

## **Supporting Information for:**

### **“Pesticide Contamination of Milkweeds Across the Agricultural, Urban and, Open Spaces of Low-Elevation Northern California”**

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Figure S1. Mean effective numbers of pesticides per sample by land use type using different Hill numbers after rarefaction. Points show the mean effective number of compounds per sample. Error bars show the range of effective numbers of pesticides across samples within one land use type.

Figure S2. Variation in the number of compounds per sample by milkweed species. Bars show the maximum and minimum number of compounds detected in any single sample.

Figure S3. Indicator species analysis examining associations between chemicals and land use types. Color indicates concentration and size the scaled frequency of occurrence. Significant associations are labeled with a black bar and the land use type they are associated with. No correction was made for multiple comparisons.

Table S1. Number of samples of different milkweed species from different land use types.

<b><i>Asclepias</i> sp.</b>	<b>Agriculture</b>	<b>Refuge</b>	<b>Retail</b>	<b>Urban</b>
<i>Asclepias curassavica</i>	0	0	9	3
<i>Asclepias eriocarpa</i>	4	0	0	0
<i>Asclepias fascicularis</i>	64	86	0	11
<i>Asclepias speciosa</i>	32	3	2	13

Table S2. Retention times and optimized SRM acquisition parameters for pesticides and internal standards (RT: Retention time, CE: Collision Energy)

Compound	RT (min)	Polarity	Precursor (m/z)	RF Lens (V)	Product 1 (m/z)	CE 1 (V)	Product 2 (m/z)	CE 2 (V)
d7-Propamocarb	3.25	Positive	196.2	97	103.1	18	151.2	14
d4-Imidacloprid	5.05	Positive	260.1	114	213.1	16	179.1	19
d7-Bentazone	6.42	Negative	246.0	134	132.1	26	182.2	20
d5-Atrazine	7.42	Positive	221.0	113	179.1	18	101.0	25
d10-Chlorpyrifos	9.66	Positive	359.9	123	199.0	199	98.9	31
Chloromequat chloride	0.73	Positive	122.0	113	58.0	27	63.0	21
Mepiquat chloride	0.79	Positive	114.1	128	98.0	26	58.0	25
Methamidophos	1.79	Positive	141.9	100	94.0	14	125.0	14
Cyromazine	2.40	Positive	167.0	133	85.1	19	125.1	18
Acephate	2.74	Positive	184.0	65	143.0	10	94.8	23
Omethoate	3.24	Positive	214.0	115	182.8	10	124.9	18
Propamocarb	3.28	Positive	189.1	98	102.0	17	74.1	25
Aminocarb	3.32	Positive	209.1	124	137.1	24	152.1	14
Formetanate hydrochloride	3.35	Positive	222.1	144	165.1	15	120	27
Butocarboxim sulfoxide	3.47	Positive	207.0	94	132.0	10	88.0	10
Pymetrozine	3.57	Positive	218.0	150	105.0	20	78.1	39
Dinotefuran	3.59	Positive	203.0	98	113.1	10	129.1	12
Butoxycarboxim	3.65	Positive	223.0	124	166.1	15	46.1	26
Aldicarb sulfone	3.71	Positive	223.1	117	148.0	10	86.1	16
Oxamyl	3.90	Positive	237.0	73	72.1	10	90.0	10
Methomyl	4.13	Positive	163.1	71	87.9	10	106.1	10
Demeton-S-methylsulfone	4.25	Positive	263.0	150	169.0	16	108.9	28
Thiamethoxam	4.39	Positive	292.0	121	211.1	12	181.0	22
Mexacarbate	4.50	Positive	223.1	136	151.1	24	166.1	15
Monocrotophos	4.54	Positive	224.0	112	127.0	16	192.9	10
Ethiofencarb sulfone	4.73	Positive	258.0	119	107.0	16	201.0	10
Dicrotophos	4.81	Positive	238.0	127	127.0	18	192.5	10
Pirimicarb-desmethyl	4.84	Positive	225.2	135	168.0	15	72.0	21
Ethiofencarb sulfoxide	4.91	Positive	242.0	106	107.0	18	185.0	10
Trichlorfon	4.94	Positive	256.9	131	108.9	18	79.0	30
Clothianidin	5.03	Positive	250.0	104	169.0	13	131.9	17
Imidacloprid	5.06	Positive	256.0	131	209.0	16	175.1	19
Fenuron	5.13	Positive	164.8	116	72.1	15	46.1	15
Thiabendazole	5.13	Positive	202.0	208	175.0	26	131.0	33
Flumetsulam	5.17	Positive	326.0	192	129.0	26	262.1	19
Dimethoate	5.19	Positive	229.8	106	198.8	10	124.9	22
3-Hydroxy-carbofuran	5.21	Positive	238.1	119	181.0	10	163.1	16
Vamidotion	5.25	Positive	288.0	120	146.0	14	118.1	23
Fuberidazole	5.26	Positive	185.1	152	157.1	22	129.0	35
Metamitron	5.29	Positive	203.0	170	174.8	17	104.0	23
Methiocarb sulfoxide	5.29	Positive	242.0	134	185.0	14	122.1	29
Chloridazon	5.41	Positive	222.0	152	104.0	23	92.0	26

