Electronic supplementary material (Teulier et al.)

Table S1. Body and thorax mass of insects used. Our species comparison (part I) included *Bombus impatiens*, *Apis mellifera*, *Vespula vulgaris*, and *Locusta migratoria*. A more detailed investigation of the bumblebee *B. impatiens* (part II) was also conducted. Ratio TM/BM: ratio thorax mass/body mass. Sample sizes are indicated in parentheses. Values are means ± sem.

	Part I				**Part II**
	B. impatiens	***A. mellifera***	***V. vulgaris***	***L. migratoria***	***B. impatiens***
	(13)	(11)	(11)	(6)	(40)
Body mass (mg)	160.8 ± 13.3	86.9 ± 4.1	79.3 ± 7.0	1312.1 ± 122.9	164.0 ± 7.2
Thorax mass (mg)	57.1 ± 4.2	32.9 ± 0.9	28.0 ± 2.5	443.9 ± 54.0	56.4 ± 2.5
Ratio TM/BM	0.36 ± 0.01	0.38 ± 0.01	0.35 ± 0.01	0.35 ± 0.01	0.35 ± 0.01

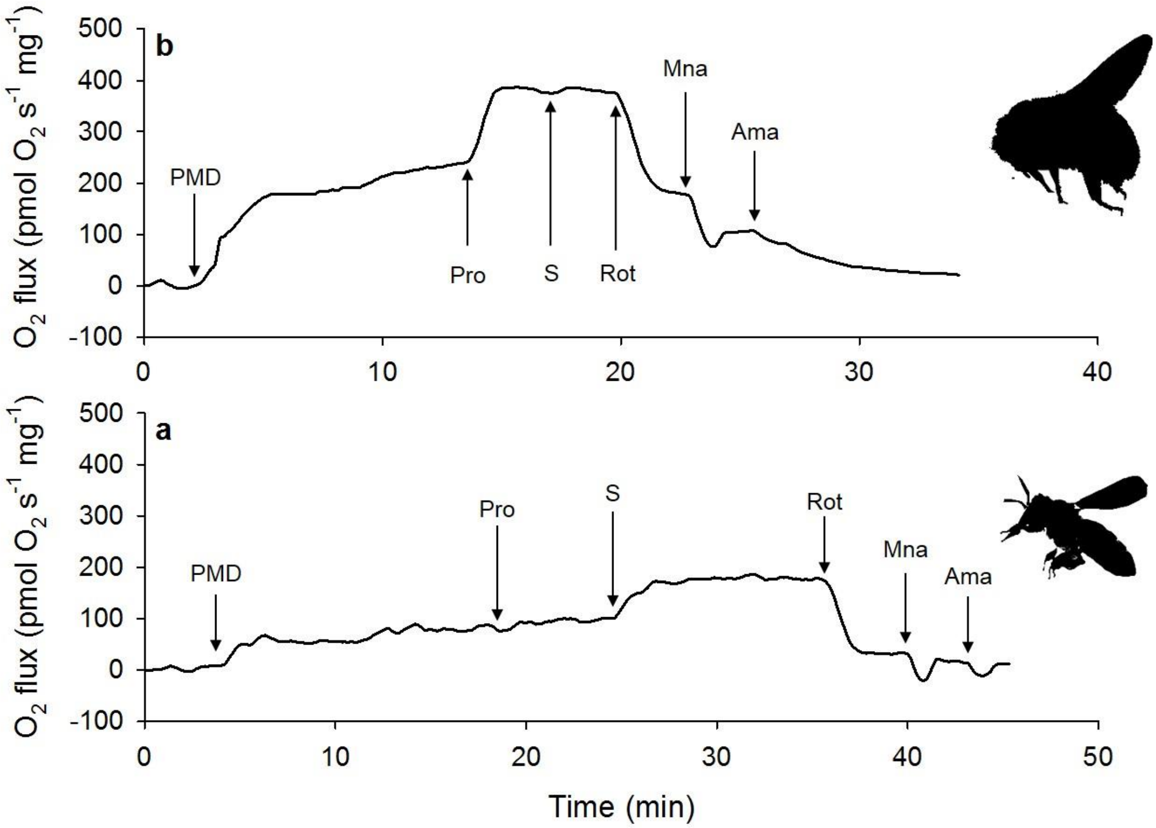

Figure S1. Traces of oxygen flux (pmolO_2 s^{-1} mg^{-1}) obtained using sequential addition of substrates and inhibitors performed on thoracic flight muscle fibers of the bumblebee *Bombus impatiens* (A) and the honeybee *Apis mellifera* (B). The following substrates were added: pyruvate + malate + ADP (PMD), proline (Pro), and succinate (S), followed by the inhibitors rotenone (R), malonate (Mna), and antimycin A (Ama).

