

Table S1. Morphological, kinematic and load-lifting data for individual bees

Method tested	Date	Body mass (mg)	Mass of abdomen (mg)	Mass of thorax (mg)	Mass of wing pair (mg)	Total lifted (mg)	Wing area (mm <sup>2</sup> )	Wing length (mm)	$\hat{f}_z$ (S)	Aspect ratio	$\rho_w$	Frequency (Hz)	Stroke amplitude (deg.)	$F_{\text{vert}}$ (N)	$F_{\text{vert}}/mg$
Asymptotic	2-Nov-06	232.35	110.92	80.27	0.48	264.88	82.27	12.25	0.56	7.30	27.71	n/a	n/a	0.00260	1.14
Asymptotic	2-Nov-06	132.63	59.53	47.54	0.19	147.60	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.00145	1.11
Asymptotic	2-Nov-06	169.00	73.90	62.97	0.20	217.05	64.38	10.61	0.56	6.99	25.75	n/a	n/a	0.00213	1.28
Asymptotic	3-Nov-06	146.68	65.01	52.40	0.50	194.73	55.41	9.97	0.55	7.17	25.97	n/a	n/a	0.00191	1.33
Asymptotic	6-Nov-06	159.46	70.80	55.88	0.22	184.54	62.89	11.25	0.57	8.05	24.88	n/a	134.77	0.00181	1.16
Asymptotic	6-Nov-06	206.77	96.35	70.73	0.40	278.44	76.62	11.15	0.55	6.49	26.47	n/a	148.49	0.00273	1.35
Asymptotic	6-Nov-06	134.87	57.09	47.61	0.16	182.23	56.53	9.78	0.55	6.77	23.41	n/a	143.44	0.00179	1.35
Asymptotic	6-Nov-06	155.54	74.25	51.15	0.15	233.75	55.32	9.34	0.54	6.31	27.58	n/a	154.88	0.00229	1.50
Asymptotic	8-Nov-06	154.68	68.70	55.41	0.32	221.25	62.17	10.65	0.56	7.30	24.41	190.00	134.44	0.00217	1.43
Asymptotic	22-Nov-06	140.37	57.75	51.35	0.25	271.87	59.16	9.72	0.57	6.38	23.28	200.00	148.50	0.00266	1.94
Asymptotic	22-Nov-06	154.68	75.74	49.70	0.24	265.04	57.21	9.70	0.57	6.58	26.52	185.00	141.51	0.00260	1.71
Asymptotic	22-Nov-06	143.81	62.94	46.04	0.28	273.27	57.93	10.11	0.56	7.06	24.35	205.00	138.53	0.00268	1.90
Asymptotic	22-Nov-06	123.13	50.05	45.03	0.24	259.44	51.31	9.38	0.56	6.85	23.54	190.00	141.02	0.00254	2.11
Asymptotic	29-Nov-06	165.91	68.72	62.76	0.28	326.44	66.55	10.15	0.55	6.19	24.46	190.00	136.87	0.00320	1.97
Asymptotic	29-Nov-06	149.07	74.95	44.33	0.20	225.71	49.99	9.82	0.59	7.72	29.26	190.00	141.67	0.00221	1.51
Asymptotic	29-Nov-06	155.70	68.70	49.90	0.31	236.32	65.67	10.48	0.56	6.69	23.26	190.00	135.32	0.00232	1.52
Asymptotic	29-Nov-06	216.75	113.72	63.35	0.28	318.60	72.27	11.14	0.56	6.86	29.42	155.00	139.61	0.00312	1.47
Asymptotic	29-Nov-06	197.92	76.59	79.86	0.46	363.50	83.29	11.93	0.56	6.83	23.31	160.00	146.75	0.00356	1.84
Asymptotic	29-Nov-06	231.52	106.35	82.34	0.44	392.50	81.85	12.01	0.57	7.04	27.75	160.00	141.03	0.00385	1.70
Asymptotic	29-Nov-06	133.40	66.53	40.71	0.20	157.08	49.91	9.07	0.55	6.59	26.22	200.00	136.42	0.00154	1.18
Asymptotic	1-Dec-06	152.81	74.27	49.70	0.20	227.46	59.68	10.07	0.57	6.80	25.12	180.00	157.80	0.00223	1.49
Asymptotic	1-Dec-06	154.47	67.57	55.35	0.28	283.93	63.13	10.36	0.55	6.79	24.01	190.00	142.23	0.00278	1.84
Asymptotic	1-Dec-06	248.47	124.30	79.04	0.37	384.78	84.26	11.69	0.55	6.48	28.93	170.00	146.79	0.00377	1.55
Asymptotic	18-Jan-07	127.18	58.66	42.79	0.20	226.83	58.06	9.15	0.59	5.77	21.49	200.00	147.95	0.00222	1.78
Asymptotic	18-Jan-07	304.05	158.39	89.51	0.49	410.77	88.83	11.91	0.55	6.38	33.58	180.00	148.93	0.00403	1.35
Asymptotic	23-Jan-07	314.41	173.97	90.15	0.37	439.97	84.36	11.93	0.55	6.74	36.56	180.00	139.46	0.00431	1.40
Asymptotic	23-Jan-07	190.91	90.81	63.90	0.25	319.81	68.94	10.75	0.57	6.71	27.17	190.00	134.51	0.00313	1.68
Asymptotic	24-Jan-07	317.47	162.92	99.26	0.48	488.50	102.66	13.09	0.56	6.67	30.34	155.00	139.68	0.00479	1.54
Asymptotic	24-Jan-07	290.38	140.47	93.90	0.46	427.81	96.32	12.33	0.55	6.31	29.57	155.00	151.21	0.00419	1.47
Asymptotic	30-Jan-07	331.24	163.00	107.05	0.63	559.27	104.02	13.41	0.56	6.91	31.24	170.00	137.56	0.00548	1.69
Asymptotic	12-Feb-07	221.28	98.00	71.07	0.38	321.27	65.42	11.12	0.57	7.56	33.18	190.00	130.83	0.00315	1.45
Asymptotic	12-Feb-07	156.40	71.42	54.70	0.23	263.12	61.22	10.45	0.58	7.14	25.06	200.00	137.40	0.00258	1.68
Asymptotic	12-Feb-07	322.32	150.66	110.71	0.63	449.34	110.14	13.18	0.55	6.31	28.71	165.00	138.29	0.00440	1.39
Asymptotic	13-Feb-07	258.29	123.43	84.93	0.50	456.03	86.13	12.08	0.57	6.78	29.42	170.00	152.62	0.00447	1.77
Asymptotic	13-Feb-07	136.35	58.67	44.69	0.27	179.21	55.98	9.60	0.57	6.59	23.89	190.00	140.82	0.00176	1.31
Asymptotic	13-Feb-07	277.62	132.44	91.60	0.57	403.85	81.92	12.41	0.58	7.53	33.25	165.00	141.04	0.00396	1.45

