

RESEARCH ARTICLE

Review About the Biodiversity of Pill Clams (Bivalvia, Sphaeriidae) in the Confines of the World, the Argentinean Patagonia

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ABSTRACT

This study aims at updating the diversity and distribution of Sphaeriidae in Argentine Patagonia, with a particular emphasis on the Santa Cruz Province. Samples were collected between 2015 and 2023 across diverse habitats, including rivers, lakes, lagoons, and Patagonian wetlands, and this was complemented by data obtained from a comprehensive literature review and a revision and improvement of major malacological collections. Both manual and sieve-based collection methods were used to obtain specimens from different habitats. From 121 records analyzed, 101 records were identified to species level, including four species of *Pisidium* and two of *Sphaerium*. *Pisidium magellanicum* and *Pisidium patagonicum* were the most frequently recorded species. *Sphaerium patagonicum* demonstrated the broadest distribution, ranging from northern Neuquén to southern Tierra del Fuego. Santa Cruz Province had the highest number of records (57), followed by Chubut (24), with Río Negro and Tierra del Fuego having the fewest records. We report the first record of *Pisidium chilense* in Neuquén Province, providing new evidence of its presence in Argentine Patagonia. These findings advance our knowledge of Sphaeriidae distribution in Patagonia and highlight gaps in coverage, particularly in less-sampled regions.

1 | Introduction

Sphaeriidae, commonly referred to as “pills,” “peas,” or “finger-nail clams,” are the smallest freshwater bivalves (≤ 25 mm) and play a key ecological role by dominating benthic communities and contributing to nutrient cycling (Cummings and Graf 2015; Lee 2019). They occur in most freshwater habitats, generally requiring silty-sandy substrates rich in organic matter (Ituarte 1996), and are distributed across all continents except Antarctica (Graf 2013; Bernalaya et al. 2024a). These biological traits also contribute to their ability to occupy geographical ranges larger than freshwater mussels (unionids), which makes it possible for them to inhabit isolated freshwater environments disconnected from major water bodies (Lee 2019; Halabowski et al. 2024).

All recognized species of Sphaeriidae are simultaneous hermaphrodites, reproducing mainly by cross-fertilization but also by self-fertilization, and show parental care, with embryos developing in suprabranchial cavities or gill sacs (Ituarte 2009; Lee 2019). In Euperinae, broods are synchronous, while in Sphaeriinae, sequential brooding occurs (Heard 1977; Mackie et al. 1974). Dispersal is passive via insects, birds, fish, and amphibians, with external bird transport regarded as the most important mechanism (Mackie 1979; Bernalaya et al. 2020, 2024b).

The lack of comprehensive phylogenetic studies complicates the establishment of global lineage relationships (Halabowski et al. 2024). However, over the past two decades, taxonomic studies integrating both morphological and molecular data have significantly enhanced our understanding of phylogenetic relationships

and biogeographical patterns in specific regions. Korniusshin and Glaubrecht (2002) provided valuable insights into the biogeographical distribution of the Sphaeriidae family, highlighting significant affinities between species pairs from Eurasia and North America, which suggest a widespread Holarctic distribution. They also identified connections between South African species and their Palaearctic and Holarctic relatives. Additionally, some groups exhibit mixed biogeographical patterns, incorporating Holarctic species alongside Nearctic and Ethiopian taxa. Notably, certain *Sphaerium* species indicate a Gondwanan distribution, with representatives found in Australia, New Zealand, and South America. The authors propose that the Sphaeriinae subfamily may have Gondwanan roots, emphasizing the evolutionary relationships among these taxa.

Although the current diversity of Sphaeriidae is considerably lower compared to other groups of freshwater bivalves (Graf 2013), ongoing taxonomic research is steadily revealing new species and expanding the recognized diversity within this family. This is illustrated by Lee (2019), who reported 227 recognized species worldwide, whereas a recent study by Bernalaya et al. (2024a) increased this number to 266 species.

