

Supplementary Information

Bite force in the horned frog (*Ceratophrys cranwelli*) with implications for extinct giant frogs

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Supplementary Table S1. External morphometrics and measurements of bite force for scaling analysis of *Ceratophrys cranwelli*.

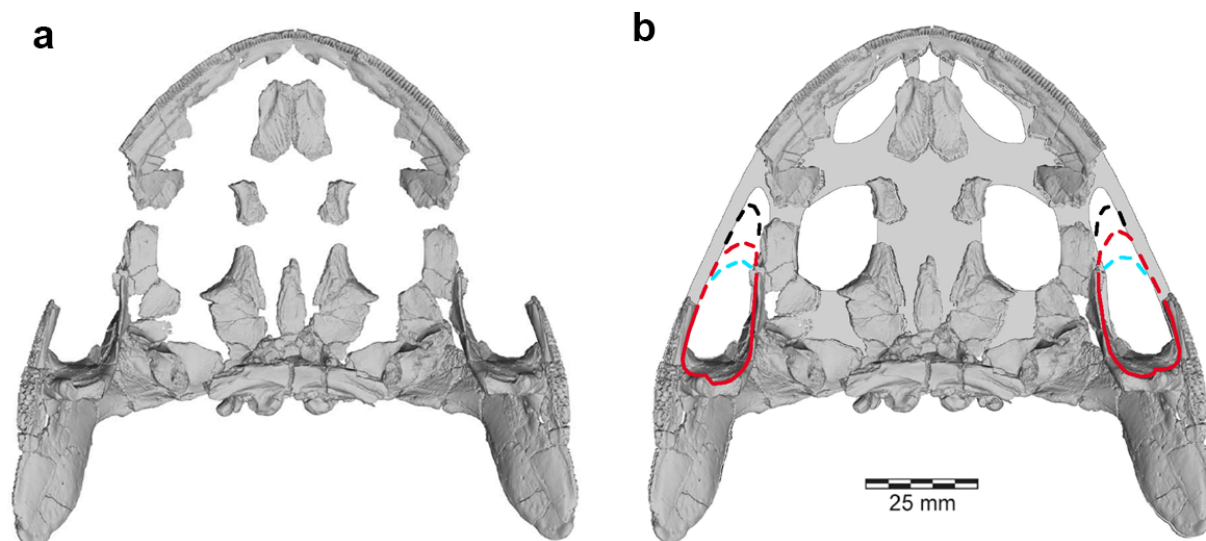
Specimen	BodyLength (mm)	HeadWidth (mm)	HeadLength (mm)	HeadDepth (mm)	BodyMass (g)	BiteForce_JawMidpt (N)	BiteForce_JawTips (N)
4	52.2	27.6	21.2	14.5	22.5	6.6	3.3
4	55.6	31.2	22.6	15.7	31.1	9.2	4.6
4	61.2	32.9	24.9	16.0	32.3	11.3	5.6
4	67.5	35.1	26.1	17.1	39.9	14.0	7.0
4	68.8	36.2	26.4	17.3	56.2	15.8	7.9
4	74.5	38.3	27.0	18.2	63.3	19.9	9.9
4	75.0	38.7	27.0	18.3	80.3	24.0	12.0
4	78.4	40.8	29.3	19.2	96.6	22.2	11.1
5	58.6	33.0	23.2	16.4	30.6	9.0	4.5
5	57.9	33.2	23.8	16.6	31.0	10.0	5.0
5	62.9	35.0	24.7	16.9	36.6	12.9	6.5
5	63.8	36.9	24.9	17.1	43.7	14.8	7.4
5	63.8	37.3	25.1	17.5	40.3	16.1	8.0
5	80.1	42.7	28.5	19.7	82.2	24.6	12.3
5	83.5	44.5	30.5	19.8	95.5	26.9	13.4
5	85.3	44.9	31.1	20.6	131.0	32.9	16.4
6	44.5	24.0	16.9	11.7	13.7	3.4	1.7
6	48.2	26.6	17.7	13.2	21.8	4.2	2.1
6	49.9	27.1	17.7	13.6	22.7	6.1	3.0
6	54.9	29.6	20.2	14.2	21.9	7.9	3.9
6	57.7	30.2	20.3	14.6	23.0	9.6	4.8
6	61.4	32.8	21.0	15.4	32.8	10.9	5.4
6	61.4	33.2	21.8	15.9	36.0	14.2	7.1
6	74.6	37.6	24.9	17.1	57.2	15.7	7.8
6	76.6	39.0	26.4	18.0	59.1	18.1	9.1
6	95.6	46.1	31.7	20.5	147.8	30.1	15.0
7	46.5	28.5	19.3	14.2	22.2	8.6	4.3
7	49.7	28.8	19.4	14.4	22.0	8.3	4.2
7	54.1	32.4	19.6	14.9	29.1	10.5	5.3
7	55.8	33.0	19.9	15.3	36.6	11.5	5.8
7	70.1	38.0	22.7	16.8	56.6	16.4	8.2
8	52.0	30.8	18.3	14.0	22.2	9.9	4.9
8	57.6	32.3	20.3	14.6	28.0	13.0	6.5
8	61.8	32.9	21.0	14.6	34.6	13.8	6.9
8	68.1	36.3	24.1	16.5	44.0	17.1	8.5
8	71.4	38.7	24.9	16.7	64.9	20.3	10.2

Supplementary Table S1 (continued).

