

A Study of Ants as a Suitable Learning Cycle to Investigate for Studies Through Observations

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Abstract

Ants are among the most commonly encountered social insects and provide a useful model for observing animal behaviour in natural and semi-natural environments. Their abundance, social organization, foraging behaviour, habitat preferences, and interactions with other organisms make them suitable subjects for introducing students to biological observation and scientific investigation. The present review examines the usefulness of ants as organisms for developing observational learning, scientific reasoning, and research oriented skills among students. The source study describes observations of harvester ants in an agricultural area, with particular attention to nest activity, foraging behaviour, seed collection, environmental conditions, and differences in activity among colonies. Approximately thirty nests were observed, while detailed observations were conducted on selected nests during different periods of the day. The observations indicated that environmental conditions, particularly direct sunlight and cooler periods, were associated with differences in foraging activity. The study also highlights the educational value of using locally available insects because they can be observed with relatively simple equipment and without complex laboratory arrangements. Ant behaviour can therefore serve as a practical learning cycle in which students observe organisms, formulate questions, develop hypotheses, record observations, interpret patterns, and propose further investigations. The review suggests that ant-based observational activities can connect concepts of ecology, animal behaviour, adaptation, social organization, and scientific methodology in an accessible manner.

Keywords: Ants; animal behaviour; field observation; scientific method; foraging behaviour; ecological study; learning cycle; Zoology.

1. Introduction

Observation occupies an important position in biological sciences because many aspects of animal life can be understood by systematically recording organisms in their natural surroundings. Field-based observation allows learners to examine behavioural patterns, habitat relationships, environmental responses, and interactions between organisms without necessarily requiring sophisticated laboratory facilities. The source paper emphasizes that field observation can help students develop scientific methodology, logical reasoning, and the ability to examine biological questions through direct evidence. Among insects, ants provide particularly useful opportunities for observational studies. They belong to the order Hymenoptera and family Formicidae and are characterized by complex social organization. Different kinds of ants can commonly be encountered around houses, gardens, agricultural areas, urban green spaces, and forests. Their feeding strategies, nesting behaviour, movement, communication, and responses to environmental conditions provide numerous possibilities for simple biological investigations. An important advantage of studying ants is their local availability. Students can often observe them in their own surroundings, making the learning experience directly connected with the environment in which they live. Such accessibility can make Zoology more engaging because students are not restricted to textbook descriptions. Instead, they can formulate questions based on organisms that they encounter regularly. The source study particularly considers the foraging activities of harvester ants near an agricultural area. Observations were conducted around nest entrances at different times of the day, allowing patterns of activity and seed collection to be recorded. The educational importance of such an approach extends beyond ant biology. When

students observe an organism, record a behavioural pattern, compare observations, and attempt to explain the observed variation, they begin to practice the basic stages of scientific inquiry.

2. Ants as Model Organisms for Observational Learning

Ant colonies display a variety of behaviours that can be examined through relatively simple observations. Their collective activities include searching for food, transporting resources, returning to nests, interacting with other individuals, and responding to environmental conditions. For students, this creates several possible questions: Why do ants leave their nests? What types of food materials do they select? Does temperature influence their activity? Does sunlight affect their movement? Do different colonies show different levels of activity? How do ants respond when individuals from different colonies encounter one another? Such questions can transform an ordinary observation into a scientific investigation.

3. Learning through Field Observation

Field observation provides an opportunity to connect theoretical concepts with real biological events. Instead of simply learning that animals respond to environmental factors, students can observe those responses directly. In the reviewed study, movements of foraging ants were recorded during short observation intervals at different times of the day. The investigation was conducted during the post-monsoon period, and observations were focused around nest entrances. This type of investigation can introduce students to several fundamental research practices: selection of a study organism; identification of an observable behaviour; development of a research question; systematic recording of observations; comparison of observations; interpretation of behavioural patterns; and development of further research questions. Thus, even a simple field observation can become the starting point of a research-oriented learning process.

4. Foraging Behaviour of Ants

Foraging is one of the most easily observable behaviours in ants. The reviewed paper reports that ants were attracted to seeds containing elaiosomes. These structures contain nutritional components and can encourage ants to collect and transport seeds. The ants carry the seeds toward their nests, where the food-rich portion can be removed and used within the colony. The observations also demonstrated differences in foraging activity under different environmental conditions. Approximately 27% of the observed nests showed heaps of husks associated with active seed collection. Foraging activity was reported to be lower during periods of direct sunlight and higher during cooler parts of the day. These observations provide an excellent teaching opportunity because students can examine how behaviour may vary with environmental conditions rather than remaining constant throughout the day.

