

Ellen Watrous

Oregon Bee Atlas Collection and Identification Report

1 Your 2023 Collections

Ellen Watrous caught 279 bees across 15 counties from April 22, 2023 to September 03, 2023, representing 45 unique taxa, including 21 unique species.

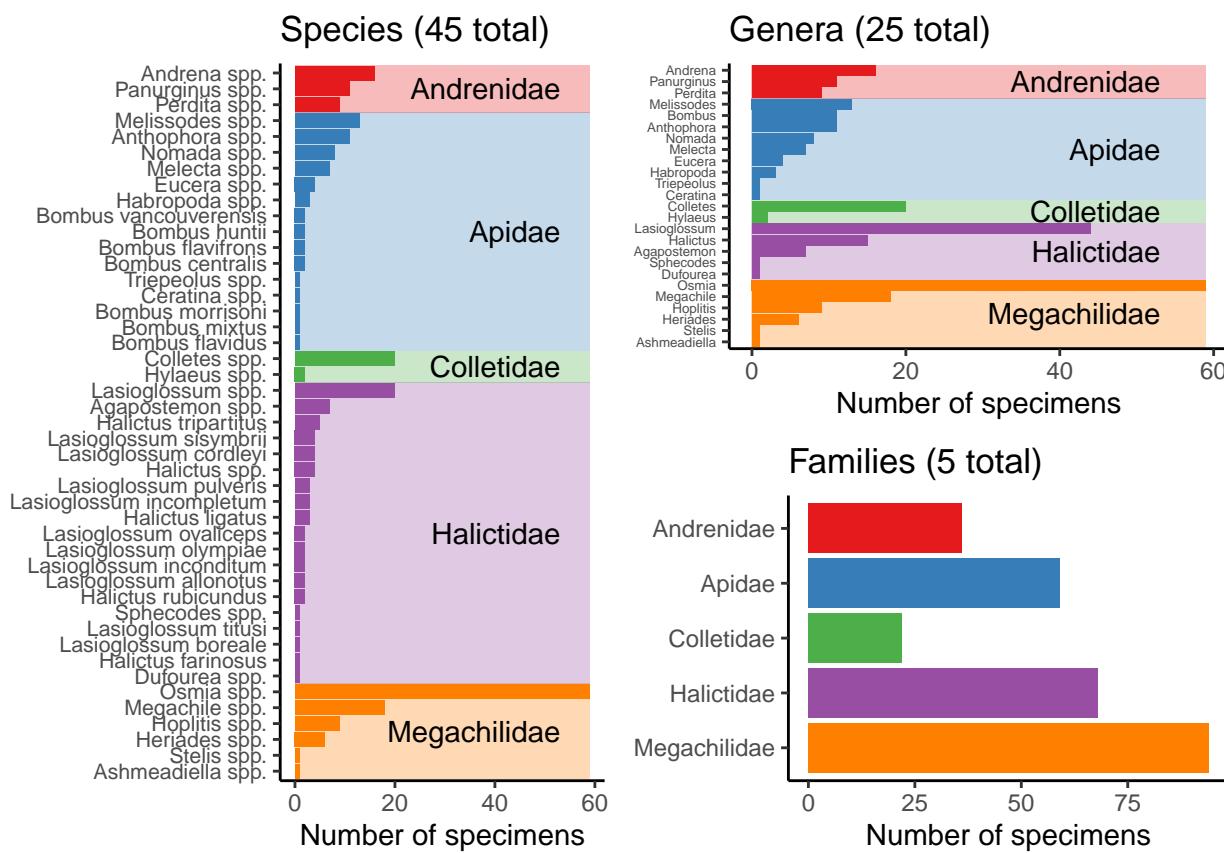


Figure 1: Bees caught by Ellen Watrous, broken down by species, genus, and family.

2 All Your Collections

Ellen Watrous caught 3209 bees across 26 counties from March 29, 2018 to August 10, 2024, representing 196 unique taxa, including 169 unique species. Ellen Watrous also caught the only *Ashmeadiella foveata* in the collection!

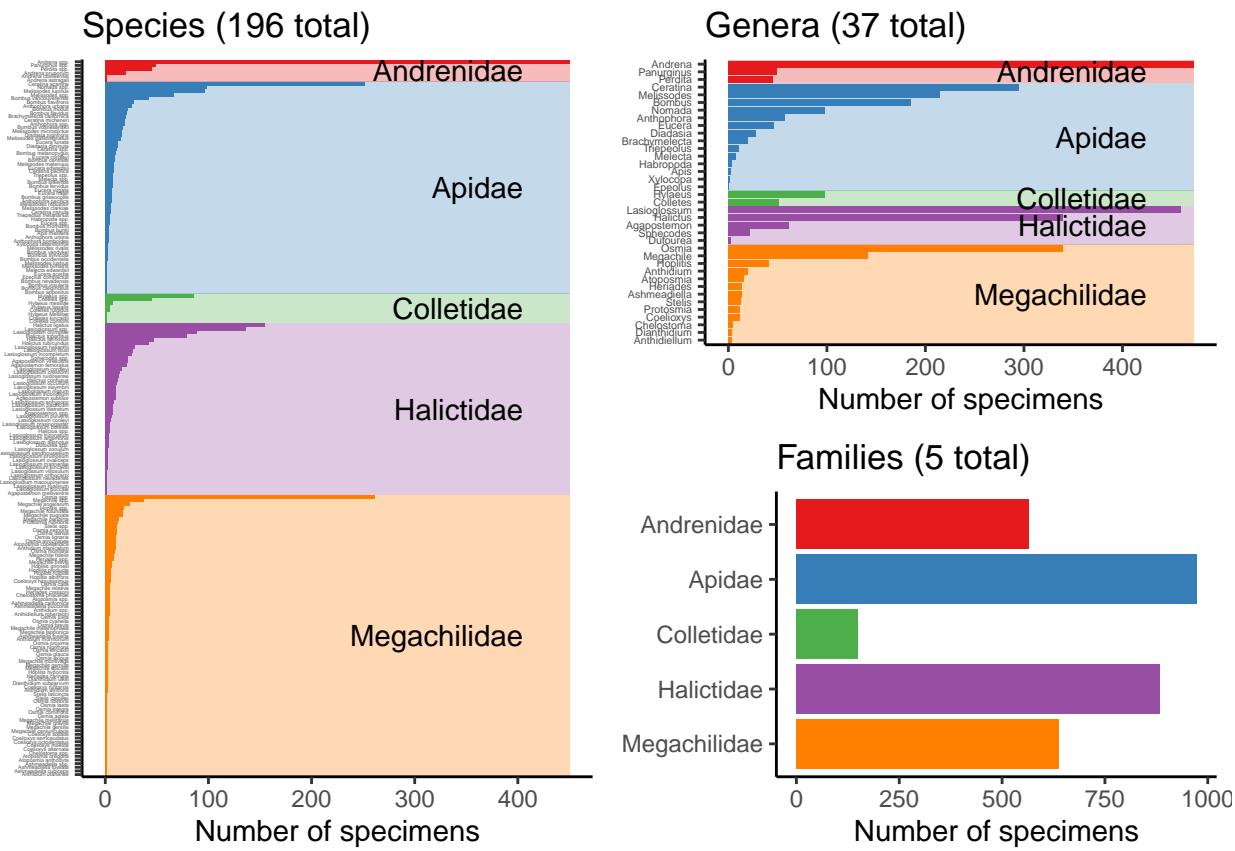


Figure 2: Bees caught by Ellen Watrous, broken down by species, genus, and family.

