

## RESTORING NATURE ONE GARDEN AT A TIME

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*This is a recap of our November program which consisted of a video of a lecture by Dr. Douglas Tallamy, professor of entomology at the University of Delaware. His lecture was the keynote address at the CNPS Conservation Conference last February in Los Angeles. You can watch the video at <https://www.youtube.com/watch?v=yo4ZJ-ryTaE>. For a more in-depth discussion of this topic, I highly recommend Tallamy's book, "Bringing Nature Home: How You Can Sustain Wildlife with Native Plants."*

Insects are making headlines—again. For years we have heard troubling reports of the crisis in honeybee populations, and there have been articles about the alarming decline of monarch butterflies (as much as 96% since 1976 in central and eastern U.S.). But recent news stories are revealing a more widespread problem.

In September 2018 the Associated Press released an article entitled "Bye bye bugs? Scientists fear non-pest insects are declining" (*Times-Standard*, September 23, 2018). The study noted that scientists in the U.S., Canada, Costa Rica, Germany, Denmark, and Greenland who study beneficial flying insects such as bees, moths, butterflies, ladybugs, and fireflies are reporting declining populations. One study estimated a 14 percent decline in ladybugs in the United States and Canada from 1987 to 2006, while a 2017 study of 63 nature preserves in Germany found an 82 percent mid-summer decline in the number and weight of bugs compared to 27 years earlier.

On October 15 the *Washington Post* ran an article entitled "'Hyperalarming' study shows massive insect loss," detailing the results of a study in Puerto Rico where a sharp drop in the number of moths, butterflies, grasshoppers, and spiders was accompanied by steep declines in the number of insect-eating lizards, frogs, and birds. In Tallamy's lecture he referred to a study that estimates invertebrate abundance worldwide has declined by 45% since 1974.

Should we care about this news? The answer is a resounding yes, because insects are the basis of the food web on land. And if insects are declining, multiple other organisms that eat insects are also at risk. Insects are highly nutritious, rich in protein and fat, and are an important component of the diet even for such animals as the red fox (25% of their diet) and black bear (23% of their diet)!

Tallamy's lecture focused on an issue that many people aren't aware of: the crucial importance of insects for birds. Ninety-six percent of terrestrial birds in this country raise their young on insects, primarily caterpillars. So if insect populations are declining, it isn't surprising to learn that roughly one-third of the birds in this country are at risk of extinction. The 2016 State of the Birds report found *15 billion* fewer birds breeding in the U.S. compared to 40 years ago.

Caterpillars are an essential food for baby birds. Caterpillars are large and soft compared to other insects, making them easy for nestlings to digest. Caterpillars are also higher in carotenoids than many other insects, and these carotenoids provide immune system support, antioxidants, and the nutrients

that birds need to develop the bright colors of their feathers. A 1961 study found that Carolina chickadees require between 6,000 and 9,000 caterpillars to successfully raise one brood of young birds.

If insects are vital components of the food web, the next question is what plants produce the most insects, especially caterpillars? This seems to fly in the face of conventional gardening wisdom which regards most insects as pests. But the bottom line of current research is that *if we want to encourage birds in our gardens we need to grow plants that will serve as hosts to a variety of insects. And the plants that do this best are native plants.*

Native plants harbor more insects because 90% of leaf-eating insects are specialists in terms of which plants they can eat. Plants don't want to be eaten, so in order to overcome the chemical and physical defenses that plants have developed, these specialist insects need to have co-evolved with a particular lineage of plants for thousands of years. A good example of this is the monarch butterfly, which has a long evolutionary history with milkweeds that has enabled the butterfly to work out how to eat the plant without being poisoned by its toxic chemicals.

Tallamy and his students counted the numbers of caterpillars on a native oak tree and found 410 caterpillars from 19 species. In comparison, on a non-native Bradford pear, a popular ornamental, they found exactly one. In a recent study in a Washington, D.C. suburb one of Tallamy's students found that, compared to native plant landscapes, yards dominated by non-native plants produced 75% fewer caterpillars. This study concluded that only yards with more than 70% native plant biomass can sustain chickadee populations.

Non-native plants are not evil in themselves—though some are certainly problematic in terms of invasiveness. They are simply plants that have not been here long enough to evolve a relationship with insect herbivores. And this is true even though some, like the ginkgo, have been grown on U.S. soil for 400 years.

Tallamy and his students have further discovered that 5% of native species of plants produce 75% of the caterpillars they studied. They call these the native super plants. On the east coast these are native oaks, plums and cherries, willows, and pine. White oak (a different species than our local white oak), for instance, supports 557 species of caterpillars, produces acorns that help support food webs, and serves as habitat and nesting sites for many birds and mammals.

Tallamy's group has developed a list of the most productive native plants, searchable by zip code, for every area of the country except California—because our state is so large and diverse. What are our native super plants? We don't currently know, but it seems that this should be an urgent topic for research. At the moment, perhaps the best option is to use Tallamy's list for Brookings, Oregon. On that list, the best native trees and shrubs are willow (312 species of caterpillars); plums and cherries (240 species); poplar/cottonwood/aspen (227 species); alder (210 species); oak (200 species); pine (199 species); and crabapple (155 species).

Finally for some good news: *we can make a difference*. In our own landscapes we can start to address the problem of declining insects, birds, bees, and butterflies by planting more natives, especially super plants; by reducing the area covered by lawn; and by creating wildlife corridors to connect existing stands of native plants. When we do so, we reap an added benefit—these creatures literally animate our gardens, providing another level of interest and beauty. And by the way, Tallamy recommends “holistic” gardening: if your plants have holes in the leaves, consider that a good sign!

In his words, “You can make a beautiful garden that also supports local food webs, sequesters carbon, improves your watershed and helps pollinator populations all by yourself if you choose productive plants. And your contribution to local ecosystem function plays an important role in sustaining this planet.” Such gardens sustain us as well, enriching our lives with a stronger sense of place and the rewards of being attuned to natural processes and seasonal patterns.

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