Acetamiprid	5.55	Positive	223.0	118	126.0	21	90.0	34
Methiocarb sulfone	5.62	Positive	258.0	119	122.0	19	201.0	10
Schradan	5.69	Positive	287.1	144	242.1	14	135.1	26
Mevinphos	5.83	Positive	225.0	97	127.0	17	192.9	10
Ethirimol	5.89	Positive	209.8	192	140.1	22	98.0	27
Florasulam	5.96	Positive	360.0	179	129.0	25	108.9	53
Pirimicarb	5.97	Positive	239.1	147	182.1	16	72.0	21
Thiacloprid	5.98	Positive	253.0	162	126.0	21	90.0	36
Metoxuron	6.21	Positive	229.0	145	72.1	18	156.0	26
Formothion	6.23	Positive	258.0	80	199.0	10	124.9	22
Imazethapyr	6.29	Positive	290.1	189	177.0	27	248.1	19
Carbetamide	6.33	Positive	237.1	102	192.0	10	120.0	16
Metolcarb	6.34	Positive	166.0	83	108.9	10	94.0	31
Oxadixyl	6.35	Positive	279.1	120	219.1	10	132.1	31
Tricyclazole	6.45	Positive	190.0	178	163.0	23	136.0	29
Bentazone	6.46	Negative	238.9	169	132.0	26	197.0	21
Cyanazine	6.46	Positive	241.1	164	214.1	18	103.9	29
Azamethiphos	6.56	Positive	324.9	166	182.9	16	111.9	34
Bromacil	6.60	Positive	261.0	112	204.9	14	187.8	28
Propoxur	6.60	Positive	210.0	87	111.0	14	168.1	10
Thiophanate-methyl	6.62	Positive	343.0	161	151.0	20	93.0	46
Bendiocarb	6.67	Positive	224.0	104	167.1	10	108.9	18
Carbofuran	6.68	Positive	222.0	111	165.1	12	123.0	22
Ofurace	6.76	Positive	282.1	145	254.1	12	160.1	24
Malaoxon	6.79	Positive	315.0	133	98.9	23	269.0	10
Imazaquin	6.81	Positive	312.1	195	267.1	21	199.0	28
Thidiazuron	6.83	Positive	220.6	119	101.9	16	127.9	17
Pyroxsulam	6.83	Positive	435.0	262	195.1	26	258.0	22
Simetryn	6.83	Positive	214.1	161	124.1	20	96.0	25
Desmetryn	6.85	Positive	214.1	161	172.0	18	82.0	30
Ancymidol	6.86	Positive	257.1	157	135.0	25	81.1	25
Hexazinone	6.89	Positive	253.1	141	171.1	16	71.1	31
Tebuthiuron	6.90	Positive	229.0	145	172.1	18	116.0	27
Metosulam	6.99	Positive	418.0	233	174.9	27	140.0	50
Prometon	7.08	Positive	226.1	156	184.1	19	142.1	23
Carbaryl	7.08	Positive	202.0	95	145.1	10	127.0	29
Fenthion sulfoxide	7.09	Positive	295.0	187	280.0	19	108.9	32
Ethiofencarb	7.09	Positive	226.1	105	107.0	17	164.1	10
Cyantraniliprole	7.10	Positive	475.0	158	285.9	11	444.0	18
Terbumeton	7.20	Positive	226.2	153	170.0	17	142.1	23
Monolinuron	7.20	Positive	215.0	131	126.0	18	148.0	15
Fosthiazate	7.21	Positive	284.0	118	103.9	21	228.0	10
Fluometuron	7.24	Positive	233.0	145	72.0	19	46	18
2,4-D	7.27	Negative	218.9	101	160.9	13	125.0	26
Bromoxynil	7.29	Negative	275.8	194	80.9	31	78.9	30
DNOC	7.30	Negative	197.0	147	180.0	19	137.0	18
Ethoxyquin	7.36	Positive	218.1	183	160.1	33	148.1	22

Benodanil	7.36	Positive	323.8	180	231.0	23	202.9	35
Imazalil	7.37	Positive	297.0	170	156.0	23	200.9	18
Isoprocarb	7.38	Positive	194.1	105	95.0	15	137.1	10
Flutriafol	7.42	Positive	302.0	144	70.0	19	123.0	28
Chlorotoluron	7.43	Positive	213.0	141	72.1	18	46.0	16
Atrazine	7.44	Positive	216.1	167	174.0	18	103.9	28
Metobromuron	7.47	Positive	258.9	114	148.0	15	169.9	19
Metazachlor	7.48	Positive	278.0	111	210.1	10	134.1	22
Lenacil	7.50	Positive	235.1	109	153.1	16	136.0	32
Isocarbophos	7.53	Positive	307.0	73	231.0	16	273.0	10
Metalxyl	7.54	Positive	280.1	98	220.0	14	192.2	18
Griseofulvin	7.54	Positive	353.2	188	285.0	18	165.1	20
Methoprotryne	7.59	Positive	272.1	175	240.2	19	198.0	23
Isoproturon	7.59	Positive	207.1	143	72.1	19	165.1	14
Fensulfotion	7.64	Positive	309.0	180	280.9	15	253.0	18
Heptenophos	7.69	Positive	251.0	123	127.0	17	124.9	13
Desmedipham	7.71	Positive	301.3	133	182.0	10	136.0	20
Forchlorfenuron	7.71	Positive	248.0	134	129.0	18	93.0	33
Dodemorph	7.73	Positive	282.2	188	116.1	21	98.0	27
Cycluron	7.73	Positive	199.1	137	72.1	22	69.1	21
Chlorantraniliprole	7.75	Positive	481.9	182	283.9	12	450.8	18
Methabenzthiazuron	7.75	Positive	222.0	118	165.1	17	150.0	33
Diuron	7.77	Positive	233.0	145	72.1	19	46	18
Ioxynil	7.79	Negative	369.7	204	126.8	35	214.9	32
Azaconazole	7.82	Positive	299.9	162	159.0	28	231.0	17
Phenmedipham	7.82	Positive	301.1	145	168.0	10	136.0	20
Dimefuron	7.83	Positive	339.0	220	167.0	22	72.1	26
Benoxacor	7.84	Positive	260.0	173	149.1	18	134.0	29
Clomazone	7.91	Positive	240.0	134	125.0	21	89.0	47
Diethofencarb	7.92	Positive	268.0	114	226.1	10	124.0	32
Azinphos-methyl	7.93	Positive	317.9	103	132.0	15	125.0	17
Fenobucarb	7.93	Positive	208.1	110	95.0	15	152.0	10
Ethofumesate	7.98	Positive	287.1	159	121.0	16	259.1	10
Fluazifop	8.01	Positive	328.0	174	282.0	19	254.0	26
Azoxystrobin	8.03	Positive	404.1	175	372.0	14	344.1	25
Propazine	8.03	Positive	230.1	177	146.1	23	188.1	18
Pyrimethanil	8.03	Positive	200.1	184	107.0	25	168.1	30
Nuarimol	8.04	Positive	315.1	177	252.1	22	243.0	25
Ethiprole	8.04	Positive	396.9	189	350.9	21	255.0	36
Fenamidone	8.05	Positive	312.1	151	236.1	15	92.0	25
Halofenozide	8.07	Positive	331.0	99	275.1	10	105.0	18
Dimethenamid	8.09	Positive	276.1	135	244.1	14	168.1	24
Prometryn	8.11	Positive	242.2	149	158.0	24	200.0	19
Methiocarb	8.13	Positive	226.1	105	169.1	10	121.0	19
Spiroxamine	8.18	Positive	298.2	167	144.2	20	100.0	30
Crotoxyphos	8.18	Positive	332.0	100	210.9	10	127.0	25
Mandipropamid	8.18	Positive	412.1	186	328.1	15	356.1	10

