UTAH PESTS fact sheet
EXTENSION UtahStateUniversity
Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-211-19 October 2019

Odorous House Ants (*Tapinoma sessile*)

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Quick Facts Odorous House Ants:

- Are small, brown-to-black ants that produce a rotten, coconut-like odor when they are crushed.
- Do not bite unless provoked and they cannot sting.
- Can invade structures and landscapes.
- Feed on sweet- and protein-based food sources.
- Prefer moist, shaded habitat close to food.
- Have multiple queens, form new colonies via budding, are non-hostile to members of related subcolonies, and colonies may contain tens-of-thousands of workers.
- Can be managed by eliminating habitat and contributing conditions, and using multiple insecticide formulations, including baits.
- Are persistent, and without proper follow-up after management may continue to be a nuisance.

INTRODUCTION

Odorous house ants (OHAs) (Formicidae, *Tapinoma sessile*), derive their name from the rotten, coconut-like odor they give off when crushed. These tiny brown-to-black ants occur throughout the United States, and are an emerging pest ant in Utah where the pavement ant (*Tetramorium caespitum*) dominates in urban areas. OHA can infest the inside and outside of a structure and can be difficult to manage due to their biology. In particular, odorous house ants have multiple queens, can split colonies to form many subcolonies (budding), and are non-hostile toward workers from related subcolonies, allowing them to take over large areas.

Fig. 1. Odorous house ant worker (*Tapinoma sessile*)[1].

IDENTIFICATION

Odorous house ant workers are brown-to-black in color and are roughly equal in size, about 3 mm in length (Figs. 1 & 2). When viewed from the top, these ants do not appear to have a petiole, or node, which is obstructed by the rear of the ant's body (gaster). When viewed from the side, the petiole is difficult to see, flattened and lies under the gaster (Fig. 2). Visible with a microscope, odorous house ants have a horizontal slit on the last segment of the gaster; they do not have a sting or circular opening as is common with other structural ants in Utah (i.e., pavement ants and carpenter ants). They have 12 antennal segments and lack hair on the back of the thorax (mesosoma, the section between the head and node).

The ant most likely to be confused with the odorous house ant in Utah is the pavement ant, the most dominant ant species in Utah's urban environments. Pavement ants are similar in color and size, but have two readily visible nodes when viewed from above or the side (Fig. 3). One distinguishing characteristic of the odorous house ant is the rotten, coconut-like odor they give off when crushed, which pavement ants do not have.

Fig. 2 (top). Odorous house ant worker; notice hidden node[2]. **Fig. 3 (bottom)**. Pavement ant worker with two nodes[3]. Red arrows indicate nodes.

BIOLOGY

OHAs have a few biological attributes that can make their management difficult. They are considered "tramp ants." Tramp ants inlcude a number of species that have similar habits that make them difficult pests to control, inlcuding:

- multiple queens that all produce eggs
- workers of the same size
- multiple subcolony sites
- non-hostility toward members of related colonies or subcolonies; supercolonies
- hostility toward non-related ant species
- reproduce by budding
- live in close association with humans
- disperse primarily by human activities
- varied diet
- wide range of nesting habitats

OHAs have many tramp ant characteristics, but they are only friendly toward OHAs from subcolonies derived from the main colony or its subcolonies. OHAs from distinctly different colonies, or their subcolonies, are treated with hostility, as are ants from other species. Friendliness between the main colony and its subcolonies can allow supercolonies to form, and large areas can be dominated by one genetically similar group of ants adding to their success, and difficulty to manage.

OHA colonies can vary in size and number of queens depending on the nest location and habitat quality. Ant colonies located in natural habitat may be small, from 15 to 30 workers, whereas, a colony with many queens, which often occurs in an urban habitat, can contain tens-of-thousands of workers. Supercolonies - i.e., friendly subcolonies connected by foraging ant trails where food, workers and brood are exchanged - can take over large areas and can have hundreds-of-thousands of workers.

