

The Language of Pheromones



Program Update

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An important new area of research in my group is the study of pheromones for turfgrass insect monitoring. Pheromones are chemical signals that are released by one individual and stimulate a reaction in other individuals of the same species. Insects of the same species can communicate with one another by emitting small quantities of chemical substances from their bodies into the air. The released pheromone travels through the air until it is intercepted by antenna (or possible other body part) containing sensory receptors that recognize the pheromone as coming from a member of its own species. While in some cases pheromones are single compounds, in many instances an insect pheromone will be a blend of two or more compounds that are produced and released in a specific ratio by the insect. In such cases an alteration in either the structure of the individual compounds or the relative amount of any compound in the blend will cause the pheromone to become inactive.

Information transmitted through pheromone release include:

- The presence of a willing individual (usually a female) advertising her presence to distant members of the opposite sex (usually a male).

- The presence of high quality food or a valuable area to mate or take shelter
- The presence of danger such as predators or parasites or other unwanted intruders in the area.

Although we know that many insect species employ sex pheromones to attract mates, the confirmation of the presence of a sex pheromone is just the first in a long series of steps need to use this pheromone in a practical pest management program. These steps include the verification of the pheromones presence, isolation, identification, and synthesis of compounds and determining proper blend ratios in the laboratory, testing of release rates in the field, optimization of trap placement and design in the field, and finally incorporation of the pheromone into an established turfgrass pest management program. Possible uses of pheromones in turfgrass pest management programs include confirming the presence of exotic or endemic insect pest species, pinpointing the source of an insect population, estimating the size of an insect infestation, and improving the timing of insecticide applications.

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Turfgrass, Soil and Water Quality Program: 1998, A Year of Transition

The best way to sum up 1998 is to say it was a major year of change. My department changed its position on staff support for faculty resulting in a 50% cut in support staff that I have had for over 15 years. Fortunately, the department has shifted part of Jeff Barlow's time to serve the technical role in my program. Jeff brings with him a strong turfgrass background and has served as our in-house IPM specialist for the past several years.

Results from this year field studies were interesting. The impact of nutrient pretreated zeolite amendment of sand in the greens construction phase was remarkable. If you attended this summer's field day you got to see first hand how effective the natural zeolite was in improving establishment. Applying a natural zeolite (Zeopro) that was pre-loaded with fertilizer (N-P-K) to sand at a rate of 10% by volume, compared to the traditional sand to peat mix (80/20 by volume), resulted in a dramatic improvement in the establishment rate of creeping bentgrass.

Within 30 days after seeding, the Zeopro amended sand greens had 80% turfgrass cover compared to only 25% for the sand-peat mix greens. Samples of the drainage water have been collected for analysis to determine the extent of nutrient leaching (nitrate, phosphorus and potassium) as influenced by amend type. From our previous research with natural zeolites, we found them to increase the amount of fertilizer nitrogen in the clippings while reducing nitrate leaching. These results suggest they can be used to enhance establishment in sand based turf systems.

Sewage treatment facilities are one of the contributors of phosphorus in surface waters, which can lead to algal blooms resulting in unsafe drinking water, fish kills and poor quality recreation waters. One option for the disposal of sewage effluent is to land apply it. We have very few sites in the northeastern US that land apply sewage effluent. This summer we were involved with a project with the Lake Placid Resort Club involving using the Village of Lake Placid sew-