ISSN: 3048-6580

AgroPedia
e - Publication for Agriculture Popular Articles
Volume: 03, Issue: 08 (August, 2026)
Available online at: https://www.agropedia.co.in

Insect Funeral Services: Managing Death in Tiny Societies

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Introduction

Death is an inevitable part of life, even in highly organized insect societies. In ants, termites, bees, and some wasps, dead nestmates are more than lifeless bodies; they can serve as a potential source of bacteria, fungi, and parasites that threaten the entire colony. To reduce this risk, social insects have evolved remarkable corpse-management behaviours that detect, remove, or neutralize the dead and help to protect the colony. This evolutionary sanitation behaviour in social insects is known as "Necrophoresis". The social insects are among nature's greatest examples of cooperative organisms. Eusocial species share three key traits: cooperative care of young, a reproductive division of labour, and overlapping generations living together. These traits allow colonies to function as tightly integrated societies, with workers foraging, defending the nest, rearing brood, and maintaining. Undertaking behaviour includes several responses to dead nestmates, such as carrying corpses away, burying them, consuming them, or avoiding contaminated areas. These actions are usually triggered by chemical cues from the body, which workers detect with their antennae and use to respond quickly to potential disease threats. Far from being a morbid curiosity, corpse management is a form of social immunity: a collective defense that helps colonies limit infection and survive. Scientists now study these behaviours not only to understand social evolution but also for insights that may inform pest control, robotics, and public health.

Why does Corpse Management Matter?

Social insects live in dense colonies, often with thousands or even millions of individuals sharing the same nest, food, and resources. In such crowded conditions, disease can spread quickly, and a single infected corpse may become a source of dangerous pathogens. Because insects cannot rely on medicine or hospitals, they depend on behavioural defences to limit transmission and protect the colony.

How do insects sense the Dead?

Recognizing and removing dead members is important in social insect colonies to prevent the spread of diseases. Insects primarily use chemical cues from the corpse surface, with

tactile features sometimes helping. Two main mechanisms have been proposed:

• *Fatty acid death cue*: Corpses release fatty acids, especially oleic acid, that act as necromones and trigger corpse-removal or burial behaviours. Oleic acid is a widely conserved signal linked to decay and infection risk.

• *Chemical vital sign*: Some species detect death by the rapid loss of life-associated cuticular chemicals. In ants such as the Argentine ant, a decrease in these compounds prompts undertaking behaviours before decomposition begins.

Scientific evidence from ants, honey bees, and termites suggests that both mechanisms often work together. While the specific chemicals remain unidentified in many species, the combined use of death-associated compounds and absence of life-associated chemicals enables quick detection and removal of dead colony members, reducing pathogen spread and protecting colony health.

Corpse management strategies by insects

Social insects follow a sequence of actions when dealing with the dead colony members. The corpse management depends on the species, the condition of the corpse, and the level of disease risk.

1. Detection and Recognition

The workers encounter a dead individual and inspect it using their antennae and detect chemical changes associated with death, such as the loss of life signals or the presence of death cues like oleic acid.

2. Inspection and Risk Assessment

Workers evaluate each corpse and determine whether it's a nestmate or an outsider, then by judging how fresh or decomposed the body is and whether there are signs of disease or infection; together, these factors the insects assess the threat the corpse poses to colony health.

3. Decision-Making

Based on the assessment, workers select one of several management strategies.

A. Necrophoresis (Corpse Removal)

When workers detect a dead nestmate, they begin to inspect it with their antennae, then grasp the body with their mandibles and carry or drag it out of the nest. Finally, the corpse is deposited in refuse piles or designated cemetery areas away from the colony to keep living members safe.

Examples: Honey bees (*Apis mellifera*), ants (*Solenopsis invicta*).

B. Burial (Entombment)

When workers decide to bury acorpse, they first surround and inspect it, then gather soil, faeces, or other nest materials to cover and seal the body within a chamber. This entombment physically isolates pathogens and keeps the colony safe.

Examples: *Coptotermes formosanus*, *Pseudacanthotermes spiniger*.

C. Cannibalism (Necrophagy)

When workers judge a corpse to be fresh and safe, they may consume it, recovering nutrients and beneficial gut microbes while removing a

potential infection source before decomposition begins.

Examples: *Reticulitermes lucifugus*, *Coptotermes lacteus*, fire ants.

D. Avoidance (Necrophobia)

When workers detect a dangerous corpse or a contaminated area, they raise alarms and withdraw, avoiding the site and sometimes relocating. Onthis kind of occasion, entire colonies will abandon infected nesting areas to protect the group.

Examples: Fire ants (*Solenopsis invicta*) and termites (*Coptotermes formosanus*).

E. Self-Removal by sick individuals

When workers become moribund or detect they are heavily infected, they often leave the nest voluntarily and die apart from their nestmates. This lowers disease transmission risk for the colony.

Examples: *Pogonomyrmex barbatus* and *Solenopsis invicta*.