For the Neotropical region, traditionally five genera have been recognized—Euperinae: *Eupera* Bourguignat, 1854; *Byssanodonta* d'Orbigny, 1835; Sphaeriinae: *Pisidium* Pfeiffer, 1821; *Musculium* Link, 1807; and *Sphaerium* Scopoli, 1777 (Pereira et al. 2014; Ituarte in Cuezco et al. 2020). The number of species in this region has been increasing in recent decades (Ituarte 1995, 1996, 1999, 2000, 2001, 2004, 2005, 2007), from 43 in Pereira et al. (2014) to 65 species in the latest revision of Ituarte (Ituarte in Cuezco et al. 2020).

Although Ituarte (in the works mentioned above) maintains the genera *Pisidium* and *Musculium* for the South American representatives, recent studies, including molecular analyses (Bernalaya et al. 2024a), suggest that *Musculium* should be replaced by *Sphaerium*. The situation regarding the genus *Pisidium* remains unresolved because the only two sequences of South American specimens available in GenBank, representing two species out of a total of 26, have been assigned variously to *Afropisidium* Kuiper, 1962, *Euglesa* Jenyns, 1832, and more recently retained in "*Pisidium*" with reservations by Bernalaya et al. (2024a). In this work, we choose not to introduce changes at the genus level and therefore retain *Pisidium* for the South American species until molecular information becomes available for a greater number of taxa.

Bernalaya et al. (2024a) advanced the global understanding of Sphaeriinae phylogeny and highlighted the need for research in underexplored regions, including South America. In Argentina, studies on Sphaeriidae were discontinued after the contributions of Ituarte in the late 20th and early 21st centuries and were only recently resumed by our research group.

Although pill clams are important indicators of ecological quality in freshwater systems, acting as sentinel organisms, records from Argentine Patagonia remain limited. To date, six species of Sphaeriinae have been documented, with no representatives of Euperinae, and most records are concentrated in easily accessible areas, leaving many sites unsurveyed and several species known only from their type localities (Ituarte, 2009). Limited access to remote areas has further constrained field surveys. This study aimed to review and update knowledge on the diversity and

distribution of Sphaeriidae in Argentine Patagonia through the examination of collections, literature review, and new surveys in nontourist areas.

2 | Methods

Field surveys were carried out in Santa Cruz Province in the Argentinean Patagonia (Figure 1) between 2015 and 2023. Sampling encompassed a variety of habitats where Sphaeriidae species are found, including rivers, small streams, lakes, lagoons, and Patagonian wetlands such as mallines and springs (Figure 1). Fifty sampling sites distributed across various water bodies were surveyed. Sites were selected based on two criteria: maximizing habitat diversity and ensuring road access for sampling equipment.

The sampling methodology was based on the procedures outlined by Ituarte (2009). Extensive surveys were conducted to maximize species sampling at each site. Manual sampling lasted for 20–30 min per site. To cover a wide range of habitats, surveys were performed by one or more researchers, depending on personnel availability during sampling. Metal mesh sieves with pore sizes of 250–500 µm were used in various aquatic environments with soft and generally silty substrates rich in organic matter. For water bodies with vegetation, a manual net with a 500 µm mesh was employed (Ituarte 2009; Torres 2022).

Additionally, this study used data from the main malacological collections in Argentina, namely the Museo de La Plata (MLP-Ma) and the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN), complemented by a comprehensive literature review through Scielo, Scopus, and Web of Science. Although collection records must be interpreted with caution, as they were obtained at different times and using diverse methods that may introduce bias, the integration of historical data with new surveys provides valuable insights for further research and helps to identify distribution patterns (Miyahira et al. 2022; Torres et al. 2024).

The data were systematically processed and analyzed to develop distribution maps using QGIS 3.34.0-Prizren. Administrative boundaries, watersheds, and water bodies were obtained from the Instituto Geográfico Nacional de la República Argentina (IGN 2023). Localities without geographic coordinates were georeferenced using the GeoPick application (Marcer et al. 2023), Google Earth, and the point radius method, in accordance with the standards established by Wiczorek et al. (2004) and Chapman and Wiczorek (2020), incorporating the updates proposed by Bernalaya et al. (2024a).

The identification of specimens and the description of species were conducted in accordance with the works of Ituarte (1996, 2007, 2009), Parada and Peredo (2002), Parada et al. (2009), and the updated dichotomous keys provided by Ituarte in Cuezco et al. (2020). The species were nominated using the systematic scheme presented by Ituarte in Cuezco et al. (2020).

