

**Islands in space: Urban gardens as sanctuaries for bees and other pollinators**

**By Neil Cunningham for the Saint Anthony Park Garden Club**

**Tuesday, April 5, 2011**

**7:15-8:30 p.m.**

**I. Introduction: Bumblebees and solitary bees: Who are they and how/where do they live?**

**A. Bumblebees**

Advantages:

- 1) Native to and adapted for cold climate
- 2) Buzz pollination (esp. effective for plant families where pollen is tightly held by anthers, such as tomato, potato, and eggplants (Family Solanaceae); cranberries and blueberries (genus *Vaccinium*)
- 3) Extensive foraging range (5-20 km)
- 4) Highly successful pollinator (80%)
- 5) Inconspicuous ground-nesting social bee
- 6) Persistent. Bumblebees are known to be active until the evening.

**B. Solitary bees**

Advantages:

- 1) Not affected by the same complex of parasites and diseases that affect honey bees
- 2) Able to access pollen and nectaries and (ultimately) pollinate multiple flower sizes & types
- 3) Many species of solitary bees (i.e., the orchard mason bees) are better adapted to and can function better in cold conditions than *Apis mellifera* (ATTRA, 2010).
- 4) Some solitary bees are specialists in certain flower types, such as the squash bee.
- 5) Efficiency. Only 250 blue orchard mason bees (which require nectar and pollen to feed their eggs) are required to pollinate an acre of apple trees. Because honey bees are nectar foragers, 1-2 honey bee hives containing 15,000-20,000 workers are needed for the same area. (ATTRA)

**C. More about solitary bees.**

1. Solitary bees nest in stems, wood, and the ground. (70% are ground nesters, 30% in wood or stems). Source: ATTRA
2. With a few notable exceptions (such as orchard mason bees, *Osmia lignaria*) solitary bees are mostly unmanaged. They reproduce and feed themselves. They “happen”.
3. Solitary bees are effective pollinators, and in some cases, multiple-species complexes of solitary pollinators are the dominant pollinators in an area. (see Russian research, Tables)
4. Most common families of solitary bees:
  - *Megachilidae* - “leaf cutter” bees and “mason” bees
  - *Halictidae* - “sweat bees”
  - *Andrenidae* - “mining bees” [International bee research association). Mining bees may use a common entrance to a nest, but each female feeds her own eggs. [Pacific Horticulture]
  - *Colletidae* - “plasterer, masked, or yellow-faced bees, and sometimes cellophane bees”. Build their nests in the ground sometimes in aggregations.
  - Apidae (subfamily Xylocopidae and Anthophoridae) - “carpenter bees and small carpenter bees” and “digger bees”
  - *Melittidae* – no common name, but includes clarkia bees (mostly ground-nesting bees)

List of bee families compiled from information from the following sources: Bugguide.net (Iowa State University), ATTRA (2010), Pacific Horticulture.

5. Other pollinators: flies, wasps, butterflies, etc.

- 71 anthophilous fly species visit flowers
- Hoverflies (Syrphidae)
- “Some of the larger, more notable pollinating flies belong to the families Bombyliidae, Syrphidae, Anthomyiidae, Tachinidae, Calliphoridae, and Muscidae” (Resilience Alliance, para. 3)
- “The diversity of forms of flower-visiting flies is great; consequently, flies vary significantly in the amount of pollen that they carry, in the time that they spend in flowers, and in their effectiveness as pollinators” (Resilience Alliance, para. 3)
- Even flies that are generalists in their floral visits can contribute to plant reproductive success, and may equal or rival bees as effective pollinators in some circumstances (Motten 1986, McGuire and Armbruster 1991, Kearns and Inouye 1994) (Resilience Alliance, para. 4)

**Main Ideas:** In light of information about honey bee colony collapse disorder, there has been much less attention given to other kinds of bees that are already present in our neighborhoods, our parks, and natural areas...and even less attention given to the importance of flies as pollinators. Just because they already exist does not necessarily mean that we can't do more to conserve them and provide areas that support them. By learning about the different kinds of bees, we are taking the critical first steps necessary to sensitize ourselves and our neighbors about species that may become more important to urban diversity and urban agriculture as population grows and more land is developed and more bee habitat is disturbed or destroyed.

## II. Other Issues of Concern: What can gardeners do to support bees in urban areas

**D. The decline of honey bees and other bees is a problem that has received a great deal of media attention. But the presence of solitary bees and other pollinators reminds us that honey bees are not the only pollinators in the garden.**

6. A “perfect storm” of trouble: viruses, bacterial diseases, mites, pesticide use (esp. neurotoxic neonicotinoid pesticides and potential sub-lethal effects), and lack of quality foraging areas. [Source: Yale Environment 360, 2010]
7. In Oct. 2006: U.S. beekeepers reported between 30-90% loss of their hives. [USDA, 2010]
8. Solitary bees may be able to fill in gaps created by honey bees or expand foraging in areas where they are already present (Welzel, 2010).
9. Question: how much are bumblebees and native bees being affected by the problems experienced by honey bees? (Xerces Society report, August 2010)

**E. The growing interconnectedness of economics, urban agriculture, and the increased need for pollinators (an attempt at tying links together from one perspective).**

10. Slow economic recovery and increased fuel costs and desire to reduce fuel consumption are *creating*...
11. ...a need for high quality low-cost food...which is *building*...
12. ...increased interest for backyard and community gardening...which is *supporting*...
13. ...the community garden movement which was already busy working on raising...
14. ...increased awareness of and demand for fresh local food...which is beginning to create...

