Supplementary material

Honey bees save energy in honey processing by dehydrating nectar before returning to the nest

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Fig. S1 Racemes of the four *Macadamia* cultivars (left to right: 816, 814, 695, A4). For these cultivars, the average length of racemes ranged from 21 to 26 cm and the average number of florets ranged from 247 to 305 per raceme. Data were obtained from at least 25 racemes per cultivar.

Fig. S2. Flowering *Macadamia* trees showing pendant racemes and shaded environment.

Table S1. Nectar and honey bee crop data. Nectar concentrations (% w/w) for the four *Macadamia* cultivars; volumes (µl) and concentrations (% w/w) of the crop contents of bees foraging on the four cultivars and captured on return to the hive.

Cultivar	695			A4			814			816			Returning bees	
RH & temp	43.4% 26.7°C			48.4% 30.4°C			32.5% 26.6°C			31.6%, 31.0°C			48.4% 30.4°C	
	nectar conc	crop volume	crop conc	nectar conc	crop volume	crop conc	nectar conc	crop volume	crop conc	nectar conc	crop volume	crop conc	crop volume	crop conc
	19	18	41	25	18	42	27	15	61	30	17	46	24	66
	20	12	42	28	15	58	26	17	63	33	12	54	20	64
	22	10	37	25	26	33	26	24	63	33	25	34	18	60
	23	18	37	20	20	36	28	15	58	31	20	50	18	67
	24	20	38	20	19	38	27	18	62	27	15	38	22	55
	22	12	34	22	26	35	26	20	61	28	14	45	17	57
	23	16	41	22	20	45	28	22	63	27	25	58	15	63
	21	21	32	24	16	45	30	17	58	28	12	58	24	65
	20	24	31	20	18	38	29	20	64	30	17	56	17	70
	20	19	32	22	20	40	30	22	64	26	20	56	15	67
	19	19	35	20	24	42	31	24	62	31	17	59	25	65
	20	11	37	21	20	40	31	20	63	27	24	58	20	67
	20	18	36	21	16	34	28	19	60	27	12	60	21	63
	19	12	36	21	20	36	30	20	66	35	17	57	15	62
	21	10	40	21	22	36	30	17	60	30	25	61	20	67
	19	23	43	22	16	37	30	15	65	28	22	63	24	60
	23	21	41	20	17	34	30	10	60	26	25	63	19	67

Table S1 continuous

Cultivar	695 nectar conc	crop volume	crop conc	A4 nectar conc	crop volume	crop conc	814 nectar conc	crop volume	crop conc	816 nectar conc	crop volume	crop conc	Returning bees crop volume	crop conc
	18	16	38	20	16	34	31	15	67	26	19	60	18	58
	21	19	40	20	18	37	28	17	63	31	15	64	20	66
	18	20	33	19	12	39	30	24	62	29	18	62	25	59
	24	20	43	19	22	44	29	17	64	27	10	63	15	64
	25	23	39	20	20	45	30	17	62	25	21	62	18	63
	27	24	39	18	28	45	31	12	61	26	24	65	17	65
	26	20	38	20	19	42	28	22	63	27	18	63	21	64
	28	12	37	21	18	39	27	17	62	27	20	60	24	68
	25	18	42	22	18	37	28	10	58	25	15	58	18	64
	26	12	37	24	24	39	30	22	60	25	17	56	12	61
	22	17	35	21	26	44	30	10	62	24	20	60	15	71
	22	16	33	22	20	40	28	20	63	28	22	60	20	68
	22	12	35	22	18	42	31	24	62	29	24	63	21	72
Mean	21.97	17.10	37.4	21.4	19.73	39.87	28.93	18.07	62.07	28.2	18.73	57.07	19.27	64.27

Table S2. Results of the Kruskal-Wallis ANOVA. In the case of an significant effect, right below are the pairwise multiple comparisons of mean ranks for all groups. For each multiple comparison the z-values are given above the grey diagonal and the corresponding p-values below it. Significant comparisons are highlighted in bold.

