Phenological stage dependent sensory and behavioral responses of *Zeugodacus cucurbitae* (Coquillett) to cucurbit volatiles

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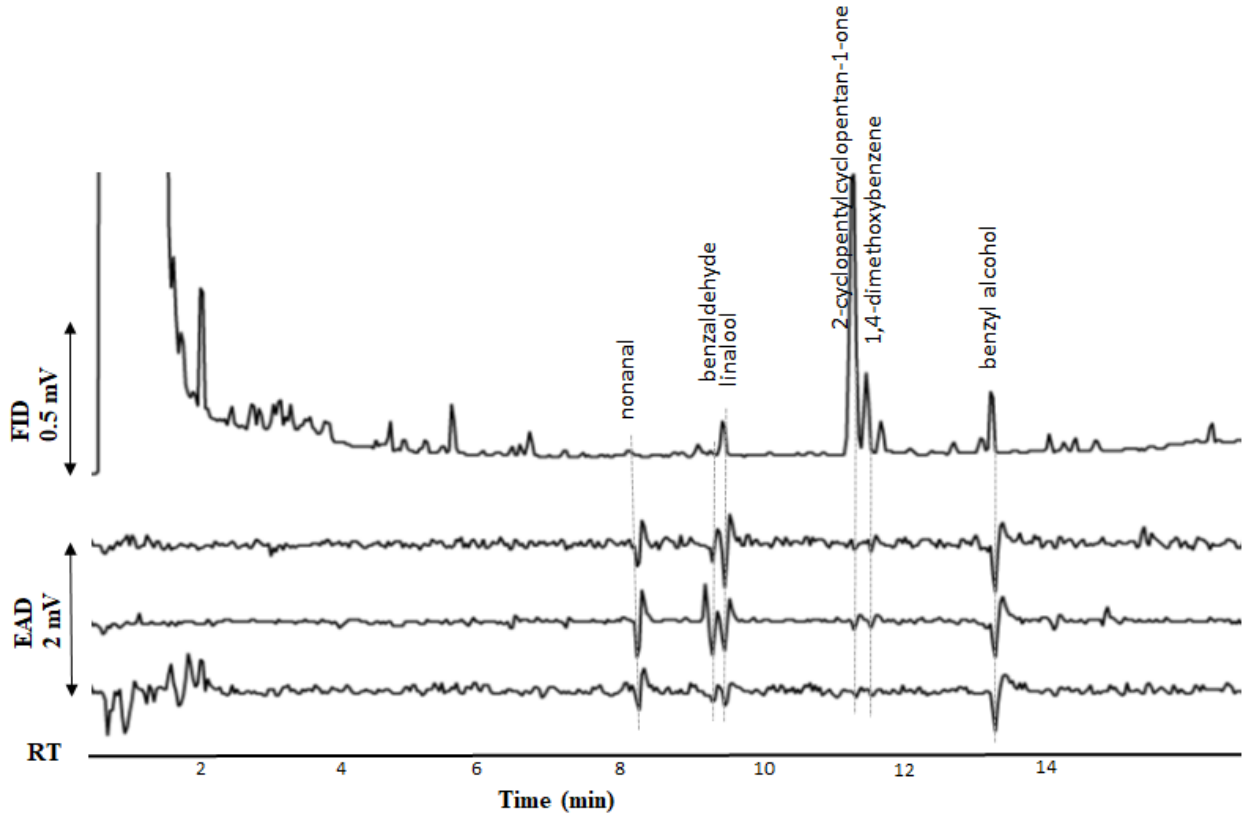
Supplementary Table S1. list of compounds identified from flowers, immature fruits and mature fruits of *C. sativus*, *C. pepo* and *C. mixta* using GC-MS non-polar (HP-5 MS) and polar (DB-WAX) columns.

