



## ANTS: A COMPLEX, BUT CONTROLLABLE PEST

Controlling ants in and around a food plant is complex because of the vast number of ant species and the biological, behavioral, and feeding differences of each. There are more than 12,400 species of ants throughout the world and about 1,000 known species in the U.S. While only about 25 of those are considered pests, and even fewer tend to inhabit any one geographic area, even a single ant in food processing facility can indicate a bigger problem. Thus, identifying the ant species is critical to its control and elimination.



Carpenter ant

Effective elimination relies on understanding the feeding and social behavior of the ants that have invaded. As examples: if a bait is placed in an area where the ants don't travel, or it consists of a food ingredient to which it is not attracted, the bait will do little except collect dust. If inspection is conducted outdoors for the colony of an indoor-nesting ant, the time will be spent in vain. If only a single colony of a multi-nest ant is found and treated, the infestation is unlikely to be eliminated.

Even within a species, complexities can arise. For example, the pavement ant often will nest under sidewalks and driveways in temperate weather – then move indoors during the winter, nesting under the foundation or near a heat source. Ants also can have seasonal variations in food preferences, with many foraging for proteins in the spring as they work to build up the colony, then preferring more sugar/carbohydrates in the summer and fall.

FOOD PREFERENCE	SUGARS	PROTEINS	GREASE/FATS
Argentine Ant	X	X	
Carpenter Ant	X		
Odorous House Ant	X	X	
Pavement Ant	X	X	X
Pharaoh Ant	X	X	X
Thief Ant	X		X

Source: Compiled from Agriculture & Natural Resources, Univ. of Calif.

### The Ant Queen



What does the ant queen do and why is she so important to the colony?

The queen holds the highest rank in an ant colony – there is no king. However, contrary to her title, the ant queen is not in charge of the colony; she does not direct the ants or make colony decisions. Rather she lays eggs.

However, this is more important than it may seem because she is the only one that can lay eggs and reproduce workers to ensure the survival of the colony. Some species do have more than one queen per colony, but there is a limited number, so if the queen(s) dies, the colony dies, because no new workers will be produced. Once the last of the existing workers reaches its three- to four-month life span and dies, the colony will go defunct.

The queen's egg-laying role also is her only role. She does not search out food, ever leave the nest, or even feed herself. Rather, she is fed by the workers who are all sterile females. As a colony grows, it will eventually produce winged male and female ants, which swarm from the nest to mate. After mating, the male will die and the female will seek a new nesting site – to start the process over again.

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## ANTS: A COMPLEX, BUT CONTROLLABLE PEST

### Impact on Elimination

Baits are the most effective form of treatment for the majority of ant species, especially those which invade structures.\* This is because the worker ants will feed on the bait – which contains an attractant and an insecticide – and carry it back to the nest to share with other colony members, including the reproductive queen. Ants are able to do this because they have two stomachs – one which holds the food for its own consumption, the other for the food that is to be shared with other ants through trophallaxis, e.g., regurgitation.

While some ant species are monomorphic (having all its workers of similar size), others show the evolutionary trait of polymorphism (having workers of varying size). This variation enables a division of labor. Some species, for example, have soldier ants, which are large, sterile females with strong mandibles, enabling them to defend against predators as well as to crush food sources, while the bite of the smaller worker is better suited for cutting.



**Polymorphic:** Ants vary in size (Atta.cephalotes shown). (Leftmost 7 are workers of various castes, right 2 are queens (Rightmost: winged form) photo credit: Gamekeeper



**Monomorphic:** Ants of similar size (Acrobat ant shown)

**The Partnership.** For a bait to be most effective, pest access to alternate food and water sources needs to be reduced as much as possible. In the food or beverage facility, this means maintaining a sanitary environment, cleaning up spills and crumbs, keeping garbage emptied, repairing leaks, eliminating equipment harborage areas, etc. It also is important to understand that bait does not take effect immediately, but it is a long-term solution. While it can take a week or two to stop seeing ants, the feeding of the bait to the colony and queen enables complete kill of the ants that you don't see, instead of just the workers that you do.

