Nagalomorpha: Proposed Clade of Basal Tetrapods for the Tridactyls

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Abstract

This paper proposes the establishment of a new clade, Nagalomorpha, to categorize the tridactyl beings recovered near Nazca, Peru. Morphological, developmental, and mineralogical evidence indicates that these specimens exhibit traits consistent with proto-amphibian/basal tetrapod forms. Traits include tridactyly, fused clavicles (furcula), gastralia, a urostyle-like sacral fusion, fused limb bones, pneumatic skeletal structures, and adaptations for cutaneous respiration. Mineralogical analyses reveal embedded marine sediments, suggesting a semi-aquatic or amphibious origin. Recognition of these combined traits, as originally proposed by the author (Casas, unpublished manuscript, 2025), supports Nagalomorpha as a distinct basal tetrapod lineage.

Introduction

The Nazca tridactyl specimens have been subject to multidisciplinary analysis, including CT imaging, morphometric tomography, histology, and mineralogical studies (Korotkov 2019; Hernández-Huaripaucar et al. 2024). Common anatomical features across "J-type" and "insectoid" morphotypes highlight morphological innovations aligned with early tetrapod evolution (Clack 2012; Sues 2019; Miles 2022). The author originally proposed the Proto-Amphibian/Basal Tetrapod Hypothesis based on early analysis of these specimens (Casas, unpublished manuscript, 2025).

Proto-Amphibian/Basal Tetrapod Hypothesis

The Proto-Amphibian/Basal Tetrapod Hypothesis posits that the tridactyl specimens derive from early amphibian ancestors retaining cutaneous respiration, metamorphic development, and pneumatic skeletal adaptations. To accommodate this lineage, the author proposes the clade **Nagalomorpha**, representing basal tetrapods with proto-amphibian traits.

Geologic Timeline and Phylogenetic Context

The key morphological features correspond to evolutionary milestones during the Devonian (419–359 million years ago [Ma]) and early Carboniferous (359–323 million years ago):

- **Gastralia:** Appearing in early tetrapodomorph fishes (~385 million years ago) (Clack 2012).
- **Furcula:** Documented in stem tetrapods, prominent by the early Carboniferous.
- **Pneumatic bone structures:** Emerging in early semi-aquatic tetrapods (~375 million years ago) (Sues 2019).
- **Urostyle-like sacral fusion:** Identified by the author based on specimen analysis (Casas, unpublished manuscript, 2025), seen in amphibian-like tetrapods such as *Acanthostega* (~365 million years ago).
- **Tridactyly:** Suggestive of specialized ecological adaptations.

While these traits appeared separately among early tetrapods, no known lineage retains the full suite of ancestral characteristics. Following the Devonian-Carboniferous transition, clades such as amniotes and lissamphibians each lost key features. Thus, the tridactyl specimens' preservation of gastralia, furcula, pneumatic structures, urostyle fusion, tridactyly, and cutaneous respiration represents a uniquely conserved evolutionary state.

Morphological Characteristics

Key features identifying the tridactyl specimens as proto-amphibian/basal tetrapods include:

- Tridactyl hands and feet across all specimens.
- Fused limb bones (ulnius and tibial structures).
- Presence of a furcula (fused clavicle).
- Gastralia suggesting primitive respiratory adaptations.
- Pneumatic skeletal structures visible via tomography.
- Sacral urostyle-like fusion.
- Absence of coccyx, consistent with tail reduction through metamorphosis.
- Cutaneous respiration and waste removal adaptations.
- Absence of dentition, replaced by predentary plates suggesting a soft or fluid diet specialization.

Morphological Diversity and Proposed Lineages

Examination of the so-called "insectoid" morphotype reveals a pronounced spinal protrusion. The term "insectoid" is here considered a misnomer, as the morphology shows no true arthropod affinities. A more appropriate designation may be **Tridactyls nagi**, representing a likely antecedent type specimen lacking supraorbital arches.

The absence of these arches suggests that their presence in J-type specimens may derive from hybridization with a primate lineage, potentially chimpanzee-like ancestors. Thus, J-types could represent an intermediary hybrid form between two disparate evolutionary lines.

