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RESEARCH UPDATE

The Latest Findings From Prominent Industry Researchers.

Food For Thought

Service technicians should keep in mind that even ants like a little variety in their diet.

By John Klotz, Byron Reid, Dave Williams and Karen Vail

The old saying "Variety is the spice of life" is not only true for man, it also rings true in the ant kingdom, particularly as it relates to diet. Eating the same thing over and over can become boring, even to ants. Although initially attracted, pest ants feeding on the same bait may eventually lose interest and stop feeding altogether.

Often, these same "bored" ants will show renewed interest when a different bait is offered. This behavior should be suspected in cases where baits have failed due to the ants' apparent lack of interest in a particular bait, rather than concluding that the bait itself is ineffective.

Like all living organisms, ants have certain nutritional requirements such as carbohydrates, proteins and fats. In nature they obtain these essential nutrients from a varied diet of insect prey (proteins and fats) and nectar, aphid honeydew and other plant products (carbohydrates). Proteins are important for brood development and carbohydrates serve as energy sources for adult ants. These nutrients are found in either liquid or solid form.

A BALANCED DIET. Ants naturally strive for a balanced diet to optimize the growth of the colony. However, the amounts of each of the three dietary requirements necessary for optimal growth may vary seasonally. For example, carpenter ants eat a diet rich in proteins during brood development, usually in the spring and summer, but the colony will begin to forage for carbohydrates in late summer and fall to meet the adult workers' increased energy requirements (see Figure 2, page 48). "Bait switching" is well documented for Pharaoh ants that have satisfied their appetite for one food and then consequently chosen another.

As pests in structures, the opportunity for ants to achieve a balanced diet are limited only by the occupants' sanitation practices and the baits technicians use to control them. Ideally, sanitation problems can be corrected, so that baits don't have to compete with other foods in the location, thus forcing the ants to feed on whichever bait technicians provide them.

BAIT REVIVAL. Although ant baits have a long history in the pest control industry, there is renewed interest in their formulation and development.

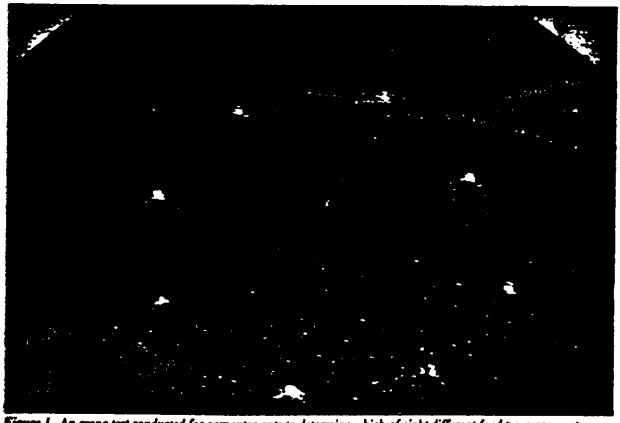

Figure 1. An arena test conducted for carpenter ants to determine which of eight different food types are most attractive and palatable to these selective-eating attackers of wood structures.

The new popularity of baits is most likely due to several factors, including public pressure to reduce pesticide use, current availability of insecticides well suited for this type of formulation and the numerous advantages offered by baits.

Baits are more target-specific than traditional ant control techniques. Service technicians have traditionally relied upon broadcast applications of insecticides in spot and perimeter treatments, thus placing heavy loads of broad-spectrum insecticides into the environment.

Ant baits are also more cost-effective compared to labor-intensive inspections to locate nests (which are often unsuccessful) and to treatment strategies which often involve invasive techniques like drilling and dusting. For example, technicians should exploit the natural foraging behavior of ants to recruit and share resources, thereby spreading the bait toxicant throughout the entire colony, and eventually destroying it.

On the negative side, baits tend to be slower-acting than sprays or dusts, sometimes requiring patience from a distraught customer. In such a case, the technician needs to educate the customer about how baits work and the length of time required to gain control. The shelf-life of baits is also limited due to susceptibility of the attractant to spoilage.

However, in the long run the many advantages offered by baits far outweigh the disadvantages, which can be alleviated through customer education and new and improved bait formulations.