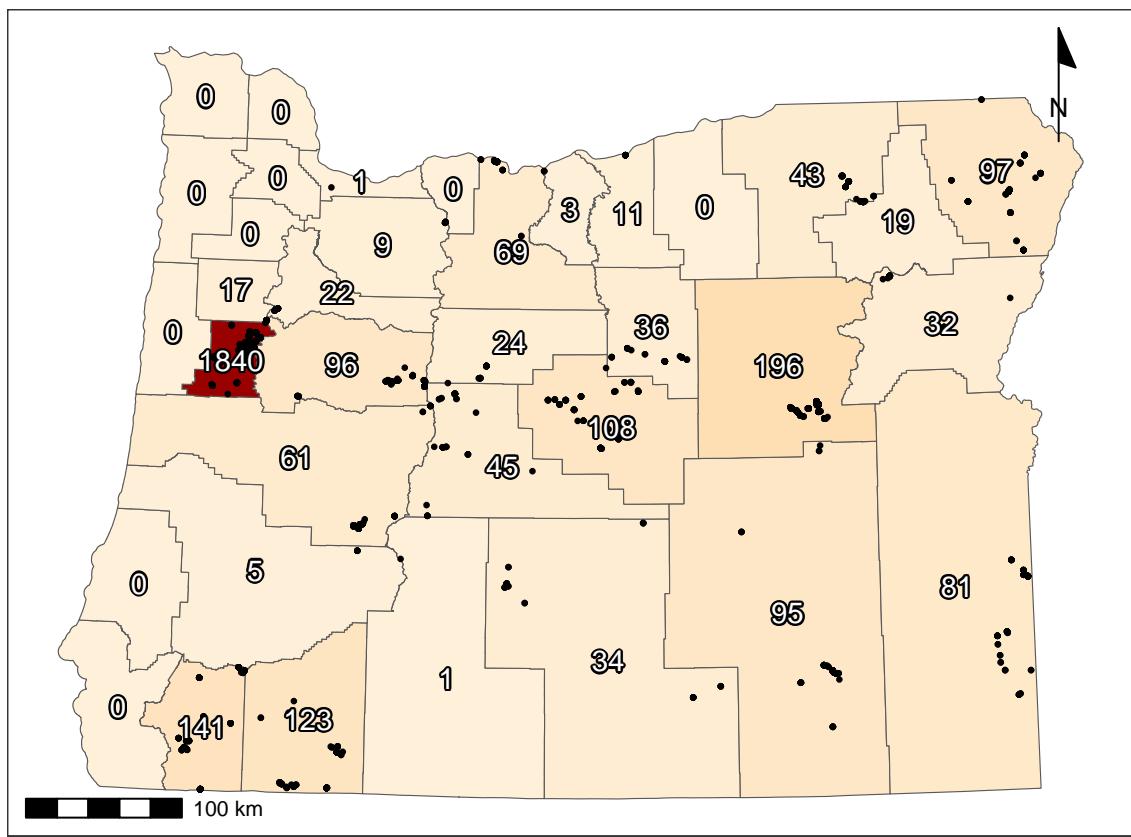


Figure 3: Bee catch locations for Ellen Watrous (within Oregon), along with total catches per county.

3 Total Catches

Volunteers from the Oregon Bee Atlas project caught 22478 bees across 36 counties from January 24, 2023 to December 13, 2023, representing 90 unique species and 48 unique genera. The **Nimble Net Kudos** (most specimens collected) goes to Scott Sublette, Dan O'Loughlin, and Michael O'Loughlin, who caught a total of 2274, 1283, and 1255 specimens. The *positive* kind of **Darwin Award** (most species collected) goes to Scott Sublette, Ellen Silva, and Michael O'Loughlin, who caught a total of 77, 74, and 72 unique species. Well done!



Figure 4: Bees caught by all volunteers, broken down by species, genus, and family.

