Example
IPM PROTOCOL FOR THE ARGENTINE ANT (*LINEPITHEMA HUMILE*)

Purpose of the Example IPM Protocol:

This document is an example to help you fill out the IPM Protocol Form that you must attach to your Business Application.

Note: This Argentine ant protocol was prepared by BIRC with input from two pest control companies. This is an example and not meant to be exhaustive. Other techniques and other pesticides on the Program Materials List may work just as well or better. The protocol is written as if it were being used by a "typical" EcoWise Certified company for a commercial account.

1. **Establish a partnership with the customer.** It is important for the success of our company's IPM service to establish a partnership with the customer (to the extent feasible—each customer will vary).
   a. Determine who your customer contact will be; record their name and phone number
   b. Determine who the decision-maker at the site will be; record their name and phone number
   c. At the appropriate time, advise the customer of their responsibilities:
      - Keeping dumpsters and areas around them clean, locating dumpsters away from the building, and making sure they are emptied at least once a week
      - Keeping inside trash receptacles clean, lined with plastic and emptied nightly—no trash left overnight without the bag knotted
      - Maintaining adequate sanitation in the building
      - Informing building occupants that all food in workspaces must either be in a refrigerator or sealed in an ant-proof container (screw top jar with rubber on the lid or plastic container with tight-fitting lid, such as Tupperware)
      - Distributing our company's Argentine Ant Fact Sheet to appropriate building occupants; distributing our Sanitation and Pest Management Fact Sheet to appropriate building staff/contractors
      - Refraining from spraying aerosol pesticides near or on bait stations that we set up
      - Following through on recommendations made by our company
   d. Determine with the decision-maker which pest management recommendations will be the responsibility of the customer and which will be the responsibility of our company.
   e. Suggest periodic meetings (by phone or in person) with the decision-maker to review pest management progress and any issues
   f. If the ant problem is very serious because of customer non-cooperation, suggest a short customer training/education session for an extra fee

2. **Record a detailed history about the problem.**
   Some of the following questions are appropriate for asking on the phone before you visit the site. Others can be asked on the phone or in person.
   a. Where is the site/structure?
   b. Type of building?
   c. Where do they see ants?
   d. How long have they had the problem?
   e. Have changes occurred that might relate to the ants being a problem now (e.g. potted plants brought inside, construction activity disturbing soil)?
   f. Have they or someone else treated the problem? How or with what?
   g. Are there children at the site? (crumbs, food in places other than kitchen) Pets? (dog food, cat food left out, people may be feeding feral cats)
   h. Do they have ants all year? If not, when do they see them?

3. **Biology of the pest.** This section contains important biological information related to effective ant management.

Argentine Ant Colonies

- Colonies are linked by tunnels; workers and queens move freely from nest to nest; each colony has many queens that live in harmony. Perhaps it is more accurate to think of Argentine ants as living in huge colonies with 1000's of entrances.
- Because of these huge "supercolonies," the concept of finding and killing "the" nest is not always valid.
- The energy that most other ant species use in defending the colony is used instead for reproduction.

Feeding Behavior

- Worker ants (all females) feed and care for the young, but also feed each other and the queens (called **trophallaxis**); this is the way baits are spread throughout a colony
- On average at any one time, a very small proportion of a colony is out foraging, so killing these ants will not eliminate the colony.
- These ants feed on just about anything from dead animals (including insects) to all kinds of human and pet food, to vomit, feces, and even human sputum.
- A favorite food is the honeydew produced by insects like aphids, mealybugs, scales, and whiteflies. Argentine ants protect these insects from their natural enemies.
    - Plants that harbor these pests and are growing near a structure will attract ants to the building.
    - If ants are excluded from plants with honeydew-producing insects, natural enemies will often eliminate the plant pests
- Liquid baits with sugar as the attractant are useful throughout the year, because adult ants will always feed on sugary liquids.
- Baits with a protein attractant may only be useful when the colony is expanding and ants are feeding a large number of young.

