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## Gardeners and Native Bees. Insights into Gardening, 2019.

**Research on Garden Bees:** at least 213 bee species have been collected from a garden. Urban areas often have more bee species than natural or agriculture areas. In urban areas, gardens promote bee abundance and diversity.

- Gardens may filter bees: gardens have fewer andrenids (spring-foraging bees), fewer soil-nesting bees, more cavity nesting bees.
- Urban areas filter bees: favors larger bees with increased dispersal ability, higher physiological stress tolerance, broader diet breadth, wider regional distribution.
- What Do Gardeners Know about Bees?

Check Which Insects are Bees	Bee, Fly, or Wasp?	Check Which Flowers are Bee Friendly
<input type="checkbox"/> 1	1. <input type="checkbox"/> Bee <input type="checkbox"/> Fly <input type="checkbox"/> Wasp	<input type="checkbox"/> 1
<input type="checkbox"/> 2		<input type="checkbox"/> 2
<input type="checkbox"/> 3	2. <input type="checkbox"/> Bee <input type="checkbox"/> Fly <input type="checkbox"/> Wasp	<input type="checkbox"/> 3
<input type="checkbox"/> 4		<input type="checkbox"/> 4
<input type="checkbox"/> 5	3. <input type="checkbox"/> Bee <input type="checkbox"/> Fly <input type="checkbox"/> Wasp	<input type="checkbox"/> 5
<input type="checkbox"/> 6		<input type="checkbox"/> 6
<input type="checkbox"/> 7	4. <input type="checkbox"/> Bee <input type="checkbox"/> Fly <input type="checkbox"/> Wasp	<input type="checkbox"/> 7
<input type="checkbox"/> 8		<input type="checkbox"/> 8
<input type="checkbox"/> 9	5. <input type="checkbox"/> Bee <input type="checkbox"/> Fly <input type="checkbox"/> Wasp	<input type="checkbox"/> 9
<input type="checkbox"/> 10		<input type="checkbox"/> 10

- Bees have thick 3<sup>rd</sup> leg. Wasps have thin 3<sup>rd</sup> leg. Bees and wasps have long antennae. Flies have stubby antennae. Bees have branched hairs. Flies and wasps have straight hairs. Only bees collect pollen!
- Most gardeners are interested in pollinator conservation: 91% surveyed plant for pollinators and dedicate an estimated 515-681 acres to pollinator habitat (1,386 gardeners surveyed). Gardeners vary in their ability to identify bees and bee-friendly flowers. Oregon Bee Atlas Volunteers are the best. Master Gardeners tied for last with the general public.

## Pollinator-Friendly Plants

- Most pollinator plant lists are based upon anecdotal observations. No research-based list exists for the Pacific Northwest.
- Our Study Plants (\*\* = non-native): counted pollinators, vacuum-sampled plants for insects; 2017-2019 at field plots (1m<sup>2</sup>, separated by 6 m of turf on all sides) in Aurora, OR

Scientific Name	Common Name	Perennial/Annual	Notes
<i>Clarkia amoena</i>	Farewell-to-spring	Annual	#4 native bee D-vac (2017); #4 Bee Species Richness (2017)
<i>Collinsia grandiflora</i>	Giant blue eyed Mary	Annual	
<i>Gilia capitata</i>	Globe gilia	Annual	#1 All Bees & Native Bees counts (2017); #2 All Bees counts (2018); #1 native bee D-vac (2017); #2 Bee Species Richness (2017); #5 Ranked by Gardeners

<i>Lupinus polycarpus</i>	Miniature lupine	Annual	
<i>Madia elegans</i>	Common madia	Annual	#2 All Bees & Native Bees counts (2017); #3 native bee D-vac (2017); #3 Bee Species Richness (2017)
<i>Nemophila menziesii</i>	Baby blue eyes	Annual	
<i>Eschscholzia californica</i>	California Poppy	Annual	#5 Native Bees counts (2017), #5 All Bees counts (2018), #1 Native Bees counts (2018), #3 Native Bee D-vac (2018); #1 Bee Species Richness (2018)
<i>Helianthus annuus</i>	Common sunflower	Annual	
<i>Phacelia heterophylla</i>	Varied-leaf phacelia	Annual	#3 Native Bees counts (2018), #1 Native Bee D-vac (2018); #2 Bee Species Richness (2018)
<i>Acmispon (Lotus) parviflorus</i>		Annual	
<i>Achillea millefolium</i>	Yarrow	Perennial	#2 Native Bee D-vac (2018); #5 Bee Species Richness (2018)
<i>Anaphalis margaritacea</i>	Pearly everlasting	Perennial	#3 Bee Species Richness (2018)
<i>Asclepias speciosa</i>	Showy milkweed	Perennial	
<i>Aquilegia formosa</i>	Western red columbine	Perennial	#1 Ranked by Gardeners
<i>Scientific Name</i>	<i>Common Name</i>	Perennial/Annual	
<i>Aster subspicatus</i>	Douglas' aster	Perennial	#3 All Bees & Native Bees counts (2017), #2 Native Bees counts (2018); #2 native bee D-vac (2017); #1 Bee Species Richness (2017)
<i>Camassia leichtlinii</i>	Common camas	Perennial	#3 Ranked by Gardeners
<i>Eriophyllum lanatum</i>	Oregon sunshine	Perennial	#4 Bee Species Richness (2018)
<i>Fragaria vesca</i>	Wild strawberry	Perennial	
<i>Iris tenax</i>	Oregon iris	Perennial	#2 Ranked by Gardeners
<i>Sedum oregonense</i>	Cream Stonecrop	Perennial	
<i>Sidalcea virgata</i>	Rose Checkermallow	Perennial	#5 Bee Species Richness (2017)

