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SUPPLEMENTARY ONLINE MATERIAL FOR

**New information on sexual dimorphism and allometric growth  
in *Keichousaurus hui*, a pachypleurosaur from the Middle Triassic  
of Guizhou, South China**

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**Supplementary Online Material**

Table 1. Measurements of *Keichousaurus hui*, used in the current study.

Table 2. The result of LDA for training data.

Table 1. Measurements (in mm) of *Keichousaurus hui*, used in the current study. Gender 1 stands for the initial genders according to published ratios of Cheng et al. (2009). Gender 2 stands for the reclassification by LDA. Abbreviations: d, width at distal end; F, female; fb, fibula; fm, femur; hm, humerus; l, length; M, male; m, width at the middle of the shaft; nc, neck; rd, radius; S, subadult; sd, standard length; s-v, snout-vent; ta, tail; tb, tibia; ul, ulna.

Number/item	nc.l	ta.l	s-v.l	sd.l	hm.l	fm.l	rd.l	ul.l	tb.l	fb.l	hm.d	hm.m	fm.d	fm.m	Gender 1	Gender 2
NMNS000933-F0034394	28	40	78	7	6.2	6.8	3.1	3.1	2.3	3	2	1	1.8	1	M	M
NMNS-chw-01	11.5	16	33.5	2.5	2	3	1	0.9	1	1	0.9	0.8	0.6	0.5	F	F
NMNS-chw-02	18.2	26	48.2	4	3.8	4.8	2	2	1.8	1.6	1.2	0.8	1	0.6	F	F
NMNS-chw-03	16	15	40	3	2.8	3.5	1.2	1.2	1	1.2	1	0.5	0.9	0.5	M	M
NMNS-chw-04	15	16	39.2	3	2.5	3	1.3	1.5	1	1.1	–	–	–	–	F	F
NMNS-cyn2002-01	76.5	110	187	18.2	21	19	10	9	7.5	8	5	5	4	3	M	F
NMNS-cyn2002-02	60	96	145	13	13	12.8	6.5	6.2	5	6	3	2.5	2.4	1.8	F	F
NMNS-cyn2002-03	57	82	130.5	12.5	13	13	6.5	6	5	5.5	3	2.5	2	1.8	F	F
NMNS-cyn2002-04	70	120	166	15.5	25.5	21	12.5	12	8	9	3	2	6	3	M	M
NMNS-cyn2002-05	54	88	128	11	11.5	12	6	6	4.5	4.5	3	2.2	2.2	1.3	F	F
NMNS-cyn2002-06	81	127	198	18.5	22	21	10	9.5	7	8	5.2	3.7	3	2.7	F	F
NMNS-cyn2002-07	70	128	168	16	17	17	9	8	6	6.5	4.2	3.8	2.5	2	F	F
NMNS-cyn2002-08	72	120	163.8	14.5	26	21	10	11	8	9	7	2.9	4	2	M	M
NMNS-cyn2002-10	45	120	110	13.8	19.2	17	10	9	6.5	7	4.5	2.5	2	1.8	M	M
NMNS-cyn2002-11	70.5	85	163.5	15	22	18	11.5	10	7.5	8	5.8	2.2	2.8	1.8	M	M
NMNS-cyn2002-12	74	120	180	17	28	23	14	13	8	10	8.5	4	4	3	M	M
NMNS-cyn2002-13	22.8	30	57.5	4.8	4.2	5	2	2	1.8	2	1	0.9	1.5	1	F	F
NMNS-cyn2002-14	57	80	126	11.5	17.5	15	9	8.5	4	5.2	4.8	2	2	1.7	M	M