Colony reproduction occurs through mating flights and budding. Mating flights are infrequent, but can occur in early-to-mid summer when winged males and females fly and mate. Males die after mating and mated females seek suitable habitat to start a new colony. Mating most commonly occurs within the nest between related ants. OHAs also reproduce by budding or fission, where a queen and workers will carry brood from an existing nest across the landscape and start their own subcolony. This can happen naturally when populations become too large within the main colony, or it can be encouraged by human disturbances, such as inadequate insecticide applications, causing a colony to split, and new subcolonies to form (fission). The presence of multiple queens and the ability of colonies to reproduce by budding or fission make OHA more difficult to manage than our common pavement ant.

As a tramp ant, OHAs are opportunistic, and can nest in many sites (Table 1); however, moist, shady areas near food are preferred. They can tolerate a broad range of habitats and environments. Outside, ants frequently make shallow nests in the soil under objects. Almost any object can serve as shelter, including mulch, rocks, log piles, etc. Inside, moisture and heat are key components to nesting habitat. Moisture from leaks, condensation, etc., and wall voids that contain heated pipes provide the preferred habitat for OHA.

Nesting sites can vary in location and may move frequently in response to human activity or changes in environmental conditions. Areas once occupied by OHA that were disturbed (e.g., by insecticide application, drying/solar heating, etc.) are likely to be reoccupied once the disturbance ends. In the winter, ants from subcolonies tend to migrate to a few overwintering nests. In spring, the overwintering colonies will begin to bud and by summer many nests will once again be present.

Table 1: Typical Odorous House Ant Nesting Sites		
UNDER	IN	NEAR/AROUND
Rocks	Tree cavities	Moisture
Lawn ornaments, miscellaneous items	Bird & mammal nests	Water damage/leaks
Fire wood piles, logs, construction materials	Wall voids	Heat
Pavers, flagstone, landscape timbers	Wood damaged by termites or water	Toilets
Patios	Insulation	Bath tubs
Lose bark of trees	Turfgrass	Sliding glass doors
Mulch, leaf litter	Gardens, landscaped areas	Window or door frames
Bath tubs, toilets	Attics, above showers or near roof leaks	Sinks
Carpets		Bases of trees

OHA nests are often connected by foraging trails, which can become heavily trafficked by ants. Foraging trails can vary in length, but often range between 33 and 157 feet. Ants may be found foraging between the temperatures of 43-95°F. Food, brood and workers are often shared among nests along common foraging trails. Inside a structure, ants may forage along trails that originate outside of the structure. Insecticide treatments that split an exterior/interior foraging trail (i.e., using repellent insecticides as barrier applications) may create additional problems inside the structure as ants are cut off from their nests.

Figs. 4 (top) & 5 (bottom). Argentine ant foraging trails look similar to odorous house ant foraging trails[4].

Foraging trails typically correspond to a certain subset of nests. If baits are used to manage ants, locate as many foraging trails as possible and bait along trails. This will increase the odds of reaching more nests with the chemical. Keep in mind that foraging ants may be coming from off property or have supercolonies that extend beyond property boundaries. Insufficient management of ants on an adjacent property may result in poor long-term control on your property as ants recolonize previously treated areas.

Ant foraging trails can be hidden from view and may occur below the level of the ground, under carpets, etc. When looking for foraging trails around a structure or property, follow the instructions located in the Management section on Inspections.

OHA feeds on dead insects (protein) and sweet foods, particularly honeydew produced by insects such as aphids and soft scales living in ornamental trees, shrubs and plants. They can also feed on food items inside the home. Food preference tends to be consistent throughout the year. OHAs do not like fat-based foods. The varied OHA diet can make management with baits difficult.

OHA, like all ants, undergo complete metamorphosis and have four distinct life stages: egg, larva, pupa and adult. OHA can grow from an egg to an adult in 5 - 11 weeks, but can take up to 7 months, depending on the time of year and environmental conditions. Generally, OHA development times are as follows: egg, 11-26 days; larva,13-29 days; prepupae, 2-3 days; pupae, 8-25 days. Adult queens and workers can live for several years. There can be four to five generations produced per year.

As a tramp ant species, OHA is one of the more difficult ant species to manage in and around structures. The presence of multiple queens makes successful

baiting and pesticide applications more difficult as any surviving queen can continue to lay eggs. OHA should be managed using multiple techniques including: thorough inspections, removal of contributing conditions and habitat, insecticidal baits and liquid, dust and/or granular insecticides. OHA is difficult to manage completely, so consider using multiple approaches simultaneously to combat this ant species.