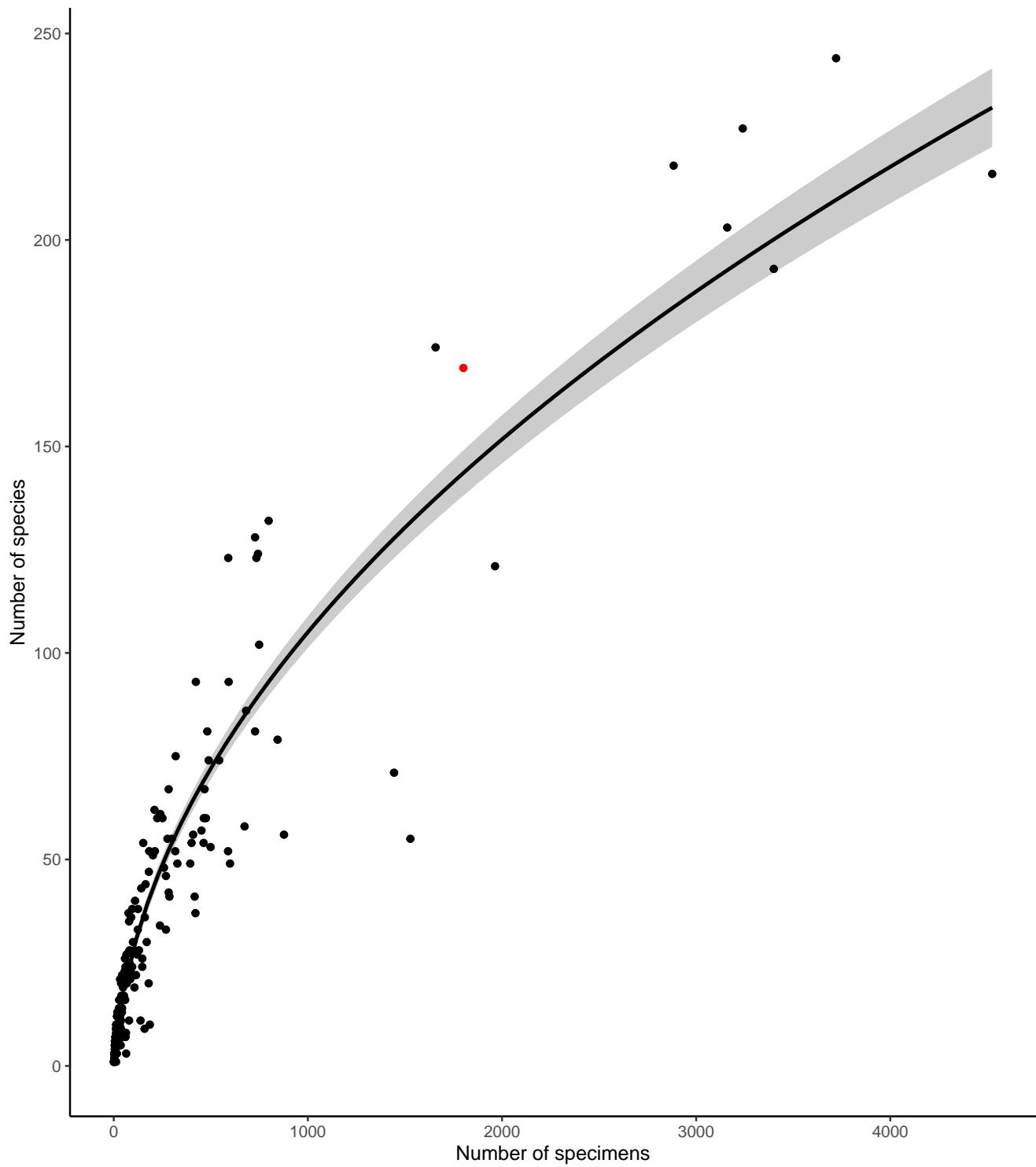


Figure 5: Number of bee specimens and unique bee species caught by all volunteers, with your effort shown in red. This graph should give you an idea of how many specimens you would need to catch to begin seeing rarer bee species.



Figure 6: Total specimens caught per county, along with catch location of each specimen (black dots). For genus- and species-specific information for each county, see Tables 3 and 4.



Figure 7: Total catches per (Level III) ecoregion, along with catch location of each specimen (black dots).

4 Flight Phenology

West of (and including) the Cascade Mountains, most bees (90%) were caught between April 13 and September 02, but the peak of season (50% of specimens) was from May 21 to July 26.



Figure 8: Phenology plot for all bee species caught in or West of the Cascade Mountains, sorted by median abundance times. Percentiles of overall emergence times (50th & 90th) are shown in grey shaded regions. Date ranges for each species (minimum, first, second, third quartiles, and maximum) are shown only for species with >10 specimens.

East of the Cascade Mountains, most bees (90%) were caught between April 28 and September 16, but the peak of season (50% of specimens) was from June 02 to August 07.

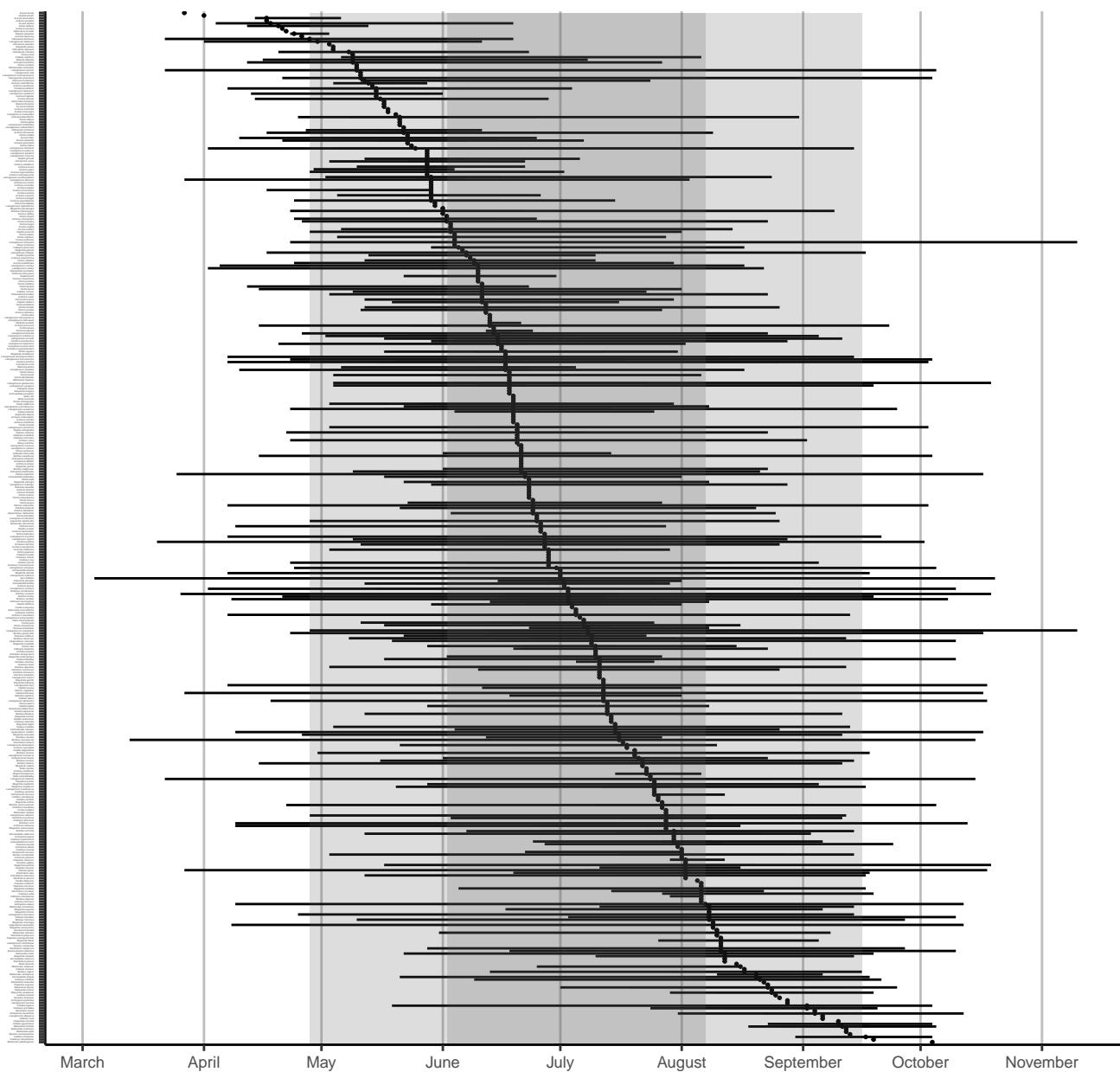


Figure 9: Phenology plot for all bee species caught east of the Cascade Mountains, sorted by median abundance times. Percentiles of overall emergence times (50th & 90th) are shown in grey shaded regions. Date ranges for each species (minimum, first, second, third quartiles, and maximum) are shown only for species with >10 specimens.

