

PORTLAND

BEE GUIDE



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cover art by
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1st Edition, September 2023

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Funding for this project was provided by donations to the Oregon State University Garden Ecology Lab from Y. Sherry Sheng & Spike Wadsworth and Sara Running, as well as grants from the Oregon Master Gardener Association (Extension Educator Grant), Clackamas County Master Gardener Association (Gray & Norrene Thompson Community Grant), and the OSU Extension Association (Hoeker Family Innovation Grant).



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Land Acknowledgement

Oregon State University in Corvallis is located on the traditional homelands of the Mary's River, or Ampinefu Band of Kalapuya. Following the Willamette Valley Treaty of 1855 (Kalapuya etc. Treaty), Kalapuya people were forcibly removed to reservations in Western Oregon. Today, living descendants of these people are a part of the Confederated Tribes of Grand Ronde Community of Oregon (<https://www.grandronde.org>) and the Confederated Tribes of the Siletz Indians (<https://ctsi.nsn.us>).

The bee species documented in this guide were all collected from land situated in the Portland Metro area, which “rests on traditional village sites of the Multnomah, Wasco, Cowlitz, Kathlamet, Clackamas, Bands of Chinook, Tualatin, Kalapuya, Molalla, and many other tribes who made their homes along the Columbia River creating communities and summer encampments to harvest and use the plentiful natural resources of the area” (Portland Indian Leaders Roundtable, 2018).

Leading with Tradition: Native American community in the Portland Metropolitan Area, 2018. Portland Indian Leaders Roundtable. <https://www.up.edu/activities/files/leading-with-tradition.pdf>

Additional Acknowledgements

This guide would not be possible without all the aforementioned contributors. Thank you to LeAnn Locher for providing insights to the accompanying social media campaign to promote the use of this guide.

We would also like to thank all of those who opened their gardens to us: L. Eyer, C. Campbell, D. & E. Young, Elaine & Brad Rhodes, A. Neff, N. & F. Howarth, S. Sheng, G. Lambert, S. Rueda, L. Gustafson, L. Carr, Bo. Shaw, M. Brady, L. Wolfram, Br. Shaw, K. Pfaff, J. Lazareck, P. Schwartz, Multnomah County Master Gardener demonstration garden committee, C. Greening, S. Pringle, Pascal Tyrrell, P. Selby, C. Blasé, and L. Messer. Sharing the beauty and diversity of bee communities in Portland gardens is only possible due to your generosity.

TABLE OF CONTENTS

INTRODUCTION	1
<i>What is the purpose of this guide?.....</i>	<i>1</i>
<i>Background of the data supporting this guide.....</i>	<i>1</i>
<i>How to use this guide.....</i>	<i>3</i>
WHY URBAN BEES MATTER.....	8
DEFINITION OF TERMS	10
<i>Diet.....</i>	<i>10</i>
Generalist, or, polylectic	10
Specialist, or, oligolectic.....	10
<i>Sociality.....</i>	<i>10</i>
Eusocial	10
Sub-social.....	11
Solitary.....	11
Parasitic	11
<i>Nesting.....</i>	<i>11</i>
Soil.....	11
Cavity	11
Hive	12
<i>Furriness.....</i>	<i>12</i>
Very furry.....	12
Somewhat furry.....	12
<i>Body Size</i>	<i>14</i>
Small	14
Medium.....	14
Medium-large	14
Large.....	14
<i>Color.....</i>	<i>14</i>
Dull metallic.....	15
Metallic dark blue-green	15
Metallic green.....	15
<i>Frequency.....</i>	<i>15</i>
Ubiquitous	16
Very common	16
Common.....	16
Uncommon	16
Rare.....	16
<i>Status</i>	<i>16</i>
<i>Seasonality.....</i>	<i>16</i>

Early-season.....	16
Mid-season	16
Late-season	16
All season.....	16
<i>Taxonomy</i>	16
Mining bees	16
Honey bees, bumble bees, and allies.....	16
Plasterer bees	16
Sweat bees.....	17
Mason, leafcutter, carder, and resin bees	17
MINING BEES (ANDRENIDAE)	19
<i>Andrena crataegi</i> (Hawthorn Mining Bee).....	20
<i>Andrena lawrencei</i> (Lawrence’s Miner Bee).....	20
<i>Andrena nigrocaerulea</i> (Blue-and-black Mining Bee)	20
<i>Andrena proluxa</i>	21
<i>Andrena sigmundi</i> (Sigmund’s Mining Bee)	21
<i>Panurginus atriceps</i> (Black-tipped Miner Bee).....	21
HONEY BEES, BUMBLE BEES, AND ALLIES (APIDAE)	22
<i>Apis mellifera</i> (Western Honey Bee).....	23
<i>Bombus appositus</i> (White-shouldered Bumble bee)	24
<i>Bombus caliginosus</i> (Fog-belt Bumble bee)	24
<i>Bombus fervidus californicus</i>	25
<i>Bombus flavifrons</i> (Yellow-fronted Bumble bee).....	26
<i>Bombus griseocollis</i> (Brown-belted Bumble bee).....	26
<i>Bombus melanopygus</i> (Black-tailed Bumble bee).....	27
<i>Bombus mixtus</i> (Fuzzy-horned Bumble bee)	27
<i>Bombus nevadensis</i> (Nevada Bumble bee)	28
<i>Bombus vancouverensis</i> (Vancouver Bumble bee).....	28
<i>Bombus vosnesenskii</i> (Yellow-faced Bumble bee).....	29
<i>Ceratina acantha</i>	29
<i>Ceratina micheneri</i>	30
<i>Melissodes lupinus</i>	30
<i>Melissodes microstictus</i> (Small Long-horned Bee)	30
<i>Melissodes rivalis</i> (Western Thistle Longhorn Bee).....	31

<i>Melissodes robustior</i>	31
<i>Tripeolus simplex</i> -group	31
PLASTERER BEES (COLLETIDAE)	32
<i>Hylaeus modestus</i> (Modest Masked Bee)	32
<i>Hylaeus punctatus</i> (Punctate Masked Bee).....	32
<i>Hylaeus mesillae</i> (Mesilla Masked Bee)	33
SWEAT BEES (HALICTIDAE)	34
<i>Agapostemon texanus</i> (Texas Striped Sweat Bee)	35
<i>Agapostemon virescens</i> (Bicolored Striped Sweat Bee)	35
<i>Halictus confusus</i> (Confusing Furrow Bee)	36
<i>Halictus farinosus</i> (Wide-striped Sweat Bee)	36
<i>Halictus ligatus</i> (Ligated Furrow Bee)	37
<i>Halictus rubicundus</i> (Orange-legged Furrow Bee)	37
<i>Halictus tripartitus</i> (Tripartite Sweat Bee)	37
<i>Lasioglossum albipenne</i> (White-winged Sweat Bee).....	38
<i>Lasioglossum cooleyi</i>	38
<i>Lasioglossum cressonii</i>	38
<i>Lasioglossum helianthi</i>	38
<i>Lasioglossum knereri</i>	39
<i>Lasioglossum laevissimum</i>	39
<i>Lasioglossum nevadense</i>	40
<i>Lasioglossum olympiae</i>	40
<i>Lasioglossum ovaliceps</i> (Oval-headed Sweat Bee).....	40
<i>Lasioglossum pacificum</i>	41
<i>Lasioglossum ruidosense</i>	41
<i>Lasioglossum sisymbrii</i> (Tansy Mustard Sweat Bee)	41
<i>Lasioglossum titusi</i>	41
<i>Lasioglossum villosulum</i> (Shaggy Furrow Bee).....	42
<i>Lasioglossum zephyrus</i> (Zephyr Sweat Bee).....	42
<i>Lasioglossum zonolum</i> (Bull-headed Furrow Bee).....	42
MASON, LEAFCUTTER, CARDER, AND RESIN BEES (MEGACHILIDAE)	43

<i>Anthidium manicatum</i> (European Woolcarder Bee)	44
<i>Anthidium oblongatum</i> (Oblong Woolcarder Bee).....	45
<i>Heriades carinata</i> (Carinate Armored-Resin Bee)	45
<i>Hoplitis producta</i> (Produced Small-Mason)	45
<i>Megachile angelarum</i>	46
<i>Megachile apicalis</i>	46
<i>Megachile centuncularis</i> (Patchwork Leafcutter Bee).....	47
<i>Megachile fidelis</i>	47
<i>Megachile perihirta</i> (Western Leafcutter).....	47
<i>Megachile rotundata</i> (Alfalfa Leafcutter Bee)	48
<i>Osmia nemoris</i>	48
<i>Osmia proxima</i>	49
<i>Osmia pusilla</i>	49
<i>Osmia tristella</i>	49
<i>Protosmia rubifloris</i> (Prong-faced Slender-Mason).....	50
<i>Pseudoanthidium nanum</i> (European Small-Woolcarder).....	50
<i>Stelis laticincta</i> (Wide-striped Painted-Dark Bee)	51
ADDITIONAL RESOURCES	52
<i>i</i> NATURALIST BEE GUIDE URL.....	52
INDEX OF BEES BY SCIENTIFIC NAME	52
RECOMMENDED PLANT PICKS FOR BEES	54
ADDITIONAL BEE IDENTIFICATION/TAXONOMY RESOURCES	54
ADDITIONAL RESOURCES ON BEES	54
BIBLIOGRAPHY	56



INTRODUCTION

What is the purpose of this guide?

This guide is designed as a public tool, and an accompaniment to the online iNaturalist guide [Summer Garden Bees of Portland](https://beav.es/Tdj). You can use this link to access it: <https://beav.es/Tdj>.

The 67 bee species included in this guide were found in a three-year study of garden bee communities active during the summer months of 2017 - 2019, in the Portland Oregon metropolitan region (see “Background of the data supporting this guide” for more information on study methods). These 67 bee species belong to 19 genera and five families.

This guide is *not* designed to be an identification guide. Identifying bees is notoriously difficult, particularly for smaller-bodied bees like *Lasioglossum* species. While it is certainly possible to learn to identify some of these bees to the species level, this guide does not contain the detail necessary for species identification. The level of detail included in this guide is suitable for anyone with an interest in bees, including those with limited or no knowledge of bee biology, ecology, or taxonomy. **The intention of this guide is to help the public familiarize themselves with garden bees in the Portland, Oregon, metropolitan area, and to recognize the potential diversity in size, color, and life history traits of these bees.** If bee taxonomy and identification something you are interested in learning about, you may consider the Master Melittologist Program at Oregon State University (OSU). This community science program contains a curriculum designed for anyone to gain expertise in bee family and genus-level identifications, so that they can help document the bees of Oregon and the Pacific Northwest. More information about this program, and other resources, are listed towards the end of this document, in the section titled “Additional Bee Identification/Taxonomy Resources”.

