Supplementary Materials

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Table S1. Locations of hives sampled in this study.

Location	Description	Latitude	Longitude
Haverford College	suburban	40.0122° N	75.2996° W
Greensgrow Farms	urban	39.9785° N	75.1210° W
Awbury Arboretum	urban	40.0508° N	75.1681° W
private residence in Doylestown, PA	rural	40.2739° N	75.1169° W
Monastery of the Visitation Nuns	urban	39.9924° N	75.2434° W
Mt Moriah Cemetery	urban	39.9303° N	75.2338° W
private residence in Malvern, PA	suburban	40.0356° N	75.5157° W
Leapfrog Farm	rural	39.7859° N	75.9791° W
Swarthmore College	suburban	39.9007° N	75.3482° W
Temple University, Ambler Campus	rural	40.1662° N	75.2546° W

Table S2. All compounds identified on bands.

Groups	Compound Name	Chain Length	Log K_{ow}	CAS Number	No. of Bands	References
alkanes	*n*-heneicosane	C_{21}	10.7 [c]	629-94-7	36	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-tricosane	C_{23}	11.6 [c]	638-67-5	73	waggle dance [7 – 8]
	n-pentacosane	C_{25}	12.6 [c]	629-99-2	73	waggle dance [7 – 8]
	n-heptacosane	C_{27}	13.6 [c]	593-49-7	76	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-nonacosane	C_{29}	14.6 [c]	630-03-5	74	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-hentriacontane	C_{31}	15.6 [c]	630-04-6	73	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-tritriacontane	C_{33}	16.6 [c]	630-05-7	54	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
alkenes [a]	*n*-tricosene	C_{23}	11.4 [c]		35	waggle dance [7 – 8], nestmate recognition semiochemical [2 – 5], and queen tergal gland secretion [6]
	n-pentacosene	C_{25}	12.4 [c]		59	waggle dance [7 – 8], nestmate recognition semiochemical [2 – 5], and queen tergal gland secretion [6]
	n-pentacosene	C_{25}	12.4 [c]		11	waggle dance [7 – 8], nestmate recognition semiochemical [2 – 5], and queen tergal gland secretion [6]
	n-heptacosene	C_{27}	13.5		50	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-heptacosene	C_{27}	13.5		13	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-nonacosene	C_{29}	14.4 [c]		6	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-nonacosene	C_{29}	14.4 [c]		54	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-hentriacontene	C_{31}	15.4 [c]		73	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-hentriacontene	C_{31}	15.4 [c]		71	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-tritriacontene	C_{33}	16.4 [c]		54	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-tritriacontene	C_{33}	16.4 [c]		75	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]
	n-tritriacontene	C_{33}	16.4 [c]		54	nestmate recognition semiochemical [2 – 5] and queen tergal gland secretion [6]

