UTAH PESTS fact sheet

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Pavement Ants

(*Tetramorium immigrans* Santschi)

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Quick Facts

- Pavement ants are the most common pest ant in and around structures in Utah.
- Worker pavement ants are all the same size and have only one queen.
- Pavement ants feed on many foods, but prefer sweet and greasy foods.
- Occasionally, pavement ants will injure plants.
- Indoor problems with pavement ants are worst in spring and early summer.
- Indoors, manage pavement ants using baits coupled with habitat modification, cleaning, proper food storage, and exclusion.
- Outside, use habitat modification, exclusion, bait, and residual/nonresidual insecticides to manage pavement ants.

Fig. 1. (left) Swarm of pavement ant workers in spring (Ryan Davis, Utah State University). **Fig. 2.** (right) Two workers fighting (Ryan Davis, Utah State University).

INTRODUCTION

Pavement ants (Formicidae, *Tetramorium immigrans*) are northern Utah's most common pest ant in and around homes and structures. Until recently, the pavement ant's scientific name was *Tetramorium caespitum*, but recent genetic work has clarified that our common pest *Tetramorium* species in the U.S. is from Europe and has been given the name *T. immigrans* (Wagner et al., 2017; Zhang et al., 2019). Genetic variation among pavement ant populations in the U.S. is low and it is believed that current populations were derived from one or a few closely related colonies from Europe introduced into the northeastern U.S. about 200 years ago (Wagner et al., 2017; Zhang et al., 2019).

The pavement ant derives its name from the habit of nesting in soil along edges or in cracks around pavement, patios, driveways, sidewalks, and foundations, but they can be found nesting almost anywhere soil is present. Indoors, they can occur in large numbers when they forage for food or crumbs that have fallen on the floor, or when winged ants are found emerging inside a home or structure. They are attracted indoors by food, garbage and moisture, or swarm indoors when they nest in or near foundation cracks or voids. Pavement ants can also be abundant in gardens, and occasionally injure plants. They are found throughout the U.S. from the West Coast to the Northeast.

IDENTIFICATION

Pavement ants are most commonly recognized by their habit of gathering in large groups near cracks in the pavement, concrete, etc., particularly in the spring, and by their small, volcano-shaped mounds of dirt they deposit around their nests. Workers are 2.5 to 3 mm (0.10 to 0.12 inch) in length and are dark brown in color (Figs. 1-3). Pavement ants have workers of a single size (monomorphic). These ants have two nodes, one pair of spines on the thorax, and a stinger, though the stinger is typically retracted into the gaster and not readily visible (Figs. 2 and 3). One distinguishing characteristic of this species is the heavy sculpturing on the head and thorax that forms parallel grooves (Fig. 4). These grooves can most easily be observed with the use of a hand lens or microscope.

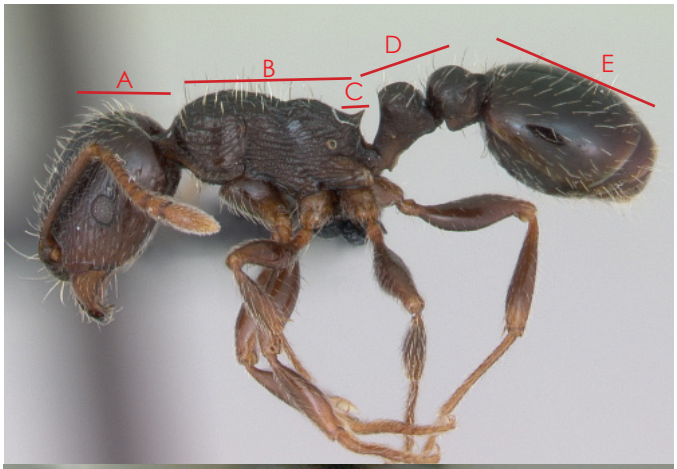

Fig. 3. (top) Pavement ant head (A); mesosoma (B); thoracic spines (C); petiole (two nodes) (D); gaster (E) (April Nobile, Antweb.org). **Fig. 4.** (bottom) Close-up of pavement ant head showing the parallel grooves (April Nobile, Antweb.org).

