This is an appendix to the paper by Taylor 2000 Maximum force production: why are crabs so strong? *Proc. R. Soc. Lond.* B **267**, 1475–1480.

Electronic appendices are refereed with the paper. However, no attempt has been made to impose a uniform editorial style on the electronic appendices.

Appendix A. Muscle stress and sarcomere length values for species used in the scaling analysis. Four stress values for *Menippe mercenaria* claws were not included in the analysis, because no sarcomere lengths (SL) were reported.

Taxa				Sarcomere Length (µm)			Maximum Stress (kN m $^{-2}$)			
Species	Ref.	Body Region	Muscle	Mean (SE)	Range	*n*	Mean (SE)	Range	*n*	Method
Crustacea										
Cancer antennarius	1	chela crusher	dactyl closer	13.7 (0.32)	10.7 - 17.1	27	866 (35)	551 - 1182	24	*vv,w,s*
Cancer branneri	1	chela crusher	dactyl closer	12.7 (0.27)	11.5 - 13.7	9	1032 (62)	713 - 1536	12	*vv,w,s*
Cancer gracilis	1	chela crusher	dactyl closer	12.7 (0.36)	9.6 - 14.7	15	526 (29)	383 - 743	14	*vv,w,s*
Cancer magister	1	chela crusher	dactyl closer	12.2 (0.26)	10.0 - 15.3	26	756 (28)	519 - 963	20	*vv,w,s*
Cancer oregonensis	1	chela crusher	dactyl closer	16.5 (0.36)	14.2 - 17.1	9	1007 (30)	817 - 1346	21	*vv,w,s*
Cancer productus	1	chela crusher	dactyl closer	16.1 (0.26)	14.4 - 17.8	13	792 (60)	421 - 1224	15	*vv,w,s*
Cancer pagurus	2	chela crusher	dactyl closer	12.8 (0.39)	9 - 14	5	496 (321)	320 - 720	18	*vt,w,c*
M. mercenaria (temp)‡	3	chela crusher	dactyl closer	--	--	--	1094 (95)	157 - 2187	26	*vv,w,s*
M. mercenaria (temp)‡	3	chela cutter	dactyl closer	--	--	--	673 (100)	--	7	*vv,w,s*
M. mercenaria (trop)‡	3	chela crusher	dactyl closer	--	--	--	711 (135)	110 - 1702	12	*vv,w,s*
M. mercenaria (trop)‡	3	chela cutter	dactyl closer	--	--	--	896 (90)	--	6	*vv,w,s*
Carcinus maenas	4	chela chrusher	dactyl closer	13.1 (--)	--	2	667 (580)	286 - 1057	16	*vt,w,e*
Carcinus maenas	4	chela cutter	dactyl closer	9.5 (--)	--	2	474 (410)	172 - 779	15	*vt,w,e*
Macropipus spp	2	chela crusher	dactyl closer	8.9 (0.23)	7 - 9	4	275 (422)	--	6	*vt,w,c*
Macropipus spp	2	chela cutter	dactyl closer	7.5 (0.21)	3 - 5	4	268 (246)	--	7	*vt,w,c*
Callinectes sapidus	5	chela crusher	dactyl closer	11.2 (0.03)	6 - 15	3	638 (178)	--	18	*vv,w,s*
Callinectes sapidus	5	chela cutter	dactyl closer	10.5 (0.09)	6 - 15	3	514 (143)	--	18	*vv,w,s*
C. opilio (mature)	6	chela cutter	dactyl closer	10.4 (--)	4 - 17	--	552 (24)	--	12	*vv,w,s*
C. opilio (immature)	6	chela cutter	dactyl closer	9.5 (--)	4 - 17	--	444 (29)	--	13	*vv,w,s*
Homarus americanus	7 & 8	chela crusher	dactyl closer	7.6 (--)	6 - 10	--	302 (--)	253 - 390	3	*vv,w,s*
Homarus americanus	7 & 8	chela cutter	dactyl closer	4.2 (--)	2 - 10	--	272 (--)	182 - 426	8	*vv,w,s*
Cherax destructor	9	chela cutter	dactyl closer	8.6 (0.11)	6 - 10	49	305 (17)	100 - 571	49	*vt,f,c*
Cherax destructor	9	chela cutter	dactyl closer	3.3 (0.32)	2 - 5	64	186 (8.0)	57 - 278	64	*vt,f,c*
Astacus fluviatilis	10	walking leg	extensor	10.5 (0.3)	--	--	648 (--)	0.0 - 804	--	*vt,f,c*
Homarus americanus	11	adominal	MSE	6.8 (0.37)	6 - 10	25	443 (76)	--	4	*vt,b,c*
Homarus americanus	11	adominal	LDE	2.4 (0.19)	2 - 4.5	25	82 (15)	--	3	*vt,b,c*
Homarus americanus	12 & 13	2nd antenna	slow remotor	10.5 (--)	8 - 13	20	275 (--)	--	--	*vt,w,e*