We hope that this guide can make the world of garden bees accessible to anyone and everyone who is interested. Wondering what genus that super big, fuzzy bee you just saw was? What was that bright metallic green bee you saw on a sunflower earlier? Was that a bee, or a wasp? We’ll cover those questions, and more, in the iNaturalist guide and this document.

Background of the data supporting this guide

The data on which this guide is based comes out of the [Garden Ecology Lab](#) at Oregon State University. One of the primary goals of this study was to assess the quantity and diversity of bees in urban gardens. 24 garden sites were selected within the Portland, OR, Metropolitan area. These sites represented both urban and peri-urban sites, sites with variable adjacent landscape features, such as golf courses, rivers, and forests. Different gardening styles, such as

native plant gardens, edible gardens, and perennial gardens were also represented. Most gardens were privately owned and selected based on homeowner willingness to have their space sampled, but one garden was a public demonstration garden that was managed by Master Gardener volunteers, on land owned by the City of Portland. Gardens were sampled over the course of three years: 2017, 2018, and 2019. Each garden was sampled three times every summer, using both pan traps and hand collection. If you would like to read more about the sites themselves and the methods used to collect the data used for this guide, see the “Additional Resources” section for a citation to the [Langellotto et al. \(2018\) paper](#). Note that this paper only contains the first summer’s (2017) data. The full dataset is being prepared for publication as of August 2023.



Isabella Messer, who helped sample Portland area gardens, walks through a bee lawn. Bee lawns provide forage for bees, including flowers such as clover. *Photo by Gail Langellotto.*



One of the Portland area gardens that was sampled for the three-year study. *Photo by Gail Langellotto.*

How to use this guide

This guide is designed to be used in tandem with the [Summer Garden Bees of Portland](https://beav.es/Tnt) iNaturalist guide. You can use this link to access it: <https://beav.es/Tnt>. The iNaturalist guide is interactive and allows users to filter for certain functional or visual traits. For example, if you see a bee nesting in the soil, you can filter for all soil-nesting bees. If you see a bee with a metallic-colored body, you can filter for all metallic bees. Thus, you can narrow down the list of species that you could possibly see in your garden, to those that best match particular traits. The iNaturalist guide also includes photographs for most species. This document does not.



Summer Garden Bees of Portland

This guide is based upon collections made in 24 Portland-area gardens, each June, July, and August in 2017-2019. We collected *Lasioglossum* from the iNaturalist database. There are also 12 *Lasioglossum*, 16 *Sphecodes*, and 1 *Stelis* morphospecies [...more ↓](#)

All 67

Search

Search

FURRINESS

somewhat furry 4

very furry 10

GARDEN FREQUENCY

is common 3

is rare 37

is ubiquitous 7

is uncommon 15

very common 5

BODY SIZE

medium - large 6

large size 11

medium size 29

small size 21



Zephyr Sweat Bee¹
Lasioglossum zephyrus



Modest Masked Bee²
Hylaeus modestus



Punctate Masked Bee³
Hylaeus punctatus



Small Long-horned Bee⁵
Melissodes microstictus



*Melissodes robustior*⁶



Melissodes lupinus



Start from the iNaturalist “Summer Garden Bees of Portland” home page.



Summer Garden Bees of Portland

This guide is based upon collections made in 24 Portland-area gardens, each June, July, and August in 2017-2019. We collected *Lasioglossum zephyrum* the iNaturalist database. There are also 12 *Lasioglossum*, 16 *Sphecodes*, and 1 *Stelis* morphospecies [...more ↓](#)

All

67

Search

Search

FURRINESS

somewhat furry

4

very furry

10

GARDEN FREQUENCY

is common

3

is rare

37

is ubiquitous

7

is uncommon

15

very common

5

BODY SIZE

medium - large

6

large size

11

x

medium size

29

small size

21

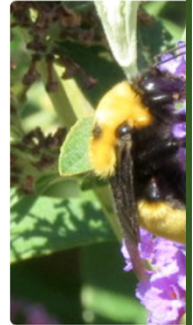
COLOR



Western Thistle Longhorn¹
Melissodes rivalis



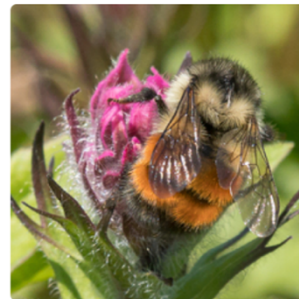
White-shouldered Bumble Bee²
Bombus appositus



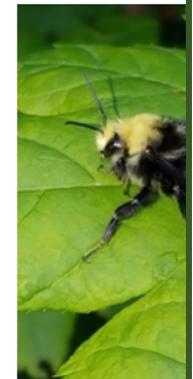
Nevada Bumble Bee³
Bombus nevadensis



Yellow-Fronted Bumble Bee⁵
Bombus flavifrons




Black-tailed Bumble Bee⁶
Bombus melanopygus



Yellow-faced Bumble Bee⁴
Bombus vosnesenskii

You can **filter** for bee traits by clicking on any of the categories. Here, we have filtered to see only “large size” bees.



Summer Garden Bees of Portland

This guide is based upon collections made in 24 Portland-area gardens, each June, July, and August in 2017-2019. We collected *Lasioglossum zephyrum* the iNaturalist database. There are also 12 *Lasioglossum*, 16 *Sphecodes*, and 1 *Stelis* morphospecies [...more ↓](#)

All
67

FURRINESS

somewhat furry
4

very furry
10

GARDEN FREQUENCY

is common
3

is rare
37

is ubiquitous
7
+

is uncommon
15

very common
5

BODY SIZE


medium - large
6

large size
11


medium size
29

small size
21

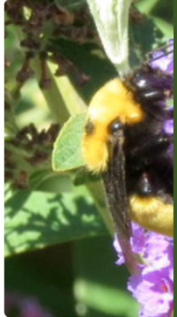
COLOR




Western Thistle Longhorn¹
Melissodes rivalis




White-shouldered Bumble Bee²
Bombus appositus




Nevada Bumble Bee
Bombus nevadensis



Yellow-Fronted Bumble Bee⁵
Bombus flavifrons



Black-tailed Bumble Bee⁶
Bombus melanopygus



Yellow-faced Bumble Bee
Bombus vosnesenskii

If you want to use **multiple filters** at once, click the green “+” button next to the bee trait you want to add to your existing filter. Here, we want to see bees that are “large size” AND are also “ubiquitous” in Portland gardens.

6

Summer Garden Bees of Portland

This guide is based upon collections made in 24 Portland-area gardens, each June, July, and August in 2017-2019. We collected Lasioglossu the iNaturalist database. There are also 12 Lasioglossum, 16 Sphecodes, and 1 Stelis morphospecies ...more ↓

All 67

Search Search

FURRINESS

somewhat furry 4

very furry 10

GARDEN FREQUENCY

is common 3

is rare 37

is ubiquitous 7

is uncommon 15

very common 5

BODY SIZE

medium - large 6

large size 11

medium size 29

small size 21

Yellow-faced Bumble Bee¹
Bombus vosnesenskii

Western Honey Bee²
Apis mellifera

Now, we're seeing the two species that are both large and ubiquitous in Portland gardens. *Enjoy exploring!*

This document is an expansion on the Summer Garden Bees of Portland iNaturalist guide and contains specific information on the natural history of each species. If there is a particular species you are interested in, you can search for it in the table of contents, and read more about its range, nesting habits, social system, and diet breadth.

Common names are provided for those species that have them. Both common and scientific names are used in this guide. Note that there may be multiple common names for some bee species, and this guide is not an exhaustive list of common names. It can be helpful, then, to learn the scientific name for species or genera for consistency. Common names are typically more fun and used often for some species, such as honey bee for *Apis mellifera*. Scientific names, though, can help with learning basic bee biology since closely related species often share similar traits. For example, all bees in the genus *Andrena* nest in the soil. **When using the iNaturalist guide, note that you can toggle between scientific and common names using the "sort" feature.**

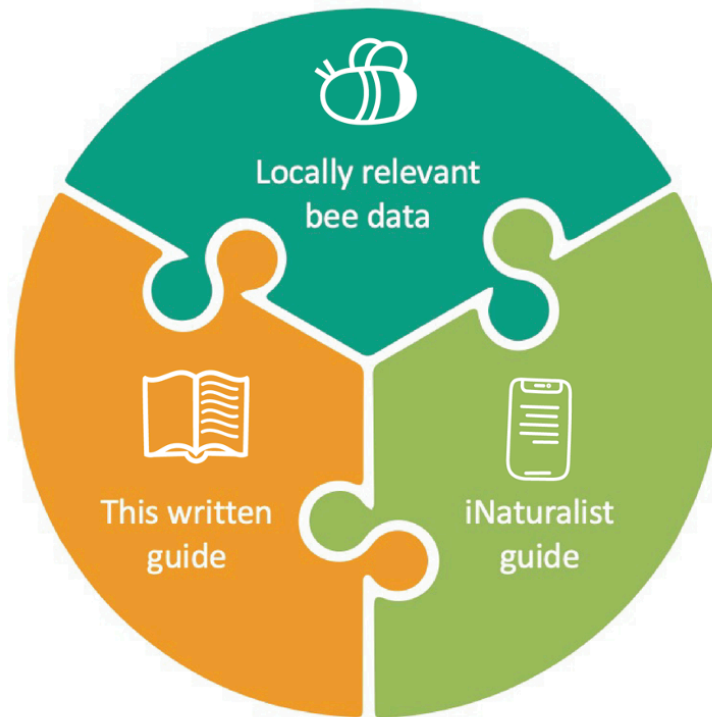


WHY URBAN BEES MATTER

You have probably heard the phrase “Save the Bees” at some point, even if you have never consciously stepped foot into the bee world (which, technically our world *is* a bee world). Bees are important pollinators of many plants, including some staple food crops, and thus play an essential role in our food production system. The bee conservation movement was born out of reported losses in Western honey bee (*Apis mellifera*) populations, though we know little about the status of most bee species. It is important to note that while honey bees play a critical role in our agricultural food system, the focus on this species for the “Save the Bee” movement is misleading. While large-scale seasonal losses of managed western honey bee colonies have been reported in the past 50 years, the number of global colonies has increased by about 45% in the same time frame.²⁸ This may be due to the report of local declines in concert with aggregation of global data.³² Honey bees are also non-native to the United States, and due to their managed status, they do not face the same risks as wild, native bees. Although beekeeping can be a fun hobby, the Western honey bee is only one of an estimated 20,000 bee species worldwide. We can do better by *all* bees by putting our attention on the ones that tend to go unnoticed.