5. Variation among Ant Colonies

The reviewed observations also indicated differences among nests. Five nests showed variation in foraging activity and its success. The number of outgoing foragers and the number successfully returning with food were not identical across nests. Such variation can lead students toward more advanced biological questions. Differences between colonies could potentially encourage investigation into colony size, food availability, nest condition, distance from food sources, environmental factors, or timing of observation. The original paper itself identifies several possible directions for further study, including competition between foragers, collected seed types, resource distance, seed drying, and relationships between colony age and the number of foragers.

6. Ants and Scientific Skill Development

One of the major educational strengths of ant studies is that they encourage students to move from passive learning to active investigation. Ants are locally abundant and can often be observed without sophisticated laboratory facilities. The paper also emphasizes that their large numbers and interesting social behaviour provide opportunities for students to develop and test hypotheses. An observational exercise can therefore develop careful observation, data recording,

comparison, logical reasoning, hypothesis formation, interpretation of evidence, scientific communication, and research curiosity. These skills are relevant not only to entomology but also to wider areas of Zoology and biological research.

7. Social Behaviour and Inter-Colony Interaction

Ants also provide an opportunity to introduce students to animal social behaviour. The source paper describes an observation in which workers from different colonies were placed together and their interactions were examined. Contrary to the expected aggressive response, the ants were observed sharing food, and no aggression was recorded during the described observation. Such an observation is particularly valuable from a learning perspective because it demonstrates that scientific investigation does not require researchers to obtain the result they initially expect. A hypothesis may be supported, partially supported, or not supported by observations. The important element is systematic observation and evidence-based interpretation.

8. Ecological Importance of Ants

Ants play important roles within ecosystems. Their interactions with plants, food resources, soil, and other organisms make them relevant to ecological studies. The reviewed paper discusses the relationship between ants and plants in seed dispersal. When plants provide nutritional rewards to ants, ants may transport seeds, thereby contributing to their dispersal. This interaction is described as myrmecochory. Consequently, ant observation can help students understand broader ecological concepts such as food relationships, resource utilization, seed dispersal, species interactions, habitat adaptation, competition, and environmental responses.

9. Educational Advantages of Using Ants

The use of ants as teaching organisms has several practical advantages. They are commonly available, relatively easy to observe, and demonstrate visible behavioural patterns. The source paper emphasizes their suitability for classroom-based animal behaviour studies because colonies can provide numerous individuals for repeated observations and hypothesis testing. Another advantage is that students can connect observations with their own communities. Instead of studying only organisms that are distant or difficult to access, students can investigate animals that occur around their homes, college campuses, gardens, or agricultural surroundings. This approach may increase interest in Zoology and encourage students to consider animal behaviour as a potential area of scientific study.

10. Research Opportunities

Simple ant observations can serve as preliminary investigations for more detailed research. The reviewed paper proposes several possible directions, including examination of competition among foragers, types of seeds collected, distance to food resources, seed drying periods, and relationships between colony age and forager numbers. Therefore, an observation-based learning activity can gradually develop into a structured research project. Students can begin with basic descriptive observations and subsequently introduce variables, replicate observations, quantify behavioural responses, and analyse relationships statistically.

11. Conclusion

Ants provide an accessible and informative model for introducing students to animal behaviour and scientific investigation. Their social organization, foraging activities, nesting patterns, responses to environmental conditions, and interactions with food resources create numerous opportunities for field-based learning. The reviewed study demonstrates that even relatively simple observations around ant nests can generate measurable information regarding foraging activity and environmental influences. More importantly, ant-based investigations can help students understand how scientific knowledge is developed. Students can begin with direct observation, formulate questions, develop hypotheses, record evidence, interpret results, and identify new questions for future investigation. The approach

therefore has value not only for understanding ants but also for developing broader scientific and research skills. Care should nevertheless be taken when collecting or maintaining ants. The source paper specifically warns against using potentially harmful species such as fire ants and emphasizes that ants obtained from suppliers should not be released into environments where they are not naturally established. Overall, ants can serve as effective organisms for observational learning and as a practical entry point into ecology, animal behaviour, and scientific methodology.

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