

Summary of Garden Ecology 101: Design

Presentation for Vancouver Master Gardeners, February 29, 2024

Elizabeth Elle, Simon Fraser University

Registration summary: This session introduces you to the beneficials that work for you, and what you should do spring, summer, fall, and winter to encourage garden biodiversity. You will learn about plant characteristics that support beneficials like pollinators and predators, and how a well-designed garden can support the biodiversity that makes your garden work—and also contributes to resilient ecosystems.

1) Who are you designing for? Natural history of some garden beneficials

- *Predatory insects* like lacewings, ladybugs, hoverflies, and parasitic wasps: offspring eat your garden pests, but adults need alternative food, especially nectar. Plants with small flowers, like sweet alyssum, and the Apiaceae (dill, fennel, cilantro) are best. These plants also have lacy (highly divided) foliage which seems to be preferred by beneficial insects.
- *Birds:* will eat large numbers of caterpillars during the growing season; during the rest of the year, a diverse diet of seeds, fruit, nectar, and insects is needed, depending on species
- *Butterflies:* need host plants that their caterpillars can eat (most plants have chemical defenses). In many cases native plants are better for butterflies. You can look up host plant requirements here: https://www.butterfliesandmoths.org/species_search
- *Bees:* most bees in our area are solitary species who complete their entire life cycle in 4-6 weeks. Developing larvae then live in the nest until the same time next year, when they emerge, mate, and start another nest.
 - Most of our bees are active in spring (some in summer)
 - Most of our bee fauna nest in the ground (south or west facing, well drained soil).
 - Also common is nesting in cavities, in plant stems (raspberry, elderberry, hydrangea, some perennials like sedum, coneflower, and many grasses). Once cavities are available (usually the spring after the stem is growing, when you cut it back to 8-12 inches) they need to be left an entire year for bees to complete their life cycle. A good rule of thumb for springtime is to wait till you need to mow, and until cherries and apples are done flowering—by then most bees will have emerged. Get more information from the Xerces society, and their [Nesting and Overwintering Habitat](#) guidelines for pollinators.

2) Choosing plants

Consider flower visitors

Pollination syndromes can predict effective pollinators—and, by extension, which species are excluded from pollinating

- Bird flowers tend to have long tubes, no scent, dilute nectar
- Butterfly and moth flowers also have long tubes but strong scent (moth flowers normally open at night, butterfly flowers in the daytime)
- Bee flowers have bilateral symmetry, concentrated nectar, and nectar guides
 - Some bee flowers are only available to bumble bees: buzz pollinated is when flowers release pollen when vibrated (behaviourally only bumble bees do this) and some flowers (eg Fabaceae) need to be physically opened by a large bodied bee

To ensure the highest diversity of organisms can benefit from your flowers, choose “easy access” flowers that don’t exclude any particular group

- Apiaceae, like fennel, Astrantia, dill, Angelica
- Asteraceae, like yarrow, sedum, asters, coreopsis, coneflower, black-eyed susan
- Rosaceae, single/old fashioned roses, apples, cherries, raspberries

Less easy-access, but lots of nectar rewards and well loved:

- Lamiaceae, lavender, mint, thyme, basil
- Ericaceae: heather, kinnikinnik, *Enkianthus*, *Pieris*, and of course rhododendrons

What is not attractive? Double flowers, snowball type inflorescences (vs. lacecap). IF you can’t see the anthers, it’s probably not a great plant for pollinators.

Choose native, for at least some of your plants.

- Native plants are good for caterpillars, so they wind up also supporting bird diversity. Use the Seattle zip code (98101) to find native plants and the numbers of caterpillar species they support from the [National Wildlife Federation](#).
- Some definitions:
 - Native: occurs naturally in a region or ecosystem; co-evolved with local flora and fauna
 - Nativar: “native cultivar” may be more or less attractive to beneficials than the species (like the “King Edward” *Ribes sanguineum*)
 - Introduced or exotic: transported (by humans) outside native range
 - Naturalized: an introduced plant that reproduces successfully in it’s new region (English daisy, white clover)
 - Invasive: introduced species whose aggressive spread has negative impacts on native species, often through competition (English Ivy, Scotch Broom, butterfly bush)
- Check the [BC Invasive Species council](#) for a list of invasive plants (and what to plant instead).
- UBC has a great resource to help you learn about the [biodiversity of BC](#) (just realize that native to BC does not mean native here at the coast; check the map).

3) Designing and maintaining the ecological garden

Apply common garden design principles as they are actually good for beneficials

- Plant in groups (3’s, 5’s) so there is enough food to attract beneficials
- Include many layers as the different layers provide habitat for different animals, from birds to ground beetles
- Plan for four season interest, as having flowers and fruit/seed for most of the year supports more beneficials, who are active at different times
- Less intervention (pruning, pest control, cleanup) allows the organisms in the garden to work for you

What to do in each season

Spring

- Plantings: have some early bloomers (February! March!) to attract pollinators and predatory insects to your garden
- Mulch/leave the leaves from last fall, for your soil
 - Stem nesting bees: cut back perennials and shrubs with nesting potential to 8-12 inches, not the ground. Ideally leave older stems (from 2 years ago) for bees to emerge, or cut and stack till June

Summer

- Monitor pests, beneficials....and a good time to ask your plants “what have you done for me lately?”
- Deadhead to encourage re-bloom and control seed spread for anything that seeds aggressively; leave less aggressive spreaders as bird food
- Clear out diseased plant material (and don't compost)
- Remember to chop and drop if you can, to return nutrients to the soil

Fall

- If you are going to convert part of the garden to something different, plant a tree or shrub, sheet mulch a lawn, etc., now is the time!
- Remove anything very unsightly, but in general, less garden cleanup is better for the soil, and for some beneficials (leave the leaves! Wait till spring to cut back perennials!)
- Late bloomers are great for some insects that are active late: do you have something blooming in late September?

Winter

- Some organisms are over wintering—don't start any spring cleanup too early!
- Consider including plants that flower in winter to support any flower visitors that emerge early, and for our resident hummingbirds
- A great time for planning next year!