Why might some bee species be declining? Many scientists suggest that habitat loss and fragmentation are primary drivers of bee declines. Habitat loss appears in many ways: what was once a flowering meadow becoming a managed monocultural crop production site, or pavement being put down over an open field for a housing development. It may also look like urbanization creating larger gaps between natural habitats, known as habitat fragmentation. Urban gardens can help provide a refuge space for wild bees: a bee refuge contains flowering plant species for food, and both soil and cavity nesting sites.

What are all the components of this bee guide?



If we *know* bees, we may feel more inclined to put effort towards their survival. Collaboration between ecologists and gardeners is an opportunity to promote bee conservation, whether that be a home garden, a community garden plot, or providing forage to bees via few pots on a porch.



DEFINITION OF TERMS

Diet

Pollen and nectar are the two most important food resources to bees. Pollen serves as their primary protein source for developing larvae, and nectar serves as a carbohydrate source to power adult flight. Some bees also collect other resources from plants, like leaves or petals (leafcutter bees) for their nests, or even floral oils in place of nectar. When we talk about bee diets, we are specifically focusing on pollen collection.

In this guide, two categories are used to describe bee diets.

Generalist, or, polylectic Bee species which collect pollen from the flowers of a variety of flowering plant families, typically from over > 25% of flowering plant species available. Most garden bees are pollen generalists.

Specialist, or, oligolectic Bee species which exhibit narrow pollen collection preferences, typically for one plant family. Note that for those bees which are tagged as specialists in the iNaturalist guide, we also have a tag for their host plants: aster, thistle, and willow.

Note that not all bees collect pollen: parasitic bee species do not collect pollen, since they utilize pollen that other female bee species have collected. They are categorized as “does not collect pollen” in this written guide. Read more about parasitic bees under “sociality.”

Sociality

Bees display a wide range of social behaviors. Often, environmental cues influence bees’ social systems. The categorization of a given bee species’ social tendencies is based upon female behavior, and there are several components that determine what category a species falls into. Those components include how the bee nests (communally, in large aggregations, in a social colony, truly solitary), and if there is an overlap of generations (like in eusocial bees) or cooperative brood care between females. The intricacy of social tendencies is beyond the focus of this guide. If you’re interested in further reading about these social structures, resources are listed in the “Additional resources” section. Instead, we use broader categories:

Eusocial Species that exhibit cooperative brood (developing offspring) care, overlapping generations within a colony of adults (older bees are dying as new bees emerge as adults), and division of labor (bees have different duties, such as being a nurse or guard bee in *Apis mellifera* colonies). There are different forms of eusociality: *primitively eusocial* species are included in this category. In primitively eusocial bees, there is a period where the foundress queen is solitary. She forages on her own, and eventually female workers provide the same division of labor as in eusocial colonies. In advanced eusocial colonies, the queen is never on her own.

Sub-social The female guards her offspring until they reach adulthood.

Solitary A single female builds her own nest, collects nectar and pollen to provision her young, and lays her own eggs. These bees are called “non-eusocial” in the iNaturalist guide. Solitary bees die soon after they build their nest, load nest cells with pollen and nectar, lay their eggs, and seal off their nest. Many solitary bees nest in close proximity to each other (aggregative nesting). Other solitary bees nest communally: females share one nest entrance, but each female constructs her own nest from there. Thus, “solitary bee” doesn’t mean “loner bee”; it means that the female does all the work on her own, without cooperation or collaboration from other bees in her species. This is the most common social behavior for bees, as an estimated 65-70% of bee species worldwide are solitary.

Parasitic All of the parasitic bees in this guide are brood parasitic, or cleptoparasites. These are species which enter the nests of pollen-collecting bees and kill the host egg or larvae. These bees do not collect pollen; adults collect nectar from flowers to power their flight. While having parasitic bees in a garden might sound like a bad thing, parasitic bees are indicators of ecological health. This is because to support a parasitic bee species, there must be sufficient populations of their host species. Note that there are also socially parasitic bee species, which enter the nests of social bees and replace the host female as the primary egg layer—a scheme to get the worker females of that species to care for the parasite’s offspring. There were no socially parasitic species found in Portland area gardens.

Nesting

Nesting sites are critical to creating a bee refuge, and a diversity of nesting options is best. Some bees nest in the soil, while others nest in pre-existing cavities in stems. Other nesting strategies exist, like bees which excavate their own nests into wood, or build freestanding aerial nests, but those bee species were not found in Portland gardens.

Soil Bees which excavate nests in the ground.

Cavity Bees which nest in pre-existing cavities, like dead wood or pithy stems. In urban settings, these bees may also nest in artificial nesting substrates, like cracks in buildings.



Entrance to a solitary bee nest in the **soil**. These nests are very difficult to spot, but it is the most common nesting strategy for bees. *Photo by Gail Langellotto.*

Hive Bees in this category may live in above or below-ground hives and may sometimes take advantage of artificial cavities for their colonies, like a bird house. Bees in this category live in large colonies with many sterile working adults, which vary considerably in size from larger queens. They also construct pollen pots, used to store food resources. In Portland gardens, these are honey bees, and *Bombus* (bumble bee) species.



Entrance to a solitary bee nest in a cavity. This bee chose to plug its nest with *Clarkia* petals. *Photo by Nicole Bell.*



A look inside a commercial honey bee colony. These “hive” nesters build a large nest, complete with distinct social castes. *Photo by Nicole Bell.*

Furriness

We created the “furriness” tag on iNaturalist to denote those bees which are notably hairy.

Very furry These are bumble bee species, of which there are many in Portland gardens. Bumble bees come in a variety of shapes, sizes, and colors, but they all share this in common: they have *lots* of hair.

Somewhat furry These are *Melissodes* species. They are less furry than bumble bees, but still much hairier than other common species. *Melissodes* are relatively identifiable because they are typically similar in size to a honey bee, but much hairier.



Bombus mixtus male.
Considered “very furry.”
Photo by Nicole Bell.



Melissodes clarkiae on
Clarkia amoena. Considered
“somewhat furry.” Photo by
Devon Johnson.

Body Size

While larger bees are certainly easiest to spot, garden bees come in a variety of sizes. Body size can be a great way to narrow down a bee's genus. Body size is tagged on the iNaturalist guide for each species. Information on bee body size came from several sources^{4,5,12,16,22}, and we used two different types of measurements to increase the number of bees for which we had data. In the lab, we measured intertegular span (ITD), or the width between where the wings attach on the bees' body, for those bees where we could not find body size information from other sources.

Body size determinations:

Small Bees with an ITD of < 1.5 mm, and body length < 7mm.

Medium Bees with an ITD of 1.6 - 3mm, and body length between 7 – 12 mm.

Medium-large Bees with an ITD and body length which can vary between medium and large, depending on the specimen.

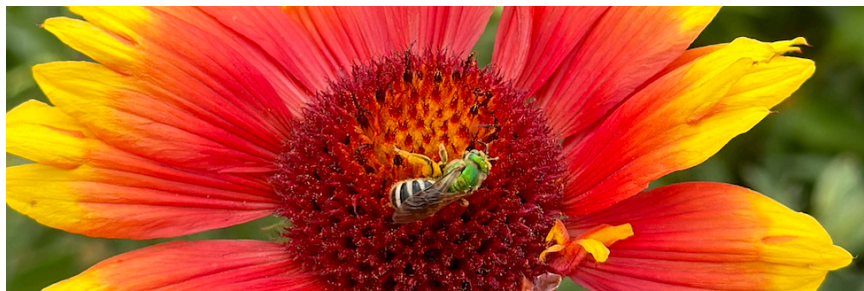
Large Bees with an ITD > 3.1 mm, and body length > 13 mm.



From left to right: *Bombus vosnesenskii* (large; length > 13 mm); *Agapostemon virescens* (medium; length 7-12 mm); *Hylaeus mesillae* (small; length < 7 mm).

Photo by Nicole Bell.

Color



Agapostemon virescens female. This bee is tagged as “metallic green” due to the brilliant green sheen on the head and thorax. *Photo by Nicole Bell.*

Bees come in a wide range of colors. One helpful way to distinguish some bee genera from others is the “sheen” of the bees: do they appear metallic, or not? We tagged some bee species under metallic categories on iNaturalist. Note that the color of males and females are sometimes different. For example, *Agapostemon texanus* females are entirely metallic green, whereas the males have a black-and-yellow striped abdomen. *Agapostemon virescens* females

have white-and-black stripes on the abdomen, whereas males have yellow-and-black stripes on the abdomen.

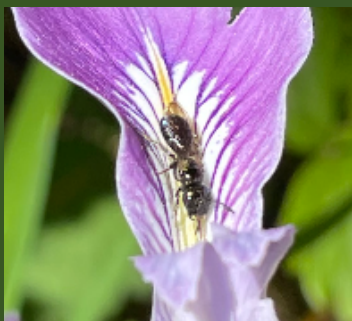
Dull metallic This category describes some bee species in the genera *Lasioglossum* and *Osmia*. Compared to some brightly colored metallic bees, “dull metallic” bees have a subtle sheen.

Metallic dark blue-green This category describes the *Ceratina* species found in Portland gardens. Though quite small, these bees are relatively identifiable because they have a dark metallic sheen.

Metallic green This category is for the two *Agapostemon* species found in Portland gardens. Both bees have noticeable, bright metallic green on the body.



Lasioglossum species. This bee would be considered “dull metallic” due to the reflective sheen the head and thorax have in sunlight. It’s a less obvious, and less brilliant, coloring than the other two categories. *Photo by Jen Hayes.*



Ceratina species. This bee is categorized as “metallic dark blue-green” because in sunlight, it’s whole body reflects a dark blue or green color. It may look similar to the “dull metallic” category in photos, but the difference in these two categories is especially noticeable in person. *Photo by Jen Hayes.*

Frequency

We tagged bees using the frequency category on iNaturalist to denote how often they were collected from Portland urban gardens *during the summer months of June, July, and August*. Some bees, including *Andrena* species and *Bombus melanopygus* (Black tailed bumble bee), might be more abundant earlier in the season than we sampled.

Frequency is also a helpful way to narrow down what bees you may be seeing most often in the garden during the summer, as there are a few species which are seen most regularly. The

number of specimens identified in the garden research is noted in parentheses next to the frequency category.