Method tested	Date	Body mass (mg)	Mass of abdomen (mg)	Mass of thorax (mg)	Mass of wing pair (mg)	Mass lifted (mg)	Non-lifted mass (mg)	$F_{\text{vert}}$ (N)	$F_{\text{vert}}/mg$
Cumulative	9-Dec-06	158.60	70.12	53.72	0.29	189.6	219.7	0.00201	1.29
Cumulative	11-Dec-06	213.90	109.83	69.25	0.38	256	297.5	0.00271	1.29
Cumulative	11-Dec-06	109.44	49.33	37.14	0.23	109.44	130.94	0.00118	1.10
Cumulative	11-Dec-06	188.68	51.92	99.36	0.39	221.78	252.18	0.00232	1.26
Cumulative	11-Dec-06	257.87	75.61	132.91	0.44	305.97	347.17	0.00320	1.27
Cumulative	11-Dec-06	137.66	92.20	51.52	0.25	20.75	44.95	0.00167	1.24
Cumulative	11-Dec-06	192.32	88.75	70.63	0.39	42.99	72.29	0.00245	1.30
Cumulative	11-Dec-06	158.62	69.89	58.55	0.29	59.29	84.79	0.00226	1.45
Cumulative	13-Dec-06	175.10	87.90	53.08	0.25	175.1	210.9	0.00189	1.10
Cumulative	13-Dec-06	168.40	87.82	56.40	0.30	237.4	271.2	0.00249	1.51
Cumulative	13-Dec-06	164.48	85.85	50.30	0.28	164.48	194.78	0.00176	1.09
Cumulative	31-Jan-07	200.20	94.01	64.75	0.28	77.88	104.28	0.00285	1.45
Cumulative	31-Jan-07	186.42	90.74	50.90	0.35	37.25	70.95	0.00235	1.29
Cumulative	31-Jan-07	321.66	165.46	98.37	0.43	94.23	126.63	0.00423	1.34
Cumulative	31-Jan-07	241.02	61.12	104.78	0.50	138.7	160.85	0.00382	1.62
Cumulative	31-Jan-07	244.29	116.76	79.54	0.42	97.62	144.72	0.00358	1.49
Cumulative	31-Jan-07	348.02	186.02	99.39	0.53	63.63	130.83	0.00436	1.28
Cumulative	31-Jan-07	315.18	142.59	109.68	0.66	115.56	167.66	0.00447	1.45
Cumulative	31-Jan-07	221.26	115.65	62.93	0.26	44.66	86.86	0.00281	1.30
Cumulative	31-Jan-07	372.33	196.69	107.53	0.62	0.62	70.82	0.00399	1.09
Cumulative	6-Feb-07	138.61	58.01	45.84	0.23	0.23	23.33	0.00147	1.08
Cumulative	6-Feb-07	130.33	56.87	44.40	0.21	0.21	29.51	0.00142	1.11
Cumulative	6-Feb-07	125.02	58.35	43.48	0.27	24.77	53.87	0.00161	1.31
Cumulative	6-Feb-07	186.79	87.00	64.31	0.28	71.38	102.58	0.00268	1.46

Measurements on the first eight bees used in asymptotic load-lifting did not include wingbeat frequencies, and associated data were used only in force and not power allometries.