(Appendix A: continued)

Taxa				Sarcomere Length (µm)			Maximum Stress (kN m $^{-2}$)			
Species	Ref.	Body Region	Muscle	Mean (SE)	Range	*n*	Mean (SE)	Range	*n*	Method
Uniramia										
Schistocerca gregaria	15	hindwing	flight	3.9 (--)	3.1 - 4.1	--	157 (--)	--	--	*vt,b,e*
Schistocerca gregaria §	16	wing	metathoracic	3.9 (--)	--	--	295 (23)	--	12	*vv,w,e*
Schistocera americana §	17	wing	metathoracic	3.9 (--)	--	--	363 (14)	--	5	*vv,w,e*
N. robustus ¥	18	singing/wing	mesothoracic	3.3 (0.3)	--	3	109 (--)	--	7	*vv,w,e*
N. robustus ¥	18	wing	metathoracic	3.1 (0.3)	--	3	240ç (--)	--	5	*vv,w,e*
N. triops §¥	18	singing/wing	mesothoracic	3.3 (--)	--	--	124ç (--)	--	6	*vv,w,e*
N. triops §¥	18	wing	metathoracic	3.1 (--)	--	--	214ç (--)	--	6	*vv,w,e*
Schistocerca gregaria †	19 & 20	hind leg	tibia extensor	11.0 (--)	--	--	705 (--)	660 - 750	--	*vv,w,e*
Vertebrata										
Scyliorhinus canicula	21	postanal	myotomal white	2.6 (--)	2.3 - 2.8	--	241 (22)	--	7	*vt,b,e*
Cyprinus carpio	22	mid-line	myotomal red	2.1 (--)	--	--	116 (4)	102 - 125	5	*vt,b,e*
Makaira nigricans	23	trunk	myotomal white	2.3 (--)	--	--	176 (2)	--	13	*vt,f,c*
Makaira nigricans	23	trunk	myotomal red	2.3 (--)	--	--	57 (9)	--	11	*vt,b,c*
Xenopus laevis	24	hind leg	IL (1N fibres)	2.3 (--)	--	--	396 (54)	--	10	*vt,f,e*
Xenopus laevis	24	hind leg	IL (2S fibres)	2.3 (--)	--	--	337 (38)	--	12	*vt,f,e*
Xenopus laevis	24	hind leg	IL (2F fibre)	2.3 (--)	--	--	312 (36)	--	6	*vt,f,e*
Xenopus laevis	24	hind leg	IL (2N fibres)	2.3 (--)	--	--	300 (49)	--	8	*vt,f,e*
Pseudemys scripta	25	hind leg	IL (fast glycolytic)	2.3 (--)	--	--	183 (5)	--	17	*vt,f,s*
Pseudemys scripta	25	hind leg	IL (fast oxidative)	2.3 (--)	--	--	120 (3)	--	16	*vt,f,s*
Pseudemys scripta	25	hind leg	IL (slow oxidative)	2.3 (--)	--	--	71 (3)	--	19	*vt,f,s*
Rattus spp.	26	hind leg	EDL	2.5 (--)	--	--	209 (10.7)	--	8	*vt,b,e*
Rattus spp.	26	hind leg	soleus	2.5 (--)	--	--	198 (19)	--	8	*vt,b,e*
albino mice	27	extraocular	inferior rectus	2.6 (0.12)	--	6	102 (11)	--	6	*vt,w,e*
albino mice	27	hind leg	EDL	3.1 (0.14)	--	6	249 (10)	--	6	*vt,w,e*