3 | Results

A total of 121 records of the family Sphaeriidae were examined, including 74 from malacological collections, 30 from bibliographic



FIGURE 1 | Sampling sites in Patagonia Argentina. A: Río Turbio; B: Río Chico; C–D: Spring in Lago Cardiel; E–F: Río Pinturas; G: Headwaters of the Ecker River, Meseta Lago Buenos Aires; H–I: Mulak Aike spring; J: Primavera stream; K: Guillermo stream; L: Del Oro stream.

sources, and 17 from new field surveys. Of these, 101 were identified to species level, 14 to genus level, and six to family level. All analyzed material is available in Supporting Information S1.

In the MLP, 24 out of 28 records without determination were identified at the species level. We identified four species within the genus *Pisidium* and two species for the genus *Sphaerium* (Figure 2). *Pisidium magellanicum* (Dall, 1908) and *Pisidium*

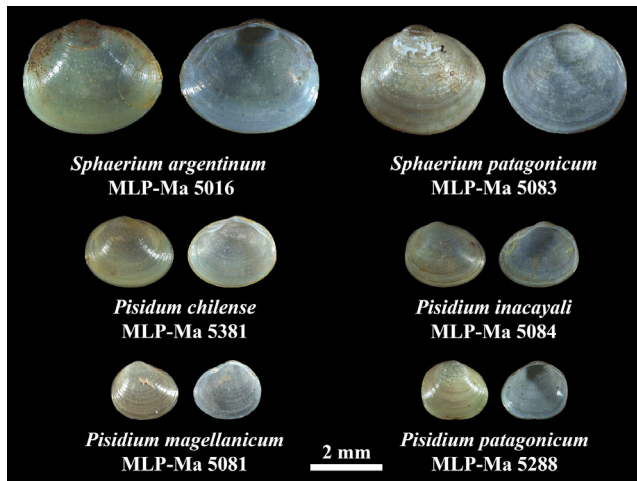


FIGURE 2 | Species of genera *Pisidium* and *Sphaerium* recorded in Argentinean Patagonia. Scale bar: 2 mm.

patagonicum Pilsbry, 1911 were the most frequently recorded, with 26 and 14 records, respectively. *Sphaerium patagonicum* (Pilsbry, 1911) had the broadest distribution range in Argentine Patagonia, extending from northern Neuquén Province (36°9'32"S, 70°23'47"W) to southern Tierra del Fuego Province (54°52'S, 67°29'W). Santa Cruz Province had the highest number of records (57), followed by Chubut with 24 records. The provinces with the fewest records were Río Negro (four) and Tierra del Fuego (11) (Figure 3, 4, and Supporting Information S2).

Pisidium chilense (d'Orbigny, 1846)

Synonymy

Cyclas chilensis d'Orbigny, 1846

Type locality

Concepción, VIII Region of Chile (36°50'S, 72°50'W) sensu d'Orbigny (1846). According to Gray (1854), the type locality would be Valdivia (39°49'S, 73°16'W) in the X Region of Chile.

Type

Syntype BMNH 1854.12.4.752.

Description

A shell of oval outline, longer than high, compressed, medium size (up to 5.5 mm long). Dorsal and ventral margins are smooth, uniformly curved, with a short, curved posterior end. Umbos are broad, subcentral, and depressed, and in internal view, they are barely visible above the dorsal margin. The shell surface is smooth, with low, weak marginal ridges. The pale yellow periostracum has a dull luster. The robust, long, internal ligament appears externally as a thin line between the valves. There is an only anal siphonal opening, with median presiphonal suture (Ituarte 2007; Ituarte in Cuezco et al. 2020).

Known distribution

Chilean Patagonia, in rivers and lakes of Biobío region (VIII), Araucanía (IX), and Los Lagos (X) Regions. In Argentina, records from Gutiérrez Stream, Bariloche, Río Negro Province (Parada and Peredo 2002; Ituarte 2007; Ituarte in Cuezco et al. 2020).