5 Plant genera

Volunteers collected specimens from a total of 636 unique flower genera, with most volunteers sampling from 19 flower genera (median value). The **Flower Power Kudos** (most sampled flower genera) goes to Michael O'Loughlin, Lori Humphreys, and Dan O'Loughlin, who collected bees from a total of 246, 210, and 188 genera of flowers. Well done!

The flower genera that had the most specimens caught on them were *Ericameria*, *Phacelia*, and *Penstemon*, which yielded a total of 6308, 4129, and 3411 specimens. The flower genera that were popular with the most species of bees were *Phacelia*, *Penstemon*, and *Ericameria*, hosting a total of 179, 167, and 140 unique bee species. See Tables 1 and 2 for more details.



Figure 10: Recorded number of flower genera per county.

7 Taxonomic Accuracy, 2023

In 2023, you identified 279 of your 279 specimens to genus level and 22 to species level, with a genus-level identification accuracy of 98.6% and a species-level identification accuracy of 81.8% (see Table 5). In total, volunteers from the Oregon Bee Atlas project identified 44.5 % (9993) of the 22478 bee specimens to the level of genus, with an average accuracy of 94.5%. Volunteers also identified 8.4% (1887) of the specimens to species level, and had an average accuracy of 88.9% (see Table 6). Nicely done!

Table 5: Your determination accuracy in 2023.

	Taxon	Specimens ID-ed	Correct ID	% Correct
Family				
<i>Andrenidae</i>		36	36	100.0
<i>Apidae</i>		59	59	100.0
<i>Colletidae</i>		22	22	100.0
<i>Halictidae</i>		68	68	100.0
<i>Megachilidae</i>		94	94	100.0
<i>TOTAL</i>		279	279	100.0
Genus				
<i>Agapostemon</i>		7	7	100.0
<i>Andrena</i>		16	16	100.0
<i>Anthophora</i>		11	11	100.0
<i>Ashmeadiella</i>		1	1	100.0
<i>Bombus</i>		11	11	100.0
<i>Ceratina</i>		1	1	100.0
<i>Colletes</i>		20	20	100.0
<i>Dufourea</i>		1	1	100.0
<i>Eucera</i>		4	4	100.0
<i>Habropoda</i>		3	3	100.0
<i>Halictus</i>		15	15	100.0
<i>Heriades</i>		6	2	33.3
<i>Hoplitis</i>		9	9	100.0
<i>Hylaeus</i>		2	2	100.0
<i>Lasioglossum</i>		44	44	100.0
<i>Megachile</i>		18	18	100.0
<i>Melecta</i>		7	7	100.0
<i>Melissodes</i>		13	13	100.0
<i>Nomada</i>		8	8	100.0
<i>Osmia</i>		59	59	100.0
<i>Panurginus</i>		11	11	100.0
<i>Perdita</i>		9	9	100.0
<i>Sphecodes</i>		1	1	100.0
<i>Stelis</i>		1	1	100.0
<i>Triepelodus</i>		1	1	100.0
<i>TOTAL</i>		279	275	98.6
Species				
<i>Bombus centralis</i>		1	1	100.0
<i>Bombus flavidus</i>		1	1	100.0
<i>Bombus flavifrons</i>		2	2	100.0
<i>Bombus huntii</i>		3	2	66.7
<i>Bombus mixtus</i>		1	1	100.0
<i>Bombus morrisoni</i>		1	1	100.0
<i>Bombus vancouverensis</i>		2	2	100.0
<i>Halictus farinosus</i>		2	0	0.0
<i>Halictus ligatus</i>		3	3	100.0

Table 5: Your determination accuracy in 2023. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Halictus rubicundus</i>	1	0	0.0
<i>Halictus tripartitus</i>	5	5	100.0
<i>TOTAL</i>	22	18	81.8

Table 6: Determination accuracy for all volunteers in 2023.

	Taxon	Specimens ID-ed	Correct ID	% Correct
Family				
	<i>Andrenidae</i>	1171	1121	95.7
	<i>Apidae</i>	3080	3039	98.7
	<i>Colletidae</i>	422	396	93.8
	<i>Halictidae</i>	2297	2266	98.7
	<i>Megachilidae</i>	3020	2970	98.3
	<i>Melittidae</i>	4	1	25.0
	<i>TOTAL</i>	9994	9793	98.0
Genus				
	<i>Agapostemon</i>	86	86	100.0
	<i>Andrena</i>	682	662	97.1
	<i>Anthidiellum</i>	30	7	23.3
	<i>Anthidium</i>	125	124	99.2
	<i>Anthophora</i>	198	184	92.9
	<i>Apis</i>	85	85	100.0
	<i>Ashmeadiella</i>	58	47	81.0
	<i>Atoposmia</i>	46	44	95.7
	<i>Biastes</i>	3	3	100.0
	<i>Bombus</i>	1671	1670	99.9
	<i>Brachymelecta</i>	5	5	100.0
	<i>Calliopsis</i>	21	10	47.6
	<i>Ceratina</i>	273	268	98.2
	<i>Chelostoma</i>	27	24	88.9
	<i>Coelioxys</i>	43	42	97.7
	<i>Colletes</i>	265	245	92.5
	<i>Diadasia</i>	71	59	83.1
	<i>Dianthidium</i>	97	78	80.4
	<i>Dioxys</i>	2	1	50.0
	<i>Dufourea</i>	53	52	98.1
	<i>Epeolus</i>	10	9	90.0
	<i>Eucera</i>	60	57	95.0
	<i>Habropoda</i>	49	47	95.9
	<i>Halictus</i>	902	862	95.6
	<i>Heriades</i>	40	29	72.5
	<i>Hesperapis</i>	4	1	25.0
	<i>Holcopasites</i>	1	1	100.0
	<i>Hoplitis</i>	231	195	84.4
	<i>Hylaeus</i>	157	151	96.2
	<i>Lasioglossum</i>	1163	1101	94.7
	<i>Megachile</i>	562	546	97.2
	<i>Melecta</i>	21	20	95.2
	<i>Melissodes</i>	370	322	87.0
	<i>Micralictoides</i>	14	14	100.0
	<i>Neolarra</i>	3	3	100.0

