

CHEMICAL ECOLOGY AND INTEGRATED MANAGEMENT OF THE BANANA WEEVIL *COSMOPOLITES SORDIDUS* IN UGANDA

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General

Infochemicals — such as pheromones (chemicals insects use to communicate with each other) and kairomones (chemicals that benefit another species) — may help control the banana weevil, *Cosmopolites sordidus*. This insect is one of the most serious pests of East African highland bananas and plantains, and it causes major damage in banana-growing regions around the world.

The banana weevil produces an aggregation pheromone that attracts both male and female weevils. Scientists have identified and manufactured the active component of this pheromone, called sordidin, and it is now commercially available.

The main goal of this research was to find out whether pheromone-based traps could effectively control banana weevils under Ugandan farming conditions.

Key Findings

1. Attraction to traps.

In both laboratory and field experiments, banana weevils were more strongly attracted to traps that combined fermented banana plant material, and the synthetic aggregation pheromone. The combined effect was stronger in the laboratory than in the field.

Several factors influenced how well the traps worked:

- The biology and behaviour of the weevil
- The strength and effectiveness of the pheromone
- Trap design and placement
- The cropping system

2. Environmental conditions.

When trap density was increased from 4 to 8 traps per hectare in farmer fields, there was little reduction in weevil numbers or plant damage. This means the pheromone-trapping system was not effective at the supplier's recommended rate of 4 traps per hectare.

3. Effects on natural predators.

The study also tested whether the pheromone affected two natural predators of the banana weevil:

- *Dactylosternum abdominale* (a beetle)
- *Pheidole megacephala* (an ant species)

Both predators were attracted to the smell of fermenting banana plant material. However, the synthetic weevil pheromone did not affect where these predators were found in the field.

4. Combining pheromones with biological control

Researchers also tested whether pheromone traps could work together with a biological control agent — a fungus called *Beauveria bassiana*, which infects and kills insects.

Results showed that:

The pheromone attracted weevils to banana plants where the traps were placed. Infected weevils spread the fungus to healthy weevils. Weevil death rates were significantly higher when the pheromone was used together with the fungus than when the fungus was used alone. This shows that pheromones can help spread the fungus more effectively and improve control of the pest.

Conclusion

This research provides evidence that synthetic aggregation pheromones can help manage banana weevils in Uganda, especially for small-scale farmers. However, pheromone traps alone are not sufficient for control.

Instead, pheromones should be used as part of an Integrated Pest Management (IPM) system. In this system, pheromones help increase weevil deaths by supporting other control methods, such as:

- Entomopathogenic fungi (like *Beauveria bassiana*)
- Possibly entomopathogenic nematodes

Future strategies should focus on combining pheromones with these biological control agents to improve banana weevil management.