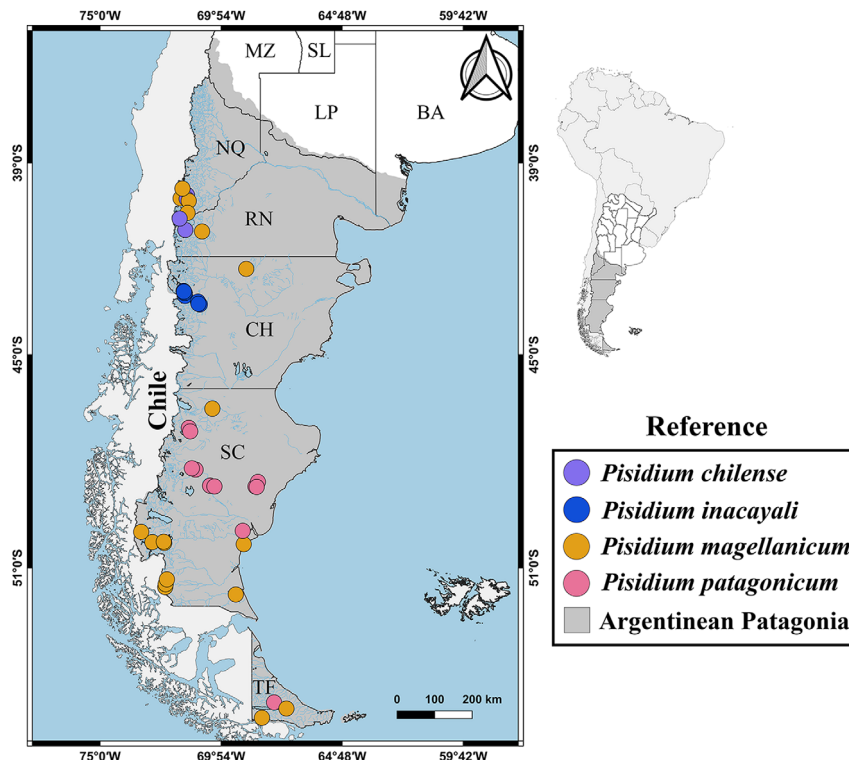


FIGURE 3 | Record of species of the genus *Pisidium* in Argentinean Patagonia. BA: Buenos Aires; CH: Chubut; LP: La Pampa; MZ: Mendoza; NQ: Neuquén; RN: Río Negro; SC: Santa Cruz; SL: San Luis; TF: Tierra del Fuego.