Table 6: Determination accuracy for all volunteers in 2023. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Nomada</i>	207	201	97.1
<i>Osmia</i>	1670	1639	98.1
<i>Panurginus</i>	140	120	85.7
<i>Perdita</i>	319	249	78.1
<i>Protandrena</i>	8	7	87.5
<i>Protosmia</i>	48	33	68.8
<i>Pseudoanthidium</i>	4	1	25.0
<i>Sphecodes</i>	79	65	82.3
<i>Stelis</i>	31	21	67.7
<i>Trachusa</i>	6	5	83.3
<i>Triepeolus</i>	43	41	95.3
<i>Xylocopa</i>	10	9	90.0
TOTAL	9993	9445	94.5
Species			
<i>Anthidiellum robertsoni</i>	7	7	100.0
<i>Apis mellifera</i>	68	68	100.0
<i>Bombus appositus</i>	8	7	87.5
<i>Bombus caliginosus</i>	32	24	75.0
<i>Bombus centralis</i>	43	38	88.4
<i>Bombus fervidus</i>	43	43	100.0
<i>Bombus flavidus</i>	23	22	95.7
<i>Bombus flavifrons</i>	57	54	94.7
<i>Bombus frigidus</i>	3	0	0.0
<i>Bombus griseocollis</i>	46	46	100.0
<i>Bombus huntii</i>	50	46	92.0
<i>Bombus insularis</i>	9	7	77.8
<i>Bombus kirbiellus</i>	1	0	0.0
<i>Bombus melanopygus</i>	42	20	47.6
<i>Bombus mixtus</i>	139	121	87.1
<i>Bombus morrisoni</i>	4	4	100.0
<i>Bombus nevadensis</i>	13	12	92.3
<i>Bombus occidentalis</i>	5	3	60.0
<i>Bombus rufocinctus</i>	6	4	66.7
<i>Bombus sitkensis</i>	29	15	51.7
<i>Bombus sylvicola</i>	45	14	31.1
<i>Bombus vagans</i>	4	2	50.0
<i>Bombus vancouverensis</i>	259	257	99.2
<i>Bombus vandykei</i>	31	24	77.4
<i>Bombus vosnesenskii</i>	269	252	93.7
<i>Brachymelecta californica</i>	3	3	100.0
<i>Ceratina pacifica</i>	1	0	0.0
<i>Halictus confusus</i>	35	28	80.0
<i>Halictus farinosus</i>	28	24	85.7
<i>Halictus ligatus</i>	208	207	99.5
<i>Halictus rubicundus</i>	16	15	93.8
<i>Halictus tripartitus</i>	108	107	99.1
<i>Halictus virgatellus</i>	7	6	85.7
<i>Holcopasites pulchellus</i>	1	1	100.0
<i>Lasioglossum anhypops</i>	3	3	100.0
<i>Lasioglossum aspilurum</i>	1	1	100.0
<i>Lasioglossum boreale</i>	2	2	100.0

Table 6: Determination accuracy for all volunteers in 2023. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Lasioglossum cooleyi</i>	23	0	0.0
<i>Lasioglossum cressonii</i>	1	1	100.0
<i>Lasioglossum diatretum</i>	1	1	100.0
<i>Lasioglossum diversopunctatum</i>	4	4	100.0
<i>Lasioglossum glabriventre</i>	1	1	100.0
<i>Lasioglossum helianthi</i>	1	0	0.0
<i>Lasioglossum incompletum</i>	74	72	97.3
<i>Lasioglossum inconditum</i>	2	2	100.0
<i>Lasioglossum kincaidii</i>	2	2	100.0
<i>Lasioglossum nevadense</i>	1	1	100.0
<i>Lasioglossum olympiae</i>	1	1	100.0
<i>Lasioglossum ovaliceps</i>	5	5	100.0
<i>Lasioglossum pavonotum</i>	10	10	100.0
<i>Lasioglossum pruinosum</i>	4	4	100.0
<i>Lasioglossum pulveris</i>	6	6	100.0
<i>Lasioglossum quebecense</i>	1	0	0.0
<i>Lasioglossum ruidosense</i>	3	3	100.0
<i>Lasioglossum sisymbrii</i>	19	19	100.0
<i>Lasioglossum titusi</i>	24	20	83.3
<i>Lasioglossum zephyrus</i>	1	1	100.0
<i>Lasioglossum zonulum</i>	4	4	100.0
<i>Megachile perihirta</i>	1	0	0.0
<i>Micralictoides ruficaudus</i>	14	14	100.0
<i>Osmia atrocyanea</i>	1	0	0.0
<i>Osmia brevis</i>	2	0	0.0
<i>Osmia coloradensis</i>	1	0	0.0
<i>Osmia cyanella</i>	3	0	0.0
<i>Osmia densa</i>	5	0	0.0
<i>Osmia sculleni</i>	3	0	0.0
<i>Protosmia rubifloris</i>	15	15	100.0
<i>Trachusa timberlakei</i>	5	5	100.0
TOTAL	1887	1678	88.9

8 Taxonomic Accuracy, All Years

Over your time in the Atlas you identified 882 of your 3209 specimens to genus level and 341 to species level, with a genus-level identification accuracy of 99.1% and a species-level identification accuracy of 95.3% (see Table 7). In total, volunteers from the Oregon Bee Atlas project identified 45 % (53168) of the 118170 bee specimens to the level of genus, with an average accuracy of 94.2%. Volunteers also identified 11.3% (13393) of the specimens to species level, and had an average accuracy of 89.9% (see Table 8). Nicely done!

Table 7: Your determination accuracy.

Taxon	Specimens ID-ed	Correct ID	% Correct
Family			
<i>Andrenidae</i>	81	81	100.0
<i>Apidae</i>	229	229	100.0
<i>Colletidae</i>	44	44	100.0
<i>Halictidae</i>	362	362	100.0
<i>Megachilidae</i>	166	166	100.0
<i>TOTAL</i>	882	882	100.0
Genus			
<i>Agapostemon</i>	8	8	100.0
<i>Andrena</i>	36	36	100.0
<i>Anthidium</i>	2	2	100.0
<i>Anthophora</i>	46	46	100.0
<i>Ashmeadiella</i>	1	1	100.0
<i>Atoposmia</i>	4	4	100.0
<i>Bombus</i>	97	97	100.0
<i>Ceratina</i>	14	14	100.0
<i>Chelostoma</i>	1	1	100.0
<i>Colletes</i>	25	25	100.0
<i>Diadasia</i>	2	2	100.0
<i>Dufourea</i>	2	2	100.0
<i>Eucera</i>	28	28	100.0
<i>Habropoda</i>	4	4	100.0
<i>Halictus</i>	199	198	99.5
<i>Heriades</i>	6	2	33.3
<i>Hoplitis</i>	18	18	100.0
<i>Hylaeus</i>	19	19	100.0
<i>Lasioglossum</i>	140	139	99.3
<i>Megachile</i>	28	28	100.0
<i>Melecta</i>	8	8	100.0
<i>Melissodes</i>	20	20	100.0
<i>Nomada</i>	9	9	100.0
<i>Osmia</i>	103	103	100.0
<i>Panurginus</i>	16	16	100.0
<i>Perdita</i>	29	29	100.0
<i>Protosmia</i>	2	2	100.0
<i>Sphecodes</i>	13	11	84.6
<i>Stelis</i>	1	1	100.0
<i>Triepeolus</i>	1	1	100.0
<i>TOTAL</i>	882	874	99.1
Species			
<i>Agapostemon virescens</i>	1	1	100.0
<i>Andrena astragali</i>	1	1	100.0
<i>Anthophora bomboides</i>	3	3	100.0
<i>Anthophora neglecta</i>	3	0	0.0