Nesting sites

- Argentine ants move their colonies within hours to take advantage of a food source or to escape inhospitable conditions. In winter they look for places that are warmer and drier, and in summer they seek cooler and moister sites.
- Their shallow nests are primarily in the ground, and they are not marked by significant soil mounds. They prefer moist, well-drained soil.

Outside, some places to find nests are

- near irrigated turf and other landscaping
- in planters and potted plants
- in the ground under trees, especially trees with honeydew producing insects,
- near faucets and irrigation valves
- under sidewalks, stones and patios
- in soil accumulated in the corners of a roof

Inside, nests can be found

- in potted plants
- inside cupboards and drawers
- under tiles on kitchen counters, behind wall tile and brick veneer
- in the insulation in dishwashers, washing machines, and refrigerators,
- in wall voids, in moist basements, and in vehicles
- in unusual places including inside metal curtain rods and inside a bathroom sink in the void that allows overflowing water to escape down the drain.

Seasonal Colony Development and Feeding Behavior

Winter (November thru January): many adults die, colony essentially stops breeding and ant population is small.

Liquid sugar baits are accepted better than other baits, and less is needed because of the low population.

Late winter/early spring: breeding increases and adult workers seek honeydew producing insects (aphids, scale) and protein to feed developing larvae.

Both solid protein and liquid sugar baits are accepted

Summer: honeydew producers decline (beginning in July/August) and ants start to look elsewhere for food, often in nearby buildings.

In early summer, solid protein baits are still accepted.
Liquid sugar baits are readily accepted all summer

Fall: the ant population has reached its maximum, honeydew food source has declined and foraging pressure results in more nearby building invasions.

Sugar baits readily accepted

4. **Thoroughly inspect the site.** Record information on our company's inspection form.

   a. Verify the ant species. Make sure you really are dealing with the Argentine ant.

   b. Inspect outdoors

   Begin your inspection around the perimeter of the building. If you don't find trails and entry points there, move farther out from the building.

   - Look for ant trails and follow back to a nest, if possible, and note nest site. Look along edges of foundation, paving, roof line, gutters; inspect pipes and wires near or leading into the building, inspect nearby trees and shrubs (especially if branches touch the building), hanging or potted plants, planters; inspect lumber piles, logs or other wooden elements in the landscape, inspect around garbage cans, dumpsters, recycling storage
   - Check for other obvious nests and note them. See above for nesting sites.
   - Note and record entry points where ants are currently entering structure & where ants could enter structure, such as
     - Holes where pipes, wires, conduit penetrate walls
     - Cracks, crevices, openings between window or door and sill or frame
     - Weep holes in doors or windows
     - Cracks in the foundation

- Note and record conducive conditions including lack of sanitation, plants with honeydew-producing insects or extra-floral nectaries (esp. citrus, roses, pines, birches, black acacia, bottlebrush, birches); ground covers and mulches; leaking irrigation; other areas of warmth and moisture or humidity
- Check garbage can/dumpster areas for cleanliness, tight lids and sealed bags

c. Inspect inside

- Look for ant trails and follow back to entry point, if possible. Follow into crawl space if necessary. Look along the edges of counters, cupboards, along and behind baseboards, under carpet along the tack strip (use needle-nosed pliers to pull up), along pipes and wires, in and around heating and air conditioning ducts, behind electrical switch plates, around windows and doors, around garbage and recycling storage, near food storage, in and around vending machines, in attics and basements in damp areas
- Note conducive conditions, such as improper food storage, substandard sanitation, holes, gaps to the outdoors, potted plants.