(Appendix: continued)

Taxa					Sarcomere Length (µm)				Maximum Stress (kN m^{-2})		
	Species	Ref.	Body Region	Muscle	Mean (SE)	Range	*n*	Mean (SE)	Range	*n*	Method
Vertebrata											
	albino mice	27	hind leg	soleus	2.8 (0.08)	--	6	177 (22)	--	6	*vt,w,e*
	albino mice	27	diaphram	hemidiaphram	2.7 (0.09)	--	6	211 (9)	--	6	*vt,b,e*
	Homo sapien ¶	28 & 29	hind leg	triceps surae	2.7 (--)	--	--	120 (4)	101 - 151	5	*vv,w,s*
	Homo sapien ¶	28 & 29	hind leg	quadriceps	2.7 (--)	--	--	239.4 (8)	191 - 277	5	*vv,w,s*
	Homo sapien ¶	28 & 29	hind leg	hip extensors	2.7 (--)	--	--	127.4 (8)	74 - 187	5	*vv,w,s*

Method symbols: vv = in vivo, vt = in vitro, w = whole muscle, b = bundle of fibres, f = single fibres, e = stimulated electrically, c = stimulated chemically, s = self stimulated. Muscle abreviations: MSE = medial superficial extensor, LDE = lateral deep extensor, IL = iliofibularis, EDL = extensor digitorum longus. Species abreviations: *M. mercenaria* = *Menippe mercenaria*, *C. opilis* = *Chionoecetes opilio*, *N. robutus* = *Neoconocephalus robustus*, *N. tripo*s = *Neoconocephalus triops.*
‡ sarcomere length measurements are not available for claws of M. mercenaria crabs. However, mean claw mechanical advantage is reported at 0.390 (N = 77) for the crusher and 0.304 (N = 29) for the cutter (Blundun, 1988). Using the regression in figure A2-3 (MA verses SL; y = 25.858x + 4.8104), an average SLs of 14.9 µm for the crusher and 12.7 µm for the cutter-claw were predicted. Assuming these SL's are reasonable estimates, the mean stress of both claw types are within the 95% confidence limits of the regression, resting SL verses maximum stress (Fig. A2-2).
§ sarcomere length assumed to be the same as found for a closely related species.
¥ stress has been corrected for myofibril area.
† only A-band length measured, therefore sarcomere length estimated by doubling this value.
¶ sarcomere length estimated by taking the mean sarcomere length for mammalian muscles referenced in Josephson (1993).
Ref.= references, temp = temperate, trop = tropical

References: 01) Taylor, (data presented here); **02)** Warner & Jones, 1976; **03)** Blundon, 1988; **04)** Warner *et al.*, 1982; **05)** Govind & Blundon, 1985; **06)** Claxton, *et al.*, 1994; **07)** Govind, 1984; **08)** Elner & Campbell, 1981; **09)** West *et al.*, 1992; **10)** Zachar, & Zacharova, 1966; **11)** Jahromi, & Atwood, 1969; **12)** Mendelson,1969; **13)** Bevengut, et al., 1993; **14)** Griffiths, et al., 1990; **15)** Weis-Fogh, 1956; **16)** Malamud, et al., 1988; **17)** Malamud, & Josephson, 1991; **18)** Josephson, 1984; **19)** Bennet-Clark, 1975; **20)** Cochrane, *et al.*, 1972; **21)** Curtin & Woledge, 1988; **22)** Rome & Sosnicki, 1990; **23)** Johnston & Salamonski, 1984; **24)** Lännergren, 1987; **25)** Mutungi, & Johnston, 1987;
26) Ranatunga, 1984; **27)** Luff, A.R. 1981; **28)** Thorpe et al., 1998; **29)** Josephson, 1993.

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