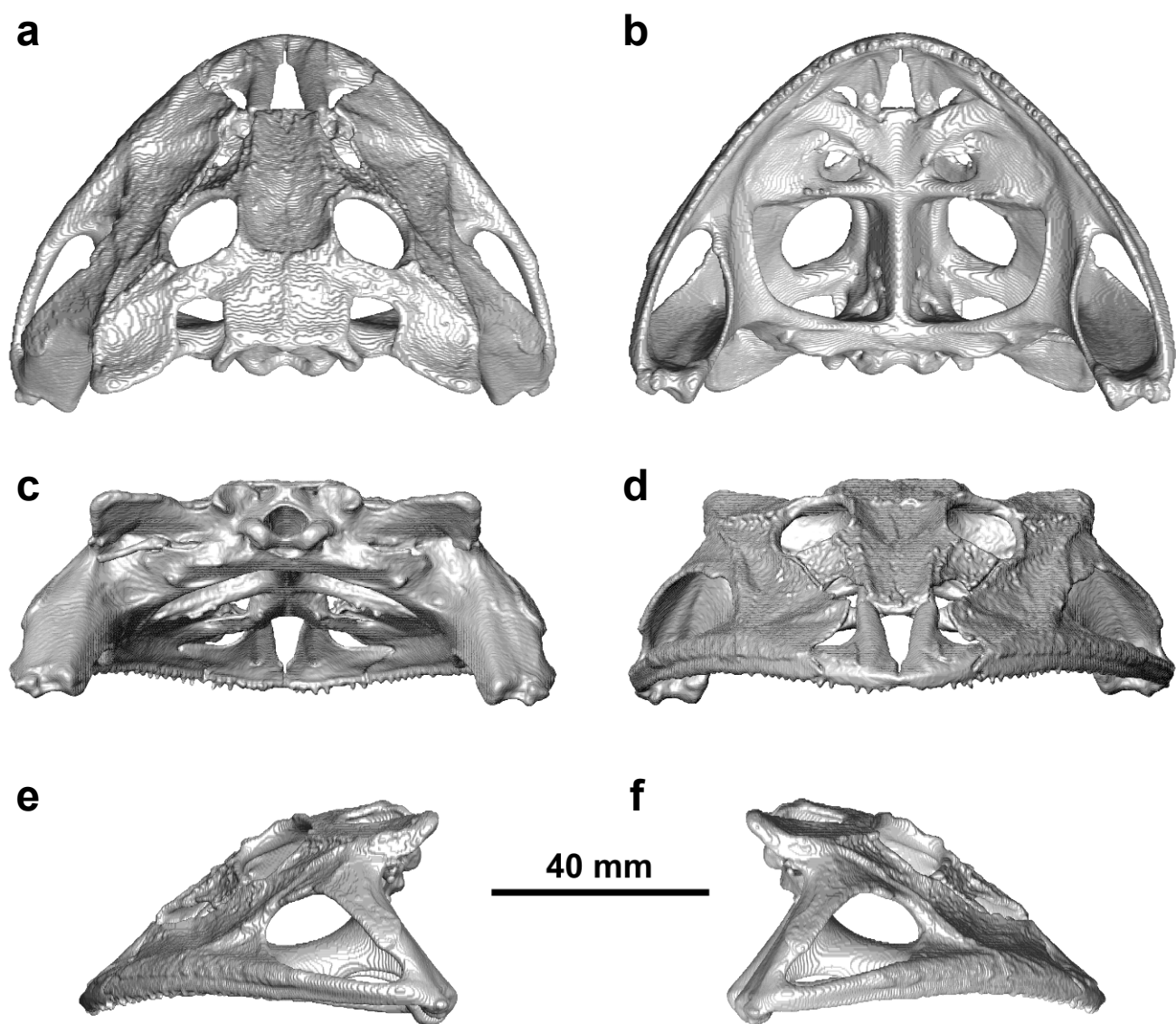
Specimen	BodyLength (mm)	HeadWidth (mm)	HeadLength (mm)	HeadDepth (mm)	BodyMass (g)	BiteForce_JawMidpt (N)	BiteForce_JawTips (N)
9	49.1	31.4	19.7	13.9	23.1	8.0	4.0
9	51.1	31.6	19.9	14.2	23.6	7.6	3.8
9	55.7	33.3	21.3	14.8	30.9	11.9	5.9
9	60.7	33.7	21.5	15.1	34.8	12.0	6.0
9	65.8	36.9	23.2	16.0	40.8	12.3	6.1
9	66.5	38.8	23.7	17.4	56.8	15.5	7.7
9	71.3	41.0	25.4	17.4	61.3	21.1	10.5
10	52.8	29.4	18.2	13.7	22.0	8.7	4.3
10	54.2	31.7	20.3	14.7	24.6	9.7	4.9
10	56.0	32.0	20.3	15.0	26.0	10.2	5.1
10	68.7	35.5	21.7	15.7	37.2	13.6	6.8
10	69.0	36.5	22.2	16.2	39.7	17.8	8.9
10	76.9	41.0	26.1	18.6	50.8	17.7	8.8
10	77.7	42.5	28.4	19.1	74.2	21.2	10.6
10	84.2	43.8	28.4	19.1	80.3	23.4	11.7
10	86.0	45.6	31.0	20.4	91.7	25.8	12.9
13	39.8	22.4	14.7	10.8	8.9	2.7	1.4
13	45.7	24.9	17.0	11.9	14.9	6.6	3.3
13	47.9	26.1	17.8	12.5	15.2	7.4	3.7
13	56.8	28.4	19.1	13.7	29.8	7.3	3.6
13	56.9	28.6	19.1	13.7	25.8	9.0	4.5
13	59.7	29.9	21.0	13.9	28.1	8.5	4.2