MANAGEMENT

Inspections:

Locating nesting sites, foraging trails and contributing conditions is essential to OHA management. Nest sites and foraging trails are excellent locations to target pesticide applications. Nests can be located under almost any object and next to foundations, landscape features, trees, etc. Take care to disturb nests as little as possible as OHA is known to relocate a disturbed nest quickly. Consider marking nest locations with flags or another method to assist with targeting pesticide applications.

Locating foraging trails is critical to OHA management. Outside, foraging trails will connect nest sites with food supplies, such as trees where aphids or scales are living, or structures. Ant foraging trails may be hidden from view and can occur below the level of the ground. When looking for foraging trails around a structure or property, pull grass, soil, mulch, plants, etc. away from foundations, sidewalks, patio edges, etc. Ant trails usually follow structural lines, or edges (e.g., along walls, patios, foundations, the corners of walls, baseboards, pipes, tree trunks, branches, electrical wires or utility lines, etc.). Foraging ants typically enter a structure through cracks in foundation walls, under sliding glass door frames, behind window frames, along heating ducts, utility lines, etc. Access to a structure can be gained by climbing up walls, utility lines, or vegetation that contacts the structure. Follow trails to determine their extent and origin. Foraging ants may be found day or night, but prefer to avoid hot conditions or times of day.

Indoors, look for trailing ants under baseboards, carpet edges, along pipes, near areas of high moisture (sinks, drains, baths, etc.) and in wall voids where warm pipes run. Consider monitoring for ants indoors by putting jelly on note cards and placing them along walls or baseboards where ants have been seen. Once strong foraging trails form, follow the trails to locate nesting locations or where trails enter walls, etc. If trails enter walls, inspect the corresponding area outside the structure to see if the foraging trail is coming from outside. OHA foraging trails have been recorded at distances of over 150 feet.

Removal of Contributing Conditions:

Locate and remove conditions that contribute to ant habitat, food availability and structural access, including:

- Potential nesting sites and cover (objects laid on soil or against structures; see Table 1 for items to eliminate to reduce nesting sites).
- Areas of high moisture inside and outside of a structure (sprinklers hitting a foundation, drip irrigation, broken sprinkler heads or valves, leaking gutters, water pooling next to foundations, leaking pipes, toilets, sinks, etc.).
- Vegetation that is growing close to and/or touching a structural (prune shrubs and trees, etc.).
- Wood mulch (replace with pea gravel, not large stones).
- Cracks and holes in the foundation and walls, under sliding glass doors, doors or window frames (caulk or use other barriers to prevent entry).
- Aphid and soft scale populations on trees, shrubs and plants (consider insecticide application to manage honeydew producers to reduce OHA food supply).

While It may not be possible to find and eliminate all conducive conditions, efforts should be made to do so to improve the chances of long-term management.

Insecticide Applications to Nests:

Nests located during an inspection can be directly treated using a residual insecticide (see Table 2. "Nest Drench" products under the "Application Type" column). To find nests, locate foraging trails and follow ants to nesting sites (see section on "Inspections"). OHA nests in soil are often shallow. Applying a water-based residual insecticide directly to an exposed nest (nest drench) can eliminate individual nests, but incomplete applications to nests with a repellent insecticide may cause the nest to split, creating multiple nests. When applying to nests in mulch, rake the mulch back to expose the nests and apply directly to the nest. Make the application quickly before the ants pick up their brood and relocate the nest. Rake the mulch back on top of the treated area and apply to the surface of the mulch.

Nests located under slabs or foundations may require termite-style applications of non-repellent insecticides/termiticides by a licensed professional. If nests are located in wall voids, ceiling voids, behind brick or other structural siding, many of the products in Table 2 allow for void applications using drilling/injection methods with liquid, aerosol, dust or foam formulations.