fatty acids	nonanoic acid	C9:0	3.4	112-05-0	56	nonselective herbicide [9]
	decanoic acid	C10:0	4.1	334-48-5	59	pollen [10]
	dodecanoic acid	C12:0	4.6	143-07-7	65	pollen [10]; detected in worker bees [11]
	tetradecanoic acid	C14:0	6.1	544-63-8	60	pollen [10]; detected in worker bees [11, 12]
	pentadecanoic acid	C15:0	6.5	1002-84-2	43	detected in varroa destructor [11]
	hexadecanoic acid	C16:0	7.2	57-10-3	68	major constituent – pollen [10]; beeswax [13]; detected in worker bees [11, 12]
	heptadecanoic acid	C17:0	7.5 [c]	506-12-7	59	detected in worker bees [11, 12] [12-13]
	octadecanoic acid [stearic acid]	C18:0	8.2	57-11-4	68	major constituent – pollen [10]; beeswax [13]; detected in worker bees [11, 12]
	oleic acid	C18:1	7.6	112-80-1	64	major constituent – pollen [10]; beeswax [13]; detected in worker bees [11, 12]
	linoleic acid	C18:2	7.1	60-33-3	54	major constituent – pollen [10]; beeswax [13]; detected in worker bees [11, 12]
	α-linolenic acid	C18:3	6.5	463-40-1	32	major constituent – pollen [10]; beeswax [13]; detected in worker bees [11, 12]
	eicosanoic acid [arachidic acid]	C20:0	8.9 [c]	506-30-9	61	pollen [10]; detected in bee bread [11]
	heneicosanoic acid	C21:0	9.4 [c]	2363-71-5	52	detected in worker bees [11]
	docosanoic acid	C22:0	9.9 [c]	112-85-6	58	pollen [10]; detected in worker bees [11, 12]
	tricosanoic acid	C23:0	10.4 [c]	2433-96-7	58	detected in varroa destructor [11]
	tetracosanoic acid	C24:0	10.9 [c]	557-59-5	61	major constituent – beeswax [13]; detected in varroa destructor [11]
	pentacosanoic acid	C25:0	11.4 [c]	506-38-7	49	plant origin [14, 15]
	hexacosanoic acid	C26:0	11.9 [c]	506-46-7	53	detected in worker bees [12]
	octacosanoic acid	C28:0	12.9 [c]	506-48-9	55	detected in worker bees [12]
	triacontanoic acid	C30:0	13.8 [c]	506-50-3	44	detected in worker bees [12]
fatty alcohols	1-hexadecanol	C_{16}	6.8 [c]	36653-82-4	36	queen retinue pheromone (QRP) [7]
	1-heptadecanol	C_{17}	7.2 [c]	1454-85-9	64	drone cocoon [16]
	1-octadecanol	C_{18}	7.7 [c]	112-92-5	62	detected in worker bees [12]; drone cocoon [16]
	1-nonadecanol	C_{19}	8.2 [c]	145-84-8	60	detected in worker bees [12]; drone cocoon [16]
	n-nonadecenol**	C_{19}			51	detected in bombus ruderarius and b. sylvarum (hymenoptera, apidae) [17]
	n-nonadecenol*	C_{19}			27	detected in bombus ruderarius and b. sylvarum (hymenoptera, apidae) [17]
	1-eicosanol	C_{20}	8.7 [c]	629-96-9	51	detected in worker bees [12]; drone cocoon [16]
	[z]-11-eicosenol	C_{20}	8.5 [c]	62442-62-0	51	alarm pheromone [7, 12]
	1-heneicosanol	C_{21}	9.2 [c]	15594-90-8	35	detected in worker bees [12]; drone cocoon [16]
	1-docosanol	C_{22}	9.7 [c]	30303-65-2	45	detected in worker bees [12]; drone cocoon [16]
	1-tricosanol	C_{23}	10.2 [c]	3133-01-5	40	detected in worker bees [12]
	1-tetracosanol	C_{24}	10.7 [c]	506-51-4	57	detected in worker bees [12]
	1-pentacosanol	C_{25}	11.2 [c]	26040-98-2	54	detected in worker bees [12]
	1-hexacosanol	C_{26}	11.7 [c]	506-52-5	53	detected in worker bees [12]
	1-heptacosanol	C_{27}	12.1 [c]	2004-39-9	50	detected in worker bees [12]
	1-octacosanol	C_{28}	12.6 [c]	557-61-9	54	detected in worker bees [12]
	1-nonacosanol	C_{29}	13.1 [c]	6624-76-6	34	detected in worker bees [12]
	1-triacontanol	C_{30}	13.6 [c]	593-50-0	46	detected in worker bees [12]

	1-hentriacontanol	C_{31}	14.1 [c]	544-86-5	26	detected in worker bees [12]
	1-dotriacontanol	C_{32}		6624-79-9	24	detected in worker bees [12]
	1-tritriacontanol	C_{33}		71353-61-2	9	plant origin [18, 19]
	glycerol		-1.8	56-81-5	63	ester biosynthesis in honey bees [7]
	benzoic acid		1.9	65-85-0	53	plant originated allelochemical [20, 21]
	cinnamyl alcohol		1.6	104-54-1	23	plant originated allelochemical [20, 21]
	trans-cinnamic acid		1.8 [c]	140-10-3	30	plant originated allelochemical [20, 21]
	hydrocinnamic acid		1.8	501-52-0	7	plant originated allelochemical [20, 21]
	cinnamic acid, p-methoxy		2.7	830-09-1	42	plant originated allelochemical [20, 21]
	4-hydroxybenzoic acid		1.6	99-96-7	8	plant originated allelochemical [20, 21]
	d-glucopyranose		-2.8	50-99-7	2	nectar [22]
	d-mannose		-3.4 [c]	3458-28-4	6	nectar [22]
	d-xylose		-2.7 [c]	58-86-6	2	nectar [22]
other	d-glucose		-2.8	50-99-7	4	nectar [22]
	benzyl salicylate		4.3 [c]	118-58-1	2	plant originated allelochemical [20, 21]
	ferulic acid		1.5	1135-24-6	5	plant originated allelochemical [20, 21]
	caffeic acid (3,4-dihydroxy-cinnamic acid)		1.2	331-39-5	2	plant originated allelochemical [20, 21]
	benzyl cinnamate		3.4	103-41-3	6	plant originated allelochemical [20, 21]
	cinnamyl cinnamate		3.9	122-69-0	8	plant originated allelochemical [20, 21]
	chrysin		3.5	480-40-0	9	honey, propolis, and beeswax [23]
	stigmasterol (29δ (5,22))		9.4 [c]	83-48-7	9	pollen [24]
	beta-sitosterol (29δ (5))		9.7 [c]	83-46-5	29	pollen [24]
	lanosta-8,24-dien-3-ol, acetate, (3, beta)-		11.8 [c]	2671-68-3	6	pollen [24]

[a] alkenes identified by weight. the exact location of their double bonds are unknown. [b] alkenes with two double bonds [c] K_{ow} values estimated using the crippen method: episuite kowwin v1.67 estimate (usepa) (HSDB [1]).

Supplementary References

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