BIOLOGY AND HABITS

Pavement ants have a complete life cycle consisting of an egg, numerous immature stages (larvae), a pupa, and an adult (Fig. 5). Their colonies can contain thousands of workers and have a single queen. Colonies propagate via winged ants (reproductive queens and males) called swarmers, which usually begin to appear in the spring. Winged queens and males will mate and mated queens will search for new nesting locations often under objects on top of soil. They primarily swarm in the late spring, but may swarm any time of the year if conditions are favorable. They can swarm even in the winter if nesting near heated slabs. Winged, swarming ants are often mistaken for termites. Swarmers have a habit of working themselves into living areas in commercial buildings using walls and false ceilings as a means of access. They are attracted to fluorescent lights which draw them out of wall and ceiling voids into lights and rooms (Fig. 6). Winged ants can continually swarm within a structure for a few days to over a week.

Fig. 5. Pavement ant workers with pupae (Ryan Davis, Utah State University).

Fig. 6. Swarming reproductive pavement ants in a window (lying in pesticide residue) (Ryan Davis, Utah State University).

As social insects, pavement ants feed one another within the colony. Foraging worker ants will provide food for both immatures and adults within the colony. Solid food collected by worker ants will be fed to and digested by larvae, which then regurgitate or excrete the digested solid food as liquid for adults to eat. This social feeding, known as trophallaxis, allows for the effective use of slow-acting, insecticidal baits when managing pavement ants.

Workers will set up trails to and from food sources. These trails can lead inside a home or structure. Workers can be found foraging at the edge of carpet and at the bottom of baseboards. Food or crumbs that are dropped or left on a surface that is accessible can attract these ants in a very short period of time. Colonies can also be located in the home, but this is less common. A common space for colonies is in bathrooms under toilets and showers. They may also nest along subterranean or sub-slab heating ducts, and access structures through heating vents. These areas of warmth will keep colonies active through the winter. Ants can also occur in garden areas where their feeding can damage plants (Fig. 7). They have been found foraging up to 30 feet away from their colony, so the source of an invasion can vary from site to site.

Table 1. Typical pavement ant nesting sites.		
UNDER	**IN**	**NEAR/AROUND**
Rocks	Wall voids	Moisture
Lawn ornaments, miscellaneous items	Wood damaged by termites or water	Water damage/leaks
Fire wood piles, logs, construction materials	Turfgrass	Heat, radiator
Pavers, flagstone, landscape timbers	Gardens, landscaped areas	Toilets
Patios	Foundation cracks	Bath tubs
Mulch, leaf litter	Pavement cracks	Sliding glass doors
Bathtubs	False ceilings	Window or door frames
Toilets	Expansion joint gaps	Sinks
Carpets	Trash	Curbs
Trash cans	Insulation	Baseboards
Wood piles	Wood piles	Crumbs, food
		Sub-slab heat ducts

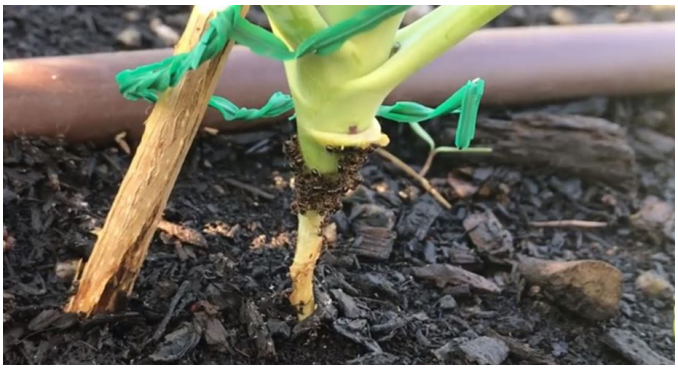

Fig. 7. Pavement ant workers damaging brassicas in a garden (Nick Volesky, Utah State University).

Outdoors, nests can be found in the soil under any type of debris, near edges of curbing, and in cracks of pavement, particularly cracked pavement near lawns. These ants are also known to nest in foundation cracks or in expansion joint gaps. This wide array of nesting behavior (Table 1) can make it a challenge to accurately locate a nest, but a giveaway to the site of a nest is a small mound of excavated dirt (Fig. 8). These small dirt mounds are often pushed up and out of where the ant nest is located.

Often, you can find large numbers of pavement ants in a grouped mass where one colony is fighting with another. They live in closed colonies in which non-members are excluded through fights in order to protect colony resources and increase territory. When a colony has a larger territory, it has increased nutritional status which leads to an increase in workers and more reproductives.

