

## Supplementary Material for:

### Important Role of the Ihh Signaling Pathway in Initiating Early Cranial Remodeling and Morphological Specialization in *Cromileptes altivelis*

Xiaoying Cao <sup>1</sup>, Shunyun Deng <sup>1</sup>, Quanyin Liu <sup>1</sup>, Lisheng Wu <sup>1,2</sup>, Xuan Zhang<sup>3</sup> and Shaoxiong Ding <sup>1,2,\*</sup>

<sup>1</sup> State Key Laboratory of Marine Environment Science, College of Ocean and Earth Sciences, Xiamen University, Xiamen 361102, China

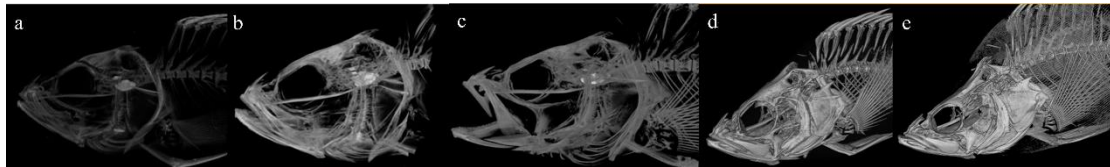
<sup>2</sup> Xiamen Key Laboratory of Urban Sea Ecological Conservation and Restoration, College of Ocean and Earth Sciences, Xiamen University, Xiamen 361005, China

<sup>3</sup> Department of Biological Sciences, University of Arkansas, Fayetteville, AR, United States

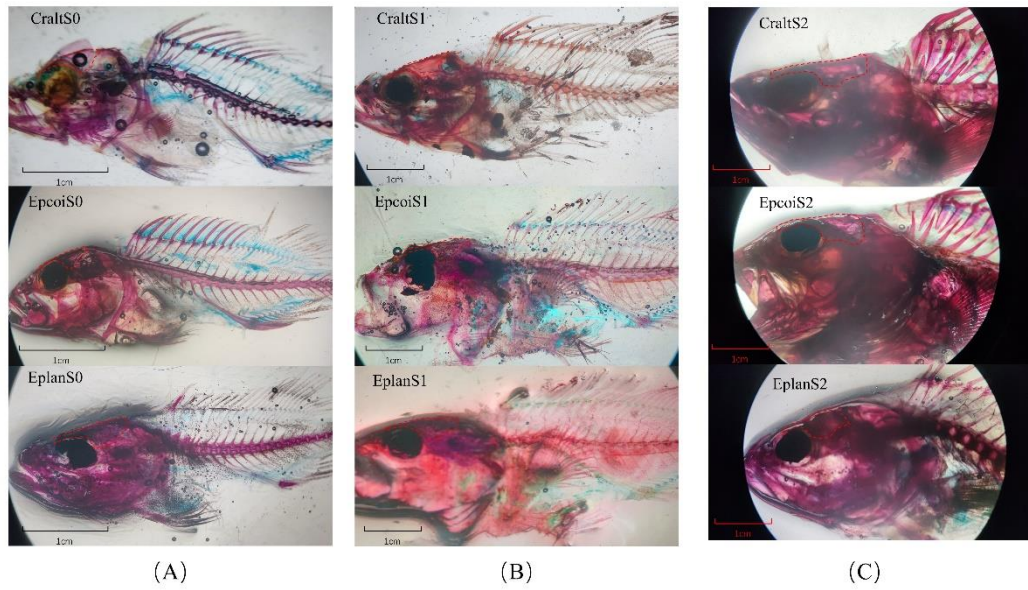
\* Correspondence: sxding@xmu.edu.cn (S.D.)

