

Upper thermal tolerance of early juveniles of six terrestrial hermit crab species

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Supplementary material

Table S1.

Median upper lethal temperature (MULT) estimates for evaluating the upper thermal tolerance of the early juveniles of six terrestrial hermit crab species.

Species	Brood no.	Lot no.	Number of test juveniles	Number of moulted juveniles	MULT (°C)	
					Estimate	Standard error
<i>Birgus latro</i> (Linnaeus, 1767)	A	1	15	4	37.18	0.06
		2	15	2	37.55	0.03
<i>Coenobita brevimanus</i> Dana, 1852	A	1	15	0	38.76	0.03
		2	15	0	37.33	0.08
	B	1	15	2	39.86	0.02
		2	15	1	39.12	0.14
	C	1	15	1	39.51	0.23
		2	15	0	39.38	0.02
<i>Coenobita cavipes</i> Stimpson, 1858	A	1	15	0	38.14	0.02
		2	15	0	38.42	0.02
	B	1	15	0	38.92	0.01
		2	15	0	38.95	0.01
<i>Coenobita purpureus</i> Stimpson, 1858	A	1	15	0	40.03	0.02
		2	15	0	39.96	0.01
	B	1	15	0	39.68	0.01
		2	15	1	39.94	0.05
<i>Coenobita rugosus</i> H. Milne-Edwards, 1837	A	1	15	1	38.72	0.08
		2	15	3	38.16	0.04
	B	1	15	0	38.51	0.39
<i>Coenobita violascens</i> Heller, 1862	A	1	15	1	35.97	0.04
		2	15	1	34.48	0.10
	B	1	15	2	35.23	0.09
		2	15	0	33.01	0.10

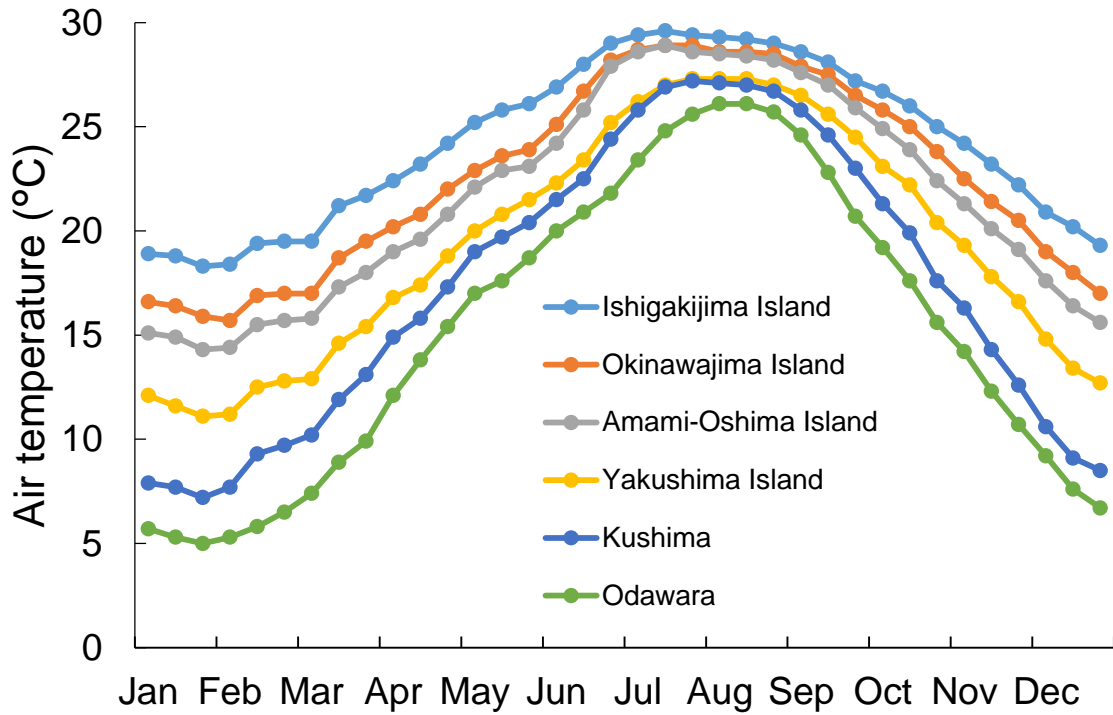


Figure S1. Seasonal air temperature fluctuations at six representative localities throughout the geographical distribution of coenobitids in Japan. Climate normals, which are three-decade (1981–2010) averages of monthly (10-day interval) temperatures, are shown for Ishigakijima Island (24°20.2' N, 124°09.8' E), Okinawajima Island (26°35.6' N, 127°57.9' E), Amami-Oshima Island (28°22.7' N, 129°29.7' E), Yakushima Island (30°23.1' N, 130°39.5' E), Kushima (31°27.9' N, 131°13.2' E), and Odawara (35°16.6' N, 139°09.3' E). Temperatures were measured at the meteorological station in each locality. Data are derived from the Japan Meteorological Agency (<http://www.data.jma.go.jp/obd/stats/etrn/index.php>).

