

Osteological development of reared *Pseudoplatystoma punctifer* with notes on the incidence of skeletal deformities

G. Estivals^{1,3}, D. Castro-Ruiz^{2,3}, C. García-Dávila^{2,3}, C. Fernández^{2,3},
J. Núñez^{1,3}, F. Duponchelle^{1,3}, J.-F. Renno^{1,3}, M. J. Darias^{1,3*}

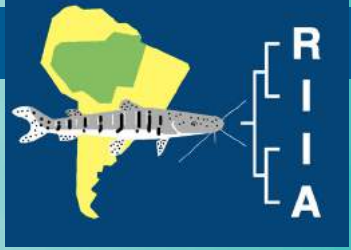
¹Institut de Recherche pour le Développement (IRD), UMR 207 BOREA, Montpellier France

²Instituto de Investigaciones de la Amazonía Peruana (IIAP), AQUAREC, Iquitos, Peru

³Laboratoire Mixte International Evolution et Domestication de
l'Ichtyofaune Amazonienne (LMI EDIA), Iquitos, Peru

*maria.darias@ird.fr

The osteological development of *Pseudoplatystoma punctifer* was studied from 27 hours post-fertilization (hpf) to 15 days post-fertilization (dpf). The first ossified skeletal structures were observed as early as at 3.0-4.7 mm total length-TL (57-75 hpf), corresponding to premaxilla and mentomeckelium, both equipped with villiform teeth, maxilla, enclosing the base of the maxillary barbel, and cleithrum. The next ossified structure was the first caudal fin ray, which appeared at 4.7-4.9 mm TL (57-81 hpf), followed by the superior pharyngeal tooth plates provided with villiform teeth, the opercle, the first branchiostegal ray and the second and third caudal fin rays at 4.9-5.1 mm TL (57-89 hpf). The structures ossified before the onset of exogenous feeding (3-4 dpf) were directly associated with breathing and feeding, both essential for survival. Then, new branchiostegal and caudal fin rays ossified at 5.3-7.1 mm TL (89 hpf-8dpf), as well as preural and ural *centra* of the caudal fin complex, where preural *centrum* 1 fused with ural *centra* 1 and 2 and ural *centrum* 3 fused with ural *centrum* 4. The first signs of vertebral ossification were observed at 6.5 mm TL (6 dpf) and corresponded to the third and fourth vertebrae. Then, vertebral mineralization proceeded rostrad and caudad, the vertebral column being completely ossified at 7.5-9.7 mm TL (7-11 dpf) and the total number of vertebrae ranging from 43 to 45. In parallel, the strengthening of the caudal fin complex took place through mineralization of hypurals and parhypural (8.4-8.7 mm TL, 9-10 dpf). Pectoral rays started to ossify at 8.6-9.7 mm TL (9-11 dpf) and dorsal rays from 9.7-12.2 mm TL (9-11 dpf). This study revealed a remarkable incidence of skeletal deformities detected as early as 4 dpf, suggesting that rearing protocols need to be evaluated to find out the origin and reduce malformations (genetic, nutritional and/or environmental factors).



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Maria J. Darías
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Av. Ballivián esq. Reza #591
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www.umss.edu.bo

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44, boulevard de Dunkerque
CS 90009
F-13572 Marseille Cedex 02, France
www.ird.fr

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