Ubiquitous Species with > 100 specimens collected. “Ubiquitous” meaning that species in this category are likely to be found in most Portland gardens.

Very common Species with 61 - 100 specimens identified.

Common Species 31 - 60 specimens identified.

Uncommon Species with 11 - 30 specimens identified.

Rare Species with < 10 specimens identified.

Status

Bee species tagged as “native” have a native range that includes Portland. Species tagged as “non-native” are exotic to Portland gardens, meaning that their native range does not include Portland. Instead, these bees were introduced to our region.

Seasonality

We used this category to denote when bees are most commonly observed: early in the season, in the middle of the season, or late in the season. This is another helpful way to narrow down which bee you might have just seen, depending on the time of year. Note that just because a bee’s abundance or the frequency at which they’re observed does not necessarily mean that they cannot be observed at other points during the season.

Seasonality information was determined by Lincoln Best.

Early-season bee species: Activity peaks before July.

Mid-season bee species: Activity peaks between July and August.

Late-season bee species: Activity peaks after August.

All season bee species: These bees are active from the early season through the late season, sometimes even beyond.

Taxonomy

The taxonomy tags divide the bees on the iNaturalist guide by family. These categories are also used to organize this guide.

Mining bees Family *Andrenidae*.

- Subfamily Andreninae (“Typical mining bees”)
- Subfamily Panurginae

Honey bees, bumble bees, and allies Family *Apidae*.

- Subfamily Apinae (“Apine bees”)
- Subfamily Nomadinae (“Nomad and related cuckoo bees”)
- Subfamily Xylocopinae (“Carpenter bees”)

Plasterer bees Family *Colletidae*.

- Subfamily Hylaeinae.

Sweat bees Family *Halictidae*.

- Subfamily Halictinae.

Mason, leafcutter, carder, and resin bees Family *Megachilidae*.

- Subfamily Megachilinae.

SPECIES SUMMARIES



MINING BEES (ANDRENIDAE)

Mining bees are in the family Andrenidae, which are often called the andrenids. These bees get their “mining” name because they excavate nests in the ground. Different mining bee species can have different soil texture preferences: some may prefer to nest in sandier soils, whereas others may nest in loam or clay soils with a denser texture. Andrenids often emerge early in the season, some as early as late February or early March. Many species of andrenids are not seen after mid-June, which highlights the importance of providing early-flowering plant species for this group. The Andrenidae family is a rather large one, encompassing 3,000 species globally.



A male *Andrena*.
Photo by Jen Hayes.

We found two Andrenidae genera in Portland-area gardens:

Andrena All bees in the genus *Andrena* nest in the soil, sometimes in large aggregations. Their nests are usually found in patches of bare and open soil, though they may also nest under small piles of leaf litter. Most bees from this genus are solitary. An important note about andrenid bees is that their abundance peaks in the spring. It is rare to see these bees in the summer. Since we sampled bees June through August of each year, we have likely underestimated the true abundance of *Andrena* bees in Portland gardens.

Panurginus Like *Andrena* bees, bees from the genus *Panurginus* are spring fliers. Many Panurgines are small, approximately half the size of a honey bee. Bees of this genus nest in the soil, in flat and open areas. Some species nest in aggregations. However, these bees are considered solitary because females from multiple nest sites in an aggregation don't exhibit social characteristics, such as cooperative brood care.

***Andrena crataegi* (Hawthorn Mining Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (1)
Seasonality	Early-season

This bee is broadly distributed across the United States. This bee is black in color, though certain parts of the body may have a brownish to reddish appearance. They additionally have yellow hairs on the head and thorax.¹⁸

***Andrena lawrencei* (Lawrence’s Miner Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (5)
Seasonality	Early-season

The range of this species is limited to the western and midwestern United States.³ It’s head and abdomen are black with black hairs, although the thorax has yellow-white pubescence. It may be considered moderately shiny.¹⁸

***Andrena nigrocaerulea* (Blue-and-black Mining Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (3)
Seasonality	Early-season

This bee extends through much of the western United States.³ It is notably dark in appearance, with a metallic blue color on the body. A distinguishing characteristic from other *Andrena* species is the often-shiny face.

Andrena prolixa

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium - Large
Garden frequency	Rare (1)
Seasonality	Early-season

This bee's range is limited to the western United States.³ It is often rather dark in appearance, with some notable reddish-brown coloring on the body. It often has yellow hairs on both the head and thorax.

***Andrena sigmundi* (Sigmund's Mining Bee)**

Native status	Native
Sociality	Solitary
Diet	Specialist
Nesting	Soil
Size	Medium
Garden frequency	Rare (1)
Seasonality	Early-season
Specialist on	Willows

This bee is known to be a specialist on *Salix*, or willows.²⁵ Similar to *Andrena prolixa*, this species is mostly dark/black in color, with some reddish-brown tints on the body and yellow hairs on the head, thorax, and lower portion of the abdomen.¹⁷

***Panurginus atriceps* (Black-tipped Miner Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Very common (79)
Seasonality	Early-season / mid-season

This species is dispersed across the western coast of the United States.³ All bees in this genus have a mostly black appearance. Because they're small and dark in color, some may mistake them for ants (or not notice them at all). In Dr. Anderson's research, this species was found to be significantly associated with both Oregon sunshine (*Eriophyllum lanatum*) and Varileaf Phacelia (*Phacelia heterophylla* ssp. *Virgata*).²



HONEY BEES, BUMBLE BEES, AND ALLIES (APIDAE)

Honey bees and bumble bees are both in the family *Apidae*. The “allies” portion of this title is used because there are many other types of bees in this family, including carpenter bees, orchid bees, some parasitic (cuckoo) bees, and more. Some of these other bees, such as long-horn bees, were found in Portland gardens. The *Apidae* family is the largest of all bee families, encompassing nearly 6,000 species.

We found these genera in Portland-area gardens:

Apis The genus *Apis* comprises 11 known species, though *Apis mellifera* (the European/Western honey bee) is by far the most well-known.

Bombus Bees in the genus *Bombus* are commonly known as bumble bees. Most *Bombus* are eusocial, which is an advanced form of sociality. There are some species of *Bombus* which are parasitic, meaning they work to overtake or kill the queen bee in an existing colony. Bumble bees build their colonies in pre-existing cavities in the ground or under piles of dense material like rocks or vegetation. They are somewhat infamous for their “buzz pollination” style, in which they grab the flower structure and vibrate their wings. This action, called sonication, is particularly helpful for bell-shaped flowers like blueberry flowers, which honeybees struggle to pollinate. Through sonication, *Bombus* species can dislodge and essentially “shake out” otherwise inaccessible pollen. These bees have large and furry bodies, which allows them to fly in cooler temperatures than many other bee species. Their large and furry body also makes them more prone to excessive and high heat in urban landscapes.

Ceratina Bees in the genus *Ceratina* are commonly known as small carpenter bees. They are visually distinct because they are dark-bodied, usually with a metallic sheen. They have very little body hair. *Ceratina* bees are cavity nesters, typically utilizing pithy stems or hollow twigs. Females excavate their cavities in the spring, sometimes creating nests that are 30 cm deep.

Melissodes These bees are often similar in size, or even larger than, honey bees. Specialization on certain floral resources is common across this genus, especially in the botanical family Asteraceae, the sunflower family. *Melissodes* bees nest in soil. Notable physical



Bombus nevadensis male. The color variation on males of this species looks most similar to *B. appositus*, while females of this species are mainly a vibrant yellow color. Photo by Nicole Bell.

traits include their light-colored hairs on the head and thorax. Males in this genus have very long antennae, giving these bees the nickname “long-horn bees.”

Tripeolus Bees from this genus are “cuckoo” bees, or cleptoparasites (nest parasites) of long-horned bees (tribe Eucerini). Like other parasitic bees, *Tripeolus* bees don't have bodies adapted for collecting and carrying pollen, though they collect nectar from a variety of flowers.

***Apis mellifera* (Western Honey Bee)**

Native status	Exotic
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Ubiquitous (317)
Seasonality	All season

The native range of the western honey bee covers Europe, the Middle East, and Africa.³ They have become naturalized across North America and have both managed and feral populations. Even though these are generalist bees, they still may prefer certain plant families or species over another, depending on proximity and accessibility of pollen/nectar resources. For example, blueberries (in the *Ericaceae* family) are relatively difficult for honey bees to pollinate, given their bell-shaped flowers that respond to sonication (“buzz” pollination, done by bumble bees). Honey bees cannot sonicate, so they may prefer nearby resources, like maple trees, rather than working to extract the blueberry pollen. In Dr. Anderson’s research, honey bees were found to be significantly associated with ‘Grosso’ lavender (*Lavandula intermedia*) and oregano (*Origanum vulgare*).² The hives that honey bees reside in may include up to 60,000 worker bees and other hive members! They are distinct from bumble bees in the sense that colonies may persist for multiple years, rather than just the queen overwintering.

Honey bees are distinct in appearance due to their furry eyes and well-developed pollen basket on their hind legs. They are characterized by amber bands on the upper portion of their abdomen, with bands becoming darker towards the tip. It is important to note, though, that honey bees can display variety in their abdominal coloring: some bees may display no amber colors at all, whereas others will also have more pale colored hairs on their abdomen.

***Bombus appositus* (White-shouldered Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Rare (1)
Seasonality	All season
Furriness	Very furry

The range of *Bombus appositus* extends through many parts of North America, though they are especially concentrated in the western United States.³ This species is considered relatively common, though they were rare in our study or Portland-area gardens. This species is found in open meadows and other habitats, both in high and low elevations.

This species lives in colonies that can be below-ground, ground-level, or above-ground. The colonies are relatively small for a eusocial species, with the average number of cocoons (new bees) produced per year/colony between 68 and 168.³⁰ Though a generalist, worker bees may still prefer a small selection of the total flowering resources at a site, which is common for generalist species.¹⁵ This species may be easily confused with another bee found in our research, *Bombus fervidus*. Distinct, pale-yellow bands on the abdomen and white shoulders make this bee relatively easy to identify.

***Bombus caliginosus* (Fog-belt Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Medium
Garden frequency	Rare (2)
Seasonality	All season
Furriness	Very furry

The range of this species extends along the Pacific Coast, from southern British Columbia to southern California.^{3,24} The common name for this species, the fog-belt bumble bee, refers to this species' preference for humid and foggy regions. This species is listed as vulnerable to extinction on the IUCN Red List of Threatened and Endangered Species.¹⁴ The appearance of this bee, though, is extremely similar to *B. vosnesenskii* (colloquially referred to as *B. vos*), the most common bumble bee in Portland-area gardens. Dissection is often needed to accurately

distinguish *B. vos* from *B. caliginosus*, which complicates our ability to accurately quantify the conservation status of *B. caliginosus* in our area.

