INSECT APPRECIATION

Bringing biodiversity down to earth

by Brian Fisher and Robert Fisher

Insects provide an inexpensive and accessible way of bringing the biological diversity crisis to the backyards and parks of students. Worldwide there are 9040 known bird species, 4000 mammal species, and 300 000 plant species, but insect species number in the tens of millions and constitute 75 percent of the animal life on Earth (Erwin, 1988).

Although bee stings may make us doubt the usefulness of insects, without them the ecosystems that allow us to survive would collapse to a few simple plants and microorganisms (Wilson 1987, 1988). Insects create the biological foundations for all ecosystems: cycling nutrients, pollinating plants, dispersing seeds, maintaining soil structure and fertility, controlling populations of other organisms, and providing a major food source for birds and other animals (Majer, 1987).

To facilitate classroom discussion of the importance of insects in ecosystem function and the fascinating natural history of many of these species, try comparing insect activities to those of humans. Examples of ecosystem functions of insects that can be related to human endeavors include:

Dating service. The sedentary nature of plants and the great distance that may exist between individuals of the same species create a need for effective and energetic pollinators. Insects are responsible for the matchmaking service of 65 percent of all flowering plants (Whitmore, 1990). Flowers come in all shapes and sizes, but insects have coevolved amazing adaptations to accommodate all tastes.

Cleaning agents. Predacious insects, such as ants, are the vacuum cleaners of the outdoors. There are two important aspects that balance the ecosystem equation: growth and destruction. We often highlight the importance of growth and overlook the vital role of recycling that growth. Ants and other predacious insects begin the cycle of turning growth back into useable material (Holldobler and Wilson, 1990).

Pest controllers. Many people do not realize that insects provide the most efficient control of insect populations. Predacious insects that eat other insects, or parasitic insects that lay eggs on host insects help keep down the populations of pest species. Without parasitic wasps and flies, we would be much more dependent on synthetic chemical pesticides to control many of our agricultural pests.

Topsoil chefs. Termites are special among insects in their ability to digest cellulose or wood. It does not take long for termites to recycle a fallen tree into food for other plants. Many forests are dependent on termites and other inconspicuous insects such as beetles and springtails to fill the role of providing humus and nutrients for plants (Wilson, 1971).

Sanitary engineers. The dung beetle forms a mass of dung into a ball and rolls it to a suitable site, buries it, and the female lays an egg on it. The dung beetle and its works were sacred to the early Egyptians. The ball of dung the beetle forms and rolls along the ground was likened to the Sun, and the beetle was seen as the invisible power that propelled the Sun across the sky each day.

Grave diggers. Burying beetles dig beneath small dead animals and bury it; eggs are then laid on the carcass so that the larvae will have a ready supply of food. Dead animals represent a vital source of food for many types of insects that quickly recycle the nutrient back into the food web of the ecosystem. Thanks to insects, dead animals are not a dead end, but a beginning that leads to more animals.

CONSERVATION BIOLOGY

As students begin to appreciate the fascinating life histories and ecological importance of insects, insects become an important tool for investigating the current biological diversity crisis. The challenge is not only to teach students that humans are affecting the environment, but also to encourage them to think about how their lives relate to the environment and the value of preserving that relationship.

Large vertebrates are wide ranging generalists that, due to hunting and the expanding human population, are restricted to large preserves that most students will never see. Insects, however, are often more specialized, characterized by restricted distributions, and associated with unique habitats. Habitats fragmented by expanding cities contain no large vertebrates but may contain viable populations of important insects.

Cities and conservation groups are beginning to appreciate the value of habitats in urban areas (Hafernik, 1992). Plainfield, New Hampshire has recently adopted the rare cobblestone tiger beetle as its town insect. A neighborhood in San

