Appendix 1: Biochemical Characterization

Biochemical or physiological pathways are likely to underlie virtually all traits. In our case, *Ak* and *Ldh* may underlie burst-swimming speed and activity rate, respectively. As such, we aimed to quantify the activity of these two enzymes in a subset of the same individuals on which we measured behavioral and morphological traits. Specifically, we selected three larvae of each species for chemical analysis while avoiding selecting individuals that were outliers in the earlier behavioral assays (0-4 individuals depending on the species, mean=1.4 individuals excluded per species).

We conducted all chemical analyses following McPeek (1999). We began by measuring larvae to the nearest 1 μg, then ground each larva in chilled 500 mL imidazole buffer (7.0 pH). Samples were centrifuged twice for 5 minutes (14000 rpm) before we extracted the supernatant and held it on ice for further spectrophotometric assays.

Ak activity in each sample was assayed in 1 mL of a solution of 50 mM imidazole buffer (7.0 pH), 10mM glucose, 1.5 mM ADP, 5 mM AMP, 0.5 mM NADP, 5 mM magnesium acetate, and 5 mM phospho-L-arginine with 5μL hexokinase and 1 μL glucose-6-phosphate dehydrogenase. We added 100 μL of imidazole buffer and 25 μL of the supernatant, then recorded the absorbance at 340 nm (25°C) every 15 seconds for four minutes. Changes in absorbance represent the production of nicotinamide adenine dinucleotide phosphate (NADPH) that is produced by the reaction catalyzed by *Ak*. The slope over a linear time interval of this reaction therefore serves as a measure of *Ak* activity, expressing the amount (μM) of NADPH produced per gram of wet mass per minute.

We used a similar spectrophotometric technique to measure *Ldh* activity. We assayed *Ldh* in a 1 mL solution of 50 mM imidazole (7.0 pH), 5 mM KCl, 5 mM pyruvate, and 0.2 mM NADH. We then added 15 μL of supernatant and measured absorbance at 340 nm every 15 seconds for 1 minute. The change in absorbance measures the loss of NADH as *Ldh* catalyzes its oxidation by pyruvate to produce NAD^+ and lactate. We can then measure *Ldh* activity as the largest change in absorbance over a 15 second interval, and thus calculate a measure of μM NADH consumed per gram of wet tissue per minute.

Table S1: Summary data for 17 dragonfly species identified during the community survey. Species are categorized by habitat type as being specialists in ponds without large game fish (NF), specialists in ponds with large game fish (F), or else generalists (G). These classifications are reflected by the proportion of individuals of a given species found in fish versus fishless ponds (e.g. NF species always have a value of 1).

Species	Habitat Type	Proportion in ponds without game fish	Activity Rate (cm/three hours)	Burst Swim Speed (cm/s)	Sample size for behavior assays	*Ldh* Activity	*Ak* Activity
Aeshna canadensis	NF	1	75	8	13	2.98	17
Libellula quadrimaculata	NF	1	66	7	14	3.2	19
Sympetrum obstrusum	NF	1	55	11	12	2.45	44
Epitheca canis	NF	1	52	3	14	1.9	16
Pachydiplax longipennis	G	0.016	26	23	11	1.23	82
Anax junius	G	0.69	73	32	13	3.44	111
Libellula Lydia	G	0.23	44	18	10	0.88	47
Libellula puchella	G	0.9	45	12	10	1.79	31
Libellula luctosa	G	0.56	39	9	10	1.67	40
Sympetrum vicinum	G	0.035	24	14	13	1.2	52
Leucorrhinia intacta	G	0.98	53	2	12	2.44	21
Erythemis simplicolis	G	0.038	19	17	12	0.89	42
Arigomphus furcifer	G	0.6	23	7	10	0.67	6

Epitheca princeps	F	0	6	1	12	0.67	3
Epitheca cynosura	F	0	14	21	13	0.21	48
Celithemis elisa	F	0	17	23	113	1.1	68
Libellula incesta	F	0	9	32	10	0.49	77