	Cultivar 695	Cultivar A4	Cultivar 814	Cultivar 816	Returning Bees
Nectar concentration between cultivars			Kruskal-Wallis test: H (3, N= 120) =81.84 p < 0.0001		
Cultivar 695		0.4705	**6.5899**	**5.5837**	
Cultivar A4	n.s.		**7.0646**	**6.059**	
Cultivar 814	0.0000001	0.0000001		1.005	
Cultivar 816	0.0000001	0.0000001	n.s.		
Crop volume between groups			Kruskal-Wallis test: H (3, N= 120) =5.38 p > 0.25		
Crop concentration among groups			Kruskal-Wallis test: H (4, N= 150) =110.57 p < 0.0001		
Cultivar 695		0.1322	**6.6978**	**4.6906**	**8.0543**
Cultivar A4	n.s.		**6.5656**	**4.5583**	**7.9221**
Cultivar 814	0.0000001	0.0000001		2.0072	1.3565
Cultivar 816	0.000027	0.000052	n.s.		**3.3638**
Returning Bees	0.0000001	0.0000001	n.s.	0.007688	
Crop mass (mg) among groups			Kruskal-Wallis test: H (4, N= 150) =14.37 p < 0.0063		
Cultivar 695		1.8572	2.3847	2.5510	**3.6594**
Cultivar A4	n.s.		0.5274	0.6939	1.8022
Cultivar 814	n.s.	n.s.		0.1664	1.2747
Cultivar 816	n.s.	n.s.	n.s.		1.1084
Returning Bees	0.0025	n.s.	n.s.	n.s.	
Sugar mass (mg) among groups			Kruskal-Wallis test: H (4, N= 150) =79.631 p < 0.0001		
Cultivar 695		1.257	**5.9623**	**5.1541**	**7.3352**
Cultivar A4	n.s.		**4.7054**	**3.8971**	**6.0782**
Cultivar 814	**0.0000001**	**0.0000001**		0.8082	1.372
Cultivar 816	**0.000003**	**0.0000973**	n.s.		2.1811

Returning Bees	**0.0000001**	**0.0000001**	n.s.	n.s.	
Water mass (mg) among groups			Kruskal-Wallis test: H (4, N= 150) =57.19 p < 0.0001		
Cultivar 695		1.9612	**4.1319**	2.4827	**4.1051**
Cultivar A4	n.s.		**6.0931**	**4.4439**	**6.0663**
Cultivar 814	**0.00036**	**0.0000001**		1.6492	0.0267
Cultivar 816	n.s.	**0.000088**	n.s.		1.6224
Returning Bees	**0.000404**	**0.0000001**	n.s.	n.s.	
Crop mass (mg) without evaporation among groups			Kruskal-Wallis test: H (4, N= 150) =57.08 p < 0.0001		
Cultivar 695		1.8721	**3.9967**	**3.3905**	**7.1881**
Cultivar A4	n.s.		2.1246	1.5185	**5.3161**
Cultivar 814	**0.000642**	n.s.		0.6062	**3.1914**
Cultivar 816	**0.007**	n.s.	n.s.		**3.7976**
Returning Bees	**0.0000001**	**0.0000001**	**0.01415**	**0.001461**	
Water mass (mg) without evaporation among groups			Kruskal-Wallis test: H (4, N= 150) =50.94 p < 0.0001		
Cultivar 695		2.0533	**2.9923**	2.4901	**6.9207**
Cultivar A4	n.s.		0.939	0.4368	**4.8674**
Cultivar 814	**0.028**	n.s.		0.5022	**3.9284**
Cultivar 816	n.s.	n.s.	n.s.		**4.4306**
Returning Bees	**0.0000001**	**0.0000011**	**0.000855**	**0.000094**	
Evaporated Water mass (mg) among groups			Kruskal-Wallis test: H (4, N= 150) =76.76 p < 0.0001		
Cultivar 695		1.673	**4.5702**	**3.5778**	**8.1569**
Cultivar A4	n.s.		**0.939**	1.9048	**6.4839**
Cultivar 814	**0.000049**	**0.037645**		0.9925	**3.5866**
Cultivar 816	**0.003466**	n.s.	n.s.		**4.5791**
Returning Bees	**0.0000001**	**0.0000011**	**0.00335**	**0.000047**	