<i>Sisyrinchium idahoense</i>	Blue-eyed grass	Perennial	#4 Ranked by Gardeners
<i>Solidago canadensis</i>	Goldenrod	Perennial	#4 All Bees & #5 Native Bees counts (2017); #4 Native Bee D-vac (2018)
<i>Origanum vulgare**</i>	Italian oregano	Perennial	#1 All Bees counts (2018); #5 native bee D-vac (2017)
<i>Nepita cataria**</i>	Catnip	Perennial	#5 All Bees Counts (2017& 2018)
<i>Salvia elegans**</i>	Pineapple Sage	Perennial	
<i>Lavandula intermedia**</i>	Lavender	Perennial	#3 All Bees Counts (2018); #4 Native Bee D-vac (2018)

### Garden Bees

- Sampled 22-24 gardens around the Portland Metro area, 2017 and 2018.
- 2017 bees have been identified
- 36 bee species identified from 2017 samples

Species	Flight Season	Native Status	Floral Specificity	Nesting Substrate	Sociality
Family: Andrenidae (Mining Bees)					
<i>Panurginus</i> sp. 1	?	N	S	S	S
Apidae (Cuckoo, Carpenter, Digger, Bumble, and Honey Bees)					
<i>Apis mellifera</i>	Year round	E	G	AG	E
<i>Bombus caliginosus</i> IUCN Vulnerable Species	Apr-Oct	N	G	G	E
<i>Bombus flavifrons</i>	Apr-Sep	N	G	G	E
<i>Bombus fervidus/californicus</i>	Feb-Oct	N	G	AG	E
<i>Bombus griseocollis</i>	Mar-Nov	N	G	G	E
<i>Bombus mixtus</i>	Feb-Aug	N	G	AG/G	E
<i>Bombus sitkensis</i>	Mar-Sept	N	G	G	E
<i>Bombus vandykei</i>	Apr-Sept	N	G	G	E
<i>Bombus vosnosenskii</i>	Feb-Oct	N	G	G	E
<i>Ceratina</i> sp. 1	Apr-Sep	N	G	W	SS
<i>Ceratina</i> sp. 2	Apr-Sep	N	G	W	SS
<i>Melissodes</i> sp. 1	May-Sep	?	S	S	P
Family: Halictidae (Sweat Bees)					
<i>Agopostemon virescens</i>	Apr-Oct	N	G	S	S
<i>Agopostemon angelicus/texanum</i>	May-Oct	N	G	S	S
<i>Agopostemon texanum</i>	May-Oct	N	G	S	S
<i>Lasioglossum pacificum</i>	Feb-Nov	N	G	S	SS

<i>Lasioglossum sisymbrii</i>	Jan-Nov	N	G	S	S
<i>Lasioglossum titusi</i>	Year round	N	S	S	?
<i>Lasioglossum zonulum</i>	May-Nov	E	G	S	E
<i>Lasioglossum sp. 1</i>	?	?	G	S	?
<i>Lasioglossum sp. 2</i>	?	?	G	S	?
<i>Halictus ligatus</i>	Apr.-Oct.	N	G	S	SS
<i>Halictus tripartitus</i>	Apr.-Oct.	N	G	S	SS
<i>Halictus rubicundus</i>	March-Oct.	N	G	S	SS
<i>Halictus farinosus</i>	Apr.-Oct.	N	G	S	SS
<i>Sphecodes sp.</i>	?	N	S	P	P
Family: Megachilidae (Leafcutter and Mason Bees)					
<i>Anthidium manicatum</i>	May-Sep	E	G	C	S
<i>Anthidium sp.1</i>	Summer-Early Fall	?	G	C	S
<i>Anthidium sp.2</i>	Summer-Early Fall	?	G	C	S
<i>Megachile rotundata</i>	Jun-Aug	E	G	C	S
<i>Megachile angelarum</i> -	Jun-Sep	N	G	C	S
<i>Megachile perihirta</i>	May-Oct	N	G	C	S
<i>Megachile sp. 1</i>	Summer-Early Fall	?	G	C,W,S	S
<i>Osmia sp. 1</i>	Spring-Fall	?	Varies	C,S	S

**Taxon** 3% Andrenidae; 36% Apidae; 39% Halictidae; 22% Megachilidae

**Native Status** 89% native; 11% nonnative

**Floral Specificity:** 96% generalists; 4% specialists

**Nesting Habit:** 22% above-ground cavity nesters; 44% soil nesters; 6% social parasites; 8% wood nesters; 17% below-ground cavity nesters; 8% above-ground nesters (e.g. grass or trees)

**Sociality:** 28% Eusocial; 19% Subsocial; 36% Solitary; 6% Social Parasites

Initial impressions

- Sunnier, flower-rich gardens have more bees
- Soil nesting bees were rarer than expected. More similar to NYC bees community than to other garden bee communities.
- Ligated sweat bees, honey bees and yellow-faced bumblebees are in [every] garden
- Overhead irrigation seems to depress bee abundance [and diversity]
- If you plant it, they will come

#### References Cited in Presentation

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