Future perspectives

Future research should focus on identifying the colony members who perform corpse-management tasks, how they are recruited, and the factors that regulate these decisions. Investigating task allocation may reveal whether the undertaking is carried out by specialised workers or by reserve labour that is activated when needed, particularly in lower termites. Studies on the genetic and molecular basis of death recognition and undertaking behaviour in

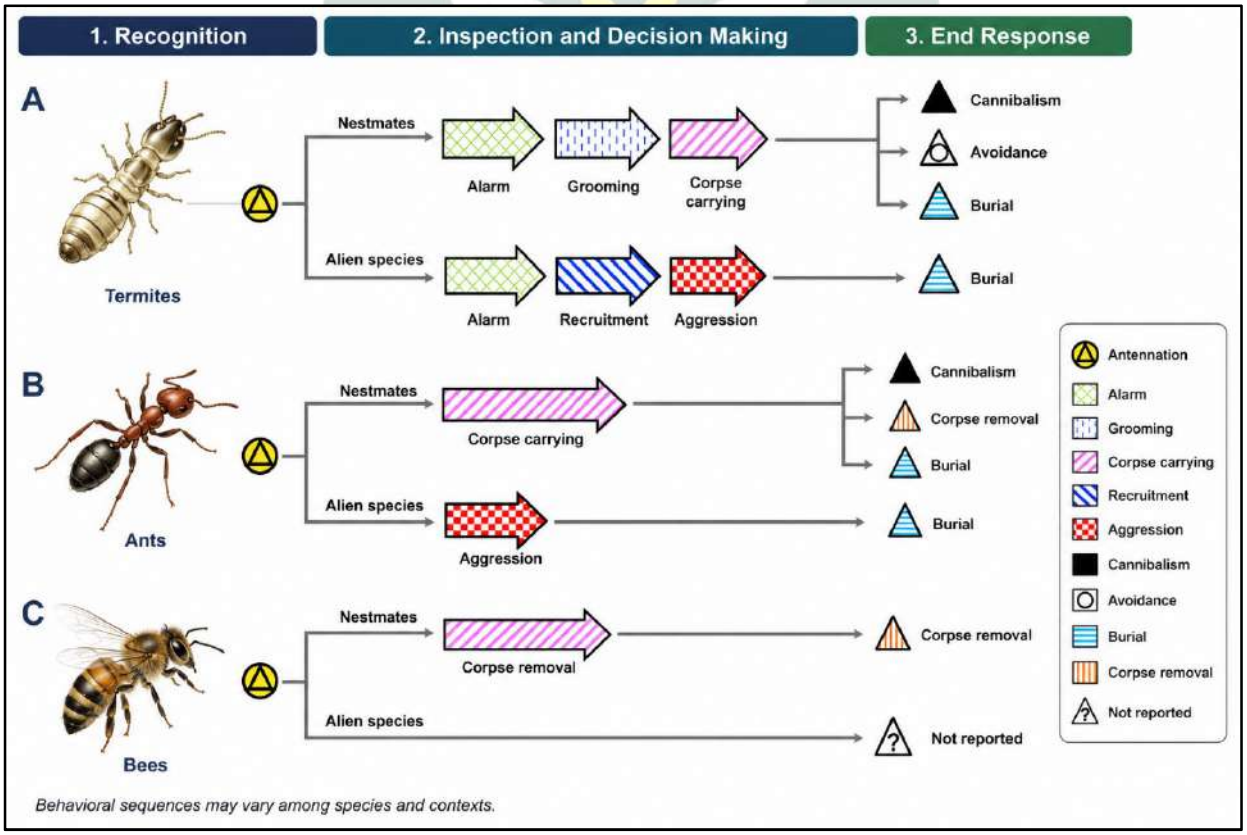

Figure: Corpse management pathway displayed by different social insects (Sun and Zhou, 2013)

ants, bees, and termites will help connect observable behaviours with their underlying biological mechanisms. Comparative analyses across different eusocial insects can distinguish shared and species-specific corpse-management strategies, while integrated approaches combining behavioural ecology, chemical communication, genomics, and functional studies will provide a deeper understanding of these processes. Ultimately, corpse management offers a valuable model for exploring social immunity, colony organization, and the evolution of eusociality.

Conclusion

Corpse management acts as an important component of social immunity in insect societies, allowing colonies to maintain hygiene, recycle nutrients, and limit pathogen spread. Social insects use a series of strategies (necrophoresis, necrophagy, burial, and avoidance), and they often combine approaches depending on the corpse condition and colony needs. These responses are guided by sophisticated chemical and tactile cues that enable workers to assess risk and select appropriate actions. Although research has clarified many aspects of death recognition and undertaking behaviour, key questions remain about their sensory, genetic, and evolutionary bases. Ongoing advances in behavioural ecology, chemical communication, and molecular biology are beginning to fill these gaps and may also suggest novel approaches to pest management. Studying corpse management, therefore, illuminates the organization and resilience of insect societies and provides a powerful model for understanding the evolution of collective disease defences.

Reference

Asokan, A. and Ramesha, B. 2024. Corpse management strategies in social insects. *Indian Journal of Entomology*. 668-677.

Chouvenc, T., Robert, A., Semon, E. and Bordereau, C. 2012. Burial behaviour by dealates of the termite *Pseudacanthotermes spiniger* (Termitidae, Macrotermitinae) induced by chemical signals from termite corpses. *Insectes Sociaux*. 59, 119-125.

Fountas, S., Mylonas, N., Malounas, I., Rodias, E., Santos, C.H. and Pekkeriet, E. 2020. Agricultural robotics for field operations. Sensors. 20(9), 2672.

KS, G.A. 2024. Corpse management in eusocial insects. *International journal*. 8(8),1315-1325.

López-Riquelme, G.O. 2013. The funeral ways of social insects. Social strategies for corpse disposal. *Trends in Entomology*.

Sun, Q. and Zhou, X. 2013. Corpse management in social insects. *International Journal of Biological Sciences*. 9(3), 313.