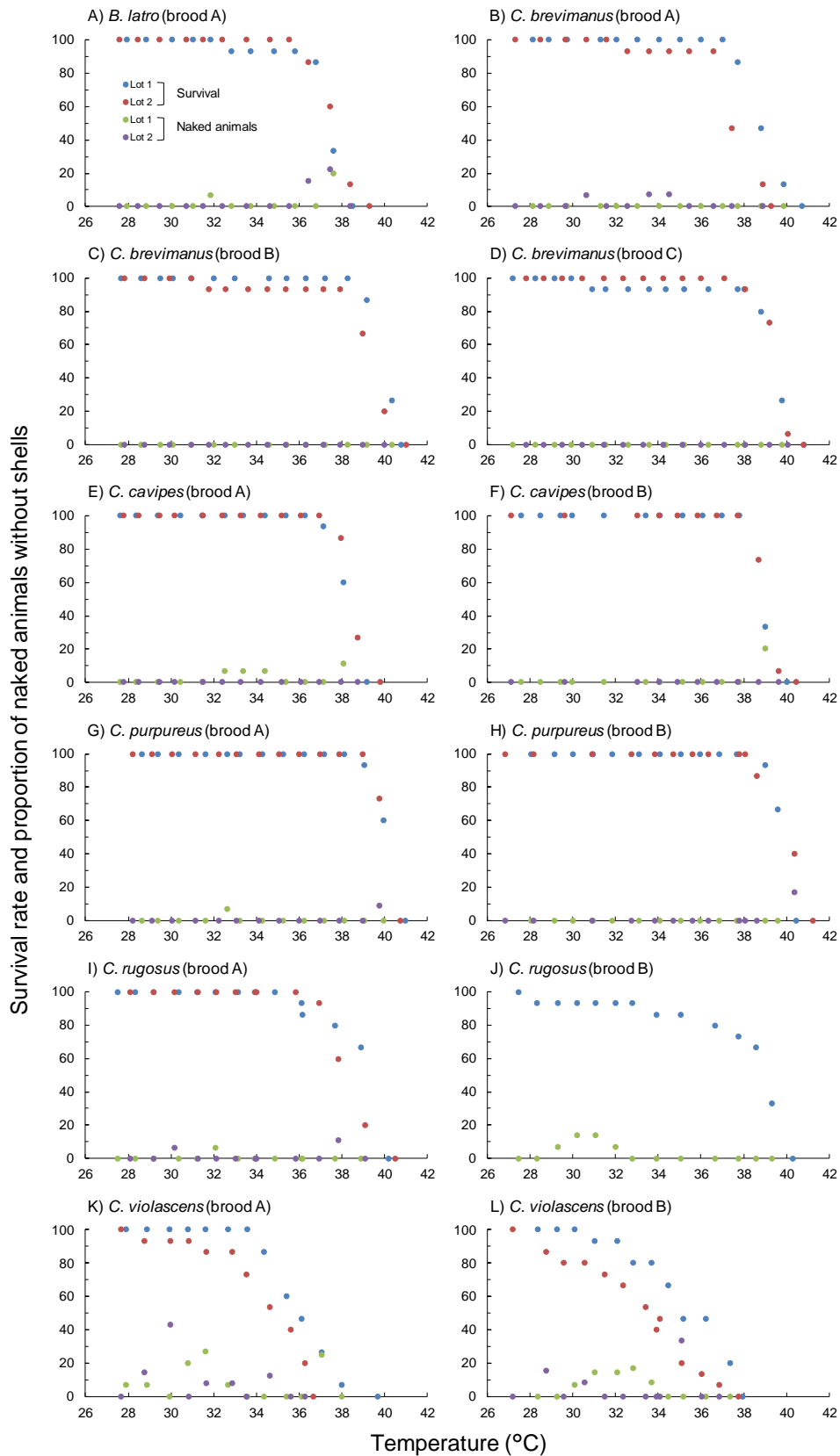


Figure S2. Changes in the survival rates and proportions of naked animals without shells in relation to temperatures when the upper thermal tolerance limits were evaluated for the early juveniles of six terrestrial hermit crab species, *Birgus latro*, *Coenobita brevipanus*, *C. cavipes*, *C. purpureus*, *C. rugosus*, and *C. violascens*. Experiments were conducted using one or two lots (each of 15 juveniles)

from one (*B. latro*), three (*C. brevimanus*) or two broods (other species).