Bombus fervidus californicus

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Uncommon (17)
Seasonality	All season
Furriness	Very furry



Bombus fervidus californicus males. Notice how long their abdomen is: males have an extra abdominal segment, which can create a “lanky” appearance. Photo by Nicole Bell.

There are two color variations for this species. One color variation for this species looks very similar to *B. vosnesenskii*: see next page for photos on how to differentiate the two species. The other color variation looks most like *B. appositus*, though their coloring is less bright white. An example is pictured to the right.

The recorded range for this species extends through much of North America, most concentrated in the northeastern portions of the United States.^{16,3} Note that while the historic range of this species is apparently in the northeast, populations are declining there, though the species remains quite common in the west.¹⁶ *Bombus fervidus californicus* is known to nest in grassy, open areas. Nests are most often found above-ground level, though they can also be below-ground. Prime habitat for this species may be a bee-lawn type setting, where floral resources like clover are included in what typically would just be a mowed grass lawn. In Dr. Anderson’s research, this species was found to be significantly associated with Grosso lavender.²



Bombus fervidus californicus female. Notice the lack of yellow hairs on the face. *Photo by Nicole Bell.*



Bombus vosnesenskii female. Notice the yellow hairs on the face (below the eyes). *Photo by Nicole Bell.*

***Bombus flavifrons* (Yellow-fronted Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Uncommon (26)
Seasonality	All season
Furriness	Very furry

These bees have been observed in most of North America. Their range is concentrated, though, from the Pacific Coast to the Rocky Mountains.¹⁶ There are some physical variations within this species, but they are known for their foggy-appearing thorax, which is caused by a mixture of white-yellow hairs with black hairs.

***Bombus griseocollis* (Brown-belted Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Rare (2)
Seasonality	All season
Furriness	Very furry

This species ranges across North America, and is considered common³, including in both rural and urban settings. Most hives are found below-ground, though some are found in above-ground or ground-level colonies.^{16,23} This species has distinct color variations. Specifically, they have a yellow or brown crescent towards the middle of their abdomen. All members of this species have black heads.

***Bombus melanopygus* (Black-tailed Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Rare (7)
Seasonality	All season*
Furriness	Very furry

The distribution of this species ranges from the Pacific Coast through the Colorado Rockies, though observations range through all the United States.³ It is most commonly found in California and southern Oregon.

It commonly nests underground, though has also been found in above-ground birdhouses and insulation. There are different color variations for this species. One includes a distinct orange-red banding on the abdomen.³³

*This species is active 12 months a year in western Oregon and may be seen on heather (*Calluna*) plants.

***Bombus mixtus* (Fuzzy-horned Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Medium*
Garden frequency	Uncommon (22)
Seasonality	All season
Furriness	Very furry

This species prefers cool and moist habitats, found in western Oregon and mountainous areas with snow accumulation. *Bombus mixtus* colonies are commonly found on the surface of the ground in open areas, like open fields or grassy meadows.³³ In Dr. Anderson’s research, this species was found to be significantly associated with ‘Grosso’ lavender (*Lavandula intermedia*) and Varileaf Phacelia (*Phacelia heterophylla* ssp. *Virgata*).²

*This bee is sometimes also small. It is distinct given that it has orange on the body, with the orange banding at the tip of the abdomen (“orange tail”), different from *B. melanopygus*, which has a black-tipped abdomen (“black tail”).

***Bombus nevadensis* (Nevada Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Rare (1)
Seasonality	All season
Furriness	Very furry

This species has a broad range across North America.³ It is a notable pollinator of commercial highbush blueberry throughout its range.²⁹ Colonies are commonly found in open, grassy areas.²⁰ It is dominantly yellow, with the tip of the abdomen black (“black butt”). Males have bulbous eyes, and their yellow coloring is less brilliant than females.

***Bombus vancouverensis* (Vancouver Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Medium - Large
Garden frequency	Rare (1)
Seasonality	All season
Furriness	Very furry

This bee recently had its name changed. This was after it was decided that our species, the one found in Portland gardens, was distinct from one found on the Colorado Plateau. Our bee’s name was changed from *Bombus bifarius* to *Bombus vancouverensis*, and the other retained the name *Bombus bifarius*. Furthermore, our bee, *Bombus vancouverensis*, was found to have two subspecies: *B. vancouverensis nearcticus* in the Portland area, and *B. vancouverensis vancouverensis* around Vancouver, British Columbia.

There are multiple color variations of this species, but they are all very furry with yellow or white hairs on the face.³³

***Bombus vosnesenskii* (Yellow-faced Bumble bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Hive
Size	Large
Garden frequency	Ubiquitous (282)
Seasonality	All season
Furriness	Very furry

This species is commonly found along the west coast of North America³ and is one of the most common bee species in the Willamette Valley of Oregon. Colloquially referred to as *B. vos*, it thrives in urban settings, and it is not entirely clear why it has dominated in abundance over so many other bumble bee species. Not only is it a common bee, but it may even be increasing in abundance¹⁶, which contrasts evidence suggesting declines in bumble bee populations.⁴ They also have a long active season and can sometimes be spotted in mid-winter. In Dr. Anderson’s research, this species was found to be strongly associated with California poppy (*Eschscholzia californica*), globe gilia (*Gilia capitata*), and ‘Grosso’ lavender (*Lavandula intermedia*).²

Total colony numbers can range from 200 to 300. Queens emerge from overwintering in the early spring and choose their nest site. It takes approximately one month for her first generation of workers to emerge, and colony numbers expand for the remainder of the season. It has a distinct appearance, though is sometimes confused with *Bombus caliginosus*. As their common name suggests, *B. vos* has yellow hairs all over their face. The thorax is an intense black color, and their abdomen is black, except for a bright yellow stripe near the tip.

Ceratina acantha

Native status	Native
Sociality	Sub-social
Diet	Generalist
Nesting	Cavity
Size	Small
Garden frequency	Ubiquitous (222)
Seasonality	All season
Color	Metallic dark blue-green

Ceratina acantha has a wide distribution across the western United States³. They are often found in woody shrubs or trees. Females of this species can be identified by their unusual dark color, paired with a dark metallic green/blue sheen.

Ceratina micheneri

Native status	Native
Sociality	Sub-social
Diet	Generalist
Nesting	Cavity
Size	Medium
Garden frequency	Uncommon (16)
Seasonality	All season
Color	Metallic dark blue-green

The range of this bee is restricted to the western coasts of the United States.³ It is typical of this genus to nest in pithy stems or wooded shrubbery. The body is dark metallic blue in color.

Melissodes lupinus

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (5)
Seasonality	Mid-season
Furriness	Somewhat furry

The range of the species covers the western parts of the United States and Canada.³ Note that while this species is considered a generalist, Dr. Anderson’s research found this species to be strongly associated with Douglas aster (*Symphyotrichum subspicatum*).²

This bee, like other bees in this genus, is quite hairy. The hairy legs and pale striped abdomen are a giveaway for this *Melissodes* species.

***Melissodes microstictus* (Small Long-horned Bee)**

Native status	Native
Sociality	Solitary
Diet	Specialist
Nesting	Soil
Size	Medium
Garden frequency	Uncommon (17)
Seasonality	Mid-season
Furriness	Somewhat furry
Specialist on	Asters

The range of this species appears to be restricted to western North America.³ Like many *Melissodes*, this bee is a specialist. This species specializes on flowers from the Asteraceae family. In our study of Portland-area garden bees, they were commonly collected from garden sunflowers. In Dr. Anderson’s research, they were found to be strongly associated with Canada goldenrod (*Solidago canadensis*) and Douglas aster (*Symphyotrichum subspicatum*).² Bees from this genus have a signature robust and hairy look. Pale hairs dominate the legs of this species and give the abdomen a striped appearance.

***Melissodes rivalis* (Western Thistle Longhorn Bee)**

Native status	Native
Sociality	Solitary
Diet	Specialist
Nesting	Soil
Size	Large
Garden frequency	Rare (1)
Seasonality	Mid-season
Furriness	Somewhat furry
Specialist on	Thistles

The range of this species extends through much of western North America.³ It has a specialist diet and restricts forage to those flowering plants in the *Asteraceae* family.⁷ This species is commonly found foraging from thistles. They also have a nesting preference for sandy soils.⁵

Melissodes robustior

Native status	Native
Sociality	Solitary
Diet	Specialist
Nesting	Soil
Size	Medium
Garden frequency	Very common (80)
Seasonality	Mid-season
Furriness	Somewhat furry
Specialist on	Asters

This bee's range extends along the western coast of the United States.³ Like many other bees in the genus, this species specializes on flowers in the *Asteraceae* family, such as Douglas Aster (*Symphotrichum subspicatum*) or sunflowers (*Helianthus*).⁵ In Dr. Anderson's research, this species was found to be strongly associated with Douglas aster (*Symphotrichum subspicatum*).²

This bee has the robust and hairy body characteristic to bees from the *Melissodes* genus, and they may have noticeably colorful blue or green eyes.

***Tripeolus simplex*-group**

Native status	Native
Sociality	Solitary
Diet	Does not collect pollen
Nesting	Soil
Size	Medium
Garden frequency	Rare (3)
Seasonality	Mid-season

These bees are native to the region in Oregon where they were collected.³ Because *Tripeolus* species parasitize the nests of bees in the tribe Eucerini (long-horned bees), they are considered soil-nesting, even though they are not excavating or founding their own nests. They may be seen on a wide array of flowers, but only to collect nectar as a carbohydrate source to power flight. Parasitic bees often have a wasp-like appearance, which may lead to their common misidentification as wasps by gardeners.



PLASTERER BEES (COLLETIDAE)

Plasterer bees get their name because the females line their nests with a cellophane, or plaster, substance. Some bees in the family Colletidae are comparable in size to a honeybee, and quite hairy. However, we did not find honeybee-like colletids in our Portland garden study. There is great variation in this family, in terms of bee appearance.

We found this genus in Portland gardens:

Hylaeus Also called “masked bees,” they are identifiable because they are small, virtually hairless, and have distinct yellow markings (their “mask”) on their face. Their body is mostly black, and they are often mistaken for wasps. They carry pollen internally, rather than on their bodies, giving them even more of a wasp-like appearance.