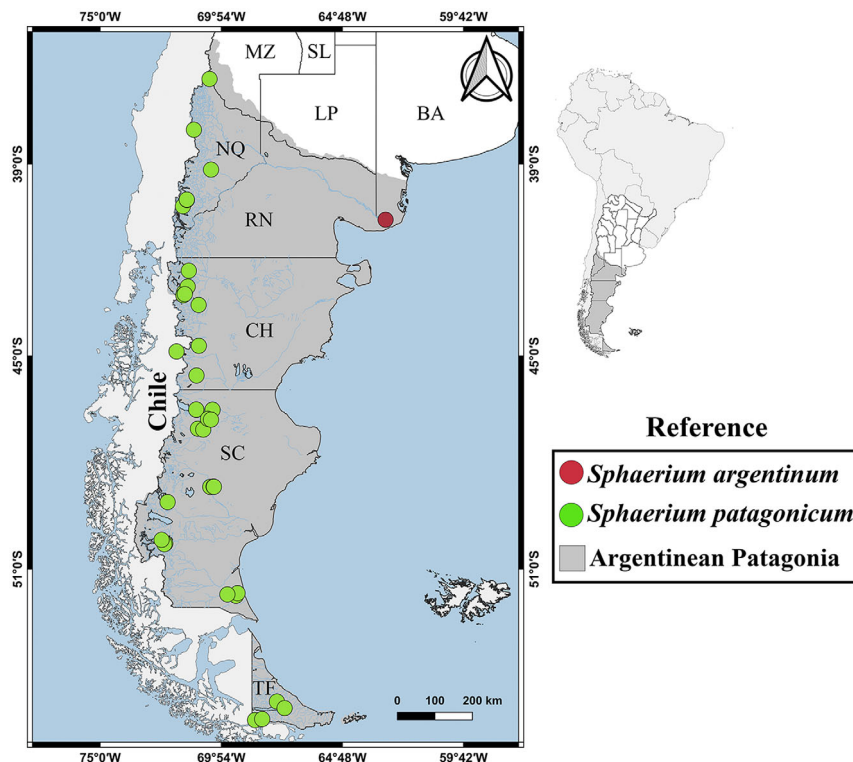


FIGURE 4 | Record of species of the genus *Sphaerium* in Argentinean Patagonia. BA: Buenos Aires; CH: Chubut; LP: La Pampa; MZ: Mendoza; NQ: Neuquén; RN: Río Negro; SC: Santa Cruz; SL: San Luis; TF: Tierra del Fuego.

New records

Neuquén Province: MLP-Ma 5425, 5524–2 (Supporting Information S1).

Pisidium inacayali Ituarte, 1996

Type locality

Unnamed creek 3 km from Trevelin, Chubut Province, Argentina (43°04'S, 71°29'W) (Ituarte 1996).

Type

Holotype MLP-Ma 5067.

Description

A shell of oval, elongated, inequilateral outline, medium size (up to 5.3 mm long). The anterior end projects forward in a sharp curve, while the posterior end is short with a curved posterior margin. Dorsal margin is subrectilinear in its anterior half, descending in a marked curve towards the posterior half. The ventral margin is broad and uniformly curved, with broad, prominent umbos, which are displaced backwards. The shell is translucent, white-yellowish, with marked marginal striations. The internal ligaments are strong and long, with a deep ligamental groove and a gently convex or very broadly S-shaped ventral edge. There is an only anal siphonal opening, with a moderately long presiphonal suture (Ituarte 2007; Ituarte in Cuezco et al. 2020).

Known distribution

Recorded exclusively in streams of northeastern Chubut.

New records

Chubut Province: MLP-Ma 9706, 9712, 12 195 (Supporting Information S1).

Pisidium magellanicum (Dall, 1908)

Synonymy

Corneocyclas magellanicus Dall, 1908

Pisidium observationis Pilsbry, 1911

Type locality

Magellan Strait, Chile (53°01'S, 70°42'15"W) (Dall 1908).

Type

Holotype USNM 110 712.

Description

A shell of oval outline and medium size (up to 5.7 mm long). Dorsal, posterior, and ventral margins exhibit a marked curvature, while the anterior margin descends to a slope towards the anterior end, projected in an acute curve. The posterior end is short, sometimes subrectangular and truncated. Umbos are low and broad-based umbos, with short and deep ligamentary groove. The internal ligament is long and not visible from the outside. There are branchial and anal siphonal apertures (Ituarte 2007; Ituarte in Cuezco et al. 2020).

Known distribution

Patagonia in Argentina and Chile. In Argentina, it was recorded in the provinces of Neuquén, Río Negro, Chubut, Santa Cruz, and Tierra del Fuego. In Chile, it was recorded in the Magallanes region around Punta Arenas.

New records

Santa Cruz Province: MLP-Ma 9710, 9714. Tierra del Fuego Province: MLP-Ma 14 789. Chubut Province: MLP-Ma 13 135 (Supporting Information S1).

Pisidium patagonicum* Pilsbry, 1911Type locality*

Springs on the Chico river, 25 km above the Sierra Oveja (48°46'S, 70°22'W), Santa Cruz Province, Argentina.

Type

Syntype ANSP 88 810.

Description

A solid shell with a rounded or high oval outline of medium size (5 mm long). The posterior end is truncated and subrectangular, while the anterior end projects in a pronounced curve. The dorsal margin is short and uniformly arched, while the ventral margin is broad and curved. Umbos are narrow, barely visible above the dorsal margin and nearly central in position, with a deep ligamentary groove. No data is available regarding siphonal apertures (Ituarte 2007; Ituarte in Cuezco et al. 2020).

Known distribution

Southern end of Argentine Patagonia, in the provinces of Santa Cruz and Tierra del Fuego.

New records

Santa Cruz Province: MLP-Ma 6969, 6970. Santa Cruz River. Springs of the Central Plateau of Santa Cruz (Margary, Mulak Aike). Lagoons and springs of the Plateau of Lake Buenos Aires (Torres 2022).