NMNS-cyn2003-15	82	126	182	16.5	25.5	21.5	11	13	9	10	7	3	3	2	M	M
NMNS-cyn2003-16	62	90	138	12	13	13.5	6.5	6	4.8	5.8	3	2.6	2.2	1.8	F	F
NMNS-cyn2003-17	87	196	238	21	30	25	14	15	9	10	8	4	4	2.8	M	M
NMNS-cyn2003-18	60	99	142.8	12.8	20	17	10.8	9.6	6.5	7	5.5	3	2.5	2	M	M
NMNS-cyn2003-19	40	58	102	8.5	9.5	10	5	5	3	4.2	2	1.8	1.5	1	F	F
NMNS-cyn2003-20	–	138	–	18	27.5	24	14.5	13	9.5	10.5	10	5	3.6	2.6	M	M
NMNS-cyn2003-21	69	90	174	17	17	16.5	8	7.5	6	7	4	3	3	2	F	F
NMNS-cyn2003-22	73	20	177	16	24.5	19	12	11	7.5	8.5	7	3	3	2	M	M
NMNS-cyn2003-23	51	70	112	9	10.5	11	5	5	4	4.2	2.5	1.8	2	1.2	F	F
NMNS-cyn2003-24	68	95	154	13.8	15	15	7	7	5.6	6.2	3	2.6	2.5	2	F	F
NMNS-cyn2003-25	72	112	169	17	25	20	12	11.5	8	9	7	3	4	2.1	M	M
NMNS-cyn2003-26	56	75	148	11	11.5	12	6	6	4.5	4.5	3	2	2	1.5	F	F
NMNS-cyn2003-27	60	90	150	14	16	14.5	7	8	5	6.5	3	3	3.5	2	M	M
NMNS-cyn2005-01	84	130	197	16.5	26	22	14	13	8	9	7.8	4	3.5	3	M	M
NMNS-cyn2005-02	58	90	141	12	13	14	7.5	7	5	5.2	2.8	2	2.1	1.5	F	F
NMNS-cyn2005-03	81	130	189	18	19.5	16.5	8	8.5	6	7	4.5	3.8	3	2.5	M	M
NMNS-cyn2005-04	42.5	72	104.5	9.2	10	10.5	5	5.2	4	4.8	2.3	1.8	1.8	1.1	F	F
NMNS-cyn2005-05	57	78	129.5	11.2	10.8	11.5	6	5	4	5	2.9	2	1.6	1.5	F	F
NMNS-cyn2005-06	80	100	184	16	20	20	9.5	9.8	7	8	5	3	3	2.5	F	F
NMNS-cyn2005-07	56	75	136.8	11	13	12	5.8	5.5	4	5	2.8	3	2	1.5	F	F
NMNS-cyn2005-08	70	118	162	15	23	20	12	12	7	9	6	2.5	3	2	M	M
NMNS-cyn2005-09	73	105	176	12	19.5	17	10	10	8	8	4	3	3	2.6	M	M
NMNS-cyn2005-10	72	80	176	16	27	22	13.5	13	9	9	7	3.2	3.6	2	M	M
NMNS-cyn2005-11	77	108	179	15.8	18.5	15	8	8	6	7.2	4	3	2.5	2	M	M
NMNS-cyn2005-12	73	118	172	16	21.5	18	10.5	10	7	8	6.5	4	3.5	2.2	M	M
NMNS-cyn2005-13	46	60	109	8.8	9.5	9.5	4	4	3.5	4	1.5	1.5	1.8	1	F	F
NMNS-cyn2005-14	58	90	141.5	12.2	12.5	12.5	6.5	6	5	5.5	3	2.2	1.8	1.5	F	F
NMNS-cyn2005-15	68	99	164	14	19	17.5	9	8.5	5.6	7.5	3	3.5	2.5	2	M	F
NMNS-cyn2005-16	56	90	142	13	13	14.5	7	6	5	5.1	3.6	2.1	1.9	1.8	F	F
NMNS-cyn2005-17	56	80	127	10	11	11.2	5	5	4	5	2.4	2	1.3	1	F	F
NMNS-cyn2005-18	71	112	169	16.5	18	17	9	9	6	7	5	4.2	2.5	3	F	F
NMNS-cyn2005-19	47	83	124	11	10.5	11.2	5.2	4.5	4	4.2	2.8	1.6	1.8	1.2	F	F
NMNS-cyn2005-20	41	76	102.5	9	9.5	10.1	5	4.8	4.8	4.5	2.1	1.6	1.2	1	F	F
NMNS-cyn2005-21	75	95	173	15.5	17	18	8	8	7.5	8	4	3	2	2.1	F	F