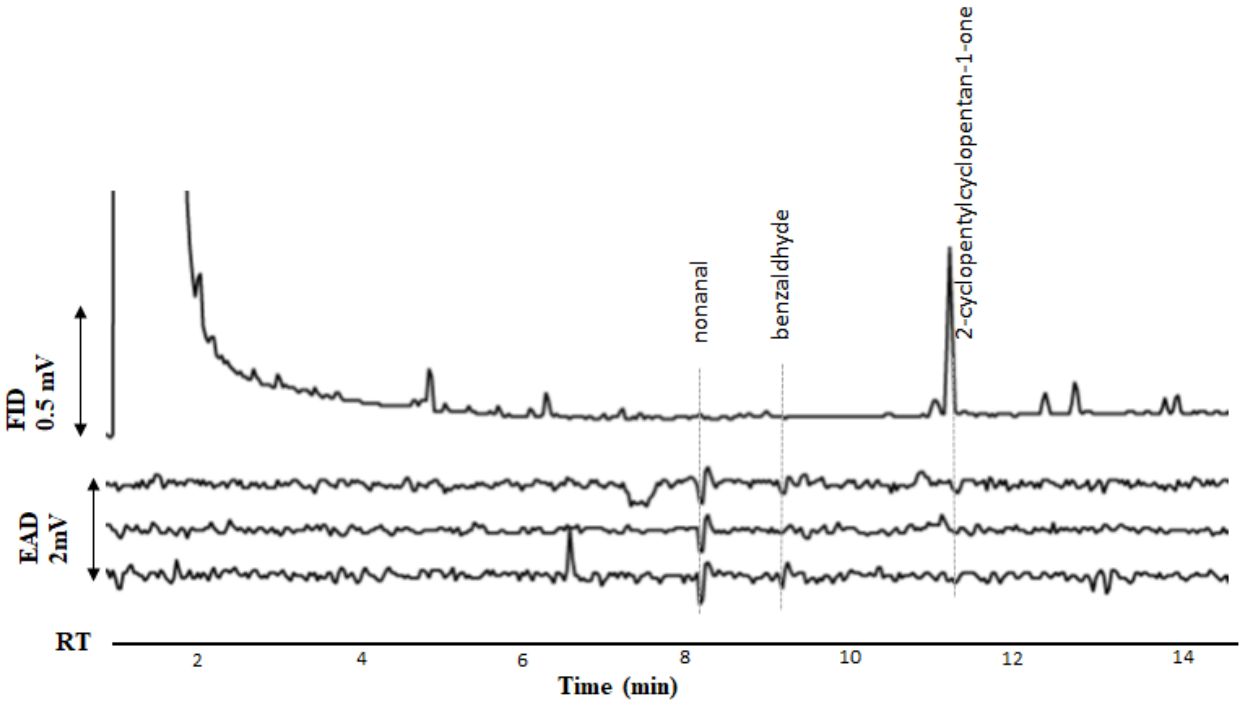
Peak #	Ret. Time	IUPAC name	CAS-number	KI calculated (HP-5)	KI calculated (DB-WAX)	Published References
1	6.003	unknown alcohol-1		810.7859	1169.728	
2	6.078	1-ethoxy-1-methoxyethane	10471-14-4	814.1266	1169.223	1
3	6.219	unknown1		818.6128	1011.356	
4	6.226	2,2-Dimethoxybutane	3453-99-4	818.8355	1032.784	2
5	6.411	toluene	108-88-3	824.7216	1046.549	3
6	6.631	hexan-3-one	589-38-8	831.7213	1057.513	4
7	6.701	4-methylpentan-2-one	108-10-1	833.9485	1082.085	5
8	6.701	hexan-2-one	591-78-6	833.9485	1085.609	6
9	6.761	cyclopentanone	120-92-3	835.857461	1189.304	7
10	6.852	4-methylpentan-2-ol	108-11-2	838.7528	1222.068	8
11	6.854	hexan-2-ol	626-93-7	838.8164	1221.162	9
12	6.876	hexane-2,5-diol	2935-44-6	839.5164	1785.334	10
13	6.878	hexanal	66-25-1	839.58	1130.848	11
14	7.059	hexan-3-ol	623-37-0	841.487	1197.376	12
15	7.876	(*E*)-hex-2-enal	6728-26-3	871.3331	1224.254	13
16	7.93	2,3-dimethylheptane	3074-71-3	858.8435	803.976	14
17	7.935	hexan-1-ol	111-27-3	866.359	1354.915	15
18	7.936	unknown alkane-1		873.2421	1067.674	
19	8.782	nonane	111-84-2	900.243	898.6184	16
20	9.962	camphene	79-92-5	957.5802	1063.677	17
21	9.667	2-ethylcyclopentan-1-one	4971-18-0	943.1973	1298.401	18
22	10.165	benzaldehyde	100-52-7	967.4441	1542.739	19
