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Editorial: True limpets as living resources - biology, ecology, exploitation and sustainability

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Editorial on the Research Topic

[True limpets as living resources - biology, ecology, exploitation and sustainability](#)

Introduction

True limpets (Patellogastropoda Lindberg, 1986) constitute a globally distributed and prominent group of marine gastropods, inhabiting environments ranging from rocky seashores to abyssal depths. Their scientific significance lies in their evolutionary status as basal gastropods, adaptive strategies for survival in challenging conditions, and their role as a dominant group influencing biological communities on rocky substrata (Lindberg, 2008; Henriques et al., 2017). Limpets play a pivotal role as keystone grazers influencing the macro-algal vegetation on rocky shores (Hawkins and Hartnoll, 1983; Jenkins et al., 2005; Coleman et al., 2006), exerting seasonal top-down control on microbial films (Thompson et al., 2004) and are crucial to local algal patchiness (Johnson et al., 1997; Burrows and Hawkins, 1998; Johnson et al., 1998). Limpets also have been exploited since the Pleistocene (Marean et al., 2007). Currently, limpets support various human activities such as food consumption, ornamentation, and as fishing bait (Firth, 2021). In this context, over exploitation coupled with other anthropogenic disturbances has led to increased sustainability risks for numerous limpet populations (Martins et al., 1987; Espinosa and Rivera-Ingraham, 2017; Carballo et al., 2023). Recent advances in methodologies related to the aquaculture (Castejón et al., 2022; Ferranti et al., 2022) and settlement (Castejón et al., 2023a; Castejón et al., 2023b) of different limpet species present an opportunity to improve our understanding of their biology and ecology. This progress is encouraging for the conservation of these species and the potential establishment of restocking programs.

The Research Topic titled “*True Limpets as Living Resources: Biology, Ecology, Exploitation, and Sustainability*” aims to provide a comprehensive understanding of this unique animal group, covering diverse aspects such as ecology, taxonomy, conservation,

and sustainability. The collaborative efforts of researchers from Africa, America, Asia, and Europe are integrated into ten Original Research articles and one Systematic Review.

Methods and recent advances in limpet conservation

The critically endangered “ferruginous limpet” *Patella ferruginea* takes center stage in four publications. [Ostalé-Valriberas et al.](#) assess the species status in Ceuta (close to the Strait of Gibraltar), revealing a significant population unit and support for the concept of “Artificial Marine Micro-Reserves” as a viable conservation measure aligned with IUCN guidelines. [Cascales-Soler et al.](#) review the literature on *P. ferruginea*, concluding that Marine Protected Areas (MPAs) facilitate the growth of larger individuals without influencing population mean density. Conservation efforts extend to technical applications revealing associated risks and optimization practices; with [Espinosa et al.](#) developing translocation methods using Artificial Inert Mobile Substrata, and [García-Gómez et al.](#) exploring an alternative translocation strategy based on extracting individuals from their natural environment.

Taxonomy and identification challenges

Given the inherent challenges in limpet taxonomy and identification, three publications focus on this aspect. [Hollister et al.](#) leverage advances in computer vision to aid shell morphology-based limpet identification. Molecular tools contribute to understanding the evolutionary history and inter-relationship of different limpet taxa. This approach was used to study the biogeography of three *Nacella* species in South America by [González-Wevar et al.](#), as well as the internal phylogeny of the Patellogastropoda through including the mitochondrial genome of new Acmaeidae and Lottiidae species by [Putri et al.](#)

Ecological insights

Limpet ecology, a timeless subject, is explored in three publications. [Branch et al.](#) investigate interactions between three invasive species and the limpet *Scutellastra granularis* in South Africa, revealing nuanced impacts dependent on the ecology of the species involved, environmental conditions, and interspecies

interactions. [Seabra et al.](#) delve into the recruitment of co-occurring patellids and a siphonariid in Southwest Portugal, highlighting the importance of rock pools and coralline algae as nursery grounds. [Vasconcelos et al.](#) provide insights into the fecundity of fishery species in Madeira Island, utilizing histological approaches to describe their reproductive cycle, potentially enhancing adult conservation strategies. [Sousa et al.](#) contribute a survey on mollusc consumption in Madeira Island, emphasizing the predominant importance of limpets.

Conclusion

In summary, the diverse and comprehensive research presented in this Research Topic sheds light on the multifaceted aspects of true limpets, encompassing their biology, ecology, exploitation, and potential pathways towards sustainability. The collaborative efforts of researchers from various continents contribute significantly to our understanding of these marine gastropods, providing crucial insights for informed conservation and management strategies in the face of escalating threats to limpet populations.

Author contributions

DC: Conceptualization, Writing – original draft, Writing – review & editing. AH: Writing – review & editing. TN: Writing – review & editing. SH: Writing – original draft, Writing – review & editing. CA: Conceptualization, Writing – original draft, Writing – review & editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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