

# Indian Meal Moth – What You Need to Know

By Dr. Bhadriraju Subramanyam

Anyone in the grain, food, and retail industry involved in storing, processing or handling grains or grain-based products has seen or heard about the Indian meal moth. This pest is distributed



*Indian meal moths are one of the most commonly found pests in the U.S. food industry.*

worldwide, and in the United States it is the most commonly encountered species in finished and packaged food products, especially at the retail level. I'm often asked: where are these pests usually found? The truth is that they're found throughout the food distribution system, and tend to be more commonly found at the retail level. They have been reported in 48 different countries and associated with 179 stored commodities.

This pest has been found in raw agricultural commodities stored on farms or at elevators, in addition to grain-processing facilities, bakeries, warehouses, distribution centers, retail stores, and even in the pantry of consumer homes. Indian meal moths are found in all areas of the United States, and they are more prevalent during the summer months where temperatures range from 64 to 95 degrees Fahrenheit. The Midwest and Southeastern United States weather during the summer months is quite ideal for them to survive and reproduce.

An infestation can start with moths (adults) or with larvae (caterpillars) moving from one infested product to the other. The adult moths are short-lived (week to 10 days) and do not feed. The females, after mating, find a suitable place to lay their eggs. Each female is capable of laying 100-300 eggs. The eggs then hatch into larvae. Most consumers become aware of the infestation by the webbing produced by the larvae. Every year I receive many inquiries from people or media, who have discovered larvae in their food products. The Indian meal moth larvae are often wrongly referred to as “maggots”. They are “caterpillars” not maggots.



*Indian meal moth larvae are found in many packaged foods and are often confused with maggots by consumers. This is a fifth stage larva.*

The reason that Indian meal moths are most commonly found in retail outlets or in home pantries is because they are attracted to cereals, stored grains, dried fruits, chocolate, and nuts. All products with these ingredients are more prone to Indian meal moth infestations. Indian meal moths get into our food when female moths after mating seek a place to lay their eggs. They choose to lay eggs near a food source, because



like all good parents, they want their newborns to have access to nutrient rich types of foods for survival.

The larvae start out as tiny caterpillars and as they feed they get bigger and bigger. Typically, there are five different growth stages of the larvae. We have shown that all larval stages, depending on the packaging type, are capable of penetrating packages by chewing a hole through the packaging



*Indian meal moths are the most common insect pests in retail outlets and home pantries.*

material. If the package seal is not intact, larvae tend to go through such openings because it is easier to invade a package rather than penetrate a package. In the fifth and final growth stage, the larvae wanders to find a suitable place to rest and turns into a pupa before transforming into an adult moth. Inside the pupa cocoon an adult is formed, and after several days, an adult moth emerges from the pupa.

Most major food manufacturing companies are aware of these pests and deploy state-of-the-art pheromone traps to monitor or control the presence of the moths during processing of food products. In addition, the insects at all stages of their development cannot withstand or survive the baking process used for making packaged food products. Here are five recommended steps for avoiding Indian meal moth infestations from occurring or spreading should one make its way into your food or home.

1. An obvious, but overlooked step is to check the packaging date to ensure freshness. When possible, thoroughly examine at-risk foods such as cereal products, flour, and dried fruit and nuts for signs of infestation before purchasing. Typical signs would be the presence of webbing or silken threads especially near the seams of packages. Avoid purchasing food with damaged packaging or wrappers; larvae can easily enter such food packages.
2. When possible, avoid storing at-risk food for longer than a month, especially during hot summer months. Store foods in insect-proof containers made of plastic, metal, or glass, ideally with screw-type lids. When possible, prioritize storing susceptible foods in the refrigerator or freezer.
3. Avoid leaving food scraps or crumbs in areas where food is stored, such as pantries and counter tops. Open food can attract these pests.
4. Should an infestation occur, it's important to identify the source and dispose of it quickly in industrial strength plastic bags or sealed garbage containers outside of the house. As infestations can grow quickly, early detection is critical to avoid serious infestation problems later.
5. Lastly, it's also important to know that while unappetizing to find, life stages of Indian meal moths do not cause any harmful effects to humans. Always examine your food prior to consumption, and throw away products with live insects. Do not panic if you accidentally bite into food with Indian meal moths. The best thing to do is to stop eating and dispose of the product as described above.

*Dr. Bhadriraju Subramanyam is the Don Wilbur Sr. Endowed Professor of Postharvest Protection (2012-2014) and a University Distinguished Professor at Kansas State University's Department of Grain Science and Industry, Manhattan, KS 66506. Tel: 785-532-4092; E-mail: [sbbadrir@ksu.edu](mailto:sbbadrir@ksu.edu); Website: <http://www.grains.ksu.edu/spirel>.*