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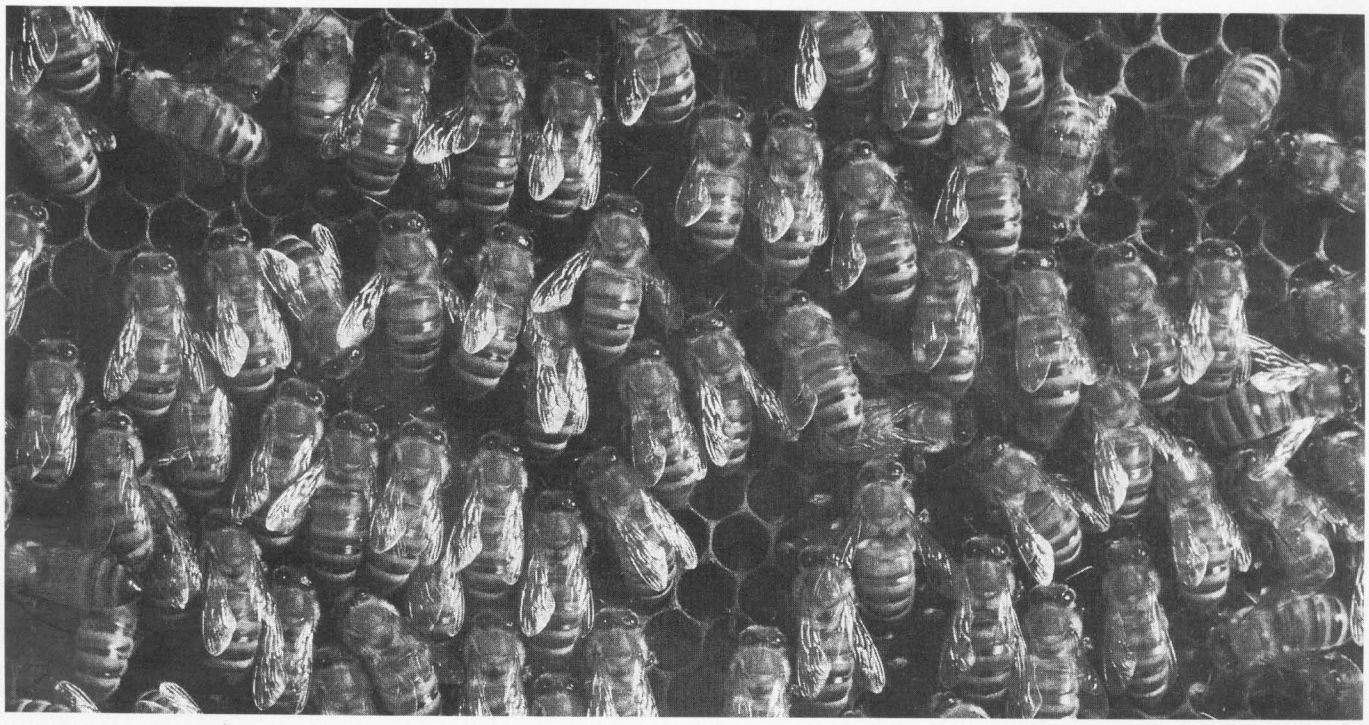

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Francisco used the presence of the forktail damselfly as a symbol for preserving open spaces in urban areas. A natural habitat surrounded by urban sprawl south of San Francisco contains the largest surviving population of the endangered mission blue butterfly.

Not every city will contain a threatened insect within its limits, but its parks will contain insects preforming vital functions for the ecosystem. As urban and suburban habitats continue to grow, it will become even more important that students appreciate the value of small reserves. For many of them, these areas will be their closest link to nature.

Spring fieldtrips to these outside laboratories can serve as a springboard for a discussion of the complex natural histories of the insects found there and the importance of insects to a heathy ecosystem. Given a chance to explore and learn about the insects, students will develop a better appreciation of these small creatures and the importance of preserving the environment around them.

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INSTRUCTIONAL MATERIALS FOR THE STUDY OF DIVERSITY OF INSECTS

Critters
Studies of animal behavior (camouflage, biomes, food chains, and so forth)
AIMS Education Foundation
P.O. Box 8120
Fresno, CA 93747

The Life Cycle of Butterflies
Study of the life cycle of an insect
Science and Technology for Children
National Science Resource Center
Smithsonian Institution-
National Academy of Sciences
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Washington, DC 20560

Six-Legged Science: Insects in the Classroom, Third Edition
Curriculum guidelines and activities suggestions for teaching about insects
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