***Hylaeus modestus* (Modest Masked Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Small
Garden frequency	Uncommon (19)
Seasonality	Mid-season

The range of this bee spreads across most of North America. It can be seen from May to September. Like other “masked bees,” the face of this bee is immediately recognizable with brilliant yellow marks. The rest of the body is mostly black and hairless, although yellow may be seen on other parts of the body, like the legs. Because they are so small, it is easy to miss these bees when bee-watching.

***Hylaeus punctatus* (Punctate Masked Bee)**

Native status	Exotic
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Small
Garden frequency	Rare (6)
Seasonality	Mid-season

This bee species is present on several continents, like North America, South America, Europe, and Africa.³ This bee is exotic to North America, first found in California. Your best chance to see one of these bees is between June and August. Like other bees in this genus, it has distinct yellow markings on the face.

***Hylaeus mesillae* (Mesilla Masked Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Small
Garden frequency	Rare (8)
Seasonality	Mid-season

This bee is widespread across North America, from southern Canada to northern Mexico. Very noticeable yellow markings are present on the face and legs.



Hylaeus bee. While we can't see the yellow markings on its face in this photo, *Hylaeus* are also known to be relatively small, hairless bees that are wasp-like! *Photo by Jen Hayes.*

SWEAT BEES (HALICTIDAE)

This is the second-largest bee family, containing almost 4,500 species globally. Sweat bees get their name because they sometimes land on human skin to lap up the mineral content in our sweat.

Note that for many sweat bees, of which *Halictus* and *Lasioglossum* are of interest to this guide, the social behavior can be varied. Many of these bees exhibit facultative eusociality, or social polymorphism. In other words, one species may produce both solitary and primitively eusocial nests. We have noted those species which are confirmed to be facultatively eusocial/socially polymorphic with an asterisk, though it's possible that more halictids in this guide are facultatively eusocial.



Halictus farinosus female. Photo by Nicole Bell.

We found these genera in Portland gardens:

Agapostemon Bees from this genus are metallic green or blue. Interestingly, the name *Agapostemon* directly translates to “stamen loving.” Bees in this genus nest in the soil. While they are considered solitary bees, it is not uncommon for these bees to nest communally, where many females share a nest entrance, but excavate their own separate tunnels from that shared entrance. It's important to note that even solitary bees that nest communally do not share nest maintenance or larval rearing duties, unlike social and eusocial bees.



Agapostemon texanus female. Photo by Nicole Bell.

Halictus Species in this genus exhibit varying forms of sociality. All five species that we identified in Portland gardens were eusocial. Like many social bees, they are seen throughout much of the gardening season, due in part to their ability to reproduce in their nest from spring through fall.

Lasioglossum *Lasioglossum* bees are often small, but some species are as large as honeybees. Bees from this genus range from solitary to eusocial and exhibit a wide variety of nesting habits and diet preferences. All but one of the 16 *Lasioglossum* species we found in Portland area gardens nests in the soil. Because many of these bees are small, they can be easily missed when observing insect activity. Gardeners may mistake particularly small *Lasioglossum* for flies, though this misidentification can be corrected by counting wings: bees have two pairs of wings, and flies only have one pair. Counting wings on a tiny *Lasioglossum* is not as easy as it sounds, though, so it may be easier to look at how “thick” the legs are: bees have more robust looking legs, and flies have very thin legs.

Agapostemon texanus (Texas Striped Sweat Bee)

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Uncommon (22)
Seasonality	All season
Color	Metallic green

This species spreads throughout most of North America.³ It is seen from spring through fall and is most identifiable by its bright metallic green coloring. Females are uniformly green, whereas males have distinct yellow and black striping on their abdomen. While some blue variations of this species do exist, they are not found in Oregon. It may nest communally, with between 2 to 24 other females. They are known to prefer steep soil banks.²³ In Dr. Anderson’s research, this species was found to be strongly associated with Douglas aster (*Symphyotrichum subspicatum*).²

Agapostemon virescens (Bicolored Striped Sweat Bee)

Native status	Native
Sociality	Solitary
Diet	Generalist

This species is found through much of the United States and southern Canada.³ It commonly nests in aggregations, though there is no collaboration between females. In Dr. Anderson’s research, this

Portland Bee Guide | Sweat Bees (Halictidae)

Nesting	Soil
Size	Medium
Garden frequency	Common (35)
Seasonality	All season
Color	Metallic green

species was found to be strongly associated with common madia (*Madia elegans*) and Douglas aster (*Symphotrichum subscpicatum*).² This bee has a metallic green head and thorax with characteristic stripes on the abdomen: females have white and black stripes, and males have yellow and black stripes.

Halictus confusus (Confusing Furrow Bee)

Native status	Native
Sociality	Eusocial*
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Ubiquitous (117)
Seasonality	All season

This species has a broad distribution across North America. It is also found across Europe, parts of Asia, the Middle East, and Australia.³ They prefer sandy loam soils and flat areas to nest. The number of bees per nest can range from just a few individuals to hundreds of bees.

These bees are small, and females have a greenish tint to their head and thorax. Note that the body itself has a greenish tint, not the body hair. Their pale abdominal hair banding makes it appear that they have stripes.

*Note that this species is socially polymorphic, so it is sometimes solitary, and sometimes primitively eusocial.

Halictus farinosus (Wide-striped Sweat Bee)

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (10)
Seasonality	All season

This bee's range covers most of the western half of the United States.³ Its primitive eusociality is exemplified by its small, but cooperative nests, and distinction between queen and worker size.¹ They are often found nesting in dry, sandy-loam soils. In Dr. Anderson's research, this species was found to be strongly associated with California poppy (*Eschscholzia californica*).² It has distinct black and white-appearing abdomen, with several white bands giving its striped appearance.

Halictus ligatus (Ligated Furrow Bee)

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Ubiquitous (152)
Seasonality	All season

This species is well-distributed throughout the United States, some parts of South America, with some records in Europe and Africa.³ In Dr. Anderson's research, this species was found to be strongly associated with Douglas aster (*Symphotrichum subspicatum*).²

There is some variation in the appearance of this species, but the banded stripes on their abdomen are more yellow in color than *H. farinosus*. The body itself is dark brown or black.

Halictus rubicundus (Orange-legged Furrow Bee)

Native status	Native
Sociality	Eusocial*
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Common (34)
Seasonality	All season

The range of this bee extends throughout Canada and the entire United States.³ It is mostly seen March through September. Their nests can be found in areas of hard-packed sandy loam soil, usually surrounded by stones to provide heat.

*While considered primitively eusocial, this species also displays social polymorphic behavior: bees in cooler regions may be solitary, whereas those in warmer climates display primitively eusocial behavior.

Halictus tripartitus (Tripartite Sweat Bee)

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Ubiquitous (265)
Seasonality	All season

The distribution of this bee is wide, from Arkansas to the western coast of the United States and into British Columbia, Canada.³ Overwintering females will forage on their own from March to May, initiating nests, until workers take over later in the season.²⁶ In Dr. Anderson's research, this species was found to be strongly associated with California poppy (*Eschscholzia californica*).² Like other *Halictus*, this species is dark in color, with distinct striping on the abdomen.

***Lasioglossum albipenne* (White-winged Sweat Bee)**

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Rare (1)
Seasonality	All season

This species' range covers most of North America. This species is most likely to be spotted between May and September.³ They have white to very pale coloring on the body.

Lasioglossum cooleyi

Native status	Native
Sociality	Unknown
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (8)
Seasonality	All season

The range of this species extends through western North America.³ The sociality of this species is unknown. *Lasioglossum* bees express great diversity in their social structures, unlike some other genera where social structure stays consistent among species within a genus. It has pale/white striping on the abdomen, giving the bee a misty appearance.²⁶ The white hairs on the legs add to the mystique.

Lasioglossum cressonii

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Cavity
Size	Small
Garden frequency	Uncommon (20)
Seasonality	All season
Color	Dull metallic

The range of this species covers much of North America, though records appear to be concentrated on the east coast of the United States.³ The overall coloring of this species is a metallic green-gold.

Lasioglossum helianthi

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small

There is very little information on this bee, and even the documented range is difficult to find, though this species is found throughout deserts in the southwestern part of the United States.¹⁰ Females are relatively distinct due to their brightly colored head and thorax.

Garden frequency	Uncommon (21)
Seasonality	All season
Color	Dull metallic

This species has a bluish metallic head and thorax, with an amber/brown colored abdomen.

Lasioglossum knereri

Native status	Native
Sociality	Eusocial*
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Common (40)
Seasonality	All season
Color	Dull metallic

This bee can be found from Alberta, Canada, through southern California and Colorado.³

*This bee has a typically complicated social structure for the genus *Lasioglossum*. Some bees of this species are solitary, some nest communally, whereas some are social.

Lasioglossum knereri is black or brown in color, sometimes with a dull green or blue tint. Their body shape is slender, with hairbands on the abdomen familiar to the genus.

Lasioglossum laevissimum

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Very common (86)
Seasonality	All season
Color	Dull metallic

This species used to be synonymous with *Lasioglossum smilacinae*, meaning they used to be considered a singular species, but are now considered separate species. Its range extends through much of North America.³ This bee has a black body that is sometimes contrasted by some pale white hairs.

Lasioglossum nevadense

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Ubiquitous (172)
Seasonality	All season
Color	Dull metallic

The range of this species covers southern British Columbia, Canada, to Utah in the United States.³ The head and parts of the body have a green-bluish tint, though the face has a brown coloring. Males are noticeably more blue than green.

Lasioglossum olympiae

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (2)
Seasonality	All season

The range of this bee is restricted to the western coast of North America but does spread into states such as Idaho.³ They are most likely to be seen between March and September. In Dr. Anderson’s research, this species was found to be strongly associated with Western columbine (*Aquilegia formosa*), California poppy (*Eschscholzia californica*), and Oregon iris (*Iris tenax*).² It is mostly black in appearance. It has some subtle white striping down the abdomen.

***Lasioglossum ovaliceps* (Oval-headed Sweat Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Rare (2)
Seasonality	All season

The range of this species covers the western half of the United States.³ This bee has a black head and thorax, but a beautifully amber-colored abdomen. The amber color can vary between specimens: some have a more solid amber color, and others appear more striped. The reddish coloring may lead some to believe it’s a member of the genus *Sphecodes* (which are parasitic bees). Females can be seen foraging for pollen, though, which a parasitic bee would never do!

Lasioglossum pacificum

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (3)
Seasonality	All season

The range of *Lasioglossum pacificum* appears restricted to the western coast of the United States.³ It has a few thick “bands” on its abdomen, which are prominent in some individuals. A combination of the hairs on this bee, along with the legs and antennae, give this bee a rather brown appearance.