15. ...jobs related to urban agriculture & “next generation” food service...which is raising...
16. ...new interest in agricultural jobs in the city and near-city...which is building...
17. ...greater demand for pollination services within and near city limits...which (we hope) should be *affecting*....
18. ...current municipal ordinances regarding honey beekeeping and/or landscaping practices that support solitary bee conservation...which (we can expect) will *improve*...
19. ...urban insect and plant biodiversity...which will *increase*...
20. ...public understanding and appreciation for plant-insect diversity, the effects of construction, human nutrition, habitat conservation, energy use, and other aspects of development.

***E. Fractured habitats and gardens as links between between habitat fractures. (What we can do)***

**22. Learn and apply habitat characteristics support insect pollinators**

- a) Provides shade & protection from predators
- b) Provides water sources.
- c) Plant perennials with year-round pollen/nectar in mind.
- d) Provides natural resources, such as undisturbed areas with mud, dirt, patchy grass, grass tussocks, sticks, stones, and dead wood.
- e) Exists in areas connected to other areas with flowering plants.
- f) Near to other more natural areas with longer ecological memory.
- g) Features a wide variety of flowers, flower types, flower colors.
- h) Features early-blooming fruit trees and late-blooming plants, such as goldenrod.

**23. Create habitat in unusual places.**

- a) Plant climbing vegetables or flowering vines along chain fences and streetlight support cables. (beans, peas, clematis, Moonseed vine, riverbank grape)
- b) Next to sidewalks & bike paths (onion, hyssop, you name it)
- c) Turnabouts
- d) In trees (orchard mason bee houses)
- e) Along buildings and roofs

**24. Increase local connections between local habitats to create webs/pathways/corridors of connectivity for solitary bees.**

- a) Create maps of “nectar/pollen pathways” from Mississippi and lake areas into urban neighborhoods and urban gardens.
- b) Collect seeds from native plants and plant them along with vegetable plants.
- c) Ensure care for the beginnings of gardens and care for the development of perennial gardens.
- d) Start seeing bees.

**25. Increase solitary bee diversity as a tool of environmental education.**

- a) Increasing plant/bee diversity as a way to document year-to-year differences in species.

**26. Develop places with “ecological memory” within the heart of the city.**

**II. Conclusions**

***Plant for the entire season.*** Many sources support the idea that abundance and diversity of native flowering plants supports the presence and diversity of bumblebees and solitary bees. To optimize the sustainability of a flowering perennial garden, growers should include plants that bloom during the early and late parts of the growing season into their garden designs.

**Integrate urban farming and perennial plantings.** Given the growing public interest in urban agriculture in the Twin Cities and declining levels of bumblebees (Xerces Society, 2010), it makes sense for urban vegetable growers in metropolitan areas to ramp up efforts to integrate bumblebee and solitary bee habitat needs and flower preferences into future and existing garden designs. These individual efforts are important in terms of growing capacity for bees and increasing connectivity between plantings. Today's plantings of flowering perennials and heightened awareness of the need to protect habitat areas will conserve present bee populations and encourage a future positive growth in bee numbers.

**Develop pollinator plans.** On a slightly larger scale, entire neighborhoods and/or groups of neighborhoods might consider developing "pollinator plans" to help organize, track, and coordinate the results of planting flowering perennials. In other words, pollinators should follow wherever flowering plants grow; in addition to planting along, however, there would be great value to mapping the areas where plantings exist. The more we know where plantings exist, the better we will be able to track the presence and numbers of pollinators. These data will help inform conservation efforts on a city-wide (or eventually a multi-city wide basis) and direct future planting efforts to areas where pollinators are needed.

**Establish pollinator corridors.** Eventually, once enough data are collected, a system of designating communities as pollinator-friendly or as known corridors could one day earn them a certain amount of protection, say, from development or other forms of interfering usage. One characteristic of these areas could be that they extend from natural areas with longer "ecological memory" and higher biodiversity (such as near the Mississippi river bluffs) that reach into the heart of the city with (presumably) shorter ecological memory and less biodiversity where urban vegetable gardens are located.

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## RESOURCES

**BeeDiverse.com.** A blog about orchard mason bees, mainly. *Great photos that show different and unusual aspects of orchard mason beekeeping.*

**Bumblebee.org.** An excellent web publication that provides a wide array of information specifically regarding bumblebees. Their guide to visual identification of bumblebees is especially unique. [www.bumblebee.org](http://www.bumblebee.org)

**Urban Bee Gardens.** <http://nature.berkeley.edu/urbanbeegardens/>

**Bugguide.com.** 2011. Native bees of North America. Retrieved from <http://bugguide.net/node/view/475348>

**Custom Paper Tubes.** A company that makes paper tubes for raising orchard mason bees. There are other companies like this. <http://www.custompapertubes.com/>

**Minnesota Wildflowers.** A website featuring a page where native plants are organized by Minnesota bloom time. A great help for folks wanting to plan out a bee garden. [www.MinnesotaWildflowers.info](http://www.MinnesotaWildflowers.info)