Terbutylazine	8.19	Positive	230.1	140	174.0	17	132.0	25
Boscalid	8.20	Positive	343.0	174	307.0	21	272.0	30
Isoxaben	8.20	Positive	333.2	167	164.9	19	150.0	39
Promecarb	8.21	Positive	208.1	107	109.0	16	151.1	10
Paclobutrazol	8.22	Positive	294.0	151	70.1	21	125.0	38
Terbutryn	8.23	Positive	242.1	158	186.0	19	91.0	28
Fluopicolide	8.23	Positive	382.9	193	172.9	23	144.9	48
Propyzamide	8.26	Positive	256.0	110	190.0	14	173.0	29
Mepronil	8.27	Positive	270.1	159	118.9	24	228.1	15
Fluxapyroxad	8.28	Positive	382.0	140	362.1	13	342.1	20
Fludioxonil	8.28	Negative	247.0	149	180.0	28	126.1	31
Isoprothiolane	8.32	Positive	291.1	116	231.0	10	188.8	22
Methoxyfenozide	8.32	Positive	369.2	113	149.1	17	313.1	10
Dimethomorph	8.33	Positive	388.1	225	301.0	21	165.1	32
Triadimefon	8.34	Positive	294.0	138	197.0	16	141.0	22
Propetamphos	8.34	Positive	282.0	106	138.0	17	156.0	10
Myclobutanil	8.39	Positive	289.0	121	70.1	18	124.9	33
Fluorochloridone	8.40	Positive	312.0	132	292.0	21	145.0	48
Butafenacil	8.42	Positive	492.1	170	331.0	24	349.0	15
Cumyluron	8.43	Positive	303.1	137	184.9	13	125.0	33
Fluopyram	8.43	Positive	397.0	202	208.0	22	173.0	29
Iprovalicarb	8.44	Positive	321.2	129	119.1	19	116.1	20
Fenhexamid	8.45	Positive	302.0	166	97.0	23	55.0	35
Bifenazate	8.46	Positive	301.1	119	198.0	10	170.1	19
Fluoxastrobin	8.49	Positive	459.1	219	427.0	17	188.0	35
Triazophos	8.49	Positive	314.0	164	162.1	19	119.0	34
Mefenacet	8.49	Positive	299.0	132	148.1	14	120.0	25
Spirotetramat	8.50	Positive	374.1	185	302.1	17	330.2	15
Bupirimate	8.50	Positive	317.1	204	166.1	21	272.1	20
Fluquinconazole	8.50	Positive	375.9	130	349.0	19	307.1	26
Flufenacet	8.51	Positive	364.0	126	194.0	10	152.1	19
Tepaloxydim	8.52	Positive	342.1	153	250.2	13	166.1	21
Simeconazole	8.53	Positive	294.1	150	70.1	20	135.1	21
Chloroxuron	8.54	Positive	291.0	178	72.1	21	46.0	19
Tetraconazole	8.56	Positive	372.0	187	158.9	30	123.0	55
Dimethametryn	8.58	Positive	256.1	180	185.9	21	96.0	30
Trietazine	8.58	Positive	230.1	178	132.0	22	104.0	29
Cyazofamid	8.63	Positive	325.0	122	107.9	14	217.0	18
Napropamide	8.65	Positive	272.0	149	171.1	19	199.0	13
Alachlor	8.64	Positive	270.1	112	238.1	10	162.2	20
Metolachlor	8.64	Positive	284.1	143	252.1	15	176.1	26
Fipronil	8.65	Negative	434.9	138	330.0	15	250.0	26
Epoxiconazole	8.68	Positive	330.0	149	121.0	21	100.9	44
Fenbuconazole	8.70	Positive	337.1	188	125.0	31	70.1	21
Fenamiphos	8.72	Positive	304.1	180	217.0	18	201.9	35
Haloxypop	8.72	Positive	361.8	166	316.0	18	91.0	30
Picoxystrobin	8.72	Positive	368.1	111	145.1	21	205.0	10