The pronounced spinal protrusions observed in Tridactyls nagi are unlikely to represent vestigial wings or aerodynamic structures. Given their association with pneumaticity and the aquatic or semi-aquatic adaptations proposed for Nagalomorpha, several functional interpretations are plausible. The spines may have contributed to buoyancy control, aided in cutaneous respiration by increasing dermal surface area, or served thermoregulatory functions by facilitating heat exchange. However, the precise biological role of these structures remains uncertain.

Larval Development, Metamorphosis, and Gastrobrooding

The author detected evidence of larvae within adult specimens, observing four eggs containing embryos. Prior to imaging, the author hypothesized preferential front-limb development based on comparative morphology; subsequent imaging confirmed this prediction.

The internal presence of embryos suggests an ovoviviparous or facultatively viviparous reproductive strategy, possibly including gastrobrooding, wherein larvae develop internally within modified digestive or coelomic chambers.

The staggered embryonic stages observed imply asynchronous development (sequential hatching). In addition, the absence of mating structures raises the possibility of parthenogenesis, although further evidence is required to confirm this.

Mineralogical Evidence and Environmental Implications

Bone analysis revealed marine mineralization, supporting the hypothesis of a semi-aquatic or estuarine paleoenvironment (Jensen et al. 2024; Groves and Palenik 2017).

This semi-aquatic association resonates with ancient cosmological accounts that symbolically link serpentine beings to bodies of water. Linguistic traditions across South and East Asia preserve the term *Naga* as denoting water deities or serpentine beings associated with lakes, rivers, and subterranean aquatic realms.

Pneumatic Structures and Functional Morphology

CT imaging demonstrated extensive cranial and long bone pneumatization (Hernández-Huaripaucar et al. 2024), indicative of buoyancy adaptations. The author formally designates a distinctive concave depression posterior to the supraorbital arches as the **kappa**.

The *kappa* is named after the mythological Japanese *yōkai*, known for a head depression capable of retaining water. Its presence challenges terrestrial mammal modification hypotheses, such as those involving camelids. The specimen "Josefina" clearly exhibits the interruption associated with the kappa, supporting the tridactyl morphology as distinct and non-mammalian.

The kappa's anatomical positioning suggests a sensory or regulatory function akin to parietal or pineal-related structures seen in extant amphibians.

Cultural Addendum: Frog-People Traditions of the Pacific Northwest

Several Indigenous peoples of the Pacific Northwest, including the Haida, Tlingit, Coast Salish, and Kwakwaka’wakw, preserve myths of frog-like beings. In these traditions, frogs often represent beings capable of moving between water and land, transformation, and liminality.

In Haida mythology, the frog (*k'úust'áan*) serves as a messenger between the material and spiritual worlds, reflecting traits of amphibiousness and metamorphosis (Boas 1916). Similarly, Coast Salish traditions view the frog as a primordial figure marking the transition from the mythological to the human era.

Totem poles, masks, and ceremonial artifacts depict anthropomorphic frogs with wide mouths, flattened heads, and squat, semi-aquatic postures—morphological features broadly consistent with adaptations observed in the tridactyl specimens.

These recurring frog-beings in oral traditions may reflect an ancient cultural memory of amphibious or semi-aquatic entities, resonating with the biological evidence presented for the proposed Nagalomorpha clade.

Conclusion

While it remains theoretically possible that the Tridactyls evolved in parallel to other terrestrial life while retaining basal morphological traits, the preponderance of morphological, developmental, and mineralogical evidence favors the recognition of the Nagalomorpha clade—and possibly a distinct megaclass—as the more probable explanation.

The author's original contributions, including detection of larval forms, identification of the urostyle, suggestion of the kappa structure, prediction of front-limb superiority, and development of the Nagalomorpha Proto-Amphibian/Basal Tetrapod Hypothesis, demonstrate the grassroots movement of science as a precursor to formal recognition of the Tridactyls of Nazca, Peru as once living beings.

Given the significant intersections between biology and cultural memory, future research should further explore amphibian-associated traditions among Indigenous peoples as possible reflections of humanity’s ancestral encounters with amphibious beings.

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