Number\item	nc.l	ta.l	s-v.l	sd.l	hm.l	fm.l	rd.l	ul.l	tb.l	fb.l	hm.d	hm.m	fm.d	fm.m	Gender 1	Gender 2
NMNS-cyn2005-22	66	100	158	14	15	14.5	7	7	4.7	6	3.2	2.4	2	1.5	F	F
NMNS-cyn2005-23	56	85	128	11	15	13	7	7	4	5	3.8	2	2.1	1.6	M	M
NMNS-cyn2005-24	76	105	175	15	16.8	16	8	7.5	6	6.5	3.2	3	3	2.1	F	F
NMNS-cyn2005-25	47	63	112	10.5	12	12	5.5	5.5	4	5	2.9	2	2	1.8	F	F
NMNS-cyn2005-26	63	87	140	11	11	12	6	6	5	5	2	2.3	2.2	1.8	F	F
NMNS-cyn2005-27	49	68	118	10.5	11.2	12	6	5.5	4.5	5	3.3	1.5	2	1.2	M	F
NMNS-cyn2005-28	70	115	166	16.5	22	19	11.5	10.5	6.5	7.5	7	3.5	3	2	M	M
NMNS-cyn2005-29	24	30	63	4.8	5.8	5.8	3	3	2	3	1.9	1	1.2	1	M	M
NMNS-cyn2005-30	52	90	127	11	16	14	8	8	5	6	5	2.5	2.9	1.5	M	M
NMNS-cyn2005-31	50	65	120	10.5	11	12	5.8	5	4	4.8	2.8	2.5	2	1.5	F	F
NMNS-cyn2005-32	56	88	136	12	13	13.5	6	6	5	5.5	2.8	2.8	2.5	1.5	F	F
NMNS-kiko2004-01	18.2	18	47	3.2	3.2	1.8	1.5	4	1.3	1.8	1	0.9	1	0.8	M	M
NMNS-kiko2004-03	13.5	15	37.3	3	2.9	3	1.8	1.6	1	1.3	1	0.9	-	-	F	F
NMNS-kiko2005-X	37.5	50	93	8	6.8	6.5	3.2	3.2	3	3.2	2	1.4	1	0.9	F	F
NMNS-kiko2005-XX	77	140	188	17	30	22	16	14	9	10	8	3.8	3.5	2.5	M	M
NMNS-kiko2005-Y	32	41	79	6.5	6	6	3	2.8	2.2	3	1.5	1	1	0.9	F	F
NMNS-kiko2005-YY	31	42.5	75	6.5	6	7	3	3	2.5	3	1.4	1	1.1	1	F	F
NMNS-VL-191	44	72	122	10.5	12	11	5.5	5	5	5	3	2	2	1.8	F	F
28-R5	70	-	174.25	-	18.34	17.38	8.96	8.33	-	-	-	-	-	-	F	F
30-R39	68.5	103.1	169.45	15.2	25.14	21.47	12.84	11.27	7.36	8.38	6.4	3.67	2.82	1.74	M	M
30-R40	51	77.6	133.52	11.06	13.17	12.53	5.84	5.65	4.44	5.42	3.01	2.7	2.54	1.81	F	F
31-R17	61	-	150.64	-	13.69	14.4	-	-	4.86	6.2	2.81	2.61	2.15	1.69	F	F
31-R5	53.1	66.5	129.2	11.36	11.06	11.29	5.17	4.87	3.87	3.69	2.27	2.17	1.53	1.37	F	F
32?-R1	-	-	-	14.48	22.11	19.26	10.98	10.3	6.56	6.87	4.87	3.05	2.94	2.06	M	M
34-R10	72	103.6	174.15	14.28	23.71	20.38	12.62	11.24	7.48	8.4	5.72	3.47	2.79	2.57	M	M
34-R11	68.2	105.1	167.98	15.61	21.63	18.24	11.47	9.96	6.73	8.05	6.27	3.53	3.94	2.95	M	M
34-R12	68.1	-	173.37	-	18.54	17.46	8.62	8.65	6.55	7.16	4.48	3.59	2.88	2.65	F	F