Pavement ants prefer greasy and sweet foods, but will also consume dead insects, seeds, pet food, carbohydrates, and just about any food that falls on the floor. Food preferences can vary by the time of year and by the individual colony.

Fig. 8. Pavement ant workers accessing the interior of a building by crawling through a drain/foundation crack. Note the excavated dirt mound left by the pavement ants (Ryan Davis, Utah State University).

MANAGEMENT

Use multiple control tactics to eliminate ant colonies and exclude ants from your home, including:

Inspections

Locating nesting sites, foraging trails, and contributing conditions is essential to pavement ant management. Nest sites and foraging trails are excellent locations to target pesticide applications. Nests can be located under almost any object, including foundations, landscape features, and trees. Consider marking nest locations with flags or another method to assist with

targeting pesticide applications.

Outside, foraging trails will connect nest sites with food supplies, such as trees where aphids or scales are living, or structures. Trails may be hidden from view and can occur below the level of the ground. When looking for trails around a structure or property, pull grass, soil, mulch, and plants away from foundations, sidewalks, and patio edges. 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). Foraging ants typically enter a structure through cracks in foundation walls, under sliding glass door frames, behind window frames, and along heating ducts and utility lines. The ants gain access to a structure by climbing up walls, utility lines, or vegetation that contacts the structure. Follow trails to determine their extent and origin. Find foraging ants day or night, but most often in cooler conditions and times of day.

Indoors, look for trailing ants under baseboards, carpet edges, along pipes, near areas of high moisture (e.g., sinks, drains, and baths) and in wall voids where warm pipes run. Consider monitoring for ants indoors by putting fruit 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. Foraging trails have been recorded at distances of over 30 feet.

Simple Homeowner Remedies

Pavement ants commonly find their way indoors in the spring and early summer to find food that may have fallen on the ground, in cabinets, or improperly stored pet food. Often, simply applying dish soap to a wet rag and wiping up ants and their pheromone trails will quickly stop ant activity in living spaces. It may be necessary to wipe up ants with soapy water once or twice a day for 1 to 7 days before activity completely stops. Usually, ant activity will not return until the following year. When using this method, always clean up the ant's food source and properly store food.

Small invasions of pavement ants are also readily managed by applying a sweet, liquid, borax/boric acid bait, such as Terro Ant Killer II Liquid Bait station, which can be found at most grocery stores and box stores (Fig. 9). Make sure to supply bait continuously until feeding stops. Underbaiting will yield subpar results. Usually, this method will eliminate ant activity in a particular area within 5 days and the effects typically last until the following spring.

Fig. 9. Pavement ant workers feeding on a sweet, borax bait from Terro – a common management technique used by homeowners (Terro Ant Killer II Liquid Bait) (Ryan Davis, Utah State University).

Removal of Contributing Condition

Pavement ants can nest anywhere there is soil, so eliminating all habitat may be unrealistic. Do the following to locate and remove conditions that contribute to ant habitat, food availability, and structural access, including:

- Remove potential nesting sites and cover (Table 1).
- Reduce or eliminate moisture inside and outside structures. Pay attention to sprinklers hitting a foundation, drip irrigation, broken sprinkler heads or valves, leaking gutters, water pooling next to foundations, leaking pipes, toilets, sinks, etc.
- Prune or remove vegetation that is growing close to and/or touching a structure.
- Reduce or eliminate objects such as pavers, rocks, wood piles and debris around the house.
- Replace wood mulch with pea gravel, not large stones.
- Caulk or use other barriers to prevent entry into cracks and holes in the foundation and walls, under sliding glass doors, doors, or window frames.
- Clean up crumbs, food, spills, or trash at floor level or in cabinets, including pet food.
- Consider insecticide applications to manage honeydew producers (aphids and soft scales) to reduce pavement ant food supply.

While it may not be possible to find and eliminate all conducive conditions and nesting habitats, make efforts 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 "Application Type" in Table 2). To find nests, locate foraging trails and follow ants to nesting sites (see "Inspections," page 3). Pavement ant nests in soil are often shallow. Applying a water-based residual insecticide directly to an exposed nest can eliminate individual nests. When applying to nests in mulch, rake the mulch back to expose the nests and apply directly to 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 nonrepellent 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 space that new ants can colonize once the insecticide product wears off. Given the prevalence of pavement in the landscape, areas will frequently be reinhabited by pavement ants. Additionally, as odorous house ants become more prevalent in Utah's urban landscape, remember that eliminating pavement ants may open up opportunity for odorous house ants to occupy their space. Odorous house ants are more of an indoor pest and are more difficult to control than pavement ants.