Lasioglossum ruidosense

Native status	Native
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Uncommon (17)
Seasonality	All season
Color	Dull metallic

The range of this bee extends through the western side of North America, with documentation from Alaska through Mexico.³ The head of this species is a golden green or blue-green color, with the abdomen more of a brown color.¹¹

Lasioglossum sisymbrii (Tansy Mustard Sweat Bee)

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (6)
Seasonality	All season

The recorded range of this bee extends through the west to midwestern United States, with records also in parts of Canada and nearly all of Mexico.³ It has distinct white banding on the abdomen. The rest of the body is dark. In some photographs, it looks brownish, but sometimes appears black.

Lasioglossum titusi

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Uncommon (12)
Seasonality	All season

The range of this species extends through the western half of the United States.³ It has a black appearance, with white banding on the abdomen. In Dr. Anderson’s research, this species was found to be strongly associated with Common Madia (*Madia elegans*).²

***Lasioglossum villosulum* (Shaggy Furrow Bee)**

Native status	Exotic
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Very common (63)
Seasonality	All season

This species is exotic to the United States and is native to Europe. The appearance of this bee is dark overall, with brownish-colored legs. It has a notably wide head (the head is wider than it is long).

***Lasioglossum zephyrus* (Zephyr Sweat Bee)**

Native status	Exotic
Sociality	Eusocial
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Uncommon (12)
Seasonality	All season
Color	Dull metallic

The range of this species extends across the United States, though observations appear to be concentrated on the eastern coast of the United States.³ They can be observed from March to October.

Their overall appearance is dark, though their body is a dark metallic green color.

***Lasioglossum zonolum* (Bull-headed Furrow Bee)**

Native status	Exotic
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Small
Garden frequency	Rare (8)
Seasonality	All season

This species is exotic to our region, though they now spread through much of the United States.³ Their appearance is black, with yellowish hairs above their thorax.²³



MASON, LEAFCUTTER, CARDER, AND RESIN BEES (MEGACHILIDAE)

The Megachilidae family includes leafcutting (*Megachile* species), mason (*Osmia* species), and wool carder bees (*Anthidium* species), as well as other genera. Most bees in the family Megachilidae carry pollen on their abdomen. There are over 1,400 species in this family worldwide. Fun fact: it's not just leaves that leafcutter bees harvest. They are also known to harvest petals. If you've ever noticed a perfect crescent-shaped cut on a Farewell-to-spring (*Clarkia*) flower, for example, it's the work of a leafcutter bee collecting petals for their nest!

We found these genera in Portland gardens:

Anthidium Both *Anthidium* species found in Portland gardens are exotic to our region. Bees in the genus *Anthidium* commonly nest in existing cavities in the soil, hollow stems, and cavities in wood. They also utilize pebbles to fill in cavities above their constructed cells.

Heriades Many bees in the family Megachilidae are cavity nesters, including the one species of *Heriades* we found in Portland gardens. These bees are small and black in color.

Hoplitis Also called small mason bees, *Hoplitis* are distinctive from other bees in the family Megachilidae (like *Osmia* and *Megachile*) due to their smaller, less hairy appearance. Many *Hoplitis* species also have small bands of white hair on their abdomen.

Megachile These bees vary in size, but most are around the size of a honey bee. They are typically dark in color. While many bees in this genus are cavity nesters, soil excavation is also widespread.

Osmia While many bees in the family Megachilidae are cavity nesters, *Osmia* bees display a variety of nesting habits. Nests are created in pre-existing cavities, in the ground, hollow plant stems, or even in snail shells. Mason bees get their name due to the females' use of her mandibles ("bee teeth") to collect mud, plant resins, and other materials to cap and build out nest cells.

Protosmia These bees have black bodies with white hairs on the thorax. Like other megachilids they have noticeable mandibles.

Pseudoanthidium Yellow and black in coloring, and few body hairs, these bees appear very wasp-like. Most bees from this genus are likely oligolectic on asters, which is a common specialization for bees.

Stelis Bees from the genus *Stelis* are also known as "dark bees." Every *Stelis* bee is parasitic, meaning they parasitize the brood of other bees. The species of *Stelis* we found in Portland gardens parasitizes *Megachile angelarum*, but other *Stelis* species found in Oregon likely

parasitize *Osmia*, *Hoplitis*, *Heriades*, and *Ashmeadiella*. *Stelis* larvae kill the larvae in the nest of their host species and use their host’s pollen provisions for development. Thus, the females of this species lack pollen carrying structures, since they do not forage for their offspring.



Megachile on California poppy. If you look closely, you can see the mandibles, or “bee teeth”, at the bottom of the face. *Photo by Nicole Bell.*



Anthidium male. It’s nearly impossible to capture these bees sitting still—they’re usually busy harassing other bees! *Photo by Nicole Bell.*

Anthidium manicatum (European Woolcarder Bee)

Native status	Exotic
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Large
Garden frequency	Uncommon (22)
Seasonality	Mid-season

This is an exotic species, native to Europe, western Asia, and northern Africa.³ It is now found across the United States, as well as many other parts of the world. These bees are relatively easy to spot, as the males are large, fast fliers. Male *Anthidium* are quite territorial and may be seen chasing or even killing other bee species.⁹ They can often be seen “hovering” around floral resources, fending off unwanted visitors (like other bee species) to maintain a patch of flowers for his potential mates.

Also called wool carder bees, females from this genus are known to collect trichomes (hairs) from flowering plants to use in their nests, particularly on Lamb’s ears leaves. *Anthidium* females have a distinct yellow color on their mandibles (like “bee teeth”) and legs. A common mistake may be to misidentify *Anthidium manicatum* as yellow jacket wasps because they have similar vibrant yellow coloring, but they are much hairier and robust looking.

***Anthidium oblongatum* (Oblong Woolcarder Bee)**

Native status	Exotic
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium
Garden frequency	Rare (1)
Seasonality	Mid-season

Like *Anthidium manicatum*, this species is exotic to the United States. Observations are concentrated on the eastern side of the U.S., though it can be found across the country.³ Like other wool carder bees, females collect hairs from flowering plants to line their nests. The males are quite territorial and will defend floral resources against other bee visitors.⁹ Many *Anthidium* can be easily misidentified as wasps, because they have vibrant yellow on the body. Note that these bees will be more robust appearing, and hairier, than a wasp would.

***Heriades carinata* (Carinate Armored-Resin Bee)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Small
Garden frequency	Uncommon (13)
Seasonality	Mid-season

This bee is found throughout much of the United States and southern Canada.

***Hoplitis producta* (Produced Small-Mason)**

Native status	Native
Sociality	Solitary
Diet	Generalist

The range of this bee extends across much of North America.³ You are most likely to see it foraging in July and August. Though this bee is considered a generalist, little is known about its foraging habits. According to a report by the Xerces Society for Invertebrate Conservation, studies should focus on *H. producta*’s forage and nesting habits. It likes to nest in pithy

Nesting	Cavity
Size	Medium
Garden frequency	Very common (69)
Seasonality	Mid-season

stems²¹, and sometimes uses pebbles or other materials as partitions to separate the offspring. The body is mostly black, with some white striping on the abdomen.

Megachile angelarum

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium
Garden frequency	Uncommon (15)
Seasonality	Mid-season

The range of this bee covers western North America. This bee is known to prefer lavenders (*Lavendula*), Russian sage (*Perovskia*), and chaste tree (*Vitex*).⁸ Rather than cutting leaves like many other leafcutters, females collect resins and gums to partition their nest cells. Since this bee does not cut leaves, it lacks teeth on its mandibles, unlike other bees in the genus. The lack of teeth and cutting edges can be helpful for distinguishing this leafcutter from others in the genus. The body is mostly black.

Megachile apicalis

Native status	Exotic
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium
Garden frequency	Rare (1)
Seasonality	Mid-season
Specialist on	Asters

This species is exotic to the United States, and native to Europe and surrounding Mediterranean regions.³ There are few records of *M. apicalis* in the United States, so its range in the United States may be expanding. Thus far, documentation in the United States is concentrated on both the east and west coasts. A recent study documented finding the first *M. apicalis* specimens in Illinois: they were found in an urban area.¹³ This is a specialist bee, known to forage selectively from flowers in the *Asteraceae* family.

***Megachile centuncularis* (Patchwork Leafcutter Bee)**

Native status	Native*
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Large
Garden frequency	Rare (1)
Seasonality	Mid-season

*It is believed to be native to this region, and its range extends through much of North America, Europe, and parts of Asia. It is possible that this species was introduced at one point to the United States, though this has not been confirmed.³¹ Females of this species are similar in size to honey bees, though they have a distinct orange band on the underside of their abdomen.

Megachile fidelis

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium
Garden frequency	Rare (4)
Seasonality	Mid-season

The range of this bee covers most of the western United States, from Montana to New Mexico, and was found in Portland area gardens. While a generalist, this bee prefers plants in the *Asteraceae* family, and is commonly collected from sunflowers.⁸

This bee has yellow or golden hair on the face and parts of the body, and are often identified due to their “face horns.”

***Megachile perihirta* (Western Leafcutter)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Soil
Size	Medium
Garden frequency	Rare (1)
Seasonality	Mid-season

The range of this species appears to cover much of the United States and Canada, though observations are concentrated in the west.³ Unlike many *Megachile*, this bee does not nest in cavities, but instead digs shallow nests in the soil.⁸

This was the largest *Megachile* species we collected. Females can reach just over ½ inch in length.

Megachile rotundata (Alfalfa Leafcutter Bee)

Native status	Exotic
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium
Garden frequency	Rare (7)
Seasonality	Mid-season*

This species is non-native to our region and was introduced to the United States in the mid 20th century. It is broadly distributed across the United States³, though it was relatively rare in our garden bee study. This bee is used in commercial pollination, particularly in alfalfa. Though originally introduced into North America after a drop in seed production, many wild populations have established in both rural and urban areas.

In commercial pollination, cocoons can be purchased by the gallon, and bees are placed in large, holed blocks at the edge of agricultural fields. These blocks can hold hundreds of female *M. rotundata* bees, emphasizing how solitary bee does not equate to a loner bee. Wild specimens can be found in stems or reeds, though they have also been found nesting in straws.

The males of this species are incredibly similar in appearance to those of *Megachile apicalis*. Males have a distinctly rounded abdomen with a notch in the center. Females have distinct white hairs on the underside of their abdomen.

*Note that this species is managed (though wild populations are established), so this may alter seasonality.