34-R13	65	-	165.21	-	23.55	19.21	11.91	10.14	-	-	-	-	-	-	M	M
35-R38	89.3	114	208.96	18.94	20.7	20.63	9.77	9.83	7.47	8.88	5.16	4.57	2.71	2.61	F	F
35-R39	73	-	176.72	15.19	17.61	17.54	8.46	7.88	6.3	6.95	3.4	2.8	3.06	2.17	F	F
35-R40	71	-	173.34	16.29	17.54	17.11	8.21	7.75	6.15	7.15	3.97	3.74	2.49	2.35	F	F
BPV601	65.9	-	143.6	-	14.5	13	-	-	-	-	-	-	-	-	M	M
GMPKU-P-1061	94.6	71.8	226.72	19.42	20.95	19.64	9.31	8.62	-	-	4.81	2.71	-	1.82	F	F
GMPKU-P-1074	52.3	61.1	122.53	10.91	10.94	11.86	-	6.16	4.26	5.08	2.42	1.9	1.72	1.39	F	F
GMPKU-P-1154(1)	35.8	43	88.52	7.98	7.18	8.9	-	-	-	-	2.74	1.06	2.4	1.21	M	M
GMPKU-P-1973	62.5	79	147.44	13.73	12.97	13.92	6.11	6.08	5.03	5.6	2.78	2.48	1.87	1.71	F	F
GMPKU-P-1976	-	-	-	16.65	26.56	22.62	13.61	-	8.24	9.17	6.72	3.46	3.78	2.13	M	M
GMPKU-P-1977	76.3	113	193.56	17.24	26.76	22.02	13.37	11.92	9.66	-	6.81	4.23	3.41	2.49	M	M
GMPKU-P-1982	68.9	-	-	14.28	14.65	14.45	6.88	7.15	-	-	3.12	2.49	-	1.57	F	F
GMPKU-P-1990	-	-	-	10.4	11.21	11.19	5.25	-	-	-	3.14	2.48	1.81	2.02	F	F
GMPKU-P-1992	-	-	-	-	28.23	22.44	14.32	13.57	-	9.35	7.6	4.44	2.75	1.58	M	M
GMPKU-P-3012a	63	-	139.9	14.5	-	13.6	6.6	6.1	4.4	5.5	2.7	1.9	2.2	1.8	F	F
GMPKU-P-3012b	-	-	-	-	16.8	15.9	8	7.1	5.4	6.7	3.5	3	2.1	1.9	F	F
GMPKU-P-3012c	-	-	-	-	3.4	3.9	-	-	-	-	-	-	-	-	F	F
GMPKU-P-3013	-	119.4	195.5	16.4	19.5	18.2	9	8.4	6.2	7.5	4.1	3	2.3	2	F	F
GXD-7602	56.5	-	124.9	11	10.1	11.4	4.7	5	4	4.7	2.5	2	1.9	1.6	F	F
GXD-7603	69.3	-	154.7	13	15	14.1	7.1	7	5	6	3.8	2.8	3.1	2	F	F
GXD-7613	83.2	-	-	16.2	25	18.8	12.1	11.5	7.5	8	6.4	3.4	2.8	2.5	M	M
GXD-7621	-	-	-	16.5	25.6	20.9	12.9	11.8	7.5	8.2	6.5	3	3.5	2.5	M	M
GXD-835002	11.3	13.5	34.2	2.6	2	2.5	1.2	1	0.8	1.1	0.6	0.5	0.7	0.2	F	F
GXD-838028	85.2	-	-	19.2	28.8	21.6	14.2	13.1	8	9.9	8	3.7	4.8	3	M	M
V7917	30.5	36.9	71	7.2	5.9	6.2	3	2.9	2.2	2.5	1.1	0.9	0.8	0.6	F	F
V7918	-	-	-	10.5	9.3	9.5	5	4.5	3.4	4.2	2.2	1.1	2	1.5	M	M
V7919	60.7	-	146.2	13.9	20	16.5	10	9.2	6	7	5	2.8	2.2	1.5	M	M
V953	-	-	-	14.3	16.3	15.5	7.5	7.5	5.1	5.5	3.8	2.8	2.1	1.2	F	F