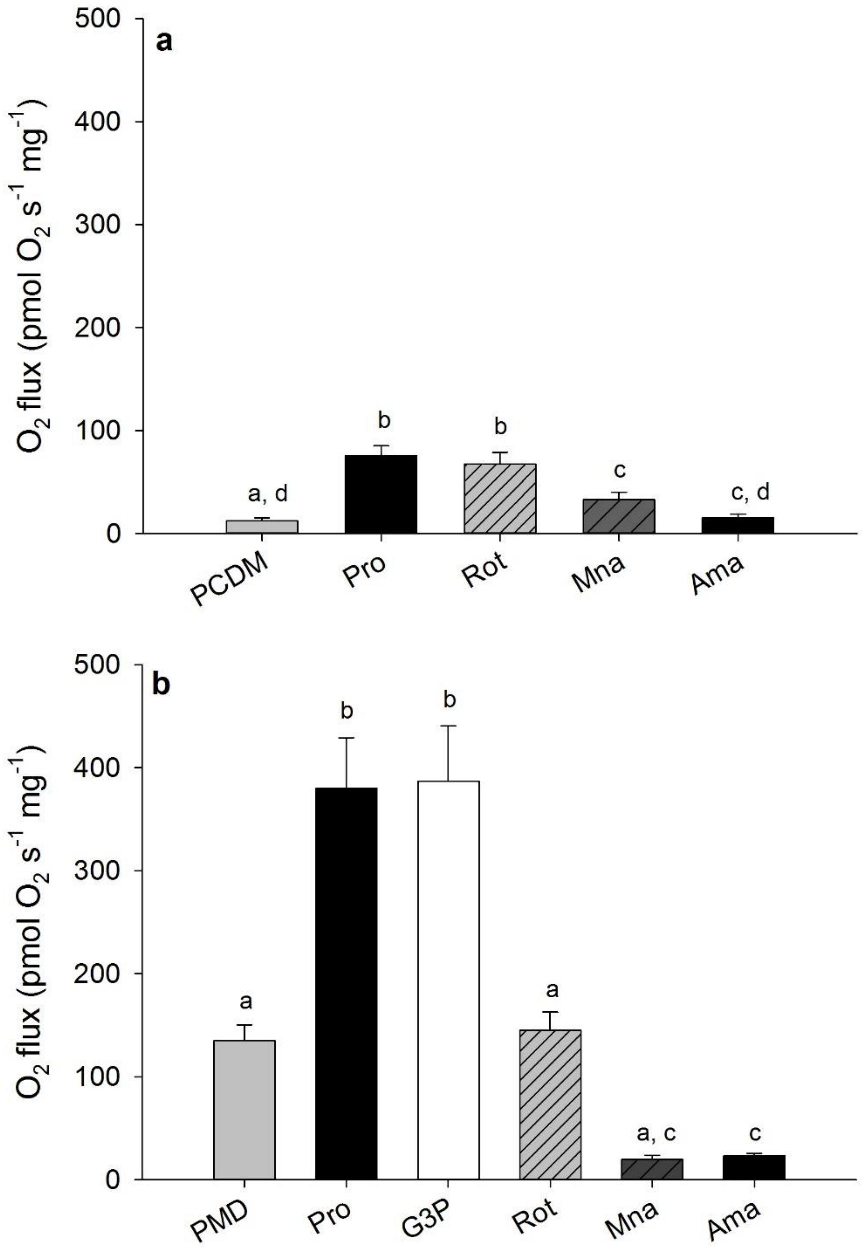

Figure S2. Effects of palmitoyl-carnitine (A) and glycerol-3-phosphate (B) on respiration rates (pmol O_2 s^{-1} mg^{-1}) measured in flight muscle fibers of bumblebees (*Bombus impatiens*). PCDM: palmitoyl-carnitine + ADP + malate, PMD: pyruvate + malate + ADP, Pro: proline, G3P: glycerol-3-phosphate, Rot: rotenone, Mna: malonate, Ama: antimycin A. Values presented are means + sem. Bars with different letters are significantly different ($P<0.05$).

Table S2. Respiration rates measured in flight muscle fibers of four insect species. Oxygen fluxes (pmol O_2 s^{-1} mg^{-1}) were determined after successive addition of pyruvate + malate + ADP (PMD), proline (PMD + Pro), succinate (PMD + Pro + S), rotenone (Rot), malonate (Mna), and antimycin A (Ama).

Species	Substrates and inhibitors					
	PMD	PMD + Pro	PMD + Pro +S	Rot	Mna	Ama
Apis mellifera	122.46±24.33	137.88±25.81	192.76±25.43	49.98±10.07	22.18±18	18.14±2.60
Bombus impatiens	124.56±20.68	291.71±41.70	312.20±42.44	155.59±19.45	20.72±3.82	19.55±1.94
Vespula vulgaris	117.62±13.12	256.49±37.34	280.18±41.53	120.49±20.23	16.21±2.41	14.50±1.03
Locusta migratoria	74.98±15.25	74.14±15.30	129.78±25.37	41.49±10.52	12.63±2.82	3.73±0.66

