

International team unearths oldest-ever reptile embryos

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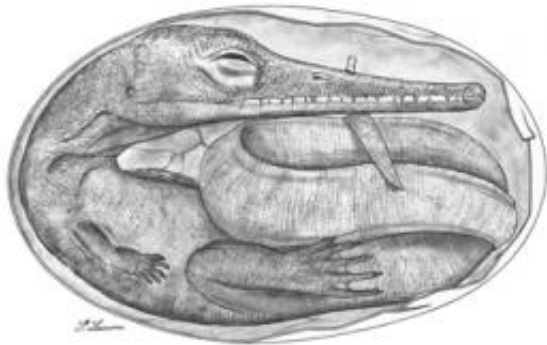


Mesosaur embryo, inside an egg, from the Early Permian Mangrullo Formation in Uruguay. Left : picture of the specimen. Right : interpretative drawing. Credit: Graciela Piñeiro (left) and Inés Castiglioni (right)

Dating back 280 million years or so, the oldest known fossil reptile embryos have been unearthed in Uruguay and Brazil. They belong to the ancient aquatic reptiles, mesosaurs. The study of these exceptionally well-preserved fossils suggests that mesosaurs were either viviparous (pushing back this mode of reproduction by 60 million years) or that they laid eggs in advanced stages of development. These finds, published in the journal *Historical Biology*, were revealed by an international team including Michel Laurin, CNRS senior researcher at the Centre de Recherche sur la Paléobiodiversité et les Paléoenvironnements.

Although the oldest known adult amniote fossils date back some 315 million years, very few collections of fossil [eggs](#) and [embryos](#) are

available to paleontologists. The discovery by an international team including Michel Laurin, from the Centre de Recherche sur la Paléobiodiversité et les Paléoenvironnements, of fossilized embryos of mesosaurs, ancient aquatic reptiles that lived ca. 280 million years ago, sheds light on these animals' reproductive mechanism.



Reconstruction of the egg. Credit: Gustavo Lecuona

In Brazil, the team uncovered a fossil specimen in gestation, which revealed that mesosaur embryos were retained in the uterus during most of their development. These reptiles, therefore, were probably viviparous.

In addition, the same researchers unearthed 26 adult mesosaur specimens in Uruguay, all of which were associated with embryos or very young individuals, dating from the same period as the Brazilian fossil.

Although these more or less disarticulated specimens are difficult to interpret, most of them are probably embryos in the uterus, thus backing up the hypothesis that mesosaurs were viviparous. The largest of these fossils may be young animals that were looked after by at least one of the parents, pointing to the existence of parental care. However, one isolated mesosaur egg (see photograph below) was also found at the

Uruguayan site. This find casts doubt on the hypothesis of viviparity (which, in theory, excludes the laying of eggs). It suggests that the Uruguay mesosaurs laid eggs at an advanced stage of development, which then hatched shortly afterwards (several minutes to days later).



Mesosaur embryo and adult, placed together for this reconstruction, and a composite photograph showing the size of the embryo in relation to that of the adult. Credit: Graciela Piñeiro

This research therefore reveals the oldest known [fossil](#) amniote embryos from the Paleozoic (543 to 250 million years BP) and the first examples of embryo retention (and perhaps viviparity), pushing back this reproductive mechanism by some 60 million years. But do the reproductive characteristics of mesosaurs highlighted in this study reflect their aquatic way of life (since viviparity is frequent in aquatic reptiles), or was it rather a fairly widespread condition among early [reptiles](#)?

More information: Graciela Piñeiro, et al. (2012): The oldest known amniotic embryos suggest viviparity in mesosaurs, *Historical Biology: An International Journal of Paleobiology*, [DOI:10.1080/08912963.2012.662230](https://doi.org/10.1080/08912963.2012.662230)

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