23	10.252	3-methylnonane	5911-04-6.	971.6715	980.336	20
24	10.427	oct-7-en-4-ol	53907-72-5	980.1749	1446.289	21
25	10.581	6-methylhept-5-en-2-one	110-93-0	987.6579	1343.898	22
26	10.837	decane	124-18-5	1000.099	990.8903	23
27	11.311	α-Terpinene	99-86-5	1023.518	1185.267	24
28	11.382	1-methyl-3-propan-2-ylbenzene	535-77-3	1027.427	1278.412	25

29	11.471	p- Cymene	99-87-6	1031.423	1320.621	[26]
30	11.563	(*R*)-(+)- Limonene	5989-27-5	1035.968	1204.591	[27]
31	11.634	benzyl alcohol	100-51-6	1039.476	1893.23	[28]
32	11.975	1,3-diethylbenzene	141-93-5	1056.324	1310.565	[29]
33	11.976	1,2-diethylbenzene	135-01-3	1056.374	1303.848	[20]
34	12.031	unknown alkane-2		1059.091	1989.004	
35	12.44	linalool oxide	60047-17-8	1079.298	1448.26	[30]
36	12.712	1-ethenyl-3-ethylbenzene	7525-62-4	1092.737	1419.255	[31]
37	12.773	Terpinolene	586-62-9	1095.751	1291.738	[32]
38	12.911	Linalool	78-70-6	1102.69	1547.812	[33]
39	12.976	Nonanal	124-19-6	1106.053	1400.12	[34]
40	13.223	(3*E*)-4,8-dimethylnona-1,3,7-triene	51911-82-1	1118.831	1307.872	[35]
41	13.573	3,7-dimethyloct-6-en-3-ol	18479-51-1	1136.937	1533.506	[36]
42	13.971	(2*E*,6*Z*)-nona-2,6-dienal	557-48-2	1157.527	1591.587	[37]
43	14.089	(*E*)-non-2-enal	18829-56-6	1163.632	1548.637	[28]
44	14.191	nona-2,6-dien-1-ol	7786-44-9	1168.908	1773.806	[38]
