

Evolving Issues in Ant Control

A Workshop Summary

March 4-5, 2003

The following information summarizes the discussions held among university researchers, product manufacturers, and industry technical directors on March 4-5, 2003, at Purdue University in West Lafayette, IN. This workshop was sponsored by Purdue's Industrial Affiliates Program in the Department of Entomology, and financially underwritten by Dow AgroSciences and Bayer Environmental Science. The Industrial Affiliates Program supports research and education efforts in Purdue's Center for Urban and Industrial Pest Management, including sponsorship of a workshop series designed to bring together parties sharing the common goal of urban and industrial pest management.

This summary contains 9 ranked categories and a list of potential action items. The topics for ranking were obtained based on extensive discussions held during the workshop, between its 30 attendees. The rankings were made by workshop participants, who scored the topics 1st – 9th (1st = most important) depending on their own personal opinion of respective topics. The scores reported for each category are the averages determined from 25 non-Purdue workshop attendees.

The intent of this summary is two-fold: (1) to be used by the research community to focus research efforts in ant management, and (2) to promote multi-university and industry collaboration on high-priority areas of ant research.

Ranking of Categories:

1. Improvement of our understanding of basic ant behavior (Score = 3.2).

- Nutrient flow in colonies: seasonality, influence of single vs. multiple queens, the role of protein, the role of larvae.
- Horizontal transfer and trophallaxis.
- Trailing behavior and trail pheromones.
- Effects of non-repellent liquid treatments on trailing behavior.
- Physiological details associated with protein digestion and utilization.

2. Basic biology, ecology, and behavior of recent invasive pest ants (Score = 3.9).

- Topics: colony nutrient flow, trailing characteristics, foraging strategies, diet preferences, seasonal behaviors and diet, role of honeydew and nectar flows in seasonal cycles, ecology in native vs. invaded habitats.
- Species:
 - Tapinoma sessile* (odorous house ant)
 - Tapinoma melanocephalum* (ghost ant)
 - Technomyrmex albipes* (white-footed ant)
 - Myrmica rubra* (European fire ant)
 - Paratrechina longicornis* (crazy ant)
 - Paratrechina bourbonica* (no common name)
 - Paratrechina pubens* (no common name)

3. Optimization and improvement of baiting strategies (Score = 4.1).

- Enhancement of pre-baiting strategies.
- Enhancement of mass-recruitment phenomenon.
- Use of trail pheromones or pheromone mimics to enhance bait acceptance.
- Efforts should continue to improve and develop species-specific containers for holding liquid baits.

4. Improvement and further development of non-repellent liquids (Score = 4.5).

- Improved formulations.
- Better definition of the role of horizontal transfer in efficacy.
- Can rates of exterior-applied non-repellent liquids be lowered to the point where they can act like true baits (what are the consequences)?
- Greater flexibility in labeling of non-repellent liquids is needed (indoor use and use in food-handling situations).
- Maximum efficacy with a minimum number of treatments is needed.
- What are the effects on ant populations far from perimeter treatment zone?
- What are the effects on ant ecology and species composition in areas adjacent to perimeter treatments (does a release from competition favor the invasion of new species like OHA)?

5. Bait improvement and development (Score = 4.6).

- Development of specific, effective odorous house ant baits.
- Emphasis should be placed on developing species-specific baits (with optimal carrier, AI concentration, and sugar/protein/oil composition), rather than “universal” baits.
- Development of “custom” baiting products where food type and amount of AI can be manually adjusted by PC professional.
- More stable protein-based baits would be useful.

6. Integrated chemical control approaches (Score = 4.9).

- Combinations of non-repellent liquids and baits.
- Combinations of bait formulations (granules, liquids, solid foods).
- Integration of trail pheromones or pheromone mimics to enhance baiting programs and / or non-repellent perimeter sprays.

7. Improvement and development of IGRs for use in ant management (Score = 5.3).

- Juvenoids and Chitin Synthesis Inhibitors.
- Baits, interior and perimeter sprays.
- Improved formulations.
- Understanding effects on different species and castes / stages.

8. Understanding the changing market shares held by native and invasive pest ants (Score = 6.4).

- Carpenter ants appear to remain as the #1 pest ant of structures in the US.
- Odorous house ants are on the increase over the central US, as well as other localized areas.
- Pavement ants and other species appear to be declining.
- Are declining trends in business opportunities for some species related to increases in the abundance and impact of invasive species?
- Based on a Purdue workshop held five years ago, the top pest ants were considered to be carpenter, crazy, Argentine, and pavement ants.

9. Systematics and migration of recent invasive pest ants (Score = 7.2).

- Are the invasive species that we are currently encountering actually what we think they are; in particular, the odorous house ant?
- Potential exists for both morphological and molecular systematic identification approaches.
- Molecular (DNA fingerprinting) approaches can help resolve issues relating to the spread and origin of the invasion, and to assess the role of human habitat modification in the expansion of invasive species.
- Aggression assessments have been very useful in understanding Argentine ant ecology and how they achieve success in invaded habitats.

Action Items:

1. Distribute the summary list to a broad cross-section of industry, manufacturers, and academia.
2. Prepare a detailed summary article for publication in a trade magazine.
3. Design new research programs to address questions of highest importance to academia and industry alike.

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