5. Discuss inspection findings with the customer and provide them with information

a. Discuss inspection results, priorities and what we will do for the customer for no additional charge and where appropriate, our price for additional work.
b. Discuss the possible outcomes of the treatment methods, how long they might take to gain control and what to expect.
c. Discuss the emphasis of IPM while judging customer interest level (e.g., long term solutions, using knowledge of pest biology, monitoring, trapping, baiting, pest exclusion, all of which lead to effective pest control and minimal pesticide use).
d. For customers not on a bimonthly schedule, emphasize the importance of being on a scheduled service so baiting can begin early in the year and help prevent infestations in the future.
d. Provide written information to reinforce and supplement verbal discussion. At minimum, this should include a copy of the inspection report and IPM site plan.
e. Discuss the customer's role such as keeping things clean, not using sprays, etc.; provide them with our Ant Fact Sheet and our Sanitation and Pest Management Fact Sheet
f. Discuss pest tolerance levels and action levels that trigger treatment, and if applicable, the advantages of higher tolerance level but be careful about being too persistent on this subject.
g. Mention that substantial control can be achieved for ants outside but we can't guarantee ants will never again come into the structure.

6. Develop a written site-specific IPM plan

This is the written plan for how our company manages a target pest at a particular site. Use our company IPM Site Plan & Treatment Record Form to record the information. IPM strives for prevention and long-term solutions with the lowest risk to people, pets, and the environment. Integrating a number of the treatments options below will result in better control than using a single treatment. Specific options chosen will depend on the time of year, customer needs, and the situation at the site.

Treatment Options Outdoors

To limit availability of food

- Treat honeydew-producing insects on vegetation near the structure by washing with plain water or with insecticidal soap and water
- Use sticky barriers around trunks to exclude ants; be sure to trim branches that touch the building, the ground, other plants or structures to prevent ants from finding an alternative route into the plant
- Remove plants that regularly have large populations of honeydew-producing insects

BIRC Note: a DPR license may be necessary for some of the above work

To limit availability of shelter/habitat

- Reduce excessive moisture and irrigation leaks near structures
- Reduce areas outside covered with black plastic and decorative rock
- Cut back or eliminate ground covers next to the structure, especially to have access to the foundation.

To limit access to the structure (pest-proofing)

- Trim trees and bushes touching structure
- Caulk or otherwise seal accessible areas where ants are getting in or have been seen getting in

To directly suppress the pest by removal or killing

Use direct suppression alongside the preceding treatment options, not as a stand-alone treatment.

Baiting (For more information, see attached Notes on Baiting for Argentine Ants)

Winter (November thru January)

- Liquid sugar baits, such as Gourmet Ant Bait Liquid (borate), Terro Ant Killer II (borate)—use outside in bait station
- Maxforce FC Professional Ant Bait Gel (fipronil)—use outside in cracks and crevices

  Place in locations where ants are present or near where they are entering structure (out of sight).

Late winter/early spring

- Liquid sugar baits, such as Gourmet Ant Bait Liquid (borate), Terro Ant Killer II (borate)—use outside in bait station
- Protein baits such as Maxforce Professional Insect Control Granular Insect Bait, Niban FG

Early Summer

- Liquid sugar baits, such as Gourmet Ant Bait Liquid (borate), Terro Ant Killer II (borate)—use outside in bait station
- Protein baits such as Maxforce Professional Insect Control Granular Insect Bait, Niban FG

Late Summer and Fall

- Liquid sugar baits, such as Gourmet Ant Bait Liquid (borate), Terro Ant Killer II (borate)—use outside in bait station

Other Baiting Considerations

To attract ants outside of the house use MaxForce Ant Killer gel with fipronil or Gourmet Ant Bait Liquid with borate.

A 5% concentration of borate will kill ants quickly, usually before they get back to the nest, and is useful for getting rid of ants inside. Little if any borate will make it back to the nest so a high concentration of borate will have little effect on the ant colony. A lower concentration of borate (0.5% to 2%) can kill an entire colony, but may take several weeks.