*\*Although bait is generally the best choice for controlling ants, applicators need to always ensure the specific application is listed on the label and allowed by the food plant's third-party audit standards, and that the bait is on the approved products list before any applications are made.*

## IS YOUR PEST PROGRAM DOCUMENTATION AUDIT READY?

Proper documentation is critical to proving the success of your Integrated Pest Management (IPM) program to auditors. In fact, pest management can account for up to 20% of the total score on a customer or third-party audit. Additionally, with audits now supporting the new rules of FSMA which require a written Food Safety Plan – including pest management – the thinking of FDA is applicable to any audit report. If it is not documented, it has not been done; if it is documented, it better be done exactly as the documents say it has.

Because of this, it is important to ensure you are working closely with your pest management provider, not only to proactively prevent pest activity through effective sanitation and facility management strategies, but to ensure it is all being properly documented and is quickly and easily accessible for audit review.

It is exactly for such reasons that electronic documentation of the pest management program provides such benefit – particularly when it is available through an online, secure website. Not only does this online data make it easy for your QA managers and auditors to find detailed information all in one place, it provides historical and geographic insights by which to understand existing or potential problem areas, assess risk, and take action for continuous improvement and preventive protection against pests.



- Service Reports
- Equipment Location Diagram
- Pesticide Usage Log
- Service Specialist Licensing
- Business Insurance/Licensing
- Other Facility- or Audit-Required Documents
- Online Accessibility
- Current and Timely Data
- Interactive, Dynamic Trending Data
- Ability to Print & Send Electronically

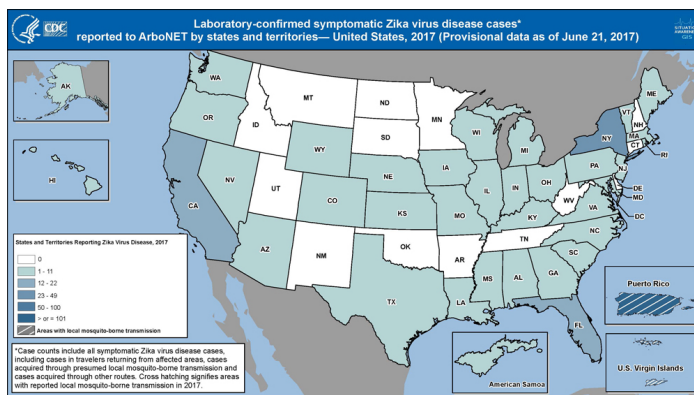
If you don't yet have an electronic logbook tracking the pest management service, history and trends of your facility, ask your provider about it today. You – and your auditor – will appreciate it!

# MOSQUITOES

## PROTECT YOUR EMPLOYEES FROM MOSQUITO-BORNE DISEASE

Mosquitoes may not be at the top of the list of pests that invade food & beverage processing and handling facilities, but they are of concern – whether your facility is in the southern U.S. where mosquitoes have been implicated in the spread of the Zika virus, or in a region where other mosquito-borne diseases have been detected. A single mosquito that invades your facility, flies across your dock, or breeds on your property, can bite an employee and transmit disease, or at the very least, be a huge discomfort to workers taking a break outdoors.

Unfortunately, many traditional treatments only focus on the mosquito resting sites and ignore the water in which they breed. Fly lights also are sometimes used to capture mosquitoes trying to enter the plant, but it can be a great deal more effective to implement exterior mosquito control measures – particularly in areas where Zika threat is high, as shown on the below map published by the Centers for Disease Control & Prevention (CDC).



## COMMON MOSQUITOES

More than 3,000 species of mosquitoes inhabit the Earth, with about 176 of these species found in North America. The most common mosquitoes of the U.S. are those of the *Aedes*, *Culex*, and *Anopheles* genera. Each has its own unique characteristics, and each has the potential to transmit various diseases.

**Aedes mosquitoes:** Unlike the “typical” mosquito of the U.S., these mosquitoes are active day biters and humans are their preferred hosts.

**Diseases:** Zika, Chikungunya, Yellow Fever, Dengue.

**Breeding:** Lay eggs singly on or near the surface of temporary water sources (e.g., used tires, flower pots, pools, roof tanks).