Sphaerium argentinum* (d'Orbigny, 1835)Synonymy*

Cyclas argentina d'Orbigny, 1835

Musculium argentinum (d'Orbigny, 1835)

Type locality

A brook at the bottom of the Cerro ("Pantanos Stream" fide Figueiras, 1965), Montevideo, Uruguay (34°46'S, 56°13'W).

Type

Holotype NHMUK 1854.12.4.751

Description

A quadrangular or sharply trapezoidal shell outline, with dorsal margin extending as far as the ventral margin of medium to large size (up to 12.6 mm long). It displays a finely striated surface. The dorsal margin connects with anterior and posterior margins at marked angles, while the anterior end projects to a distinctly obtuse or sometimes rounded angle. Posterior end is truncated, somewhat oblique, nearly straight. It exhibits a central, prosogyrous beak, and a small rodissococonch (1.5–2 mm), which is inflated with a pronounced nepionic cap. The ligament is long (20% of the shell length), narrow, and extends from the beak to a short distance from the beginning of the posterior laterals. The ligament is externally visible but does not project above the shell surface. Branchial and anal siphons are fused throughout but free at the distal end (Ituarte 1996, 2009; Ituarte in Cuezco et al. 2020).

Known distribution

Argentina: Mendoza, Buenos Aires, Entre Ríos, Corrientes, Misiones y Mendoza. Uruguay: around Montevideo. Chile: between 38° and 41°S.

New records.

No new records

Sphaerium patagonicum* (Pilsbry, 1911)Synonymy*

Musculium patagonicum Pilsbry, 1911

Type locality

Santa Cruz Province: Río Chico, 50 miles above the Sierra Oveja (today: Cerro Las Ovejas, 48°46'S, 70°22'W), Río Chico Department.

Type

Holotype ANSP 88 807.

Description

A fragile, slightly inequilateral, moderately inflated shell, with a rounded-oval outline of medium to large size (up to 10 mm long). It has a shiny, straw-colored surface, ranging from olive to grayish-violet. Dorsal and ventral margins have a similar curvature. The anterior end protrudes, with a uniform curvature, while the posterior end is truncated. The ventral margin is uniformly curved. The umbo is prosogyrate, medium-sized, broad, with a well-defined embryonic cap (calculated umbo). The ligament is externally visible but not prominent. The ligament groove is long, uniformly narrow, and pointed at both ends. The branchial and anal siphons are fused throughout but free at the distal end (Ituarte 1996, 2009; Ituarte in Cuezco et al. 2020).

Known distribution

Argentina: Chubut, Neuquén, and Santa Cruz Province. In Chile, it was reported in a lagoon in Puerto Natales (51°42'S, 72°25'W) (Parada et al. 2009).

New records

Chubut Province: MLP-Ma 9455. Santa Cruz Province: MLP-Ma 6956, 6965, 6967, 6968 (new identification of material deposited in the MLP-Ma); Springs in the northwest of Santa Cruz. Fénix Chico, Ecker, Chico, Pinturas and Gallegos rivers (Torres 2022). Tierra del Fuego Province: MLP-Ma 14 785, 14 786, 14 790.

4 | Discussion

The results of this study provide a comprehensive synthesis of the diversity and distribution patterns of Sphaeriidae species in the Argentine Patagonia (from 37°S to 56°S). The data collected through sampling address information gaps in the relatively underexplored region of southern Patagonia and update the known distribution ranges of the identified species.

Based on the results obtained, *P. magellanicum* and *S. patagonicum* exhibit the broadest distribution ranges in Argentine Patagonia, with the southernmost records on Gable Island, Tierra del Fuego Province (54°52'S, 67°29'W). Extensive sampling in Santa Cruz Province has expanded their known ranges, particularly in isolated and difficult-to-access areas of the Patagonian steppe. Santa Cruz now holds the highest number of Sphaeriidae records (59), followed by Chubut (24), while Río Negro (four) and Tierra del Fuego (11) have the fewest, highlighting the need for further sampling to assess population status and distribution patterns.