Table 2. The result of LDA for training data.

Number	LD
NMNS000933- F0034394	0.572
NMNS-chw-01	-2.956
NMNS-chw-02	-1.102
NMNS-chw-03	0.447
NMNS-cyn2002-01	-0.136
NMNS-cyn2002-02	-1.078
NMNS-cyn2002-03	-1.418
NMNS-cyn2002-04	2.732
NMNS-cyn2002-05	-0.832
NMNS-cyn2002-06	-0.661
NMNS-cyn2002-07	-1.629
NMNS-cyn2002-08	3.801
NMNS-cyn2002-11	2.214
NMNS-cyn2002-12	3.366
NMNS-cyn2002-13	-0.890
NMNS-cyn2002-14	3.108
NMNS-cyn2003-15	2.226
NMNS-cyn2003-16	-1.443
NMNS-cyn2003-17	1.996
NMNS-cyn2003-18	2.080
NMNS-cyn2003-19	-0.845
NMNS-cyn2003-21	-1.009
NMNS-cyn2003-22	3.242
NMNS-cyn2003-23	-0.513
NMNS-cyn2003-24	-1.331
NMNS-cyn2003-25	3.183
NMNS-cyn2003-26	-1.095
NMNS-cyn2003-27	0.878
NMNS-cyn2005-01	2.462
NMNS-cyn2005-02	-1.654
NMNS-cyn2005-03	0.374
NMNS-cyn2005-04	-0.882
NMNS-cyn2005-05	-2.017
NMNS-cyn2005-06	-0.179
NMNS-cyn2005-07	-0.411
NMNS-cyn2005-08	2.477
NMNS-cyn2005-09	1.149

Number	LD
NMNS-cyn2005-10	2.863
NMNS-cyn2005-11	0.579
NMNS-cyn2005-12	2.073
NMNS-cyn2005-13	-1.502
NMNS-cyn2005-14	-1.666
NMNS-cyn2005-15	-0.694
NMNS-cyn2005-16	-2.224
NMNS-cyn2005-17	-2.091
NMNS-cyn2005-18	-0.324
NMNS-cyn2005-19	-1.742
NMNS-cyn2005-20	-2.697
NMNS-cyn2005-21	-2.714
NMNS-cyn2005-22	-1.071
NMNS-cyn2005-23	2.239
NMNS-cyn2005-24	-1.030
NMNS-cyn2005-25	0.072
NMNS-cyn2005-26	-2.601
NMNS-cyn2005-27	-0.539
NMNS-cyn2005-28	1.938
NMNS-cyn2005-29	2.222
NMNS-cyn2005-30	3.066
NMNS-cyn2005-31	-1.663
NMNS-cyn2005-32	-1.466
NMNS-kiko2005-X	-1.316
NMNS-kiko2005-XX	3.611
NMNS-kiko2005-Y	-0.703
NMNS-kiko2005-YY	-2.005
NMNS-VL-191	-0.091
30-R39	1.673
30-R40	0.105
31-R5	-2.369
34-R10	1.623
34-R11	2.565
35-R38	-1.746
GMPKU-P-1973	-2.800
GXD-835002	-1.258
V7917	-2.541