

## Supplementary Data

Table S1. Morphological parameters for each individual during control (full wings) and clipped wing treatments. Moths 1- 8 were used for the load-lifting experiment and moths 9 – 15 were used for the respirometry experiment. Asymmetric trials were recorded from moths 1, 2, 10, 11, 12, 13, 14 after clipping the right wing (R) and in moths 3, 4, 5, 6, 7, 8, 9 after clipping the left wing (L).

Moth	Treatment	Wing area (cm <sup>2</sup> )		Length (cm)		2 <sup>nd</sup> moment (cm <sup>4</sup> )		3 <sup>rd</sup> moment (cm <sup>5</sup> )		Total Clip (%)	
		L	R	L	R	L	R	L	R	L	R
1	Control	7.42	7.53	5.34	5.31	73.53	76.94	280.24	295.38	10.17	9.35
	Clipped	6.67	6.83	4.52	4.54	54.78	59.58	188.12	210.07		
2	Control	7.28	7.14	5.13	5.19	64.66	65.57	233.63	239.49	9.40	8.68
	Clipped	6.59	6.52	4.41	4.38	50.42	50.39	167.44	167.80		
3	Control	6.86	6.91	5.27	5.28	65.95	66.60	244.82	247.67	22.86	18.46
	Clipped	5.29	5.63	3.80	4.00	33.42	39.70	99.33	124.85		
4	Control	6.53	6.62	4.94	4.95	57.02	56.42	202.11	197.81	14.23	16.28
	Clipped	5.60	5.54	4.07	3.90	39.25	36.65	123.12	111.87		
5	Control	6.03	6.15	4.57	4.70	44.83	46.26	147.67	153.86	16.16	21.97
	Clipped	5.06	4.80	3.71	3.49	28.26	25.04	79.89	68.20		
6	Control	6.67	6.43	5.19	4.93	59.18	52.44	215.17	181.78	12.06	11.75
	Clipped	5.87	5.67	4.24	4.18	42.34	38.46	136.68	120.54		
7	Control	7.27	7.27	5.06	4.94	62.18	65.65	222.19	238.13	9.18	8.37
	Clipped	6.61	6.67	4.60	4.46	51.13	53.91	171.19	183.72		
8	Control	7.29	7.23	5.37	5.16	74.04	65.67	282.34	239.66	7.52	8.43
	Clipped	6.75	6.62	4.77	4.42	61.44	52.69	220.01	177.74		
9	Control	8.92	9.66	4.35	4.68	49.34	61.18	152.61	202.78	23.22	24.57
	Clipped	6.85	7.28	3.46	3.78	21.94	33.50	51.22	92.51		
10	Control	9.41	9.18	5.32	4.94	70.33	62.57	250.10	209.11	10.01	9.26
	Clipped	8.47	8.32	4.24	3.92	48.16	45.81	147.89	137.48		
11	Control	11.01	10.54	5.46	5.60	85.54	84.18	309.88	317.97	11.33	12.17
	Clipped	9.76	9.25	4.10	4.10	53.22	49.06	159.82	147.56		
12	Control	10.62	10.54	5.34	5.60	76.63	84.88	267.95	317.97	7.62	9.70
	Clipped	9.81	9.52	4.41	4.39	57.57	56.10	180.66	178.43		
13	Control	9.63	9.32	5.25	5.17	70.47	66.61	247.77	230.41	9.90	9.91
	Clipped	8.68	8.40	4.15	4.13	49.78	47.27	152.72	142.26		
14	Control	9.13	8.77	4.99	4.83	58.59	51.68	195.24	167.07	8.40	8.24
	Clipped	8.36	8.05	4.13	3.89	46.81	38.17	140.53	109.89		

Table S2. Maximum load and wing kinematics data

Moth	Treatment	Mass (g)	Max. Force (mN)	Flapping Frequency (Hz)	Flapping Amplitude R – (Deg.)	Flapping amplitude L – (Deg.)
1	Control	1.76	29.11	28.74	114.7	117.6
	Asymmetric	1.69	24.53	28.07	110.4	110.7
	Symmetric	1.45	24.16	29.01	115.6	113.2
2	Control	1.49	26.53	27.34	122.0	121.8
	Asymmetric	1.54	25.01	28.87	123.7	116.0
	Symmetric	1.48	22.48	29.27	117.5	129.9
3	Control	1.46	26.05	31.05	109.3	106.9
	Asymmetric	1.38	17.48	32.27	87.4	134.0
	Symmetric	1.35	16.22	30.32	122.9	131.8
4	Control	1.41	21.75	27.26	115.9	106.9
	Asymmetric	1.27	16.49	29.31	108.0	128.8
	Symmetric	1.24	16.15	29.25	119.8	127.2
5	Control	1.44	22.00	29.49	130.1	117.0
	Asymmetric	1.21	15.82	29.52	107.4	124.0
	Symmetric	1.24	14.07	29.97	123.0	119.9
6	Control	1.54	27.31	29.03	120.5	115.7
	Asymmetric	1.49	19.03	29.27	106.8	121.9
	Symmetric	1.42	20.09	30.01	120.6	121.2
7	Control	1.57	24.23	28.55	125.6	113.8
	Asymmetric	1.86	26.20	28.38	121.6	121.5
	Symmetric	1.66	24.27	30.06	120.0	125.2
8	Control	1.58	27.76	27.01	125.5	127.9
	Asymmetric	1.53	24.93	-	-	-
	Symmetric	1.50	25.10	28.10	131.6	126.9

Table S3. Oxygen consumption and carbon dioxide production data

Moth	Treatment	Mass (g)	$\dot{V}O_2$ (ml hr <sup>-1</sup> )	VCO <sub>2</sub> (ml hr <sup>-1</sup> )
9	Control	1.56	90.80	77.07
	Asymmetric	1.56	115.76	102.03
	Symmetric	1.57	134.48	103.70
10	Control	1.67	88.04	59.78
	Asymmetric	1.63	112.14	92.56
	Symmetric	1.63	108.12	92.38
11	Control	1.73	84.34	68.8
	Asymmetric	1.63	96.79	82.84
	Symmetric	1.53	77.30	64.12
12	Control	1.89	83.56	65.49
	Asymmetric	1.63	109.65	87.29
	Symmetric	1.62	78.15	61.08
13	Control	1.69	84.06	75.57
	Asymmetric	1.61	96.78	99.26
	Symmetric	1.50	126.17	111.23
14	Control	1.29	72.32	56.63
	Asymmetric	1.23	89.64	79.37
	Symmetric	1.12	80.25	67.10