Supplementary Table S2. Head width and conduit areas for morphometric analysis of *Ceratophrys* and *Beelzebufo*.

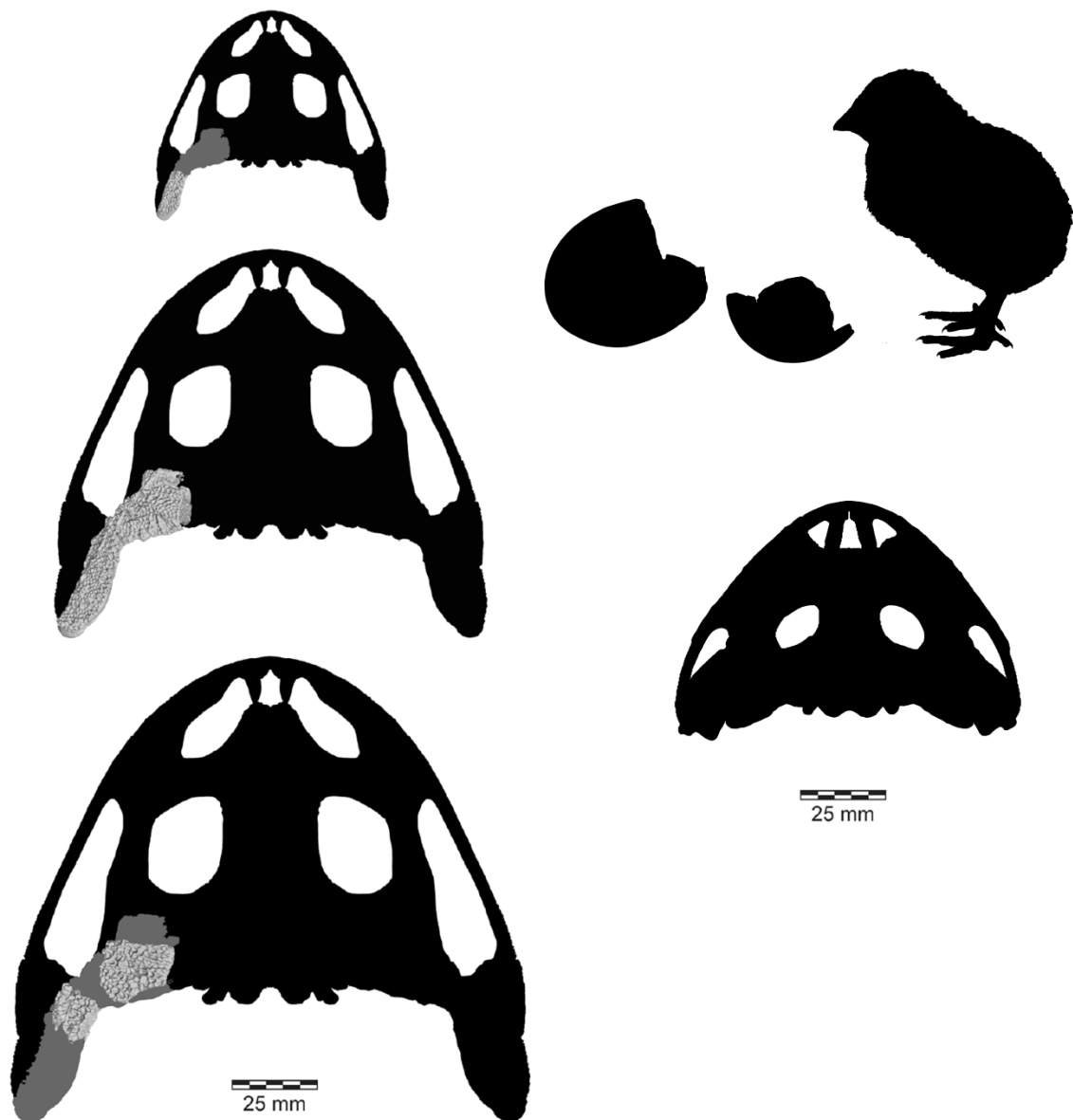
Species	SI Specimen	HeadWidth (mm)	Conduit_Right (mm^2)	Conduit_Left (mm^2)	Conduit_Average (mm^2)
<i>C. calcarata</i>	LACM_163429	43.0	63.7	68.7	66.2
<i>C. cornuta</i>	A08	18.8	5.6	5.9	5.7
<i>C. cornuta</i>	A09	19.6	5.9	6.1	6.0
<i>C. cornuta</i>	B01	28.4	14.9	13.1	14.0
<i>C. cornuta</i>	B02	23.7	10.3	9.6	10.0
<i>C. cornuta</i>	B03	33.3	23.0	24.0	23.5
<i>C. cranwelli</i>	A03	58.9	79.9	83.5	81.7
<i>C. cranwelli</i>	A04	43.3	43.7	46.1	44.9
<i>C. cranwelli</i>	A05	43.2	44.7	45.0	44.9
<i>C. cranwelli</i>	A06	56.7	66.5	77.3	71.9
<i>C. cranwelli</i>	A07	45.1	47.2	54.4	50.8
<i>C. cranwelli</i>	A10	44.2	35.4	32.7	34.0
<i>C. cranwelli</i>	A12	58.2	63.2	80.3	71.7
<i>C. cranwelli</i>	A13	42.4	53.2	49.9	51.5
<i>C. cranwelli</i>	A14	49.1	51.7	61.4	56.5
<i>C. cranwelli</i>	A15	45.2	46.4	42.7	44.5
<i>C. cranwelli</i>	A16	51.8	66.6	73.0	69.8
<i>C. cranwelli</i>	A17	61.3	105.3	116.1	110.7
<i>C. cranwelli</i>	B04	58.1	93.0	87.6	90.3
<i>C. cranwelli</i>	B05	32.6	27.6	28.0	27.8
<i>C. ornata</i>	B06	34.7	20.8	26.4	23.6
<i>C. ornata</i>	B07	42.2	49.6	52.4	51.0
<i>C. ornata</i>	B08	46.3	53.6	57.6	55.6
<i>C. ornata</i>	B09	47.1	60.4	55.3	57.9