South America, and Patagonia in particular, remains relatively understudied from a malacological perspective (Darrigran et al. 2020). These results represent an important step toward understanding Patagonian pill clam distributions. However,

because of low researcher density, vast distances, and limited site accessibility, survey areas must continue to be expanded to minimize sampling biases.

Pisidium sterkianum Pilsbry, 1897 has been reported in the Patagonian provinces by Rumi et al. (2008); however, this species is primarily associated with the Plata Basin, a large area with tropical and subtropical climates (from 14°30'S to 36°30'S latitude) and some of the largest rivers in the world such as Paraná, Paraguay, and Uruguay (Clavijo et al. 2024), where it exhibits a broad distribution across Argentine provinces and in the neighboring country of Uruguay (Ituarte and Korniuschin 2006; Ituarte 2007; Ituarte in Cuezco et al. 2020). The only record of this species in the Patagonia region is attributed to Hylton Scott, who collected it in the Somuncurá Plateau in 1963 (Hylton Scott 1963) in the Río Negro Province. However, the absence of reference material, an unclear specimens description, and the lack of subsequent sightings for over 60 years render Hylton Scott's record questionable. Notably, in later revisions by Ituarte, the species *P. sterkianum* is not mentioned for the Patagonian region (Ituarte 2007, Ituarte in Cuezco et al. 2020).

The distribution of *Sphaerium argentinum* in Argentina is primarily found in the Plata Basin, with only a single record from Patagonia, specifically in Carmen de Patagones in the south of Buenos Aires Province. Ituarte and Gordillo (1991) cite the species for Tierra del Fuego Province (MLP-Ma 5016); however, subsequent analysis of the deposited material led to the identification of another species in the genus, *S. patagonicum*, which has a much broader distribution throughout Patagonia.

Despite being a frequent component of benthic macroinvertebrate communities in Patagonian water bodies, where they serve as indicators of environmental water quality (Ituarte 2009; Torres et al. 2023a, 2023b), the sphaeriids remain one of the least studied in the region due to their small size, cryptic lifestyle (infaunal in soft substrates), and the challenges associated with their identification (Parada and Peredo 2006; Ituarte 2009). Additionally, Ituarte (2009) notes that the potential for autogamy may result in populations with distinct clonal lines, which accentuate morphological differences between spatially proximate populations, even within the same water body. These factors collectively complicate the identification of Sphaeriidae at both generic and specific levels, resulting in a significant underrepresentation of their diversity in ecological studies of Patagonian aquatic macrofauna (Ituarte 2009).

Although the family presents several challenges for accurate species descriptions, experts have developed updated identification keys to assist in the taxonomic classification of Sphaeriidae species (Ituarte 2009; Ituarte in Cuezco et al. 2020). These keys are primarily based on general shell morphology, hinge characteristics, size, and general morphometric indices, such as the length-to-height ratio. These updated identification keys are crucial for the training of ecologists working in Patagonian aquatic environments, where identifications often reach only the family level. The implementation of these keys can significantly enhance the accuracy of specimen's identification and improve ecological assessments in these regions.

Recently, Halabowski et al. (2024) delineated the conservation challenges facing European Sphaeriidae, underscoring the necessity for a comprehensive roadmap to guide effective conservation strategies. This roadmap should involve identifying

key threats and addressing knowledge gaps to formulate targeted and actionable measures. In contrast, research on the conservation risks to freshwater bivalves in Patagonia has remained sparse. Torres (2022) identifies several critical threats, including habitat destruction, particularly of Patagonian wetlands (mallines and springs) due to mining activities and extensive livestock farming.

Additional concerns include the impacts of potentially invasive species such as the diatom *Didymosphenia geminata* (Lyngbye) Mart. Schmidt, 1899, salmonid fish, and the recent introduction of freshwater molluscs like *Corbicula fluminea* (O. F. Müller, 1774) and *Physa acuta* Draparnaud, 1805 (Labaut et al. 2021; Horak et al. 2023; Gutiérrez Gregoric et al. 2024; Torres et al. 2024). Predation, resource competition, and habitat modification are key impacts associated with the establishment of invasive species (Torres et al. 2024). In Patagonian basins, extensive rainbow trout stocking disrupts aquatic communities, likely altering freshwater assemblages, including freshwater bivalves, that serve as key prey (Lancelotti et al. 2015). Habitat modification has been linked to the proliferation of *D. geminata*, which favors tolerant taxa such as chironomids and oligochaetes while reducing sensitive groups including mayflies, stoneflies, and caddisflies (Brand and Miserendino 2014). Dense mats of this species alter habitat conditions and reduce food availability, negatively affecting filter-feeding organisms such as freshwater bivalves by limiting sediment access and reducing growth and reproduction (Brand and Grech 2020; Torres et al. 2024). Similarly, the expansion of *Corbicula fluminea* and *Physa acuta* has substantially decreased freshwater mollusc diversity, particularly among bivalves (Labaut et al. 2021; Horak et al. 2023).

