

# INDIAN MEAL MOTH (IMM) *Plodia interpunctella*

## Description:

### Adults:

Adults are approximately 0.5 in (12.7 mm) with a wingspan of 0.6-0.8 in (16-20 mm). Forewings are silver-grey, with the distal two-thirds copper to brown in color, and hindwings cream to off-white.

### Eggs:

Females lay 300-400 eggs in small clusters on stored cereal, flours, or other food resources. Eggs are white to yellow-white, oval, and 0.01-0.02 in (0.3-0.5 mm) in length.

### Larvae:

Mature larvae are dull white with a brown to black head capsule, and approximately 0.5 in (12.7 mm) in length. Larvae have five to seven instars and can take on a hue of the color of their host commodity.

### Pupae:

Pupae are 0.25-0.4 in (6-11 mm) and are pale brown. Pupation occurs away from infested material.



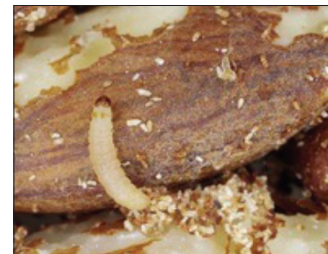
Left: Dorsal view of adult female. Right: IMM larva and pupa (Source: John Obermeyer, Purdue Extension).

## Hosts:

All types of stored-grains, especially corn meal (Indian meal), cereals, packaged cereals, flours, beans, candies, chocolate, nuts, and dried fruits, and meats. Their distribution is cosmopolitan in nature and can be found outdoors as well as indoors.

## Damage:

- Larvae are surface feeders and consume stored grain, infests field crops such as drying and dried raisins, cherries, apricot, and peach pits, and contaminates stored products with silken webbing and frass.
- Adults do not feed and therefore do not cause direct damage, but their presence is a nuisance and can be seen by customers a lack of cleanliness.



Left: larval feeding damage and webbing (source: Oklahoma State University Extension). Right: larval damage to stored almonds (source: action pest).

## Phenology:

Life Cycle	28-35 days
Egg hatch	2-22 days
Larvae (while feeding)	21-240 days
Pupae	4-9 days
Mating/oviposition	1-2 days after eclosion
Adult lifespan	2-30 days

Threshold temperature 15°-32°C (59°-90°F)

## Lure Type and Maintenance:

\* Please note that the lure recommendations can change depending on the trap being used.

- STORGARD® IMM + 4 controlled release lure.**
  - Replace STORGARD® IMM + 4 lures every 6-12 weeks or according to individual package instructions.
- STORGARD® ULTRA-COMBI™ QC MOTH AND BEETLE controlled release lure.**
  - Replace STORGARD® ULTRA-COMBI™ QC MOTH AND BEETLE lures every 6-12 weeks or according to individual package instructions.
  - Or replace traps and lures when traps are saturated with dirt or debris.
- STORGARD® IMM + 4 BROAD SPECTRUM® QC MOTH controlled release lure.**
  - Replace STORGARD® IMM + 4 BROAD SPECTRUM® QC MOTH lures every 6-12 weeks or according to individual package instructions.
  - Or replace traps and lures when traps are saturated with dirt or debris.

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## **Lure Storage:**

- Store in unopened factory sealed packages in a cool place (< 74° F or 24° C maximum) for short periods or refrigerate longer term.
- Refrigerate or freeze unopened packages to carry over for annual storage.

## **Trap Design:**

- STORGARD® II, STORGARD® III, PHEROCON® 1C, or MICRoDOT™ trap.

## **Placement Time:**

- When the commodity is in a location where the ambient temp is above 55°F (12.7°C).
- Initiate monitoring program with a full-area survey for at least one month while there is insect activity.
- Monitor incoming commodities and off-loading areas intensively.

## **Placement Pattern:**

- Place in a grid pattern evenly spaced throughout the building.
- Hang traps on walls or posts that are out of the way of human or machinery traffic.
- When appropriate the traps can be placed under shelving.
- Around processing, filling, and packaging equipment. Never over any sort of conveyor.
- Keep traps away from water.
- Use in closets and other residential areas.

## **Trap Maintenance:**

- Check traps 1-2 times weekly.
- Replace traps as recommended, or when fouled with dust or insect debris.

## **Recommendations:**

- Mark trap location using a map and pinpoint areas of infestation for future reference.
- Few IMM captured in scattered locations is a signal to increase attention to monitoring program.
- Monitor on a continuing basis, regardless of frequency and rate of capture.
- Use guidelines below as treatment thresholds to focus IPM treatment program:

### ***Occasional Low Capture, IPM Protocol:***

- Tighten STORGARD® trap-grid in areas showing marked or general increase.
- Check inventory for at-risk infested commodities.
- Remove/clean contaminated commodities.
- Check for outside sources of infestation.

- Review sanitation program and continue to monitor for infested commodities.

### ***TREATMENT:***

- Delay insecticide treatment until there is evidence of a significant population change.

### ***Constant Low Capture, IPM Protocol:***

- Tighten STORGARD® trap-grid areas of marked increase only.
- Remove/clean contaminated commodities.
- Review sanitation program and continue to monitor for infested commodities.

### ***TREATMENT:***

- Initiate insecticide treatments in areas considered susceptible or especially valuable.

### ***Constant Localized High Capture, IPM Protocol:***

- Tighten STORGARD® trap-grid in areas showing marked or general increase.
- Remove/clean contaminated commodities.
- Review sanitation program and continue to monitor for infested commodities.

### ***TREATMENT:***

- Initiate insecticide treatments in areas considered susceptible or especially valuable.

### ***Constant High Capture, IPM Protocol:***

- Remove/clean contaminated commodities.
- Review sanitation program and continue to monitor for infested commodities.

### ***TREATMENT:***

- Initiate insecticide treatments immediately.

*Source: Recommendations and certain other sections were sourced from University of Florida Extension, Oklahoma State University Extension, and Purdue University Extension guidelines.*

### ***Note, always:***

- Use only one pheromone lure per trap.
- Count and record captures as recommended.
- Change trap as needed.
- Discard lures in trash far from the area of use and remove trash afterwards.
- Follow recommendations.
- Contact local extension authorities and consultants for regional advice.