Perimeter Barrier Application

If necessary, accomplish perimeter barrier applications in two ways depending on the management objectives. Use repellent insecticides to quickly exclude ants from entering a structure. If rapid deterrence/repellency is not required, nonresidual insecticides should be used to manage pavement ants (see products listed in Table 2). Nonrepellent products are recommended for perimeter applications in most cases because repellent products can cause ants inside the home to become disconnected from their colony, creating additional ant issues indoors. Repellent and fast-acting nonresidual 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. Nonrepellent products act slower and are compatible with baiting programs. Repellent insecticides are best used for direct nest drenches and chemical deterrence from gaining entry into a structure.

Nonrepellent insecticides do not scatter ants or break foraging trails. Since ants do not detect the presence of nonrepellent insecticides, they will continue to travel over them and will drag the chemical back to the nest where it will be mechanically transferred around the colony. Most nonrepellent insecticides can only be used for pavement ants as a perimeter application to the structure foundation and the ground immediately around the foundation (carefully read product labels). A few products, Optigard Flex (thiamethoxam) and Advion WDG (indoxacarb), are nonrepellents that can be used as a perimeter application or nest drench and in places where ants trail, such as along patios, ornamental timbers, and bases of trees, making their use more diverse than some other products. Consider using one or more of the nonrepellent insecticides for pavement ant management.

Baits

Ant baits can be used alone or in conjunction with nonrepellent insecticides to manage pavement ants. Baits come in granular, gel, and liquid formulations. For pavement ants, 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 pavement ants 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 nonrepellent insecticide applications. Granular formulations may be less attractive to pavement ants compared to liquids and gels (Figs. 10 and 11). Gel formulations for pavement ants 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, especially for homeowners.

Fig. 10. Pavement ant workers feeding on a gel bait; notice that the gasters are filled with gel that will be distributed to members of the colony (Ryan Davis, Utah State University).

Table 2. Some insecticides labeled for the management of pavement 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
Advion WDG	Indoxacarb	22	No	Liquid contact	Perimeter barrier; indoor/outdoor crack and crevice; where ants trail
Optigard Flex	Thiamethoxam	4A	No	Liquid contact	Perimeter barrier; nest drench; where ants trail

***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.**

Note. Products highlighted in yellow 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.

Note. Products highlighted in blue are nonrepellent products labeled for ant perimeter barrier and spot applications. Nonrepellent insecticides work well in conjunction with a sweet-liquid baiting program. Optigard Flex Advion WDG are nonrepellents that can be used as a perimeter barrier application and to drench nests, ant trails and apply to areas where ants are likely to forage, such as along landscape timbers, and patio and sidewalk edges. Many of these products are intended for professional use and some require a license to apply termiticides.

Fig. 11. Pavement ants feeding on a protein-based gel bait for carpenter ants (Maxforce Carpenter Ant Bait Gel) (Ryan Davis, Utah State University).

Place bait stations along known ant trails and near nests. If the ants do not accept the baits, place 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, particularly outdoors. Check bait stations 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 bait insecticides 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. 12), Antopia R6 Ant Bait Station (Fig. 13), PFT Green In-Ground Station, and the Ants-No-More bait stations (Fig. 14). Granular, liquid, and gel baits can also be placed in refillable bait stations designed for smaller applications such as the Maxforce Refillable Buffet Station (Fig. 15), or the Ant Cafe Refillable Bait Station. One, or a combination of these stations, can be used depending on the application area and specific site situation.

Fig. 12. (top left) KM Ant Pro Liquid Ant Bait Station (ePestControl.com). **Fig. 13.** (top right) Antopia R6 Ant Bait Station (ePestHero.com). **Fig. 14.** (bottom left) Ants-No-More Bait Station (Amazon.com). **Fig. 15.** (bottom right) Bait Plate Station (domyown.com).

PRECAUTIONARY STATEMENT

All pesticides have both benefits and risks. Benefits can be maximized and risks minimized by reading and following product labels. Pay close attention to the directions for use and the precautionary statements. The information on pesticide labels contains both instructions and limitations. Pesticide labels are legal documents, and it is a violation of both federal and state laws to use a pesticide inconsistent with its labeling. The pesticide applicator is legally responsible for proper use. Always read and follow the label.

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