Tebufenozide	8.73	Positive	353.2	110	297.1	10	133.1	19
Triadimenol	8.73	Positive	297.0	101	133.0	14	105.0	39
Flubendiamide	8.74	Positive	683.0	195	407.9	10	274.0	30
Rotenone	8.74	Positive	395.1	231	213.1	23	192.1	24
Fenoxycarb	8.75	Positive	302.0	152	88.0	19	116.0	10
Flusilazole	8.76	Positive	316.1	192	247.1	18	165.1	27
Carfentrazone-ethyl	8.76	Positive	412.0	217	346.0	23	365.9	18
Diflubenzuron	8.76	Positive	311.0	131	158.0	13	141.1	32
Dimoxystrobin	8.77	Positive	327.2	108	204.9	10	115.9	22
Phenthoate	8.78	Positive	320.8	119	247.1	12	135.0	20
Isoxadifen-ethyl	8.79	Positive	296.1	146	232.1	17	263.2	10
Kresoxim-methyl	8.79	Positive	314.1	116	267.1	10	222.1	13
Neburon	8.80	Positive	275.0	171	88.1	16	57.0	21
Sulfotep	8.81	Positive	323.0	145	171.0	14	114.9	29
Penthiopyrad	8.84	Positive	360.1	149	276.0	14	256.1	20
Fipronil sulfone	8.86	Negative	450.8	152	415.0	15	282.0	26
Tebuconazole	8.87	Positive	308.0	162	70.1	23	125.0	38
Cyprodynil	8.88	Positive	226.1	153	93.0	34	108.1	26
Anilofos	8.89	Positive	368.0	173	198.9	14	124.9	31
Bromuconazole	8.90	Positive	377.8	185	159.0	30	161.0	31
Carpropamid	8.90	Positive	334.0	126	139.0	20	195.9	13
Etrimfos	8.90	Positive	293.0	178	265.1	17	124.9	26
Chlorfenvinphos	8.93	Positive	359.0	159	155.1	13	169.9	39
Penconazole	8.93	Positive	284.1	134	159.0	30	70.1	18
Zoxamide	8.95	Positive	336.0	167	186.9	22	159.0	39
Benzoylprop-ethyl	8.95	Positive	366.0	134	105.0	16	77.1	48
Fenthion	8.96	Positive	279.0	133	169.0	16	247.0	13
Cyflufenamid	8.99	Positive	413.0	161	295.0	15	241.1	23
Propiconazole	8.99	Positive	342.1	69	159.0	30	122.9	55
Pirimiphos-methyl	9.00	Positive	306.1	199	164.1	22	108.0	31
Coumaphos	9.01	Positive	362.9	169	227.0	26	306.8	18
Hexaconazole	9.01	Positive	314.0	151	70.0	21	159.0	32
Metconazole	9.03	Positive	320.1	170	70.1	24	125.0	38
Phoxim	9.04	Positive	299.0	95	129.0	11	77.0	30
Pyraclostrobin	9.04	Positive	387.8	159	194.0	12	163.1	24
Benzoximate	9.06	Positive	364.1	105	199.0	10	105.0	24
Prochloraz	9.07	Positive	376.0	125	307.9	10	266.0	17
Spinosad (Spinosyn A)	9.09	Positive	732.4	299	142.1	29	98.1	45
Metrafenone	9.10	Positive	409.0	169	209.1	14	227.0	21
Pencycuron	9.12	Positive	329.1	190	125.0	40	218.1	16
Haloxypop-methyl	9.15	Positive	376.0	180	315.8	17	91.0	31
Thiobencarb	9.15	Positive	258.0	118	125.0	20	89.0	49
Indoxacarb	9.16	Positive	528.0	233	203.0	38	150.0	24
Diniconazole	9.16	Positive	326.0	178	70.0	26	159.1	31
Trifloxystrobin	9.18	Positive	409.0	179	186.0	18	145.0	44
Piperophos	9.19	Positive	354.1	175	171.0	22	255.0	14
Difenoconazole	9.24	Positive	406.0	214	251.0	26	337.0	18

Dithiopyr	9.24	Positive	402.0	167	354.0	18	272.0	29
Cycloate	9.25	Positive	216.0	126	154.1	12	83.1	16
Hexaflumuron	9.28	Negative	458.8	142	438.9	10	175.0	36
Clethodim	9.27	Positive	360.1	140	164.1	18	268.1	12
Prosulfocarb	9.34	Positive	252.1	139	91.0	22	128.1	13
Triflumizole	9.34	Positive	346.0	113	278.1	10	73.1	17
Furathiocarb	9.38	Positive	383.1	176	194.9	18	252.1	13
Quizalofop-ethyl	9.39	Positive	373.0	221	299.0	19	271.1	26
Buprofezin	9.40	Positive	306.1	129	201.1	12	116.0	16
Profenophos	9.41	Positive	374.9	171	304.8	19	346.9	13
Tetramethrin	9.41	Positive	332.2	139	164.1	24	135.1	18
Sethoxydim	9.43	Positive	328.2	153	178.0	19	282.1	12
Fluazinam	9.44	Negative	462.8	194	415.9	19	398.0	16
Tebufenpyrad	9.44	Positive	334.2	206	117.0	36	145.0	27
Esprocarb	9.47	Positive	266.2	139	91.0	24	71.1	15
Piperonyl butoxide	9.51	Positive	356.3	118	177.1	10	119.0	33
Tolfenpyrad	9.58	Positive	384.1	188	197.0	25	196.0	19
Imibenconazole	9.54	Positive	411.0	209	125.0	31	171.0	10
Hexythiazox	9.63	Positive	353.1	123	228.0	15	168.0	25
Tralkoxydim	9.64	Positive	330.2	159	284.2	13	138.1	20
Chlorpyrifos	9.66	Positive	349.9	126	197.9	19	321.7	11
Spiromesifen	9.68	Positive	371.1	132	273.2	10	255.2	23
Flufenoxuron	9.69	Positive	489.2	142	158.1	18	140.9	41
Sulprofos	9.69	Positive	323.0	118	218.9	16	247.0	12
Etoxazole	9.74	Positive	360.1	201	141.0	31	304.0	18
Quinoxifen	9.81	Positive	308.0	234	196.9	32	162.0	45
Chlorfluazuron	9.82	Positive	541.8	223	384.9	21	158.0	20
Difenacoum	9.84	Positive	445.1	236	179.0	31	257.2	20
Amitraz	9.87	Positive	294.1	103	163.1	14	122.1	29
Fenpyroximate	9.88	Positive	422.2	197	366.2	16	214.1	30
Avermectin B1a	9.95	Positive	890.5	225	305.1	25	567.2	14
Resmethrin	10.03	Positive	339.1	158	171.1	15	128.0	41
Brodifacoum	10.12	Positive	523.1	289	335.0	22	178.0	34
Fenazaquin	10.24	Positive	307.1	159	161.2	17	57.1	23
Etofenprox	10.25	Positive	394.0	133	177.1	15	359.2	10

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Table S3. Contact and oral LD<sub>50</sub> data for honey bees.