After applying insecticides to nests, it is important to regularly check for and eliminate new nests. Remember that when colonies are eliminated, it opens up territory that new ants can colonize once the

Table 2. Some Insecticides Labeled for the Management of Odorous House Ants*					
Product	**Active Ingredient**	**MoA****	**Repellent**	**Type**	**Application Type*****
Maxforce Carpenter Ant Bait Gel; Maxforce FC Ant Killer Bait Gel	Fipronil	2B	No	Gel Bait	Spot/ Refillable Bait Station
Advion Ant Gel	Indoxacarb	22	No	Gel Bait	Spot
Maxforce Quantum Ant Bait	Imidacloprid	4A	No	Gel Bait	Refillable Bait Station
Gourmet Liquid Ant Bait; Green Way Liquid Ant Killing Bait	Disodium Octaborate Tetrahydrate	8D	No	Liquid Bait	Refillable Bait Station
Terro-PCO Liquid Ant Bait; Dominant Liquid Ant Bait; InTice Thiquid Ant Bait	Sodium Tetraborate Decahydrate (Borax)	8D	No	Liquid Bait	Refillable Bait Station
Terro-PCO Liquid Ant Bait Stations; Terro Ant Killer II Liquid Ant Baits	Sodium Tetraborate Decahydrate (Borax)	8D	No	Liquid Bait	Ready-to-Use Bait Station
Advance 375A; Advance Granular Carpenter Ant Bait	Abamectin B1	6	No	Granular Bait	Broadcast
Amdro Kills Ants; Ant Block; Maxforce Complete Granular Insect Bait	Hydramethylnon	20A	No	Granular Bait	Broadcast
Tempo SC Ultra	Beta-Cyfluthrin	3A	Yes	Liquid Contact	Nest Drench
Talstar SC	Bifenthrin	3A	Yes	Liquid Contact	Nest Drench
Suspend SC	Deltamethrin	3A	Yes	Liquid Contact	Nest Drench
Demand CS	Lambda-Cyhalothrin	3A	Yes	Liquid Contact	Nest Drench
Phantom	Chlorfenapyr	13	No	Liquid Contact	Structural Spot
Taurus SC	Fipronil	2B	No	Liquid Contact	Perimeter Barrier
Termidor SC	Fipronil	2B	No	Liquid Contact	Perimeter Barrier
Premise 2	Imidacloprid	4A	No	Liquid Contact	Perimeter Barrier
Fuse	Imidacloprid; Fipronil	4A, 2B	No	Liquid Contact	Perimeter Barrier
Optigard Flex	Thiamethoxam	4A	No	Liquid Contact	Perimeter Barrier; Nest Drench; Where Ants Trail

***This is only a partial list of products registered for use against odorous house ants.**

****MoA = Mode of Action. Visit irac-online.org for more information.**

*****Application Type = The primary use in an odorous house ant management program; read labels for use directions and alternative application methods, such as foam applications.**

Products highlighted in light brown are sweet, boric acid- and borax-based liquid baits. They can be purchased in larger quantities that might be necessary for a successful baiting program and are intended for use in refillable ant bait stations.

Products highlighted in blue are non-repellent products labeled for odorous house ant perimeter barrier and spot applications. Because they are non-repellent, ants will continue to travel over treated areas, carrying chemical back to the colony on their bodies. Non-repellent insecticides work well in conjunction with a sweet-liquid baiting program. Optigard Flex is the only listed non-repellent liquid insecticide that can be used as a perimeter barrier application AND to drench nests and apply to areas where ants are likely to forage, such as along landscape timbers, patio and sidewalk edges, etc.

insecticide product wears off and re-infestation of OHA, or other ants, such as pavement ants, can occur.

Perimeter Barrier Application:

Perimeter barrier applications for OHA are applied around the foundation of a home or structure, and are best accomplished with one of the non-residual products listed in Table 1 (e.g., Fuse, Taurus, Optigard, etc.). Non-residual products are recommended for OHA perimeter applications because repellent products can cause ants inside the home to become disconnected from their colony, creating additional ant issues indoors. Repellent and fast-acting non-residual products often kill ants before the chemical can be transported back to the colony and transferred to nestmates. Additionally, repellent and fast-acting insecticides are *not* compatible with baiting programs. Non-repellent products act slower and are compatible with baiting programs.

