillars feed almost exclusively on the skin of the fruit.

Coffee that is not dried to recommended levels (9–13 percent moisture) allows for fungus to grow, which makes the beans more attractive to insects. Insect pests feed on the stored coffee and, left unchecked, can reduce its weight significantly. Coffee bean weevils alone can reduce a coffee’s weight by up to one-third within six months.

An insect attack can also compromise the physical qualities of the coffee, resulting in a greater number of defects, and can even alter the finished beverage, says Flavio Meira Borém, professor of Coffee Post-Harvest and Quality at the Universidade Federal de Lavras in Brazil. “However, the most significant alterations to the quality of the drink occur when the incidence of insect damage is associated with an occurrence of fungi,” Borém adds. “The greatest damage occurs in warehouses located in areas of high temperature and humidity, such as those located in sea ports.”

An infestation of these insects is easy to see in green coffee, says Borém. Adult coffee bean weevils are small brown beetles about 5 mm in length and 3 mm in width, about twice as large as head lice. On the elytra, or leathery forewings, there are three elongated, yellow spots as well as light and dark spots in



Coffee warehouse, Cerrado, Brazil.

no set alignment, he explains. Adult coffee berry borers are small shiny black beetles that measure 1.2–1.7 mm in length by 0.7 mm in width.

The presence of insect pests in the coffee does not always mean that the beans need to be relegated to the compost heap. “When the coffee is infested only by insects and the perforations being left by the borers and weevils are clean and free of microorganisms as well as waste or toxins, the coffee can still be roasted,” Borém says.

Though fungus and insect pests cause the most damage to coffee, other pests, including rodents, nuisance wildlife, birds

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Insect Light Trap. | photo courtesy of The Green Room



Pheromone Trap. | photo courtesy of The Green Room



Insect Mating Inhibitor. | photo courtesy of The Green Room

and flies, may also be encountered in coffee warehouses.

### Rodents

Mice can enter a facility through a hole the size of a dime and rats through an opening the size of a quarter, so imagine the easy access that is offered when freight loading doors are left open or ajar. Not only will rodents chew through most packaging to access food supplies, they act as a vector, or second-hand carrier, of common diseases. In fact, the Centers for Disease Control and Prevention estimates that rats and mice spread more than 35 diseases and can easily transmit foodborne illnesses such as salmonella. The most common rodents to plague food warehousing facilities are Norway rats, roof rats and mice. In addition to the health threats they pose, rodents may also gnaw through electrical wiring, putting facilities at risk for fire. Though rodents are not attracted to coffee, they sometimes use burlap to make nests. Coffee warehouses must take measures to deter rodents because their excrement will damage coffee beans. Like many coffee storage facilities, Seattle-area warehouse The Green Room places rodent traps inside the warehouse and outside the perimeter, says Warehouse Manager Ben Ray.

Though fungus and insect pests cause the most damage to coffee, other pests including rodents, nuisance wildlife, birds and flies may also be encountered in coffee warehouses.

### Nuisance Wildlife and Birds

With warehouses having so many entrance and exit points, it's not uncommon to find occasional squirrel and raccoon invaders inside facilities without proper pest management procedures in place. In addition to the damage both pests can cause when inadvertently confined, they can transmit diseases including leptospirosis and salmonella. Birds are another

pest that frequent warehouses and can cause problems with their droppings and the secondhand pests they often carry.

### Flies

Because of many open spaces into warehouses, flies are a constant source of trouble for many facilities. They provide another vector for disease transmission.

## CLEARING OUT AND PREVENTING COFFEE-SPECIFIC PESTS

It is critical for warehouse personnel to look closely for pests as the coffee is unloaded from the container, says Ray, The Green Room's warehouse manager. The Green Room checks closely for Indianmeal moths, grain beetles, psocids and cockroaches, which can all catch rides in containers from origin. Psocids are insects that burrow into stored food and grain, including coffee beans. However, Ray says, "they need moisture to survive, so they don't survive in the Northwest due to our mild climate."

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House Fly. | courtesy of the National Pest Management Association/Tom Myers



Red Flour Beetle. | courtesy of the National Pest Management Association/Tom Myers

The Green Room uses pheromone traps, insect light traps and mating inhibitors to control insect pests. “These inhibitors have worked great for us the last three years,” Ray says. “In fact, in the last two years, the WSDA (Washington State Department of Agriculture) hasn’t even seen an Indianmeal moth in our facility. It’s pretty standard having a few flying around in a coffee storage facility.”