Compound Name	Compound Type	Contact LD <sub>50</sub> (ppb)	Oral LD <sub>50</sub> (ppb)
Azoxystrobin	fungicide	200000	25000
Bifenazate	insecticide	7800	98000
Boscalid	fungicide	200000	166000
Buprofezin	insecticide	200000	163500
Carbaryl	insecticide	378	210
Carfentrazone ethyl	herbicide	200000	200000
Chlorantraniliprole	insecticide	4000	104100
Clethodim	herbicide	51000	43000
Clothianidin	insecticide	44	4
Cyantraniliprole	insecticide	93	116
Cyflufenamid	fungicide	100000	100000
Cyprodinil	fungicide	784000	112500
Cyromazine	insecticide	200000	186000
Difenoconazole	fungicide	100000	177000
Diflubenzuron	insecticide	114800	25000
Dinotefuran	insecticide	41	18
Diuron	herbicide	101700	86750
Etofenprox	insecticide	38	366
Etoxazole	insecticide	200000	200000
Fenhexamid	fungicide	200000	102070
Fenpyroximate	insecticide	15800	118500
Fipronil	insecticide	6	4
Fludioxonil	fungicide	100000	100000
Fluopicolide	fungicide	100000	241000
Fluopyram	fungicide	100000	102300
Fluoxastrobin	fungicide	200000	843000
Fluxapyroxad	fungicide	100000	110900
Hexythiazox	insecticide	200000	112000
Imazalil	fungicide	39000	35100
Imidacloprid	insecticide	65	4
Isoprothiolane	fungicide	NA	NA
Isoxaben	herbicide	100000	100000
Mepiquat	herbicide	100000	107400
Metalaxyl	fungicide	200000	269000
Methamidophos	insecticide	1370	860
Methiocarb	insecticide	294	80
Methoxyfenozide	insecticide	100000	100000
Metolachlor	herbicide	110000	110000
Metrafenone	fungicide	100000	114000
Myclobutanil	fungicide	33900	33900
Paclobutrazole	herbicide	40000	2000
Penthiopyrad	fungicide	500000	500000
Piperonyl butoxide	synergist	294000	NA

Prometryn	herbicide	99000	NA
Propamocarb	fungicide	100000	84000
Propiconazole	fungicide	100000	100000
Propyzamide	herbicide	136000	100000
Pyraclostrobin	fungicide	100000	110000
Spinosyn	insecticide	47	140
Spirotetramat	insecticide	1073000	607000
Tebuconazole	fungicide	200000	83050
Tebufenozide	insecticide	234000	100000
Tebuthiuron	herbicide	30000	NA
Tetraconazole	fungicide	63000	130000
Thiabendazole	fungicide	34000	4000
Thiamethoxam	insecticide	24	5
Thiobencarb	herbicide	100000	100000
Thiophanate methyl	fungicide	100000	114700
Triadimefon	fungicide	NA	25000
Triadimenol	fungicide	200000	224800
Trichlorfon	insecticide	59800	225
Trifloxystrobin	fungicide	100000	110000

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Table S4. Studies from Lepidoptera literature review.

Authors	Year	Species	Compound
Su et al.	2014	<i>Cnaphalocrocis medinalis</i>	Azoxystrobin
Grafton-Cardwell et al.	2008	<i>Marmara gulosa</i>	Buprofezin
Nasr et al.	2010	<i>Spodoptera littoralis</i>	Buprofezin
Abivardi et al.	1999	<i>Cydia pomonella</i>	Carbaryl
Nagarkatti et al.	2002	<i>Endopiza viteana</i>	Carbaryl
Grafton-Cardwell et al.	2008	<i>Marmara gulosa</i>	Carbaryl
Liu et al.	2017	<i>Agrotis ipsilon</i>	Chlorantraniliprole
Liu et al.	2017	<i>Helicoverpa armigera</i>	Chlorantraniliprole
Pasquini et al.	2017	<i>Lobesia botrana</i>	Chlorantraniliprole
Liu et al.	2017	<i>Spodoptera litura</i>	Chlorantraniliprole
Liu et al.	2018	<i>Bombyx mori</i>	Chlorantraniliprole
Bosch et al.	2018	<i>Cydia pomonella</i>	Chlorantraniliprole
Bird and Walker	2018	<i>Helicoverpa punctigera</i>	Chlorantraniliprole
Lutz et al.	2018	<i>Spodoptera cosmioides</i>	Chlorantraniliprole
He et al.	2019	<i>Agrotis ipsilon</i>	Chlorantraniliprole
Jallow et al.	2019	<i>Tuta absoluta</i>	Chlorantraniliprole
Krishnan et al.	2020	<i>Danaus plexippus</i>	Chlorantraniliprole
Schultz et al.	2016	<i>Euphydryas colon</i>	Clethodim
Schultz et al.	2016	<i>Euphydryas editha</i>	Clethodim
Schultz et al.	2016	<i>Euphydryas phaeton</i>	Clethodim
Pecenka and Lundgren	2015	<i>Danaus plexippus</i>	Clothianidin
Ding et al.	2018	<i>Agrotis ipsilon</i>	Clothianidin
Basley and Goulson	2018	<i>Polyommatus icarus</i>	Clothianidin
Sang et al.	2016	<i>Spodoptera litura</i>	Cyantraniliprole
Xu et al.	2017	<i>Agrotis ipsilon</i>	Cyantraniliprole
Dong et al.	2017	<i>Helicoverpa assulta</i>	Cyantraniliprole
Xu et al.	2017	<i>Ostrinia furnacalis</i>	Cyantraniliprole
Van Laeke et al.	1991	<i>Spodoptera exigua</i>	Diflubenzuron
Grafton-Cardwell et al.	2008	<i>Marmara gulosa</i>	Diflubenzuron
Waldstein et al.	2000	<i>Choristoneura rosaceana</i>	Fipronil
Durham et al.	2001	<i>Ostrinia nubilalis</i>	Fipronil
Gu et al.	2010	<i>Plutella xylostella</i>	Fipronil
Grafton-Cardwell et al.	2008	<i>Marmara gulosa</i>	Imidacloprid
Ahmad et al.	2013	<i>Helicoverpa armigera</i>	Imidacloprid
Krischik et al.	2015	<i>Danaus plexippus</i>	Imidacloprid
Krischik et al.	2015	<i>Vanessa cardui</i>	Imidacloprid
Whitehorn et al.	2018	<i>Pieris rapae</i>	Imidacloprid
James	2019	<i>Danaus plexippus</i>	Imidacloprid
Smagge et al.	2003	<i>Spodoptera exigua</i>	Methoxyfenozide
Rodriguez Enriquez et al.	2010	<i>Spodoptera exigua</i>	Methoxyfenozide
Zarate et al.	2011	<i>Spodoptera frugiperda</i>	Methoxyfenozide
Saber et al.	2013	<i>Helicoverpa armigera</i>	Methoxyfenozide
Rehan et al.	2015	<i>Spodoptera litura</i>	Methoxyfenozide

