Diversity: A Key Concept in Biology, Ecology and Ecosystems

When scientists study a natural area, be it a farm or ranch, a field, a woodland, a grassland, or a riparian area, one of the features that they will take note of is the diversity, or more correctly, biodiversity of the area. The term biodiversity was first used by E.O. Wilson in 1983.

Diversity has to do with variety, in terms of both numbers of plant and animal species and ages of the longer-lived species. One can think of diversity of woody plants, or grass plants or forbs, or of mammals or birds or insects or of young individuals or old individuals or breeding pairs. And in one context or another, each of these has meaning to biologists. But in most contexts, when we think of biodiversity, we are really thinking of the diversity of all of the above.

And why does diversity matter? Because diversity is an indication of the health and sustainability of the ecosystem and the functioning of all of its components. One characteristic of what scientists would consider pristine or near-pristine ecosystems or habitats is that they are very diverse. Said another way, a diverse habitat is a requirement for a healthy, sustainable and functioning habitat. The greatest biodiversity is usually found in tropical rainforests.

Consider the opposite. The least diverse habitat could be a cotton field, or a corn field, or a pure bermudagrass pasture. The cotton field can provide food for only a few species of insects, fewer still species of birds to eat the insects, no nest sites for most birds. Only an occasional rabbit will nibble young cotton plants. And during much of the year when the field lies fallow, it is even less of a habitat for anything.

Now consider an Ideal Hill Country habitat. It will contain several species of grasses, some producing seeds early in the year, some throughout the year and some in the fall, so that seed-eating birds and small animals can find food throughout the year. It will also contain several species of wildflowers, some blooming early in the year, some later so that there is always something blooming for pollinators, which also means food for insect-eating birds. This ideal habitat will also contain several species of woody plants, some vines, some low shrubs, some larger shrubs and some major trees, so there will be berries, fruit, nuts and acorns at some point during the year as well as nesting sites for various birds from the ground to the crown.

The bottom line is the more different plant species in a given area, the more species of insects, birds, mammals and reptiles can live there, and the more insects means more birds and more birds attract more reptiles, etc. The more vegetation, the more herbivores, the more herbivores the more carnivores and omnivores, the more of all kinds of animals the more detritivores (decomposers), and so on.

The more different species of plants growing in an area, the more likely the soil organisms will be healthy and productive, which makes for more porous soil and thus better capture of rainwater, and the better capture of rainwater and the more fertile the soil, the healthier the plants and the greater the amount of biomass.

Diversity is what drives the food web and the water cycle.

People can help to manage and improve on the diversity in several ways. First, not introducing non-native plants that may become invasive and which the native insects, pollinators and animals did not evolve to utilize will help to maintain a healthy native habitat. Second, controlling native invasive species, such as juniper (cedar) will prevent it from crowding out other native vegetation and thus reducing the plant diversity and therefore the animal diversity as well. (A cedar brake is not a good habitat for anything, although both animals and birds do utilize it to some extent.)

Another way people can improve the habitat is to encourage native plant diversity by either planting more different species of native plants and/or protecting any volunteer native plants to allow them to mature and prosper.

Remember, for a habitat to be suitable for any non-migratory animal, it must provide food, water, shelter, and cover for the animal, year around. A corn field might feed a raccoon just fine in the summer and fall, but where will it hide and find food after the corn is harvested and the stubble is plowed under in the winter?

Until next time…

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