Non-repellent insecticides do not scatter ants, divide nests or break foraging trails. Since ants do not detect the presence of non-repellent insecticides they will continue to travel over them and will drag the chemical back to nest where it will be mechanically transferred around the colony. Most non-repellent insecticides can only be used for OHA as a perimeter application to the structure foundation and the ground immediately around the foundation (carefully read product labels). One product, Optigard Flex (thiamethoxam), is a non-repellent that can be used as a perimeter application and also as a nest drench and in places where ants trail, such as along patios, ornamental timbers, bases of trees, etc., making it one of the more diverse products available. Consider using one or more of the non-repellent insecticides for OHA management.

Baits:

Ant baits can be used alone or in conjunction with non-repellent insecticides to manage OHA. Baits come in granular, gel and liquid formulations. For OHA, sweet liquid ant baits are very effective and can be purchased in ready-to-use stations or large quantities for use in refillable bait stations, ideal for combatting OHA outdoors. Granular baits can be used outdoors, broadcasting them to the turfgrass, gardens or around the perimeter of a structure. Granular baits can be used in conjunction with liquid baits and non-repellent insecticide applications. Gel formulations for OHA will most frequently be used in refillable bait stations indoors. Ready-to-use ant bait stations, such as the Terro Ant Killer II Ant Baits, are convenient for indoor use.

Bait stations can be placed along known ant trails and near nests. If the ants do not accept the baits, try placing the baits along different trail locations or try a different type of bait. Baiting programs commonly fail because insufficient bait is supplied to the ants. Using refillable bait stations that hold a larger quantity of liquid bait can ensure that bait is always available during the baiting program. Refillable bait stations should be checked regularly to make sure ample bait is available to the ants. Ant baiting programs can also be thwarted by applying repellent or fast acting insecticides, as ants exposed to these chemicals may avoid baits or die rapidly inhibiting their ability to bring the chemical back to the colony to distribute. Consider sensitive situations, such as where children and pets are present, when selecting and using baits or bait stations.

There are numerous bait stations available for ant baiting programs, some of which are designed to hold larger quantities of liquid bait. A few examples of bait stations for use outdoors, include the KM AntPro Liquid Ant Bait Dispenser (Fig. 6), Antopia R6 Ant Bait Station (Fig. 7), PFT Green In-Ground Station, and the Ants-No-More bait stations (Fig. 8). Granular, liquid and gel baits can also be placed in refillable bait stations designed for smaller applications such as the Maxforce Refillable Buffet Station, Bait Plate Station (Fig. 9) or the Ant Cafe Refillable Bait Stations. One, or a combination of these stations, can be used depending on the application area and specific site situation.

Management Summary:

Use multiple techniques to manage OHA. OHA biology makes them a difficult ant to eradicate in areas where there are large colonies or they are the dominant species. Make habitat unavailable to OHA, and use

Fig. 6. KM Ant Pro Liquid Ant Bait Station (ePestControl.com).

Fig. 7. Antopia R6 Ant Bait Station (ePestHero.com).

Fig. 8. Ants No More Bait Station (Amazon.com).

Fig. 9. Bait Plate Station (domyown.com).

exclusion to keep them from entering a structure, if possible. An effective insecticide strategy is to use sweet liquid ant baits in refillable bait stations placed along ant trails and nesting areas. Granular baits can also be used outdoors as a broadcast application. Ready-to-use liquid bait stations can be used inside (and outside) along with gel baits applied into refillable bait stations, such as the Bait Plate. Make sure that baits do not run out. Monitor bait stations and ensure that ample bait is supplied to the ants. In addition to baiting, applying a perimeter barrier application of a non-repellent insecticide to the foundation and the ground around the foundation can provide excellent control of ants trailing inside from outside and can help eliminate colonies overall. Indoors, nests in voids can be treated with liquid, aerosol or foam formulations injected into nesting sites. Nests can be treated directly with a nest drench of a non-repellent (Optigard Flex), or a repellent insecticide, though care should be taken when using repellent insecticides not to split colonies or disrupt a baiting program. OHA can be persistent on the landscape. Continued follow-up inspections and insecticide applications may be needed to keep OHA populations to tolerable levels.

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PHOTO CREDITS

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