



STORED PRODUCT INSECTS THREATEN PET FOOD

Stored Product Insects (SPIs) are a group of insects, primarily beetles and moths that feed off of grain-based foods. Not only do they feed off of them, they live in them. We may not notice them because they're very small (typically 1/8" to 1/4" long) and living in the food they're eating, but once the populations get larger, they'll infest nearby product, making their presence known and often difficult to control.

Pet stores and the pet section of retail stores have a huge challenge on their hands. A large percentage of their product is grain-based pet food. This food is highly susceptible to SPIs. Grain-based stored product foods, such as dog food, are vulnerable to pest populations from the moment it was created in a food processing plant, to the moment it is used. At any point along the food's "life," it can be infested. Let's look at the journey a bag of dog food takes and the points at which it is susceptible to stored product pests.

1. **Manufacture:** Dog food is made at a dog food processing plant, which can be threatened by many species of SPIs. These pests are often living in the manufacturing facility. Beetles or moths will lay their eggs in the food or bag as it is being filled. The bag is then sealed up, but the eggs can hatch into larvae which will grow as they eat the food.
2. **Storage and Transport:** After the bag of dog food is created, it will go to an area for storage or transport. If the truck or warehouse is carrying infested product, those populations may reach numbers where they may need to find new food. Some species of SPIs can bore holes in packaging, spreading the population from one bag of food to many.
3. **Retail:** Infestations can start at the store. Populations living in the retail environment will continually spread, looking for additional food sources.
4. **Consumer:** Infestations can even take place at the consumer's home. Some species are present in the exterior of a building and will fly into homes looking for food. Other times, there may be a population in the home already which will spread to the dog food.



Pet food stores and pet food aisles are susceptible to Stored Product Insects.



Indianmeal Moth larvae in bird seed.
Photo courtesy of Iowa State University.



Keeping Pet Food from Becoming Pest Food

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MITIGATING THE RISK

It can seem overwhelming when you evaluate the risk for dog food (or any stored product) by considering the path it takes and all the points in which it's vulnerable to SPIs. But, there are efforts that can be made along the path to mitigate that risk.

SANITATION: SPIs are often a symptom of a sanitation problem. SPIs don't need much food in order to survive. Just a handful of dog food trapped behind a pallet rack leg can house a population of Warehouse Beetles for months, even years. Sanitation is so key to SPI management because the insects are living in the food that they're eating. If we get rid of their food source, we get rid of their home; we get rid of the pest.

Sometimes this can be easier said than done, as there are many hiding places where food debris can collect. It's human nature to clean up the spills that are easy to access, but those tough hard-to-reach spills are the ones that aren't cleaned up and become an excellent habitat for SPIs. A strong sanitation program can help reduce the chances of SPIs developing within an environment. In a pet store, this means checking under shelves and racks for fallen food and vacuuming the area regularly. Bags will inevitably break and spill. If those spills are completely cleaned up, we eliminate the food and the habitat that the SPIs need.



Indianmeal Moth pupating in the folds of food packaging.
Photo courtesy of Lyle Buss, University of Florida.

EXCLUSION: Many species of SPIs, such as the Indianmeal Moth, the Cigarette Beetle, and the Warehouse Beetle; are also found outside of a building. Keeping them out of the building is as simple as closing the doors and windows and tightly sealing the building to ensure they can't come in. Exclusion is key for our containers of product, as well. If we bring dogfood home from the store, transferring it to an air-tight plastic container will reduce the chances of infestation. If we leave it in the paper bag, rolling the top down after we open it, we run the risk of the SPIs getting into the product and infesting it.

MONITORING: An important step to eliminating SPI problems in any facility is to know if you have a problem. Sometimes, populations will get so large that we can see the adults (and sometimes the larvae) flying or walking around. If the population has gotten to this stage, though, we're in trouble and it's a lot harder to eliminate them when they're everywhere than if they're still localized to specific areas or bags. So instead of waiting to actually see these tiny insects, we have monitoring tools that are available. Pheromone-based monitoring tools are typically the most effective, quickly letting us know if there's a population that needs to be controlled.