Chen et al.	2019	<i>Spodoptera exigua</i>	Methoxyfenozide
Waldstein et al.	2000	<i>Choristoneura rosaceana</i>	Spinosad
Yin et al.	2008	<i>Plutella xylostella</i>	Spinosad
Wang et al.	2009	<i>Helicoverpa armigera</i>	Spinosad
Wang et al.	2013	<i>Spodoptera exigua</i>	Spinosad
Moustafa	2016	<i>Mamestra brassicae</i>	Spinosad
Ahmed	2016	<i>Spodoptera littoralis</i>	Spinosad
Su et al.	2014	<i>Cnaphalocrocis medinalis</i>	Tebuconazole
Waldstein et al.	2000	<i>Choristoneura rosaceana</i>	Tebufenozide
Biddinger et al.	2006	<i>Platynota idaeusalis</i>	Tebufenozide
Fiaz et al.	2018	<i>Anticarsia gemmatalis</i>	Tebufenozide
Yue et al.	2003	<i>Ostrinia nubilalis</i>	Thiamethoxam
Jones et al.	2012	<i>Grapholita molesta</i>	Thiamethoxam
Brown	1987	<i>Trichoplusia ni</i>	Thiobencarb

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Table S5. Number of exceedances of honeybee LD<sub>50</sub> concentrations by land use type.

Land Use Type	Compounds	Exceedance Type	Number of Exceedances
Agriculture	Clothianidin	Contact	11
Agriculture	Clothianidin	Oral	26
Agriculture	Imidacloprid	Oral	3
Agriculture	Thiamethoxam	Contact	5
Agriculture	Thiamethoxam	Oral	14
Retail	Cyantraniliprole	Contact	6
Retail	Cyantraniliprole	Oral	6
Retail	Thiamethoxam	Contact	2
Retail	Thiamethoxam	Oral	4
Urban	Fipronil	Contact	1
Urban	Fipronil	Oral	1

Table S6. Number of exceedances of lepidopteran LD<sub>50</sub> concentrations by land use type.

Land Use Type	Compounds	Number of Exceedances
Agriculture	Chlorantraniliprole	51
Agriculture	Clothianidin	15
Refuge	Chlorantraniliprole	26
Retail	Chlorantraniliprole	6
Retail	Cyantraniliprole	6
Retail	Methoxyfenozide	2
Urban	Fipronil	1

Table S7. Mean concentrations (per plant) of compounds at each site.

Cyrantranipl ole	Clothianidin	Clethodim	Chlorantraniil prole	Carfentrazone ethyl	Carbaryl	Buprofezin	Boscalid	Bifenazate	Azoxystrobin	Site
1.35	0	0	0.68	0	0	0	0.5	0	0.44	ag_1
0.61	0	0	8	1.82	0	0.32	1.09	0.02	1.14	ag_2
0	0.01	0	1.1	0	0	0	1.1	0	0.24	ag_3
0	0.46	0.04	65.97	0	0.89	0.12	0.7	0.06	13.31	ag_4
0	0.14	0	54.05	0	0.35	0.24	0.57	0	4.03	ag_5
0	0	0	4.59	0	0	0	0.06	0	5.21	ag_6
0	0	0	1.28	0	0	0	0.22	0.06	0.94	ag_7
0	12.98	0	18.45	0	0	0	8.93	0.01	1.56	ag_8
0	352.27	0	0.66	0	0	0	0.45	0	1	ag_9
1.06	0	0	12.52	0	0	0	0.36	0	0.6	refuge_1
0	0	0	33.29	0	0	0	0.54	0	1.12	refuge_2
0	0.23	0	0.64	0	0.11	0	0.61	0	1.32	refuge_3
0	0.06	0	0.77	0	0	0	0.33	0	1.23	refuge_4
0	0	0	0.28	0	0	0	0.27	0.05	0.47	refuge_5
0	0	0	3.54	0	0	0	1.99	0	0.18	refuge_6
0	0	0	6.08	0	0	0	3.49	0	0.39	refuge_7
5.45	0	0	0.06	0	0	0	1.1	0	0	retail_1
918.59	0	0	6.22	0	0	0.21	1.93	0	0.39	retail_2
0	0	0	0.54	0	0	0	1.21	0	0.21	urban_1
0	0	0	0.12	0	0	0	0.58	0	0.12	urban_2
0	0	0	0.61	0	0	0	1.34	0	0.35	urban_3
0	0	0	0.84	0	0	0	1.26	0	0.02	urban_4
0	0	0	0.51	0	0	0	0.85	0	0.26	urban_5
0	0	0	0.19	0	0	0	0.19	0	0	urban_6
0	0	0	0.67	0	0	0	2.11	0	0.08	urban_7
0	0	0	0.6	0	0.81	0	1.92	0	0.04	urban_8





Isoprothiolane	Imidacloprid	Imazalil	Hexythiazox	Fluxapyroxad	Fluoxastrobin	Fluopyram	Fluopicolide	Fludioxonil	Fipronil.sulfone	Fipronil
0	0	0	0	0.04	0	0.85	0	0	0	0
0	0	0	0.11	0.38	0.01	0.42	0	0	0	0
0.05	0	0	0.18	0	0	7.32	0	0	0	0
0	0	0	0.11	0.66	0	0.48	0	0	0	0
0.16	0	0	0.09	4.66	0	0.57	0	0	0	0
0	0	0	0	5.18	0	4.14	0	0	0	0
0	0	0	0	0.02	0	1.17	0	0	0	0
0	3.08	0	0	0	0	0.1	0	0	0	0
0.03	0	0	0	0	0	0.06	0	0	0	0
0	0	0	0.04	1.15	0	0.18	0	0	0	0
0	0	0	0	3.83	0	0.36	0	0	0	0
0	0	0.05	0	0	0	0.17	0	0	0	0
0	0	0.09	0	0.01	0	0.13	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0.01	0	0	0	1.21	0	0	0	0
0	0	0.02	0	0	0	3.03	0	0	0	0
0	0	0	0	0	0	0.35	0	0	0	0
0	0	0	0	0	0	0.77	11.59	0	0	0
0	0	0	0	0	0	1.11	0	4.88	0	0
0	0	0	0	0	0	1.08	0	0	0	0
0	0.12	0	0	0	0	1.83	0	0	0	0
0	0	0.05	0	0	0	2.67	0	0	0	0
0	0	0	0	0	0	1.12	0	0	0	0
0	0	0.19	0	0	0	0.35	0	0	0	0
0	0	0	0	0	0	1.59	0	0	18.69	20.96
0	0	0	0	0	0	1.79	0	0	0	0