If a container were to arrive with visible insect stowaways, warehouse staff would seal the container until a pest-control company arrived to fumigate it, Ray says. “If the coffee is organic, we would send the coffee to a freezing facility and have the coffee frozen for six days,” he adds.

When insects are spotted, coffee warehouses must undergo a thorough cleaning. “Once an occurrence of insect pests has been identified in processed coffee, the affected lot must be submitted to a purge,

since the infestation can continue throughout the warehouse, increasing the losses,” Borém explains. “The products used to purge the warehouse do not leave residues on the coffee.”

The insects do not directly damage coffee bags or packaging. But Borém adds, “As insect eggs and pupae can remain on these containers, bags from old crops should not be reused, thereby avoiding contamination of new lots and dissemination to other warehouses. Because these are warehouse pests, the method that helps to control them is cleaning, removal and elimination of residual coffee from the warehouse before the entrance of a new crop.”

If insects become frequent visitors, a warehouse should take preventive measures such as fogging and spraying with insecticides registered for use in food storage facilities. “The adoption of quality management tools such as Hazard Analysis and Critical Control

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coffee warehouses  
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Points (HACCP), including the traceability of lots, also contributes to the prevention of future infestations,” explains Borém.

## ADDITIONAL PEST PREVENTION RECOMMENDATIONS

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There are numerous preventative, proactive steps facilities must take to avoid the contamination and disease risks associated with pests, as well as the damage they can cause to stored inventory. Additionally, each company’s pest management professional will offer site-specific recommendations. Recommendations will begin after a complete sanitation and pest control inspection are completed. The inspection should include exterior areas, the interior and exterior of the building, garbage and trash areas (indoor and outdoor), restrooms, lunch rooms, office areas, warehouse and storage areas, and public areas.

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House Mouse. | courtesy of the National Pest Management Association/Tom Myers

There are several fundamental steps that warehouses should take to control pests, including removing pest entry points and eliminating places where pests can hide.

## REMOVAL OF PEST ENTRY POINTS

- Screens on doors and windows should be intact.
- Place door sweeps under all doors between the inside and outside if any gaps are present.
- Direct employees to make sure doors are closed at all times and are never propped open, even on hot days (self-closing doors can be beneficial).
- Install air doors and plastic curtains to reduce interior access by flying pests.
- Insect light traps are effective but be sure to take care during their installation to ensure that they do not attract outside pests.
- Check all incoming stock for pests or evidence of pest damage.

## ELIMINATE PEST HARBORAGE AREAS

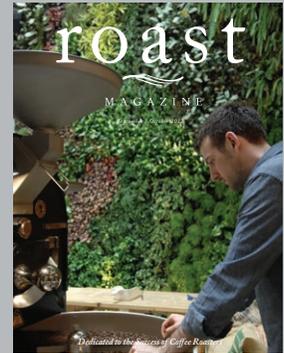
- Remove clutter and debris from around the storage facility and dock areas.
- Maintain proper landscaping by trimming long grass and weeds, cutting back bushes or tree limbs that may touch the warehouse facility, and keeping mulch at least 18 inches from the foundation of the property.
- Empty all sources of standing water on a regular basis.
- Similarly, interior plumbing must be in good order as leaky pipes and those with holes around them can attract pests.

- Remove trash and empty dumpsters, which should be on rigid cleanable areas, on a regular basis.
- Clean up food spillage immediately.
- Clean elevator shafts regularly as accumulations of debris can attract insects and rodents.
- Employee break rooms must maintain clean practices as well. Remove food debris and trash promptly, empty recycling containers regularly and clean food surfaces and floors frequently.
- Store food inventory off the ground and 12–18 inches away from the walls.
- Use the oldest food inventory first. Follow the first in, first out model.

It is virtually impossible to keep all insects out of the coffee supply chain. The Food and Drug Administration (FDA) agrees. As most readers know, the FDA allows up to 10 percent of coffee beans to be damaged or infested before the food is rejected. But just because a few bug parts are acceptable, it doesn't mean it is desirable or that facility managers should be complacent. Because of the diseases associated with pests, and with the facility and product damage they can cause, it's important that all coffee storage warehouses work with a trained and licensed pest professional to ensure the warehouse environment properly protects the inventory for which it is responsible.



**MISSY HENRIKSEN** is vice president of public affairs for the National Pest Management Association. The NPMA, a nonprofit organization with more than 7,000 members, was established in 1933 to support the pest management industry's commitment to the protection of public health, food and property. For more information about pests and prevention tips, visit [www.pestworld.org](http://www.pestworld.org).



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