**Table S1** Sample information

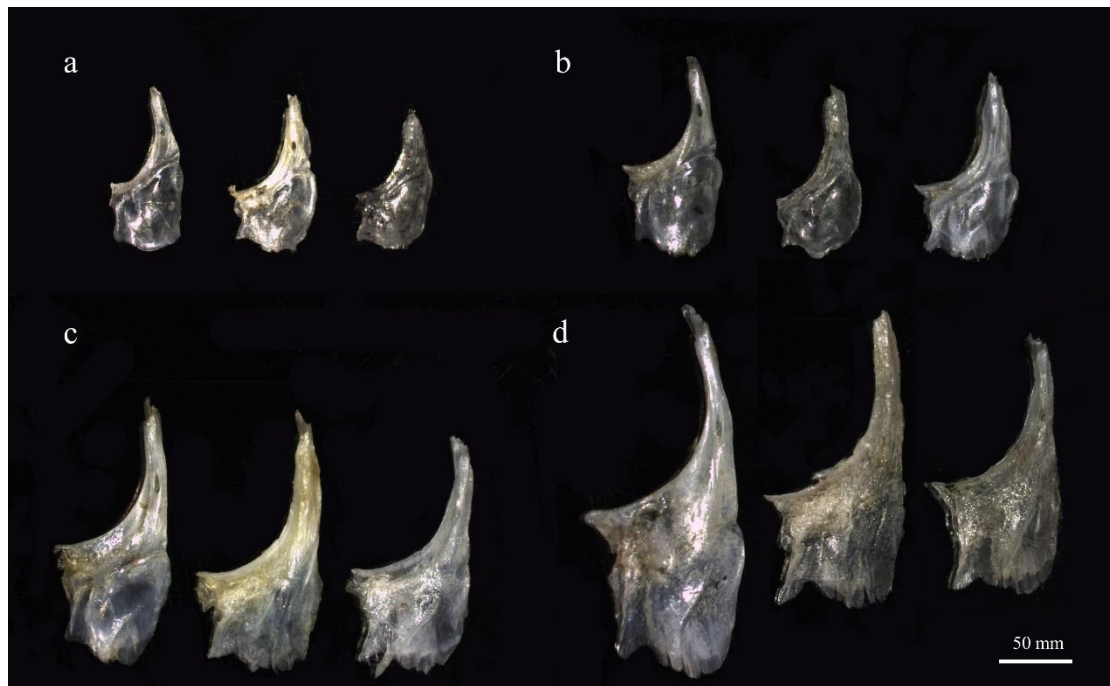
Species	Sample	Total length	Wight
<i>C. altivelis</i>	CraltS001-S030	3.0-4.0 cm	1.0-1.8 g
	CraltS101-S130	5.0-6.0 cm	2.3-2.9 g
	CraltS201-S230	7.0-8.0 cm	7.8-9.5 g
	CraltS301-S330	9.0-10.0 cm	14.5-17.8g
<i>E. coioides</i>	EpcoiS001-030	3.0-4.0 cm	0.9-1.7 g
	EpcoiS101-130	5.0-6.0 cm	2.0-2.9 g
	EpcoiS201-230	7.0-8.0 cm	8.0-10.0 g
	EpcoiS301-330	9.0-10.0 cm	15.6-20.4 g
<i>E. lanceolatus</i>	EplanS001-030	3.0-4.0 cm	0.8-1.9 g
	EplanS101-130	5.0-6.0 cm	2.1-3.0 g
	EplanS201-230	7.0-8.0 cm	7.5-10.6 g
	EplanS301-330	9.0-10.0 cm	16.9-20.5 g



**Figure S1.** The skull CT scan and 3D reconstruction of *C. altivelis* at different developmental stages.  
a: 3cm; b: 5cm; c: 8cm; d: 10cm; e: 20cm.



**Figure S2.** Transparent staining of *C. altivelis* and closely related species at S0-S2 developmental stages. Cralt: *C. altivelis*; Epcoi: *E. coioides*; Eplan: *E. lanceolatus*.



**Figure S3.** The frontal bone of *C. altivelis* and closely related species at different developmental stages.  
a: S0 (3-4cm) stage; b: S1 (5-6cm) stage; c: S2 (7-8cm) stage; d: S3 (9-10cm) stage; left: *C. altivelis*; middle: *E. coioides*; right: *E. lanceolatus*.