45	14.22	1,4-dimethoxybenzene	150-78-7	1170.409	1756.039	[39]
46	14.285	3-ethylbenzaldehyde	34246-54-3	1173.771	1732.795	[40]
47	14.286	unknown aldehyde-1		1173.823	2274.29	
48	14.374	unknown terpene-1		1178.376	843.098	
49	14.508	(2*E*,4*E*)-nona-2,4-diene	56700-78-8	1185.308	1121.443	[41]
50	14.594	4-ethylbenzaldehyde	4748-78-1	1189.756855	1757.093	[42]
51	14.597	4-prop-2-enylphenol	501-92-8	1189.912	2349.338	[43]
52	14.645	dodec-1-ene	112-41-4	1192.395	1239.665	[29]
53	14.939	decanal	112-31-2	1208.104	1507.546	[19]
54	15.37	(*E*)-3-phenylprop-2-enal	104-55-2	1231.863	1897.13	[44]
55	15.706	unknown terpene-2		1247.183	1264.572	
56	15.902	azepan-2-one	105-60-2	1261.191	2186.006	[45]
57	15.97	5-methyl-2-propan-2-ylphenol	89-83-8	1260.716	2160.710	[46]
58	15.995	(*E*)-dec-2-enal	3913-81-3	1262.261	1639.492	[47]
59	16.151	1-(4-ethylphenyl)ethanone	937-30-4	1274.917	1295.039	[48]
60	16.291	unknown alkane-3		1281.514	1443.487	
61	16.63	2-cyclopentylcyclopentan-1-one	4884-24-6	1301.408	1754.354	
62	16.771	1H-indole	120-72-9	1309.683	1499.695	[49]
63	16.773	N,N-dibutylformamide	761-65-9	1309.8	1752.668	[50]
64	16.78	[(*E*)-but-2-enyl]benzene	1560-06-1	1310.211	1473.736	[51]

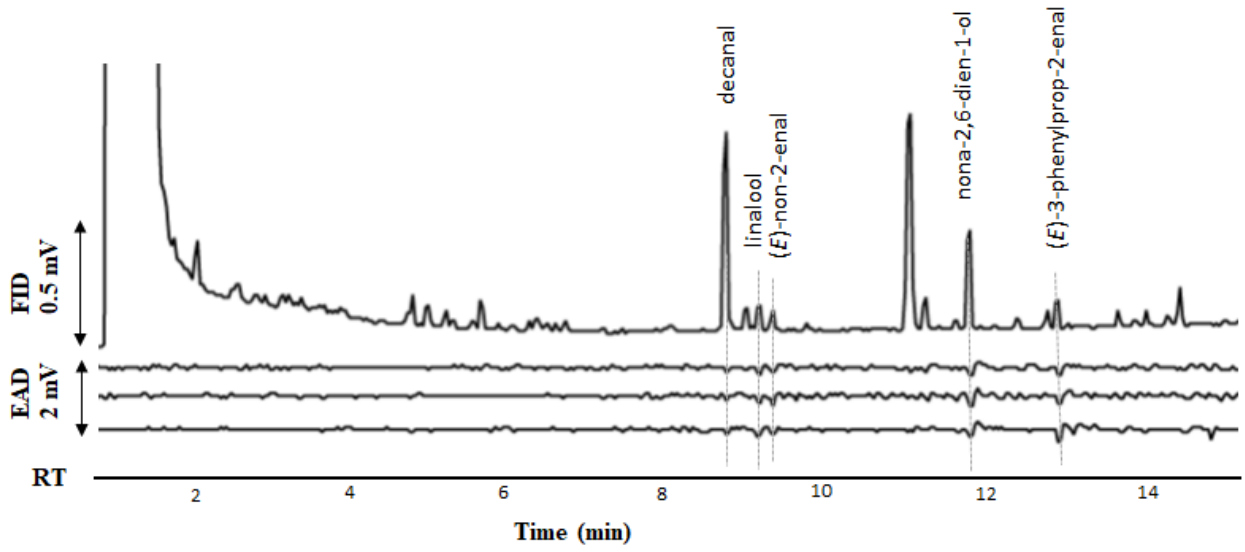
65	17.086	1-ethenyl-4-ethylbenzene	3454-07-7.	1328.169	1461.031	52
