

ISSUES : FIGURE SET

Do Antbirds Help or Hinder Army Ants?

Mark Kuhlmann, Biology Department,
Hartwick College, Oneonta, NY 13820,
<mailto:kuhlmannm@hartwick.edu>

THE ISSUE:

The effects of species interactions are not always obvious. This issue examines the nature of the relationship between army ants and ant-following birds. Students will design a hypothetical experiment to measure the effect of birds on army ant foraging success, interpret the results of a real experiment, and consider the consequences of the interaction on the ant colony and the forest community.



Army ant workers (*Eciton burchellii*) clustered around a captured insect.

Photo by Alex Wild, used with permission.

ECOLOGICAL CONTENT:

interspecific interactions, mutualism, commensalism, parasitism, experimental design, foraging, social behavior

STUDENT-ACTIVE APPROACHES:

turn-to-your-neighbor and informal group work

STUDENT ASSESSMENTS:

design an experiment, essay, essay quiz

ACKNOWLEDGMENTS:

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http://tiee.ecoed.net/vol/v4/issues/figure_sets/army_ants/abstract.html

OVERVIEW

This section is written for faculty who can modify the Overview as appropriate for their students. "Student Instructions" also include introductory material.

Direct species interactions are the main connectors between species in a community, but their effects on the species involved are not always obvious. In this figure set, students use a study by Wrege et al. (2005) to examine the relationship between the army ant *Eciton burchellii* and birds that follow foraging swarms.

Army ant swarms are one of the most dramatic sights in tropical forests and observers are impressed by the array of species that follow these swarms. It has long been assumed that some bird species have a mutualistic relationship with army ants because these birds often follow swarms and catch animals escaping from the advancing ants. It was further assumed that the birds chased some escaping animals back toward the swarm. Like many apparent mutualisms, the true effects of the ant-following birds on the ants had never been closely examined.

In this issue, the students will design a hypothetical experiment to measure the effect of birds on army ant foraging success, interpret the results of a real experiment, and consider the consequences of the interaction on the ant colony and the forest community.

References

- Gotwald, W. H., Jr. 1995. *Army Ants: The Biology of Social Predation*. Cornell University Press, Ithaca, NY.
- Schneirla, T. C. 1971. *Army Ants: A Study of Social Organization*. W. H. Freeman and Company, San Francisco, CA.
- Willis, E. O., and Y. Oniki. 1978. Birds and Army Ants. *Annual Review of Ecology and Systematics* 9:243-263.
- Wrege, P. H., M. Wikelski, J. T. Mandel, T. Rassweiler, and I. D. Couzin. 2005. Antbirds parasitize foraging army ants. *Ecology* 86:555-559.

FIGURE SETS

These are published figures from peer-reviewed research journals and monographs that engage students in data analysis and critical thinking organized by teaching approach, Bloom's Taxonomy cognitive skills, class size, and time. The student-active approaches listed here are suggestions and examples; modify them as appropriate for your teaching.

Section and Ecological Question	Student-Active Approach	Cognitive Skill	Class Size/Time
1. Design an experiment	informal group work	knowledge, comprehension application, evaluation	any/moderate
2. What is the relationship between ant-following birds and army ants? (Wrege et al. 2005)	turn-to-your-neighbor	knowledge, comprehension interpretation	any/short
3. How significant is this relationship to army ant colonies? (Wrege et al. 2005)	informal group work	knowledge, comprehension interpretation	any/moderate

Resources

Army Ants

- Animal Diversity Web. University of Michigan's Museum of Zoology. *Eciton burchelli*. (http://animaldiversity.ummz.umich.edu/site/accounts/information/Eciton_burchelli.html)
- Ant (and other creatures) photos by Alex Wild, Department of Entomology, University of California, Davis. (<http://www.myrmecos.net/ants.html>)
- Ants of Africa. Includes Antbird/Army ants images. Created by Brian Taylor, University of Nottingham (<http://antbase.org/ants/africa/clog7b.htm>)

Antbirds

- Antbirds, information and photos, by Don Roberson, Monterey, CA. (<http://www.montereybay.com/creagrus/antbirds.html>)
- Encyclopedia Britannica, definition of antbird (subscription required) (<http://www.britannica.com/eb/article-9007755/>)
- Antbird information, by David L. Ross, Jr. (<http://www.costaricanbirds.com/Antbirds.htm>)

Experimental Design Rubrics

- Rubric for assessing the ability to conduct and design a testing experiment. Rutgers Physics and Astronomy Education Research group: "Scientific Abilities" Project (sponsored by the National Science Foundation "Assessing Student Achievement" program). (http://paer.rutgers.edu/ScientificAbilities/Downloads/Rubrics/C_TestExpRub.pdf)
- Student Science Laboratory Report Rubric. Beloit College's Biology Department website; taken from a presentation given by Christopher Hilvert of Glenbrook South High School at the 1997 NABT convention (<http://www.beloit.edu/~biology/HHMIsumwork98/groupprojects/enviro/stulabrubic.html>)