BAIT COMPONENTS. The baits service technicians typically use in the field consist of four basic components:

1. An attractant, usually a food or pheromone that prompts ants to readily pick up the bait.

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2. A palatable carrier, which gives the physical structure, or matrix, to the bait.

3. A toxicant, which should be non-repellent, provide delayed action, and be effective over at least a ten-fold dosage range.

4. Other material added for reasons of formulation, such as emulsifiers, preservatives, waterproofing or anti-microbial agents.

Each of these components must be developed and tested for efficacy (see Figure 1). Currently, technicians can choose from a variety of baits whose efficacies range from marginal to excellent. (See Table 1 below for examples of baits that can be used with two common ant pests).

CHOOSING A BAIT. So how can technicians deal with this bewildering array of baits currently on the market? The best test of a bait is how it works in the field. If the ants are attracted to the bait and are feeding, technicians have a good chance of eliminating the problem. If a technician has to control Pharaoh ants in a bakery, for example, he or she should choose a protein bait which will offer something new and not in competition with the surrounding carbohydrates available to the ants.

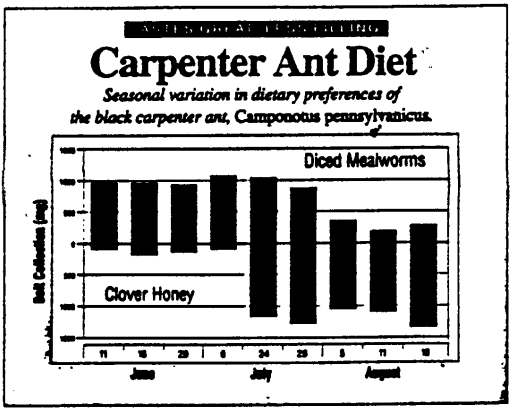

Figure 2. Seasonal variation in dietary preferences of the black carpenter ant.

In a hospital, where Pharaoh ants are feeding on blood products (mostly protein), offering them a bait with sugar is a good idea. Or, if in this same situation the ants are feeding on glucose, offer them a protein bait. If the ants are not visiting the bait, change to another brand. This is usually sufficient to stimulate feeding again.

When Pharaohs reigned in Egypt, "food tasters" were employed to protect the rulers from poisoning. Fortunately for service personnel, but unfortunately for ants, technicians can trick the food tasters into feeding on poisoned baits, and sharing it with the entire colony, thus destroying it.

However, this only holds true if the bait contains a toxicant that is slow-acting. Fast-acting insecticides are only going to kill scout ants, allowing the queen, nest workers, and brood to survive and soon replace those few that are killed before sharing the poison with their nestmates. Slow-acting insecticides allow time for scout ants to recruit and exchange food, eventually destroying the entire nest when the toxicants reach lethal levels.

So in the future, technicians involved in ant control work should provide an abundant feast their ant guests cannot refuse — successive courses of delectable and effective ant baits. **ST**

A Buffet of Baits

PHARAOH ANTS *(Monomorium pharaonis)*

Food Preference: Insects, animal and vegetable oils, sweets (sugars), honeydew, blood products.

Commercial Baits	Major Food Component	Toxicant
Maxforce	Silkworm pupae	Hydramethylnon
Pro-Control	Peanut butter	Sulfluramid
Pharorid	Your choice*	Methoprene
Raid-Max	Peanut butter	Sulfluramid
Drax	Mint apple jelly	Boric acid
Terro II	Corn syrup-like	Boric acid

**Recommended: Liver powder, sponge cake and honey in a 2:1:1 ratio, or peanut butter and honey in a 1:1 ratio.*

FIRE ANTS *(Solenopsis spp.)*

Food preference: Insects, animal and vegetable oils, honeydew, nectar.

Commercial Baits	Major Food Component	Toxicant
Amdro	Soybean oil & extruded	Hydramethylnon
Logic	Corn (outdoor use only)	Fenoxycarb
Ascend	Same as above	Abamectin
Maxforce	Silkworm pupae	Hydramethylnon

Table 1. Toxicant and major food components of the most popular ant baits used in the pest control industry.

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