66	17.09	1-methyl-4-prop-2-enylbenzene	3333-13-9	1328.404	1481.563	53
67	17.154	1-ethyl-3-propan-2-ylbenzene	4920-99-4	1332.16	1321.23	54
68	17.377	2,3-diacetyloxypropyl acetate	102-76-1	1345.246	2056.214	55
69	17.44	unknown ketone-1		1348.944	1856.88	
70	17.485	1-ethyl-4-propan-2-ylbenzene	4218-48-8	1351.585	1341.338	56
71	17.597	1-octen-3-ol	3391-86-4	943.1973	1450.36	57
72	19.036	caryophyllene	87-44-5	1542.606	1624.983	58
73	19.091	(-)-β-Bourbonene	5208-59-3	1448.569652	1542.232	59
74	19.309	propanoic acid	79-09-4	1462.065	1551.875	60
75	19.367	1-(4-acetylphenyl)ethanone	1009-61-6	1465.734	1673.453	61
76	19.917	Pentadecane	629-62-9	1499.938	1241.898	23
77	20.009	germacrene D	23986-74-5	1505.999	1687.785	62
78	20.478	ethyl 4-ethoxybenzoate	23676-09-7	1536.915	2184.669	63
79	22.225	diphenylmethanone	119-61-9	1654.976	2460.345	64
80	22.365	trimethylsilyl ester	3618-20-0	1662.884	2006.703	65
81	23.503	unknown ketone-2		1763.743	1916.949	



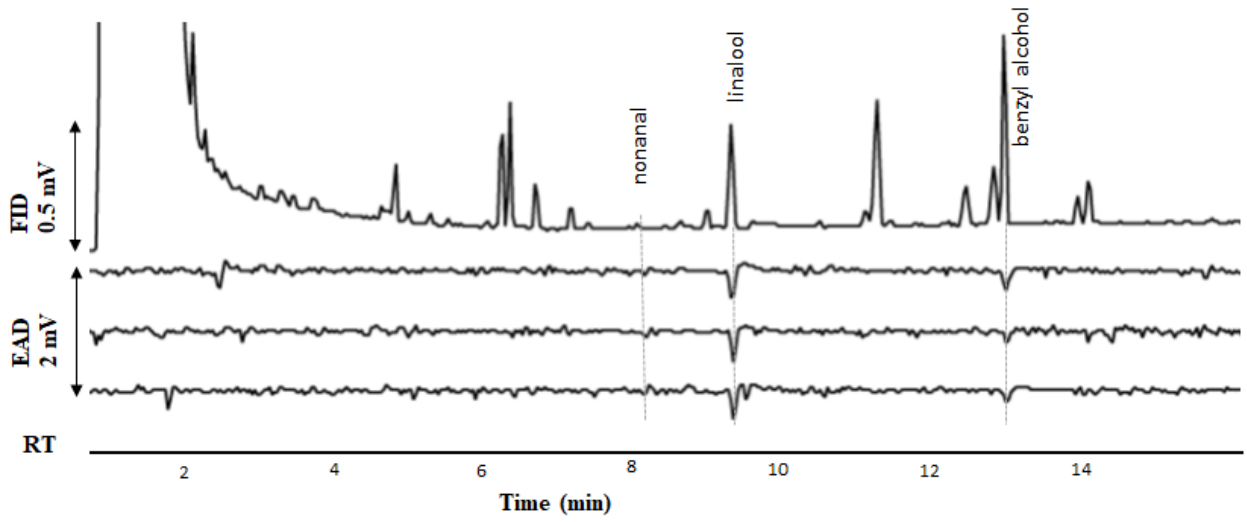
Supplementary Figure S1. GC-EAD traces of *Z. cucurbitae* females to *C. pepo* immature fruit headspace. Top trace: FID chromatogram. Three traces: antennal responses with gray vertical lines indicating the antenna active compounds. The time base was 2.00 min, scale: FID = 0.5 mV, and EAD = 2 mV. RT stands for retention time of compounds.