Table 7: Your determination accuracy. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Anthophora pacifica</i>	3	3	100.0
<i>Anthophora urbana</i>	21	21	100.0
<i>Anthophora ursina</i>	2	0	0.0
<i>Bombus appositus</i>	1	1	100.0
<i>Bombus centralis</i>	6	6	100.0
<i>Bombus fervidus</i>	5	5	100.0
<i>Bombus flavidus</i>	13	13	100.0
<i>Bombus flavifrons</i>	15	12	80.0
<i>Bombus huntii</i>	4	3	75.0
<i>Bombus insularis</i>	1	1	100.0
<i>Bombus melanopygus</i>	1	1	100.0
<i>Bombus mixtus</i>	11	7	63.6
<i>Bombus morrisoni</i>	3	3	100.0
<i>Bombus nevadensis</i>	1	1	100.0
<i>Bombus occidentalis</i>	2	2	100.0
<i>Bombus sitkensis</i>	3	3	100.0
<i>Bombus sylvicola</i>	2	2	100.0
<i>Bombus vancouverensis</i>	26	26	100.0
<i>Bombus vosnesenskii</i>	3	3	100.0
<i>Ceratina acantha</i>	2	2	100.0
<i>Ceratina micheneri</i>	1	1	100.0
<i>Diadasia nigrifrons</i>	2	2	100.0
<i>Eucera edwardsii</i>	7	7	100.0
<i>Halictus confusus</i>	6	6	100.0
<i>Halictus farinosus</i>	23	21	91.3
<i>Halictus ligatus</i>	82	82	100.0
<i>Halictus rubicundus</i>	31	30	96.8
<i>Halictus tripartitus</i>	52	52	100.0
<i>Megachile brevis</i>	1	1	100.0
<i>Melecta edwardsii</i>	1	1	100.0
<i>Protosmia rubifloris</i>	2	2	100.0
<i>TOTAL</i>	341	325	95.3

Table 8: Determination accuracy for all volunteers.

Taxon	Specimens ID-ed	Correct ID	% Correct
Family			
<i>Andrenidae</i>	6786	6064	89.4
<i>Apidae</i>	17614	17375	98.6
<i>Colletidae</i>	2847	2685	94.3
<i>Halictidae</i>	14510	14302	98.6
<i>Megachilidae</i>	11434	11275	98.6
<i>Melittidae</i>	4	1	25.0
<i>TOTAL</i>	53195	51702	97.2
Genus			
<i>Agapostemon</i>	965	961	99.6
<i>Andrena</i>	4750	4155	87.5
<i>Anthidiellum</i>	56	24	42.9
<i>Anthidium</i>	546	539	98.7
<i>Anthophora</i>	1213	1144	94.3
<i>Apis</i>	594	585	98.5

Table 8: Determination accuracy for all volunteers. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Ashmeadiella</i>	342	291	85.1
<i>Atoposmia</i>	137	93	67.9
<i>Biastes</i>	8	6	75.0
<i>Bombus</i>	7802	7774	99.6
<i>Brachymelecta</i>	95	71	74.7
<i>Calliopsis</i>	98	57	58.2
<i>Ceratina</i>	2971	2923	98.4
<i>Chelostoma</i>	82	63	76.8
<i>Coelioxys</i>	152	143	94.1
<i>Colletes</i>	1346	1229	91.3
<i>Diadasia</i>	368	322	87.5
<i>Dianthidium</i>	314	280	89.2
<i>Dioxyx</i>	6	3	50.0
<i>Dufourea</i>	260	217	83.5
<i>Epeolus</i>	61	43	70.5
<i>Eucera</i>	635	583	91.8
<i>Habropoda</i>	279	259	92.8
<i>Halictus</i>	5622	5393	95.9
<i>Heriades</i>	223	179	80.3
<i>Hesperapis</i>	4	1	25.0
<i>Holcopasites</i>	1	1	100.0
<i>Hoplitis</i>	748	605	80.9
<i>Hylaeus</i>	1500	1454	96.9
<i>Lasioglossum</i>	7189	6828	95.0
<i>Megachile</i>	2279	2223	97.5
<i>Melecta</i>	72	69	95.8
<i>Melissodes</i>	2045	1860	91.0
<i>Micralictoides</i>	16	14	87.5
<i>Neolarra</i>	3	3	100.0
<i>Nomada</i>	1220	1164	95.4
<i>Nomia</i>	2	2	100.0
<i>Oreopasites</i>	3	0	0.0
<i>Osmia</i>	6165	6055	98.2
<i>Panurginus</i>	750	567	75.6
<i>Perdita</i>	1147	1060	92.4
<i>Protandrena</i>	27	9	33.3
<i>Protosmia</i>	268	212	79.1
<i>Pseudoanthidium</i>	6	3	50.0
<i>Sphecodes</i>	454	354	78.0
<i>Stelis</i>	97	64	66.0
<i>Trachusa</i>	8	7	87.5
<i>Triepeolus</i>	176	147	83.5
<i>Xylocopa</i>	62	60	96.8
<i>Zacosmia</i>	1	1	100.0
TOTAL	53168	50100	94.2
Species			
<i>Agapostemon femoratus</i>	181	171	94.5
<i>Agapostemon melliventris</i>	14	14	100.0
<i>Agapostemon subtilior</i>	228	214	93.9
<i>Agapostemon virescens</i>	109	95	87.2
<i>Andrena angustitarsata</i>	18	18	100.0
<i>Andrena astragali</i>	1	1	100.0

