

2026 Insights into Gardening: Maximize Biodiversity in Your Garden

Take Home Message: even the smallest garden can positively contribute to biodiversity

- Get to know the plants, insects, fungi, birds in your garden. Appreciation = conservation
- Reduce/eliminate pesticides
- The plants you choose will invite or exclude others to your garden. Incorporate native plants. Choose wild-type and near natives (over cultivars) when possible.
- Move beyond plants as food. Think about nest sites and other requirements.

Biodiversity Theory: more species leads to ecosystem stability.

- Ecosystem Stability Concepts. Resistance: how much disturbance a system can take, before community composition or ecosystem function is altered. Recovery: how close a system can return to pre-disturbance state. Resilience: rate of return to post-disturbance state.
 - Disturbances that Test Ecosystem Stability in Gardens: mowing, fertilizers, pesticides, drought, heat dome.
- Rivet Hypothesis: species can be lost from a system without ill effect, due to redundant functions among different species. At some point, you will lose one too many, and function will be irreversibly altered.
- Insurance Hypothesis: Some species will do better under the conditions of certain years. Best to have a mix of species as insurance.
- Food Web Stability: more links between different species results in a stronger and more stable system.
 - Case Study: syrphid flies in Corvallis and Portland area gardens.
 - Syrphid flies offer gardeners pollination and pest control services (1 syrphid fly can eat 100-500 aphids during larval phase). Look like bees, but only two wings, smaller antennae, thin hind leg, no stinger.
 - Syrphid fly interaction network shows many interactions (typical of generalist foragers), but also indicators that associations are not random. Plant choice makes a difference.
 - Plants for syrphid fly adults: yarrow, asters, coreopsis, allysum, CA poppy, mints, carrot, daisies. Syrphids also favor cat's ears (weed) and fennel (not a noxious weed in Oregon, but shows invasive tendencies)
- Island Biogeography: shows how small habitat fragments accumulate and keep species over time. Analogous to gardens in cities.
 - Case Study: bees in Portland area gardens. 2nd highest bee species richness was found in the 2nd smallest garden (0.1 acre lot). Plant choice makes a difference!
 - Individual gardens may not bear a lot of species (alpha diversity), but collectively, they are unique (beta diversity). Gardens defy the urban homogenization phenomenon!

Our Study of Corvallis, Eugene, Portland Pollinator Garden Plant Communities

- Previous studies (UK) show that gardens are unique from one another (only 4 plant species shared among majority of gardens), and also that most plants are non-native.

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- We documented plant diversity in 26 gardens. Over 300 plant taxa found. Only 3 of these 300+ were found in the majority of gardens. Majority of pollinator plants were native to our region. Most were great choices to support pollinators.
- Evidence that there are unique city-area pollinator plant assemblages, which may be due to local nursery offerings.
- Pollinator garden plant communities are not homogenized. Yay, gardeners!

Our Studies of Bees in Gardens (globally, nationally, locally)

- Plant more flowers, and you will get more bees.
- Gardens have fewer specialist bees (which need native plants) and soil-nesting bees (which need open ground) than predicted. Planting native plants can make a positive difference. Native cultivars generally have fewer pollinators than wild type native plants. You can identify a native cultivar, by the fancy name in single quotes (e.g. Yarrow ‘Salmon Beauty’).
- Note that breeding native plants to make native cultivars makes many native plants less attractive to gardeners, as well as to pollinators.
- We are testing Grosso lavender, to see if it can help reduce negative effects of non-native honey bees on native bees. Preliminary evidence suggests that competition is reduced on flowers, when lavender is in bloom. Stay tuned for more results.

Our Study of Syrphid flies

- Evidence suggests that syrphid fly communities are somewhat homogenized (dominated by non-native species).
- Asters, Poppies, Brassicas, Sedum, Farewell-to-Spring, Hydrangea might reduce competition between non-native and native syrphid flies. Note that the native syrphid flies tend to be the predators. The non-native syrphid flies tend to be decomposers.

Final Thoughts

- Insects are important components of ecosystem function, because they are the majority of species on earth. Several studies show concerning trends indicative of insect decline.
- Gardens, even as small spaces, can make a big, positive difference!