Paclobutrazol	Myclobutanil	Metrafenone	Metolachlor	Methoxyfenozide	Methiocarb.sulfoxide	Methamidophos	Metalaxyl	Mepiquat	Malaoxon	Isoxaben
0	0	0	0	14.01	0	0	0	0	0	0
0	0	0	0.33	2.27	0	0	0	0	0.01	0
0	0.75	0	0	5.98	0	0	0	0	0	0
0	0	0	1.56	5.06	0	0	0	0	0	0
0	0	0	0.38	9.28	0	0	0	0	0	0
0	0	0	0	0.67	0	0	0	0	0	0
0	0	0	0	1.91	0	0	0	0.02	0	0
0	0	0	0.7	2.6	0	0	0.82	0.02	0	0
0	0	0	0.04	1.11	0	0	0	0.16	0	0
0	0	0	0	2.5	0	0	0	0	0	0
0	0	0	0	2.09	0	0	0	0	0	0
0	0	0	0	3.18	0	0	0	0.06	0	0
0	0	0	0	2.93	0	0	0	0.01	0	0
0	0	0	0	6.17	0	0	0	0	0	0
0	0	0	0	2.88	0	0	0	0.01	0	0
0	0	0	0	5.11	0	0	0	0.03	0	0.01
0.06	0	0	0	114.26	0.05	0	0.04	0	0	0
0.05	0.7	0	0	1.07	0.21	0.18	5.24	0	0	0.02
0	0	0	0.02	1.58	0	0	0	0	0	0
0	0	0	0	2.4	0	0	0	0	0	0
0	0	0	0	1.76	0	0	0	0	0	0.02
0	0	0	0	1.12	0	0	0	0	0	0
0	0	0	0	1.26	0	0	0	0	0	0.08
0	0	0	0	0	0	0	0	0	0	0
0	0	0.28	0	1.2	0	0	0	0	0	0
0	0	0	0	0.76	0	0	0	0	0	0





Figure S1

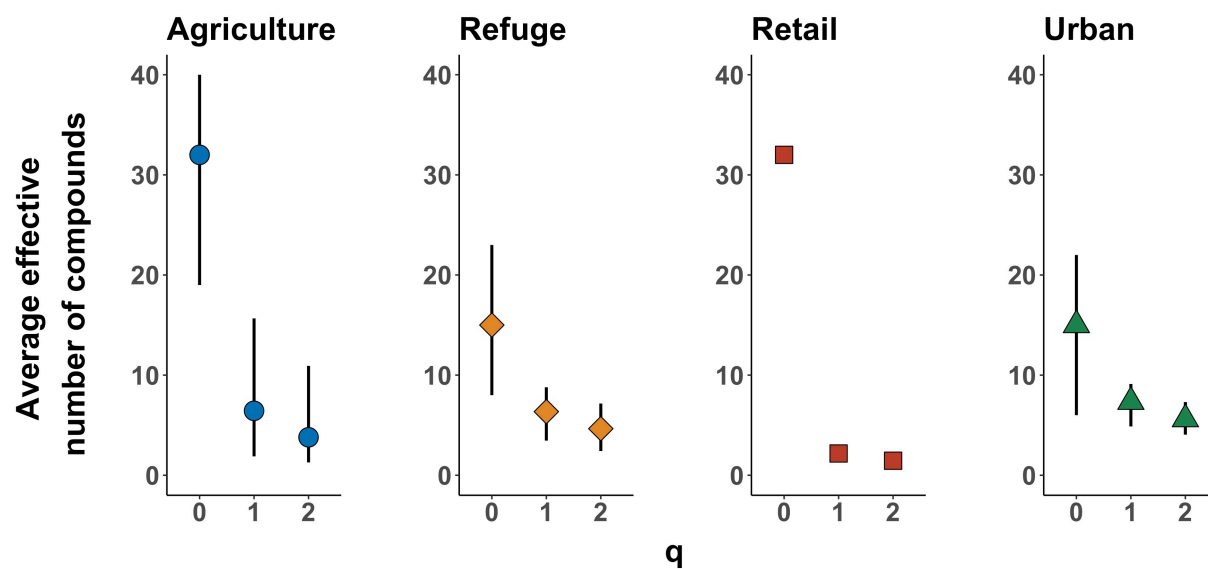


Figure S1. Mean effective numbers of pesticides per sample by land use type using different Hill numbers after rarefaction. Points show the mean effective number of compounds per sample. Error bars show the range of effective numbers of pesticides across samples within one land use type.