<i>C. ornata</i>	LACM_163427	45.0	75.7	72.2	73.9
<i>C. ornata</i>	AKL_2099	65.5	106.5	115.5	111.0
<i>C. ornata</i>	UMCZ_R1529	59.8	131.1	141.7	136.4
<i>C. ornata</i> x <i>cranwelli</i>	A01	40.3	38.3	39.1	38.7
<i>C. ornata</i> x <i>cranwelli</i>	A11	44.5	56.4	55.4	55.9
<i>C. spp</i>	LDUCZ_W186	70.9	169.4	175.7	172.5
<i>C. spp</i>	UMCZ_R1530	52.3	96.2	103.9	100.1
<i>C. aurita</i>	LACM_163430	98.3	272.6	282.6	277.6
<i>B. ampinga</i>	Evans et al. 2015: Fig 3D	111.0	349.0	365.4	357.2
<i>B. ampinga</i>	Evans et al. 2015: Fig 3D	111.0	396.0	422.6	409.3
<i>B. ampinga</i>	Evans et al. 2015: Fig 3D	111.0	468.2	481.2	474.7



Supplementary Figure S3. Reconstructions of *Beelzebufo* (FMNH PR 2512) modified from Evans et al. (2014). (a) ventral view, (b) ventral view showing estimates of adductor conduit area (conservative, likely, maximum).



Supplementary Figure S4. CT scan of *Ceratophrys aurita* specimen LACM 163430. (a) dorsal, (b) ventral, (c) posterior, (d) anterior, (e) left lateral, and (f) right lateral view.



Supplementary Figure S5. Size comparison of three reconstructions of extinct *Beelzebufo ampinga* from Fig. 47 in ref. 28 (left) and exceptional extant *Ceratophrys aurita* LACM 163430 (right) with newly hatched domestic chicken and egg shell.