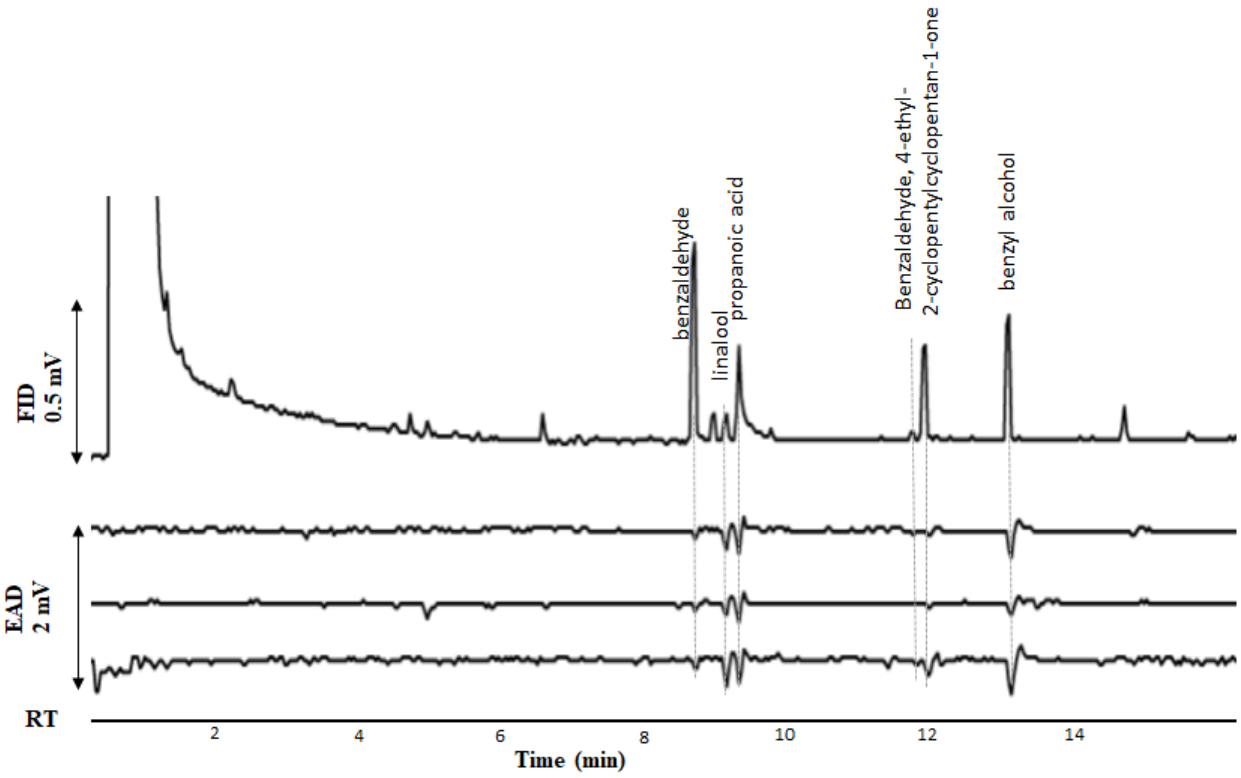
Supplementary Figure S2. GC-EAD traces of *Z. cucurbitae* females to *C. pepo* mature fruit headspace. Top trace: FID chromatogram. Three traces: antennal responses with gray vertical lines indicating the antenna active compounds. The time base was 2.00 min, scale, FID = 0.5 mV, and EAD = 2 mV. RT stands for retention time of compounds.