Table S3. Respiration rates measured in flight muscle fibers of *Bombus impatiens*. Oxygen fluxes (pmol O_2 s^{-1} mg^{-1}) were determined after successive addition of substrates and inhibitors using various protocols. Pyruvate + malate + ADP (PMD), proline (Pro), succinate (S), rotenone (Rot), malonate (Mna), and antimycin A (Ama).

Protocol	Substrates and inhibitors						
	PDM	PDM + Pro	PDM + S	PDM + S + Pro	Rot	Mna	Ama
#1	145.28±13.84	317.03±33.06	-	-	173.55±24.06	9.52±1.76	15.06±3.08
#2	160.49±15.77	-	246.55±24.30	-	61.17±6.79	18.01±3.40	19.22±1.99
#3	149.74±10.73	-	194.87±17.38	298.22±23.38	175.02±38.31	20.44±4.87	18.41±1.79

Table S4. Respiration rates measured in flight muscle fibers of *Bombus impatiens*. Oxygen fluxes (pmol O_2 s^{-1} mg^{-1}) were determined after successive addition of substrates and inhibitors using various protocols. Malate + ADP (MD), palmitoyl-carnitine + ADP + malate (PCDM), pyruvate + malate + ADP (PMD), proline (Pro), glycerol-3-phosphate (G3P), rotenone (Rot), malonate (Mna), and antimycin A (Ama).

Protocol	Substrates and inhibitors							
	DM	PCDM	PDM	Pro	G3P	Rot	Mna	Ama
#4	47.18±8.14	-	-	108.39±7.47	-	85.99±7.42	35.83±2.78	10.42±3.20
#5	-	12.36±2.83	-	75.39±9.78	-	67.72±11.26	32.91±7.24	15.28±3.60
#6	-	-	135.07±15.49	380.03±48.99	386.97±53.52	145.15±17.70	19.88±3.95	23.14±2.53