Pheromones are species-specific chemicals that insects use to communicate with one another. For several species of SPIs, pheromones have been manufactured that mimic the natural pheromone. We can put the mimic in a trap. SPIs will be drawn to the pheromone and are trapped in the sticky traps. We then know that we have a population in the building. Our placement of traps can help us pin-point exactly where the infestation is, if there's multiple infestations, and if the infestation is moving over time. Unfortunately there aren't synthesized pheromones for every SPI, but for the ones that there are, monitoring is an effective tool to identify that the SPIs are present.



Drugstore Beetle damage in a dog biscuit.
Photo courtesy of <http://beestingbrose.blogspot.com/>



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By Anna Getchell, Operations Process Manager, McCLOUD Services

REFRIGERATION: SPIs will only complete their development within a range of temperatures. That range will vary a bit by species and other environmental factors such as humidity, but in general they are most successful between 68-86°F. That means that if we can modify the temperature of the environment they're in, we can slow their growth. Refrigeration or freezing is therefore a great tool to slow down the development of SPIs. Even if there are eggs in the dog food, for example, they cannot hatch into destructive larvae or emerge from pupae as adults ready to reproduce if the temperatures are too low. Having a freezer or refrigerator to store high risk product in can help reduce the chances of infestation throughout a store.

FIRST-IN, FIRST-OUT: Temperature isn't the only thing necessary for SPIs to develop, they also need time. Infestations typically stem from the forgotten older bags of food. If, for example, a 50-lb bag of dog food is shelved at a pet food store, but consumers are buying the smaller bags, that 50-lb bag may stay on the shelf for awhile. Most SPI species need about 30 days to go from egg to adult in good temperatures and humidity. That means that if there are eggs in the bag, they'd never have the chance to grow into adults and mate and infest the bag if the dog food was used quickly. The longer that bag of dog food sits there, the more risk it poses to the pet store or retail environment. In fact many infestations stem from forgotten bags. Bags that have gotten lost in the system or have fallen behind shelving. Having a short stay on the retail shelves will reduce the chances of infestation in the retail environment. This is tied to stock rotation, or "First-In, First-out" (or FIFO). The product that was put on the shelves in April should be used/sold before the product that was put on the shelves in May because it's been there longer and poses more risk the longer it stays.

MATING DISRUPTION: For the Indianmeal Moth, we can install plastic dispensers that are impregnated with sex pheromone. These are hung throughout the store or aisle and fill the air with the sex pheromone. Normally, a male Indianmeal Moth follows that pheromone to find a female to mate with, but when the pheromone is everywhere, he can't find her. The moths never find one another and can't mate, so the population quickly dwindles.

By implementing these proactive measures, we can protect pet food from becoming pest food!

About the Author

Anna Berry is training manager at McCLOUD Services. She is a board certified entomologist, member of the Entomological Society of America and is certified in HACCP and ServSafe. Berry holds a bachelor's degree in biology from the University of Oregon and a master's degree in grain science from Kansas State University.

About McCLOUD Services

Founded in 1904, McCLOUD Services, based in South Elgin, Ill., is the leader in food protection services throughout the chain of custody – from grain elevator to grocery store. McCLOUD Services is known for its integrated approach to pest management, specifically designed for the food supply chain of custody. Serving the largest food-related brands in the U.S. McCLOUD Services has locations in 11 states with nine service centers.

McCLOUD Services is a founding member and shareholder in Copesan, an alliance of premier pest management companies with locations throughout North America. Headquartered in South Elgin, Illinois, McCLOUD Services has locations in Illinois as well as throughout Indiana, Iowa, Kansas, Kentucky, Missouri, Tennessee, Ohio and Wisconsin.

For more information, please visit www.mccloudservices.com