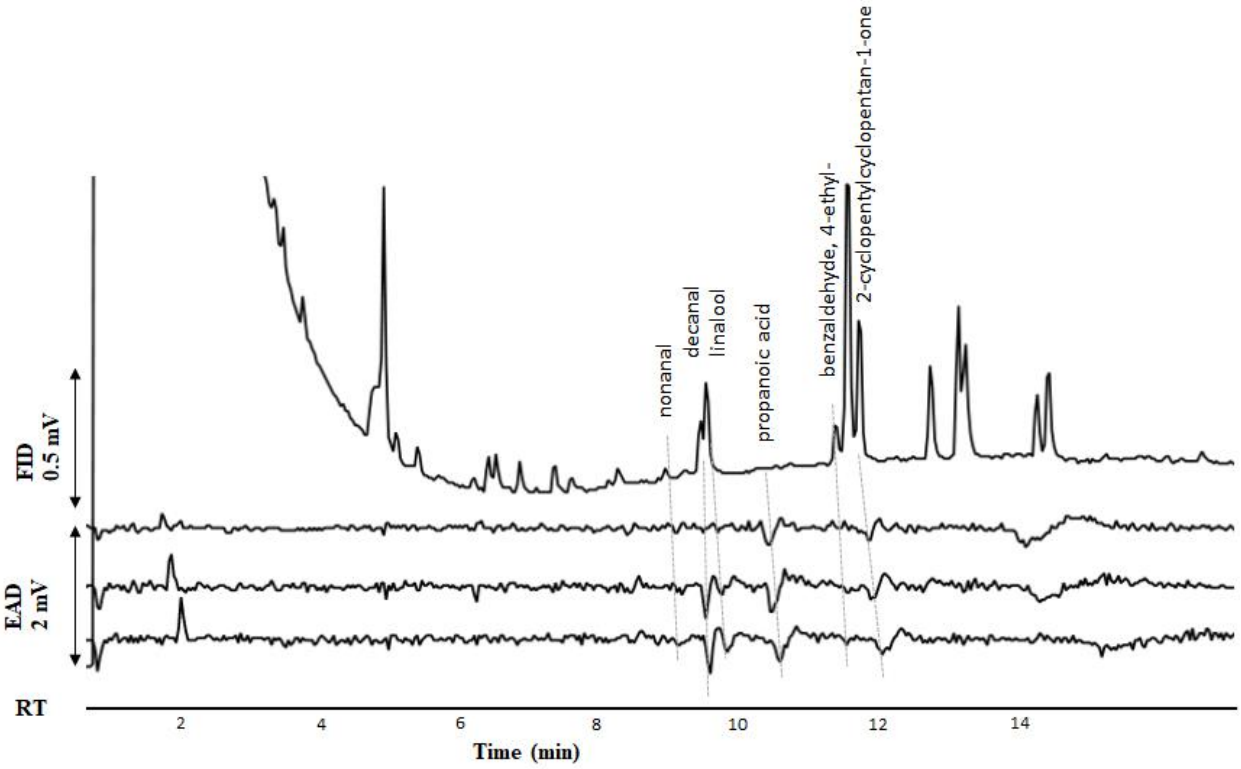
Supplementary Figure S3. GC-EAD traces of *Z. cucurbitae* females to *C. sativus* flower headspace. Top trace: FID chromatogram. Three traces: antennal responses with gray vertical lines indicating the antenna active compounds. The time base was 2.00 min, scale, FID = 0.5 mV, and EAD = 2 mV. RT stands for retention time of compounds.



