



Less than an inch long, this dew-covered scarlet-and-green leafhopper makes a big impression with its stunning beauty. More than 2,500 leafhopper species occur in the United States and Canada, but this insect group is poorly known in Kentucky. © Barry Howard



Unlike the pesky house mouse, the golden mouse is a Kentucky native. It lives in loosely knit social groups in thickets, forests, and field borders. John R. MacGregor

BIODIVERSITY

Biodiversity is the variety of all living things and their roles and connections within ecosystems. Simply put, it is the web of life. All species fulfill a specific role or task, called a *niche*, in an ecosystem, and other species depend on this role. Remove one species and it may affect the entire natural community or ecosystem. Remove too many species and the community and ecosystem may be irretrievably changed or damaged. Ultimately, biodiversity is part of the earth's life-support system.

So why is it important to save biodiversity? Here are a few reasons to consider.

- **Support services.** We depend on biodiversity to support living systems. As inhabitants of Earth, we need stable ecosystems to perform ecological services like cleansing the air and water, production and preservation of soil, removal of waste products, pollution reduction, and climate regulation. We cannot live without these vital services.
- **Resources.** Many of the products people depend on are derived from natural sources. Natural disease resistance is often higher in



Each aster "flower" is actually made up of many small flowers, some forming the outer petals of the head and others densely packed in the center. New England aster (shown) is common along roadsides. Thomas G. Barnes

wild plants, and breeding them with related cultivated plants improves resistance. Also, we depend upon pollinators for one out of every four mouthfuls of food we eat. More than half of the medicines we use are derived from animals or plants. New medicines and other uses of natural resources are continually being discovered—and as species become extinct, the potential for these opportunities is lost.

- **Ecotourism.** In addition to the economic importance of food, medicine, and other natural resources, ecotourism and recreation are huge industries that provide a livelihood for many people. Ecotourism is the fastest-growing form of tourism² and depends upon the unique beauty of natural areas.
- **Aesthetics.** Nature is inspiring; its beauty enriches our lives. It is likely that pictures of natural scenes are hanging on your home or office walls. Wild places help us see beauty in the world, find relief from everyday stress, and appreciate our lives.
- **Ethics.** We share life with all other species on Earth, and the destruction of fellow species is a violation of the respect and fairness expected from members of a well-balanced society. From a religious perspective, it may be argued that we did not create life on Earth, so who are we to degrade or eliminate it? Ethically speaking, we have an obligation to preserve Kentucky's natural heritage.
- **Our legacy.** What is our responsibility to the future? How much do we care whether the next generation sees firebelly darters in their brilliant breeding colors? Do we care if they hear a common raven or see a Kentucky lady's-slipper? Should we decide that they can do without the zebra clubtail? Can we change the culture of environmental abuse and balance our use of land, air, and water with the need to preserve biodiversity?



Three Levels of Biodiversity

Genetic Diversity	Species Diversity	Ecosystem Diversity
The genetic makeup of each black-throated green warbler contributes to the overall health of a population; genetically diverse populations tend to be more viable and better able to adapt to environmental changes.	Eastern hemlock trees, American black bears, northern parulas, and other species collectively are part of a unique natural community called a hemlock-mixed forest. Each species plays a particular role in the community and its overall viability. The loss of a single species can have consequences for the entire community.	Hemlock-mixed forests, Cumberland Plateau gravel/cobble bars, and Appalachian bogs are a few of the natural communities found in the Appalachian Highlands physiographic province. Collectively, natural communities form diverse ecosystems across the landscape.

There are basically three levels of biodiversity: genetic, species, and ecosystem. The genetic makeup of each individual plant or animal contributes to the health of a population and the ability of that population to withstand the stress of life on Earth. These challenges may be as short-term as an exceptionally

cold winter or as lasting as a decade-long drought. Species, the next level of biodiversity, are interconnected through their roles in each natural community. Building on this elaborate web of life is the third level, ecosystems, the connections among natural communities across the landscape.