Figure S2

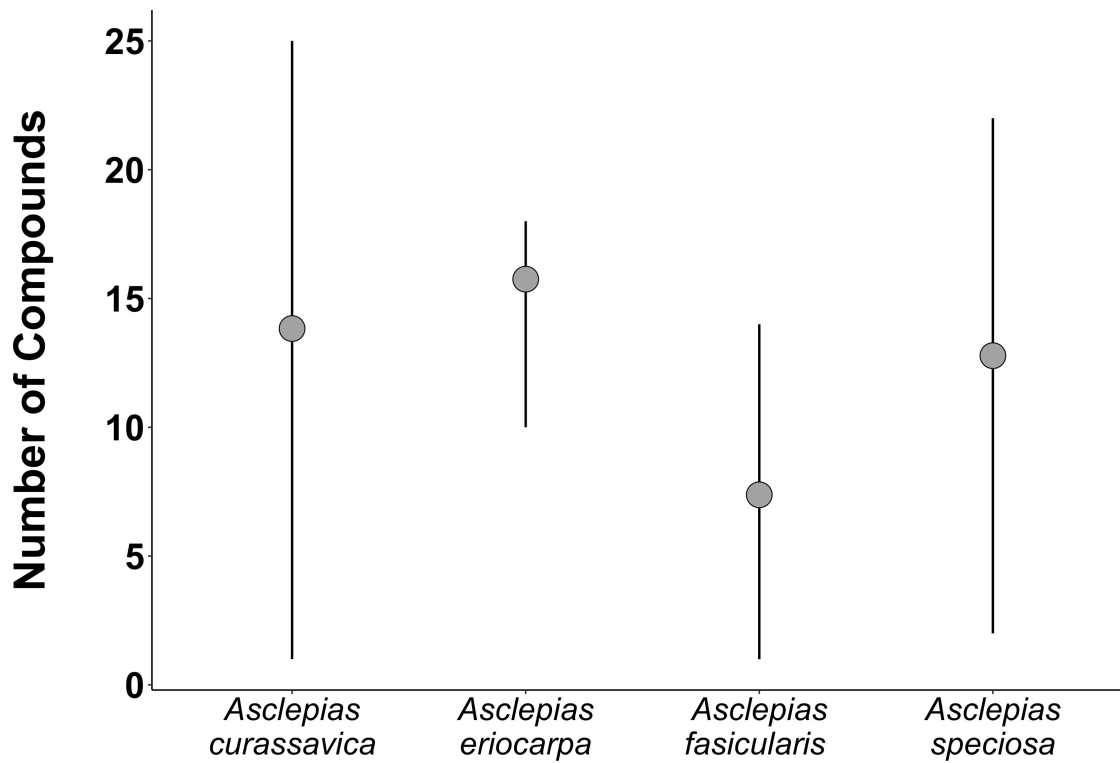


Figure S2. Variation in the number of compounds per sample by milkweed species. Bars show the maximum and minimum number of compounds detected in any single sample.

Figure S3

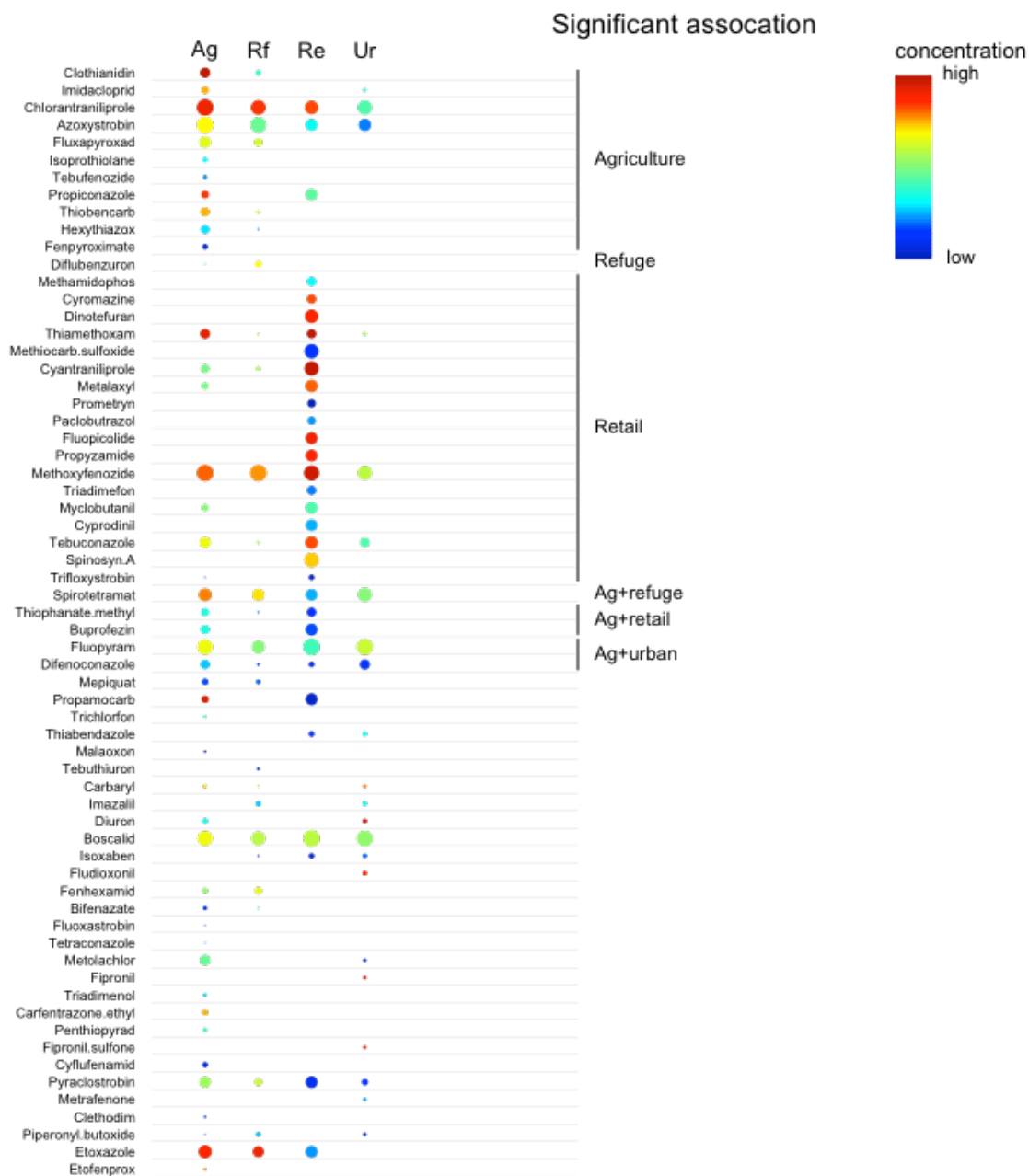


Figure S3. Indicator species analysis examining associations between chemicals and land use types. Color indicates concentration and size the scaled frequency of occurrence. Significant associations are labeled with a black bar and the land use type they are associated with. No correction was made for multiple comparisons.