**Distribution:** Across the Southern U.S., Midwest, Pacific Northwest and East Coast

**Culex mosquitoes:** Typically bite at night both indoors and outdoors; they prefer avian hosts, but will bite humans.

**Diseases:** West Nile Virus, Western/Eastern Equine Encephalitis.

**Breeding:** Lay eggs in rafts on the water surface of polluted freshwater sites and artificial containers.

**Distribution:** All parts of the U.S.



**Anopheles mosquitoes:** Bite indoors and outdoors between dusk and dawn and prefer human and mammal hosts.

**Diseases:** Malaria.

**Breeding:** Lay eggs with floats on the surface of natural, vegetated water bodies (e.g., ponds, marshes, swamps).

**Distribution:** Eastern and Western U.S.

In March, Ecolab worked with the CDC to present a webinar featuring the latest facts around Zika virus and how a proactive mosquito prevention program can reduce the risk of mosquito bites and disease transmission. The webinar, available on [YouTube](#), provides insights on a three-step, science-based mosquito program that focuses on eliminating both resting and breeding sites.

**INSPECTION.** A thorough site check is made to identify existing or potential mosquito activity and provide comprehensive recommendations to minimize risk.

**PREVENTION.** Knowledge of mosquito behavior and biology implemented to find breeding sources and target these with environmentally friendly treatments to kill larvae or prevent them from developing into adults.

**PROTECTION.** Based on the conditions and needs of the facility, harborage and high-risk sites are treated and monitors installed. Recommendations are made, staff is trained and signage posted.

There also are steps that a food facility can take to make your property less attractive to mosquitoes. Because mosquitoes breed on and in water, the most important step is the elimination of standing water and ensuring proper drainage on rooftops. High-growing grass or weeds also should be cut back, and ponds or other water that cannot be eliminated should be treated.

Although you cannot completely prevent mosquitoes from flying onto your property, you can reduce attraction and breeding potential. Through a proactive, science-based approach and food facility/pest management provider partnership, you can help to protect your employees from disease and irritation.

## Did You Know...

- Although mosquitoes generally stay in or near the area in which they are bred, most species have a flight range of up to 3 miles. ([American Mosquito Control Association](#))
- Only the female mosquito bites, but she will continue to bite and draw blood until her abdomen is full. If she is interrupted before that, she will fly to the next person. ([Mosquitoworld.net](#))
- The total weight of all the ants in the world is the same as, if not larger than, that of all humans. ([Antark.net](#))
- Most ants have very poor eyesight, but some have no eyes at all. These species have developed such advanced communication through their antennae that they have no need for eyes. ([Antark.net](#))
- Ants also don't have ears. They "hear" by feeling vibrations in the ground through their feet. ([National Pest Management Association](#))

# ASK THE PEST EXPERT



## Question: Should I consider a mating disruption program for my facility?

Answer: Mating disruption is a pest management technique designed to control certain insects by introducing artificial stimuli that confuse the males, disrupt the courtship, prevent mating, and, thus, blocks the reproductive cycle. It is primarily intended as a tactic to keep pest populations low. The first year in which mating disruption is established, fumigation or fogging may be required to reduce pest populations to levels that can then be maintained by pheromones alone. Organic facilities that cannot use chemicals, or those who wish to minimize chemical applications, should consider a mating disruption program. Mating disruption programs are ideal for facilities that manufacture or use dry products such as pasta, dried milk products, cereal, grains, spices, baked foods, pet foods or other products that attract Indian Meal Moths. If your pest population is exceeding your established threshold levels, you should work with your pest management provider to discuss a mating disruption program.

## NEED ACCURATE ID?

When you need a quick answer for an upcoming audit or consumer response, Ecolab's expert entomologists and scientists provide a significant benefit to its customers through forensic analytics – providing precise and accurate identification of a pest or foreign object in a food product or plant environment.



## About the Expert



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Scientist and Urban Entomologist

Dr. Barcay is a member of the National Pest Management Association, Entomological Society of America, American Mosquito Control Association, Gamma Sigma Delta (the honor society of agriculture), Society for Vector Ecology and Pi Chi Omega, a professional fraternity for urban pest control, and Independent Organic Inspectors Association.

Dr. Barcay received his bachelor's degree in entomology from Colorado University. He also received his master's degree and doctorate in urban entomology from Colorado University.

To submit questions to Dr. Barcay, [email here](#).

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