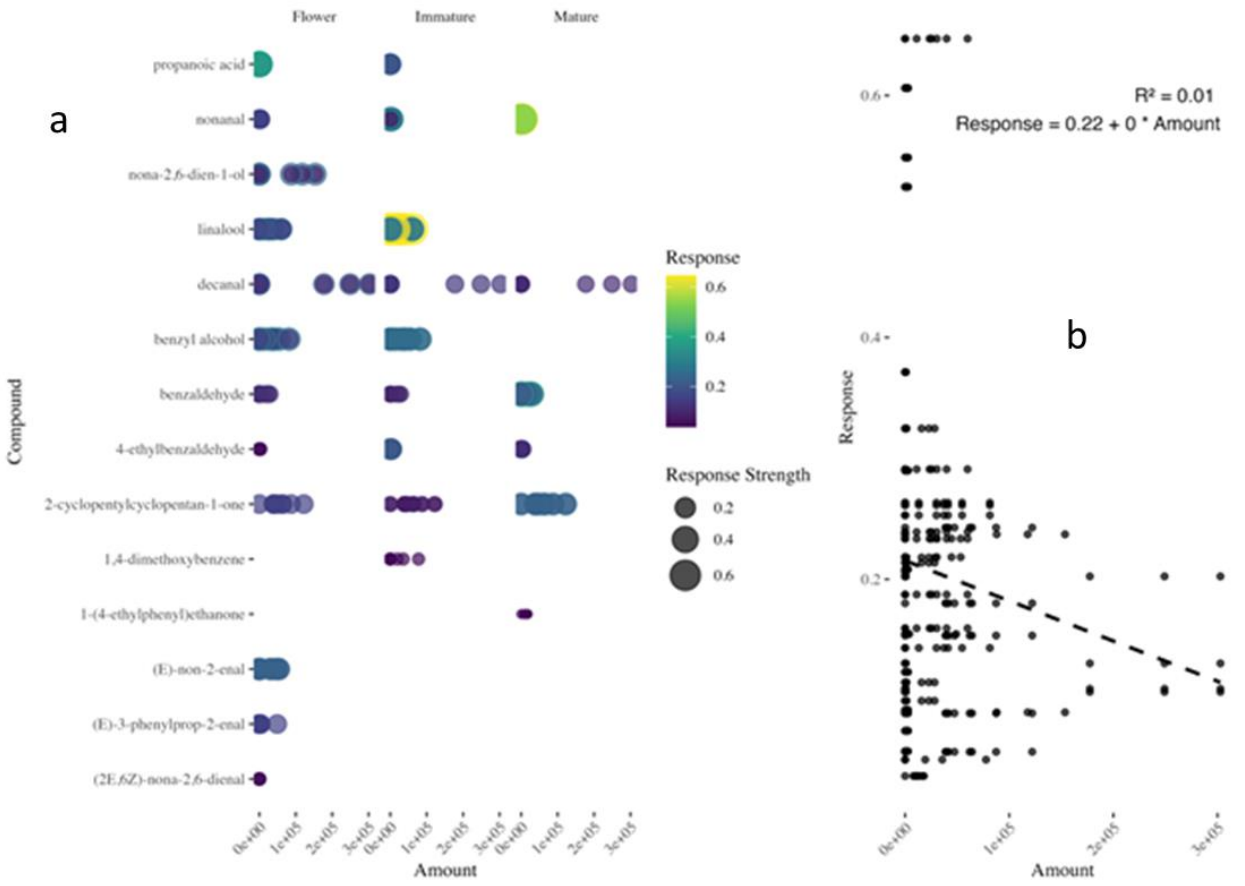
Supplementary Figure S4. GC-EAD traces of *Z. cucurbitae* females to *C. sativus* immature fruit headspace. Top trace: FID chromatogram. Three traces: antennal responses with gray vertical lines indicating the antenna active compounds. The time base was 2.00 min, scale, FID = 0.5 mV, and EAD = 2 mV. RT stands for retention time of compounds.



Supplementary Figure S5. GC-EAD traces of *Z. cucurbitae* females to *C. mixta* flower headspace. Top trace: FID chromatogram. Three traces: antennal responses with gray vertical lines indicating the antenna active compounds. The time base was 2.00 min, scale, FID = 0.5 mV, and EAD = 2 mV. RT stands for retention time of compounds.



Supplementary Figure S6. GC-EAD traces of *Z. cucurbitae* females to *C. mixta* immature fruit headspace. Top trace: FID chromatogram. Three traces: antennal responses with gray vertical lines indicating the antenna active compounds. The time base was 2.00 min, scale, FID = 0.5 mV, and EAD = 2 mV. RT stands for retention time of compounds.



Supplementary Figure S7. Regression analysis on response strength of females in response to increase in amount of a compound in headspace. (a) shows response strength of *Z. cucurbitae* females to an increasing amount of volatiles in the headspace. (b) Regression line and the scatter points around the line show there was no correlation between amount of a compound and response strength.

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