To make a bait solution with a 1% concentration of borate from a 5% concentration, dilute one part ant bait with four parts sugar water (1 cup sugar in a quart of water will make a 25% sugar solution, the ideal for Argentine ants). Add a small amount of disodium benzoate food preservative for a 1% concentration to help prevent mold growth. Use either a PFT station (Rockwell Labs) or the KM AntPro station.

- Spot treat trails and nests with a mixture of sodium lauryl sulfate and water; sodium lauryl sulfate and diatomaceous earth; rosemary oil

Record actions taken, location of bait stations or bait placement, amount and kind of material used.

Inside

To limit availability of food

- Remove and clean up food sources
- Discuss importance of sanitation with appropriate people
- Discuss importance of not feeding feral cats

To limit availability of shelter/habitat

- Look for attractive habitat—warmth and moisture—and discuss remedies with customer
- Discuss with customer about removing potted plants with nests
- Suggest using an Antser® (platform with soapy water moat underneath) to prevent ants from reaching potted plants, pet food, garbage
- Suggest placing potted plants in a dish of water with a drop of detergent as another option

To limit access to the structure (pest-proofing)

- Caulk or otherwise seal entry points that ants are currently using or are nearby
- Blow diatomaceous earth into cracks and wall voids

To directly suppress the pest by removal or killing

- Clean up ant trails with soap and water
- Vacuum up ant trails, or use a lint roller to pick them up
- Use baits temporarily to eliminate ant trails inside; remove after trails are gone

In general, it is preferable to bait ants outside because baiting inside can exacerbate the problem by drawing more ants into the structure; however, at various times, it may be necessary to bait inside briefly to eliminate trailing ants.

Record actions taken. Note locations of any bait stations.

7. Evaluate and monitor the success of the treatment(s) for this pest and the satisfaction of the customer

Return in 7 to 10 days

- Remove inside bait stations if ant trails have been eliminated
- Check bait stations outside to ensure that bait is being accepted
- Change bait if necessary
- Refill bait stations outside, if necessary
- Bait stations can be moved away from building toward fence/property line
- Check for ants trailing into building; seal entry points.
- Check on the progress of customer responsibilities to limit access, food, and habitat.

Return in 7 to 10 days

- Check and refill bait stations for last time.

8. If the customer is a one-time customer, under what circumstances might you make a 2nd or 3rd visit?

If the ant problem is severe and cannot be solved in one visit

9. In what circumstances would you establish a regular monitoring program for a customer with Argentine ants?

A regular monthly or bi-monthly customer should have a monitoring program for Argentine ants. This monitoring does not have to be highly detailed but should at minimum cover the following:

a. An evaluation of the success of actions taken by customer and our company. Check bait stations to ensure bait is being accepted. Move or change bait as needed
b. A check of problem areas for ants and other key pests
c. An inspection for new problems
d. Communication to update the customer.
e. A record of additional treatment actions taken
f. Assessment of customer's satisfaction with treatment. Leave comment card.

10. Other information you think is important:

None

Sources:

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Notes on Baiting for Argentine Ants

Why Baits Work

- Baits work because worker ants feed them to queens and young (larvae) and share them with each other. (This is called "trophallaxis".)
- Baits must have delayed toxic effects so that workers can thoroughly and uniformly share the bait throughout the colony by trophallaxis.

Which Baits Do Argentine Ants Like Best?

- Liquid sugar baits are taken all year round and can be ingested by workers. Liquid sugar baits are also fed to queens and larvae.
- Solid protein baits are taken best in the spring and early summer when there are many larvae to feed in the colony. Workers cannot ingest solid baits, so workers must first feed solid baits to larvae to be digested. Workers then feed on this pre-digested liquid and spread it through the colony.
- Argentine ants will feed on gel baits, but not as efficiently as on liquid baits.
- Argentine ants are selective when feeding on granular baits. Being small ants, Argentine ants will feed more efficiently on small granules. They prefer particles between 840 and 1000 micrometers.