Table 8: Determination accuracy for all volunteers. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Andrena chlorogaster</i>	2	2	100.0
<i>Andrena crataegi</i>	1	1	100.0
<i>Andrena cupreotincta</i>	14	14	100.0
<i>Andrena fuscicauda</i>	2	2	100.0
<i>Andrena illinoiensis</i>	1	1	100.0
<i>Andrena nigrocaerulea</i>	2	2	100.0
<i>Andrena pallidifovea</i>	1	1	100.0
<i>Andrena perplexa</i>	1	1	100.0
<i>Andrena piperi</i>	3	2	66.7
<i>Andrena prunorum</i>	34	34	100.0
<i>Andrena salicifloris</i>	2	2	100.0
<i>Andrena vicina</i>	4	3	75.0
<i>Anthidiellum robertsoni</i>	19	19	100.0
<i>Anthidium atrifrons</i>	3	3	100.0
<i>Anthidium banningense</i>	5	5	100.0
<i>Anthidium duomarginatum</i>	1	0	0.0
<i>Anthidium emarginatum</i>	5	0	0.0
<i>Anthidium manicatum</i>	53	44	83.0
<i>Anthidium mormonum</i>	12	12	100.0
<i>Anthidium oblongatum</i>	14	14	100.0
<i>Anthidium palliventre</i>	33	30	90.9
<i>Anthidium placitum</i>	1	1	100.0
<i>Anthidium tenuiflorae</i>	2	2	100.0
<i>Anthidium utahense</i>	3	3	100.0
<i>Anthophora bombooides</i>	3	3	100.0
<i>Anthophora californica</i>	1	0	0.0
<i>Anthophora neglecta</i>	3	0	0.0
<i>Anthophora pacifica</i>	3	3	100.0
<i>Anthophora urbana</i>	251	249	99.2
<i>Anthophora ursina</i>	2	0	0.0
<i>Apis mellifera</i>	492	488	99.2
<i>Ashmeadiella aridula</i>	1	0	0.0
<i>Ashmeadiella californica</i>	1	1	100.0
<i>Ashmeadiella clypeodentata</i>	1	0	0.0
<i>Ashmeadiella cubiceps</i>	2	1	50.0
<i>Ashmeadiella difugita</i>	1	0	0.0
<i>Ashmeadiella eurynorhyncha</i>	1	0	0.0
<i>Ashmeadiella timberlakei</i>	1	1	100.0
<i>Atoposmia abjecta</i>	3	3	100.0
<i>Atoposmia copelandica</i>	6	6	100.0
<i>Atoposmia oregonia</i>	4	3	75.0
<i>Atoposmia triodonta</i>	1	0	0.0
<i>Bombus Griseocollis</i>	1	0	0.0
<i>Bombus Mixtus</i>	8	0	0.0
<i>Bombus Nevadensis</i>	1	0	0.0
<i>Bombus appositus</i>	48	36	75.0
<i>Bombus caliginosus</i>	345	273	79.1
<i>Bombus centralis</i>	201	187	93.0
<i>Bombus fervidus</i>	362	325	89.8
<i>Bombus flavidus</i>	145	134	92.4
<i>Bombus flavifrons</i>	541	454	83.9
<i>Bombus frigidus</i>	5	0	0.0

Table 8: Determination accuracy for all volunteers. (continued)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Bombus griseocollis</i>	140	138	98.6
<i>Bombus huntii</i>	160	139	86.9
<i>Bombus insularis</i>	33	25	75.8
<i>Bombus kirbiellus</i>	1	0	0.0
<i>Bombus melanopygus</i>	328	274	83.5
<i>Bombus mixtus</i>	956	877	91.7
<i>Bombus morrisoni</i>	11	10	90.9
<i>Bombus nevadensis</i>	65	58	89.2
<i>Bombus occidentalis</i>	33	27	81.8
<i>Bombus rufocinctus</i>	58	36	62.1
<i>Bombus sitkensis</i>	195	147	75.4
<i>Bombus suckleyi</i>	2	0	0.0
<i>Bombus sylvicola</i>	69	31	44.9
<i>Bombus vagans</i>	24	8	33.3
<i>Bombus vancouverensis</i>	829	802	96.7
<i>Bombus vandykei</i>	86	62	72.1
<i>Bombus vosnesenskii</i>	1378	1284	93.2
<i>Brachymelecta californica</i>	45	43	95.6
<i>Calliopsis zonalis</i>	1	0	0.0
<i>Ceratina acantha</i>	679	665	97.9
<i>Ceratina micheneri</i>	44	43	97.7
<i>Ceratina nanula</i>	3	2	66.7
<i>Ceratina neomexicana</i>	1	1	100.0
<i>Ceratina pacifica</i>	8	6	75.0
<i>Ceratina sequoiae</i>	5	0	0.0
<i>Ceratina tejonensis</i>	7	2	28.6
<i>Ceratina timberlakei</i>	5	0	0.0
<i>Chelostoma minutum</i>	1	1	100.0
<i>Coelioxys alternatus</i>	1	0	0.0
<i>Coelioxys rufitarsis</i>	4	0	0.0
<i>Coelioxys sayi</i>	2	2	100.0
<i>Coelioxys texanus</i>	4	0	0.0
<i>Diadasia angusticeps</i>	7	7	100.0
<i>Diadasia australis</i>	4	4	100.0
<i>Diadasia diminuta</i>	17	17	100.0
<i>Diadasia enavata</i>	100	99	99.0
<i>Diadasia lutzi</i>	28	6	21.4
<i>Diadasia nigrifrons</i>	9	9	100.0
<i>Diadasia opuntiae</i>	8	0	0.0
<i>Dianthidium curvatum</i>	22	22	100.0
<i>Dianthidium heterulkei</i>	9	0	0.0
<i>Dianthidium pudicum</i>	12	12	100.0
<i>Dianthidium subparvum</i>	3	3	100.0
<i>Dianthidium ulkei</i>	24	17	70.8
<i>Dioxys aurifuscus</i>	2	2	100.0
<i>Eucera actuosa</i>	11	10	90.9
<i>Eucera cordleyi</i>	18	4	22.2
<i>Eucera edwardsii</i>	48	20	41.7
<i>Eucera frater</i>	8	8	100.0
<i>Eucera speciosa</i>	19	0	0.0
<i>Habropoda depressa</i>	4	4	100.0
<i>Habropoda miserabilis</i>	7	6	85.7