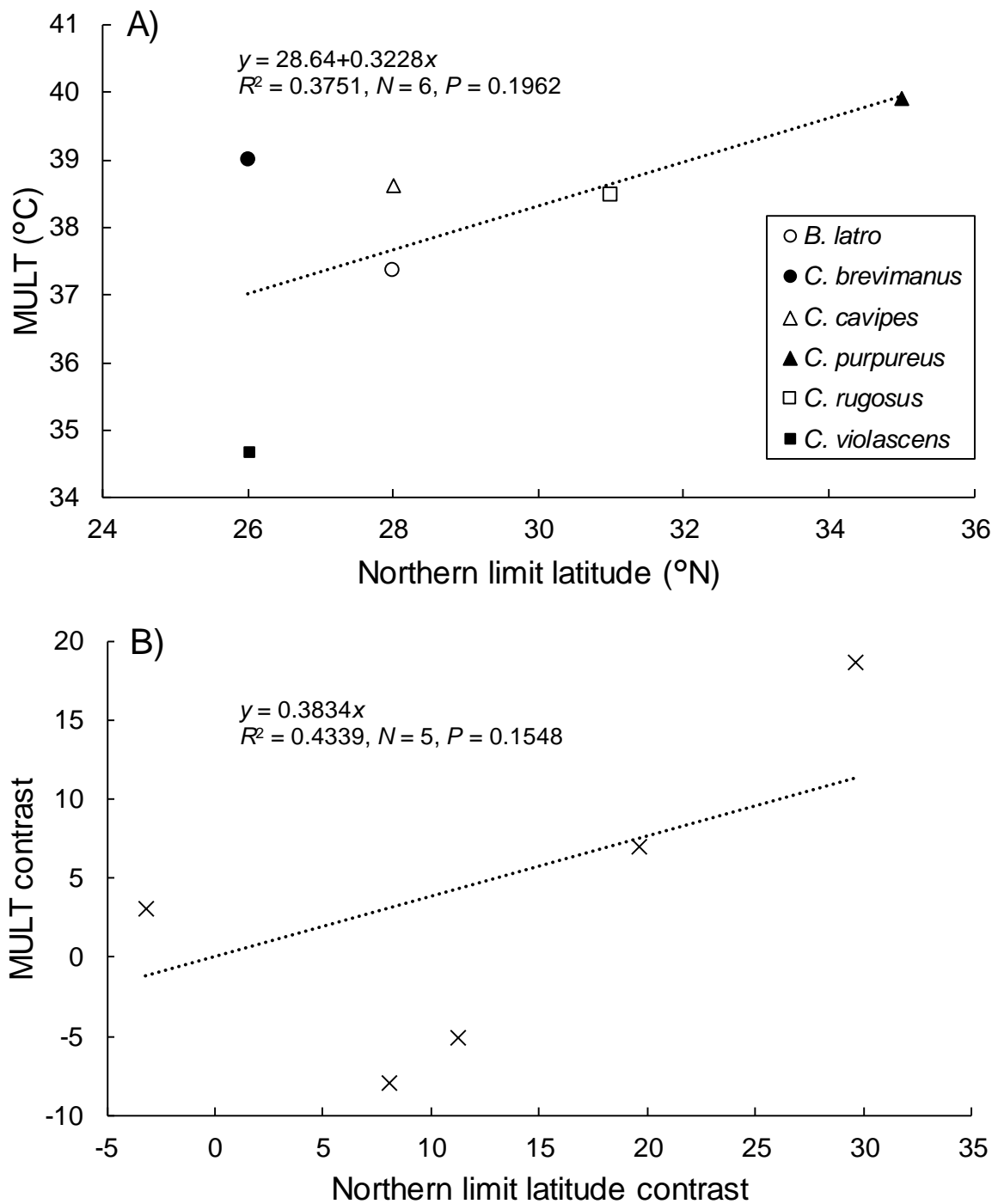


Figure S3. Relationships between the latitude of the northern limits of distributions and the mean values of the median upper lethal temperature (MULT) estimates based on the raw values (A) and phylogenetically independent contrasts (B) for six terrestrial hermit crab species, *Birgus latro*, *Coenobita brevimanus*, *C. cavipes*, *C. purpureus*, *C. rugosus*, and *C. violascens*.