The Concentration of Active Ingredient in the Bait is Very Important

- If the concentration of **active ingredient** (in other words, insecticide) **is too high** in a bait, it can repel worker ants or kill them before they have a chance to share much, if any, with the colony.

  Special Notes on Liquid Boron-based baits:

  - For a boric acid or borate baits, the concentration of active ingredient that will be most effective in killing the colony (rather than just stopping the ant trail) is between **0.5% and 2%**. Higher concentrations may be used to quickly eliminate ants indoors.
  - Commercial liquid boric acid or borate baits with a high sugar concentration (e.g. Terro®) can be diluted with tap water to achieve the desired concentration of active ingredient.
  - The optimum sugar concentration in liquid bait is 25%.
  - When you dilute a liquid bait that does not have the high sugar content of Terro, you need to fortify the sugar content (DPR confirms this is allowed as long as you are not re-selling the mixed bait). To ensure adequate sugar, dilute the bait with 25% sugar water.

  To make 25% sugar water, mix one cup of sugar with 1 quart of water.

- As the insecticidal activity in a bait increases, feeding on the bait decreases. This is true for all insecticides including borates and other toxicants.
  - Again, if the concentration of **active ingredient is too high**, it will kill ants before they can spread it to the colony, or they will refuse to feed on it at all.
  - Evaporation from a bait station could increase the active ingredient to the point where it is too highly concentrated to be effective.
  - If the concentration of the **active ingredient is too low**, ants will readily consume the bait, but it will not kill them.
  - An Argentine ant typically feeds 4 to 12 other ants, so in this process, a liquid bait with too little active ingredient could be diluted to the point where it is no longer effective.
- Research suggests that liquid baits containing low percentages of boric acid may need to be provided for several weeks to be most effective. *However, this does not mean that using liquid baits cannot work if they are used for a shorter amount of time, because it depends on the degree of infestation. It may not take as long to have a substantial impact on a light infestation.*

Locate Bait Stations Properly

- In general it is best to bait for ants outside the structure. This is because it may take a number of weeks to eliminate a colony, and you don't want to be continually attracting trails of ants into a structure.
- A liquid bait with a high concentration (greater than 4%) of boric acid or borate can be used indoors to eliminate an ant invasion within a few days.
    - Indoor bait stations should be placed in an out of the way spot, but on the ant trail.
    - Remove interior bait stations as soon as the trail disappears. Leaving them longer may attract more ants to the spot.
- Do not spray ant bait stations with pesticide; it will repel the ants.
- Do not locate ant bait stations near areas that have recently been sprayed with pesticide or that are likely to be sprayed with pesticide in the future.
- Outside, place bait stations out of direct sunlight. This will reduce evaporation, and prevent the bait from becoming too hot for the ants to feed on.
- Place bait stations where ants are seen trailing and/or near sources of moisture or food.
- Bait stations can initially be placed close to the structure and then gradually moved farther away toward the property line.

Use Enough Bait Stations The number of bait stations used should be based on the size of the structure and degree of infestation. This has not been scientifically determined for all bait stations with all baits, so experimentation may be needed.

Commonly Available Ant Bait Products. Effectiveness varies.

Active Ingredient	Example product name
Avermectin B (Abamectin)	Advance Granular Ant Bait
Borate-based products	Drax Ant Kill Gel PF Drax Ant Kill Gel Snuffer Niban FG Niban FG Niban Granular Bait MRF 2000 (Stapleton's) Advance liquid ant bait Uncle Albert"s Super Smart Ant B Gourmet Ant Bait Gel Gourmet Ant Bait Liquid Terro Ant Killer II Dr. Moss's Liquid Bait System Drax Liquidator Ant Bait
Fipronil	Maxforce FC Prof. Insect Control Bait Sta. Maxforce Ant Killer Bait Gel
Hydramethylnon	Maxforce Prof. Ant Killer Bait Stations Maxforce Prof. Granular Insect Bait Maxforce Prof. Fine Granular Insect Bait

Sources for this fact sheet:

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