Table 8: Determination accuracy for all volunteers. (continued)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Habropoda tristissima</i>	3	2	66.7
<i>Halictus Ligatus</i>	4	0	0.0
<i>Halictus confusus</i>	149	122	81.9
<i>Halictus farinosus</i>	284	246	86.6
<i>Halictus ligatus</i>	1475	1464	99.3
<i>Halictus rubicundus</i>	361	333	92.2
<i>Halictus tripartitus</i>	723	684	94.6
<i>Halictus virgatellus</i>	114	109	95.6
<i>Heriades carinata</i>	2	0	0.0
<i>Holcopasites pulchellus</i>	1	1	100.0
<i>Hoplitis albifrons</i>	5	5	100.0
<i>Hoplitis boharti</i>	2	2	100.0
<i>Hoplitis coleii</i>	1	0	0.0
<i>Hoplitis emarginata</i>	1	1	100.0
<i>Hoplitis fulgida</i>	7	7	100.0
<i>Hoplitis grinnelli</i>	8	5	62.5
<i>Hoplitis hypocrita</i>	1	1	100.0
<i>Hoplitis louisae</i>	2	2	100.0
<i>Hoplitis orthognatha</i>	7	7	100.0
<i>Hoplitis producta</i>	12	10	83.3
<i>Hoplitis uvulalis</i>	3	3	100.0
<i>Hoplitis viridimicans</i>	6	4	66.7
<i>Hylaeus basalis</i>	6	3	50.0
<i>Hylaeus mesillae</i>	1	0	0.0
<i>Hylaeus verticalis</i>	1	0	0.0
<i>Lasioglossum albipenne</i>	3	3	100.0
<i>Lasioglossum albohirtum</i>	7	7	100.0
<i>Lasioglossum allonotus</i>	1	1	100.0
<i>Lasioglossum anhypops</i>	6	5	83.3
<i>Lasioglossum aspilurum</i>	2	2	100.0
<i>Lasioglossum athabascense</i>	2	0	0.0
<i>Lasioglossum boreale</i>	2	2	100.0
<i>Lasioglossum brunneiventre</i>	4	4	100.0
<i>Lasioglossum buccale</i>	3	3	100.0
<i>Lasioglossum colatum</i>	1	1	100.0
<i>Lasioglossum cooleyi</i>	24	1	4.2
<i>Lasioglossum cordleyi</i>	5	5	100.0
<i>Lasioglossum cressonii</i>	30	30	100.0
<i>Lasioglossum diatretum</i>	5	3	60.0
<i>Lasioglossum diversopunctatum</i>	4	4	100.0
<i>Lasioglossum egregium</i>	4	1	25.0
<i>Lasioglossum glabriventre</i>	4	4	100.0
<i>Lasioglossum helianthi</i>	1	0	0.0
<i>Lasioglossum imbrex</i>	7	0	0.0
<i>Lasioglossum incompletum</i>	79	73	92.4
<i>Lasioglossum inconditum</i>	7	5	71.4
<i>Lasioglossum kincaidii</i>	10	10	100.0
<i>Lasioglossum macroprosopum</i>	2	2	100.0
<i>Lasioglossum mellipes</i>	3	0	0.0
<i>Lasioglossum nevadense</i>	9	9	100.0
<i>Lasioglossum novascotiae</i>	1	0	0.0
<i>Lasioglossum occultum</i>	3	2	66.7

Table 8: Determination accuracy for all volunteers. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Lasioglossum olympiae</i>	138	127	92.0
<i>Lasioglossum ovaliceps</i>	12	12	100.0
<i>Lasioglossum pacificum</i>	64	55	85.9
<i>Lasioglossum pavonotum</i>	59	58	98.3
<i>Lasioglossum pruinosum</i>	12	12	100.0
<i>Lasioglossum pulveris</i>	27	27	100.0
<i>Lasioglossum quebecense</i>	1	0	0.0
<i>Lasioglossum rubicundus</i>	1	0	0.0
<i>Lasioglossum ruidosense</i>	5	5	100.0
<i>Lasioglossum sequoiae</i>	6	0	0.0
<i>Lasioglossum sisymbrii</i>	105	101	96.2
<i>Lasioglossum titusi</i>	260	214	82.3
<i>Lasioglossum villosulum</i>	11	8	72.7
<i>Lasioglossum zephyrus</i>	2	2	100.0
<i>Lasioglossum zonulum</i>	25	22	88.0
<i>Megachile angelarum</i>	25	22	88.0
<i>Megachile anograe</i>	6	0	0.0
<i>Megachile apicalis</i>	4	4	100.0
<i>Megachile brevis</i>	23	1	4.3
<i>Megachile fidelis</i>	6	5	83.3
<i>Megachile melanophaea</i>	2	1	50.0
<i>Megachile mellitarsis</i>	4	4	100.0
<i>Megachile montivaga</i>	1	0	0.0
<i>Megachile nevadensis</i>	8	0	0.0
<i>Megachile perihirta</i>	61	55	90.2
<i>Megachile pugnata</i>	8	4	50.0
<i>Megachile rotundata</i>	23	22	95.7
<i>Megachile wheeleri</i>	4	4	100.0
<i>Melecta edwardsii</i>	8	8	100.0
<i>Melecta pacifica</i>	5	3	60.0
<i>Melecta separata</i>	4	4	100.0
<i>Melecta thoracica</i>	2	0	0.0
<i>Melissodes agilis</i>	1	1	100.0
<i>Melissodes bimatratus</i>	2	0	0.0
<i>Melissodes metenuus</i>	3	3	100.0
<i>Melitta americana</i>	2	0	0.0
<i>Micralictoides ruficaudus</i>	14	14	100.0
<i>Nomia melanderi</i>	1	1	100.0
<i>Osmia aglaia</i>	10	0	0.0
<i>Osmia albolateralis</i>	1	0	0.0
<i>Osmia atrocyanea</i>	10	9	90.0
<i>Osmia brevis</i>	2	0	0.0
<i>Osmia bruneri</i>	8	7	87.5
<i>Osmia californica</i>	2	0	0.0
<i>Osmia calla</i>	6	0	0.0
<i>Osmia coloradensis</i>	1	0	0.0
<i>Osmia cornifrons</i>	10	10	100.0
<i>Osmia cyanella</i>	3	0	0.0
<i>Osmia densa</i>	6	1	16.7
<i>Osmia kincaidii</i>	3	3	100.0
<i>Osmia laeta</i>	2	0	0.0
<i>Osmia lignaria</i>	11	11	100.0

Table 8: Determination accuracy for all volunteers. (*continued*)

Taxon	Specimens ID-ed	Correct ID	% Correct
<i>Osmia montana</i>	3	3	100.0
<i>Osmia nemoris</i>	5	1	20.0
<i>Osmia sculleni</i>	3	0	0.0
<i>Perdita nevadensis</i>	1	1	100.0
<i>Protosmia rubifloris</i>	168	167	99.4
<i>Pseudoanthidium nanum</i>	2	2	100.0
<i>Stelis laticincta</i>	5	5	100.0
<i>Trachusa timberlakei</i>	5	5	100.0
<i>Triepeolus concavus</i>	4	4	100.0
<i>Triepeolus utahensis</i>	5	2	40.0
<i>Xylocopa californica</i>	1	1	100.0
<i>Xylocopa tabaniformis</i>	16	16	100.0
<i>Xylocopa virginica</i>	1	0	0.0
<i>Zacosmia maculata</i>	1	1	100.0
<i>bombus flavifrons</i>	1	0	0.0
<i>bombus melanopygus</i>	1	0	0.0
<i>bombus sitkensis</i>	1	0	0.0
<i>bombus vosnesenskii</i>	1	0	0.0
<i>TOTAL</i>	13393	12047	89.9