Furthermore, climate change exacerbates these threats by altering precipitation patterns and increasing the frequency of extreme events, such as droughts, floods, and wildfires, which could alter the pH and conductivity conditions of water bodies (Williams Subiza and Brand 2018; Lawrence et al. 2022; Clavijo et al. 2024). Addressing these complex and interconnected threats is imperative for the effective conservation of Patagonian aquatic ecosystems and the preservation of their bivalve species.

The lack of societal awareness regarding the ongoing biodiversity crisis and its impacts on human well-being has resulted in the presence of environmental offices and policymakers who are often inattentive, disconnected, inadequately trained, and unprepared to manage biodiversity conservation effectively (Darrigran et al. 2024). As a result, efforts to tackle this challenge are either nonexistent or poorly coordinated. Moreover, the absence of widespread environmental education has hindered the implementation of clear, evidence-based, and long-term conservation policies. Without substantial political reforms and a broader societal commitment, South American ecosystems are increasingly at risk of becoming homogenized and degraded (Darrigran et al. 2025).

5 | Conclusion

This study synthesizes the available information on the diversity and distribution of the Sphaeriidae family in Argentine Patagonia, recording a total of six species. The findings provide a comprehensive overview of the distribution patterns of these species in a region that has been relatively underexplored.

Pisidium chilense is recorded for the first time in Neuquén Province, marking it as the second province in Argentina with records of this species. This discovery highlights the importance of ongoing field surveys to uncover new occurrences and better understand the distribution of species in Patagonia.

Pisidium magellanicum and *Sphaerium patagonicum* exhibit the most extensive distribution ranges in Argentine Patagonia, with the southernmost records located in Tierra del Fuego. Notably, Santa Cruz Province has yielded the highest number of records, emphasizing the significance of targeted sampling efforts in this region.

Accurate species identification within the Sphaeriidae family remains a challenge due to the small size and cryptic nature of these organisms. However, the recent development of updated identification keys has significantly improved taxonomic precision, facilitating more reliable species-level identification for future ecological studies in Patagonia. These studies must be complemented with genetic studies to elucidate which entities are present in Patagonia, tasks that we have already focused on to continue with the group. The populations of Sphaeriidae species face several conservation threats, including habitat degradation from mining and livestock farming, the introduction of invasive species, and the accelerating impacts of climate change. Addressing these threats is essential for society to ensure the conservation of Patagonian freshwater ecosystems and the preservation of their key species.

Author Contributions

Santiago H. Torres, Micaela de Lucía, Gustavo Darrigran, Juan P. Martin, and Diego E. Gutiérrez Gregoric: conceptualization; **Santiago H. Torres and Diego E. Gutiérrez Gregoric:** data curation; **Santiago H. Torres, Diego E. Gutiérrez Gregoric, and Micaela de Lucía:** formal analysis; **Santiago H. Torres, Juan P. Martin, Micaela de Lucía, Gustavo Darrigran, and Diego E. Gutiérrez Gregoric:** investigation; **Santiago H. Torres, Diego E. Gutiérrez Gregoric, and Micaela de Lucía:** methodology; **Gustavo Darrigran, Diego E. Gutiérrez Gregoric, and Juan P. Martin:** supervision, project administration; **Santiago H. Torres, Diego E. Gutiérrez Gregoric, Micaela de Lucía, Gustavo Darrigran, and Juan P. Martin:** writing – original draft and writing – review and editing. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors have no conflicts or competing interests to declare that are relevant to the content of this article.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.