Osmia nemoris

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity*
Size	Medium - Large
Garden frequency	Rare (1)
Seasonality	Mid-season
Color	Dull metallic

Although it was rare in the urban settings we sampled, this species apparently does well in small habitats isolated within an urban matrix.¹⁹ This bee is often found nesting in wood and stems. Like other *Osmia*, this bee has a metallic bluish/greenish sheen. It has noticeable hair bands on the abdomen, giving it a striped appearance.

*Note that this species nests in pre-existing soil burrows of *Diadasia* bee species, so while considered a cavity nester, it nests in the ground.⁶

Osmia proxima

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium - Large
Garden frequency	Rare (5)
Seasonality	Early-season
Color	Dull metallic

The range of this species appears to cover much of the United States and Canada.³ This species is found nesting in wood and stems.⁶ It appears dark in color but has a bluish metallic sheen to the body.

Osmia pusilla

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium - Large
Garden frequency	Rare (8)
Seasonality	Early-season
Color	Dull metallic

The range of this bee covers much of the western United States, as well as up into western Canada.³ It is found nesting in cavities, like wood or stems.⁶ Characteristic to *Osmia*, this bee has a bluish/greenish metallic sheen.

Osmia tristella

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium - Large
Garden frequency	Rare (1)
Seasonality	Early-season
Color	Dull metallic

The records for this bee used to expand into South Dakota, but it's possible that the range of this bee may have contracted since the 1980s. Overall, the availability of information on this species appears sparse. While we know the general life history traits of this bee, we don't know much beyond that.

Like other *Osmia*, the body of this bee has a metallic blue tint.

***Protosmia rubifloris* (Prong-faced Slender-Mason)**

Native status	Native
Sociality	Solitary
Diet	Generalist
Nesting	Cavity
Size	Medium
Garden frequency	Rare (3)
Seasonality	Early-season

This species ranges across the western United States.³ This bee is mostly black in appearance (especially males), though the females have some white striping down the abdomen.

***Pseudoanthidium nanum* (European Small-Woolcarder)**

Native status	Exotic
Sociality	Solitary
Diet	Specialist
Nesting	Cavity
Size	Medium
Garden frequency	Rare (2)
Seasonality	Mid-season
Specialist on	Asters

This species was introduced to the United States and Australia from its native ranges in Africa, Europe, and Asia. Note that this species is widely known as *Anthidium lituratum* or *Pseudoanthidium lituratum*.

This bee is a specialist on flowers in the *Asteraceae* family. It is very adept at creating nests out of artificial substrates, like discarded straws. This is a great example of a bee with a more wasp-like appearance that is not a parasitic bee! The males could easily be mistaken for yellow jackets, given their characteristic yellow and black stripes. The females have a blacker body, though notable yellow stripe patterns are still visible on the sides of the abdomen. They are much hairier and robust than a wasp.

***Stelis laticincta* (Wide-striped Painted-Dark Bee)**

Native status	Native
Sociality	Solitary
Diet	Does not consume pollen
Nesting	Cavity
Size	Medium
Garden frequency	Rare (3)
Seasonality	Mid-season

Native to the Portland area, these bees parasitize the nests of some cavity-nesting species. Thus, while they don't excavate or locate their own nest, they instead are often seen flying in search of already founded nests to parasitize. No parasitic bee species forage for pollen, as they utilize pollen collected by their host bee species. Instead, adults can be spotted consuming nectar on flowers to power flight.²²



Stelis laticincta crawling out of a *Megachile angularum* nest. Photo by Jen Hayes.



ADDITIONAL RESOURCES

iNATURALIST BEE GUIDE URL

The following is a direct link to the iNaturalist guide to Portland bees: <https://beav.es/Tdj>

INDEX OF BEES BY SCIENTIFIC NAME

Agapostemon texanus Cresson, 1872, page 35
Agapostemon virescens (Fabricius, 1775), page 35
Andrena crataegi Robertson, 1893, page 20
Andrena lawrencei Viereck & Cockerell, 1914, page 20
Andrena nigrocaerulea Cockerell, 1897, page 20
Andrena proluxa LaBerge, 1980, page 21
Andrena sigmundi Cockerell, 1902, page 21
Anthidium manicatum (Linnaeus, 1758), page 44
Anthidium oblongatum (Illiger, 1806), page 45
Apis mellifera Linnaeus, 1758, page 23
Bombus appositus Cresson, 1878, page 24
Bombus caliginosus (Frison, 1927), page 24
Bombus fervidus/californicus (Fabricius, 1798), page 25
Bombus flavifrons Cresson, 1863, page 26
Bombus griseocollis (De Geer, 1773), page 26
Bombus melanopygus Nylander, 1848, page 27
Bombus mixtus Cresson, 1878, page 27
Bombus nevadensis Cresson, 1874, page 28
Bombus vancouverensis Cresson, 1878, page 28
Bombus vosnesenskii Radoszkowski, 1862, page 29
Ceratina acantha Provancher, 1895, page 29
Ceratina micheneri Daly, 1973, page 30
Halictus confusus Smith, 1853, page 36
Halictus farinosus Smith, 1853, page 36
Halictus ligatus Say, 1837, page 37
Halictus rubicundus (Christ, 1791), page 37
Halictus tripartitus Cockerell, 1895, page 37
Heriades carinata Cresson, 1864, page 45
Hoplitis producta Cresson, 1864, page 45
Hylaeus mesillae (Cockerell, 1896), page 33
Hylaeus modestus Say, 1837, page 32

Hylaeus punctatus (Brullé, 1832), page 32
Lasioglossum albipenne (Robertson, 1890), page 38
Lasioglossum cooleyi (Crawford, 1906), page 38
Lasioglossum cressonii (Robertson, 1890), page 38
Lasioglossum helianthi (Cockerell, 1916), page 38
Lasioglossum knereri Gibbs, 2010, page 39
Lasioglossum laevissimum (Smith, 1853), page 39
Lasioglossum nevadense (Crawford, 1907), page 40
Lasioglossum olympiae (Cockerell, 1898), page 40
Lasioglossum ovaliceps (Cockerell, 1898), page 40
Lasioglossum pacificum (Cockerell, 1898), page 41
Lasioglossum ruidosense (Cockerell, 1897), page 41
Lasioglossum sisymbrii (Cockerell, 1895), page 41
Lasioglossum titusi (Crawford, 1902), page 41
Lasioglossum villosulum (Kirby, 1802), page 42
Lasioglossum zephyrus (Smith, 1853), page 42
Lasioglossum zonolum (Smith, 1848), page 42
Megachile angelarum Cockerell, 1902, page 46
Megachile apicalis Spinola, 1808, page 46
Megachile centuncularis (Linnaeus, 1758), page 47
Megachile fidelis Cresson, 1878, page 47
Megachile perihirta Cockerell, 1898, page 47
Megachile rotundata (Fabricius, 1787), page 48
Melissodes lupinus Cresson, 1878, page 30
Melissodes microstictus Cockerell, 1905, page 30
Melissodes rivalis Cresson, 1872, page 31
Melissodes robustior Cockerell, 1915, page 31
Osmia nemoris Sandhouse, 1924, page 48
Osmia proxima Cresson, 1864, page 49
Osmia pusilla Cresson, 1864, page 49
Osmia tristella Cockerell, 1897, page 49
Panurginus atriceps (Cresson, 1878), page 21
Protosmia rubifloris (Cockerell, 1898), page 50
Pseudoanthidium nanum (Mocsáry, 1881), page 50
Stelis laticincta Cresson, 1878, page 51
Tripeolus simplex-group Robertson, 1903, page 31

RECOMMENDED PLANT PICKS FOR BEES

Interested in adding some flora to the garden to attract and feed bees? Some of the significant floral associations listed earlier in this guide come from Dr. Aaron Anderson's research. Here is the link to that 2022 study: <https://beav.es/TXx>

Top 10 Native Plant Picks for Native Bees. This OSU Extension publication covers native plants you can add to the garden to support wild bees in Oregon. You can access the PDF here:

<https://beav.es/TXf>

Native Plants for Pollinators & Beneficial Insects. This guide comes from the Xerces Society for Invertebrate Conservation. This specific link is for the Inland Northwest, though you can filter by U.S. state. There are several guides available. You can access the Inland Northwest guide here: <https://beav.es/TXg>

ADDITIONAL BEE IDENTIFICATION/TAXONOMY RESOURCES

If you want to learn more about bee taxonomy and/or identification, there are numerous resources available.

Oregon Bee Project. See the website [here](#).

- This is an incredible resource for anyone interested in bees, at any level. Their website is excellently organized, with a set of resources listed specifically for gardeners. These resources include practical tips on reducing pesticide inputs, on how to differentiate a bee from a wasp, etc.

***The Bees of the Willamette Valley* by August Jackson. See the guide [here](#).**

- This guide covers bee genera found in the Willamette Valley extensively. It is an identification guide.

Master Mellitologist Program (Oregon State University). See the website [here](#).

- Interested in learning how to identify bees? Want hands-on learning options, or self-paced courses? This program might be for you. See their website for more information on learning options.

ADDITIONAL RESOURCES ON BEES

Langellotto *et al.* (2018). This research is the basis of this guide. Note that only the 2017 data are included in this paper, but it gives better insight into the study area and sampling methods.

- Read the manuscript online: <https://beav.es/Tm6>

- *Citation:* Langellotto, G., Melathopoulos, A., Messer, I., Anderson, A., McClintock, N., Costner, L. (2018). 'Garden Pollinators and the Potential for Ecosystem Service Flow to Urban and Peri-Urban Agriculture'. *Sustainability* 10.

PolliNation Podcast by *Andony Melathopoulos*. See more information on the podcast [here](#).

- Craving some bee education on your drive to work, while cooking dinner, or just about any other time? This podcast covers a variety of topics, including beekeepers, researchers, and land managers.

Oregon Bee Atlas. See the website [here](#).

- This is an amazing resource if you are looking to learn more about bee species we have all across Oregon. This link takes you to several resources, including the plants from which bees have been collected, images of bees collected in Oregon, blogs about rare bees found in Oregon, and more!

***The Solitary Bees* by Danforth, Minckley, and Neff.**

- Though it may look intimidating (almost textbook-like), the chapters are well-organized, informative, and quite accessible.

***The Bees in Your Backyard* by Wilson & Carril.**

- This is another book which is a relatively quick read. If you're a visual learner, this is a great book.

"The Many Styles of Bee Sociality" by Rusty Burlew – Read it [here](#).

- This blog is a well-written review of different bee social behavior.



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