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Aegla Species: Biology Diversity and Conservation of South American Freshwater Anomurans

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Abstract

The genus *Aegla* (Crustacea: Decapoda: Aeglidae) comprises freshwater anomuran "crabs" endemic to southern South America. This unique taxon exhibits remarkable species richness and micro endemism across river basins in Brazil, Chile, Uruguay, Argentina, and Paraguay, yet many species face habitat loss and environmental stressors. *Aegla* species display diverse morphological adaptations and occupy a range of freshwater habitats, making them important models for studies of evolution, phylogeography, and conservation biology. This article reviews the taxonomy, ecological traits, and emerging threats to *Aegla* species, emphasizing the need for targeted research and conservation actions to protect these poorly known crustaceans.

Keywords: *Aegla*, freshwater crustaceans, South America, phylogeny, biodiversity, conservation, Anomura

Introduction

Aegla is the sole genus within the family Aeglidae and represents a distinctive group of freshwater anomurans restricted to the Neotropical region of South America, with a distribution spanning southern Brazil, Uruguay, Argentina, Paraguay, and Chile. Unlike most anomurans, *Aegla* species are found exclusively in freshwater systems, typically in cool, well-oxygenated rivers and streams with rocky substrates. They resemble squat lobsters in appearance and are omnivorous, feeding on detritus, plant material, small invertebrates, and carrion. *Aegla* species are notable for their ecological specialization, high levels of endemism, and evolutionary significance within freshwater ecosystems of the southern hemisphere. Despite this, ecological data are limited for many species, and the group is underrepresented in conservation planning [1].

Research into *Aegla* biology has revealed substantial diversity; over 90 species have been described, many with highly restricted distribution ranges, often confined to specific river basins or microhabitats. This limited dispersal capacity and habitat specificity render *Aegla* species vulnerable to anthropogenic impacts such as habitat fragmentation, pollution, water extraction, and climate change [2].

Taxonomy, Distribution, and Ecological Traits of *Aegla*

Aegla species belong to the family Aeglidae within the infraorder Anomura, a group of decapod crustaceans that also includes hermit crabs and squat lobsters. Their morphology includes a robust carapace and chelae (claws) adapted for detritivory and benthic foraging in freshwater environments. Sexual dimorphism is present in many species, and females carry eggs attached to pleopods beneath the abdomen [3].

The genus *Aegla* exhibits high species richness, with many taxa described from specific basins or regions. For example, *Aegla buenoi* was recently described from the Cinzas River basin in Brazil, expanding known diversity and highlighting micro-endemism in freshwater decapods. Similarly, species such as *Aegla expansa* in Chile were thought extinct until rediscovery in disturbed micro-basins, underscoring both their fragility and resilience.

Distributional surveys also indicate diverse species assemblages in specific regions; for instance, at least 18 species and two subspecies of *Aegla* have been documented across Chilean freshwater systems, reflecting substantial regional diversity [4].

Molecular studies demonstrate that phylogenetic relationships within *Aegla* align with historical biogeographic patterns across South America. Genetic analyses using mitochondrial and nuclear DNA markers have revealed distinct clades corresponding to geographic regions, supporting hypotheses of diversification facilitated by paleodrainage changes and historical riverine connectivity.

Aegla species play important roles in stream ecosystems as omnivores and detritivores, contributing to nutrient recycling and energy flow within benthic food webs. Seasonal metabolism studies, such as those on *Aegla platensis*, show physiological adaptations corresponding to reproductive cycles and environmental variables, indicating complex life history traits shaped by their habitats.

In addition, research on *Aegla longirostri* highlights behavioral and biochemical responses to temperature increases, illustrating sensitivity to abiotic stressors that can inform biomonitoring approaches in polluted or warming freshwater systems [5].

Conclusion

Aegla species are a unique and ecologically significant group of freshwater anomurans endemic to southern South America. Characterized by high species richness, specialized ecological traits, and often extremely limited distributions, these crustaceans offer valuable insights into evolutionary biology and biogeography. However, their narrow habitat requirements and susceptibility to environmental change make them vulnerable to human-induced pressures. Conserving *Aegla* biodiversity requires comprehensive research on species distributions, population dynamics, and responses to habitat alteration, coupled with effective management strategies to

protect freshwater ecosystems. Given their ecological importance and conservation urgency, *Aegla* species should be prioritized in biodiversity assessments and freshwater conservation policies.

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