Identification and Biology of the Freshwater Bryozoan Colony Photographed in Lake Eacham

Freshwater ecosystems contain a diversity of colonial invertebrates that often receive little attention outside specialist biological literature. Among these, the freshwater bryozoans (Phylum Bryozoa: Class Phylactolaemata) present some of the most distinctive and complex colonial structures encountered by divers. A photograph taken at approximately twelve metres depth in Lake Eacham, a volcanic lake in Far North Queensland, shows a pale, lobed gelatinous mass attached to a submerged branch. The few notes that follow attempts to give a cursory review as to the identity of the organism, analyse its morphology and growth stage, and situate the observation within the broader biology of freshwater bryozoans.

Figure1. Bryozoan colony Lake Eacham, 12m depth. Photographer author 2025.

Freshwater bryozoans such as the one identified in Figure 1. are colonial suspension feeders composed of microscopic zooids that live within a shared gelatinous matrix.[1] Their colonies may take encrusting, branching, or massive lobed forms depending on species and environmental conditions. In Australian freshwater habitats, several phylactolaemate bryozoan genera are documented, including Plumatella, Fredericella, and, more recently, the adventive Pectinatella magnifica.[2] Of these, *Pectinatella* is the only genus that forms large, globular, gelatinous colonies with smooth lobes and a granular surface appearance.[3] This morphology closely matches the Lake Eacham specimen which exhibits a vesicular skeletal structure, in which the supporting framework is composed of thin skeletal walls enclosing numerous small cavities, producing a lightweight yet mechanically stable colony adapted to a freshwater lacustrine environment.

The specimen in the photograph displays several diagnostic features: a translucent, gelatinous body; distinct, rounded lobes; and a finely textured surface corresponding to the clustering of zooids. These features are characteristic of mid-stage gelatinous colonies of *Pectinatella magnifica*, a species originally native to North America but now widely reported in lentic habitats across Asia, Europe, but for which no confirmed published records currently exist in Australia.[4] While other Queensland bryozoans, such as *Plumatella repens* and *Plumatella bushnelli*, which form small cushions or crust-like colonies, they do not produce the balloon-like lobes evident here.[5] The depth of discovery (12 m) is also consistent with the ecological tolerance of *Pectinatella*, which does not depend on light but rather on suspended organic matter filtered by its lophophores.[6]

An analysis of size further supports this identification. Although scale is not provided, the colony appears approximately 8–12 cm wide, with individual lobes 2–4 cm in

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[1] Timothy S. Wood, ‘Digestion and nutrition in freshwater bryozoans (Phylactolaemata)’, *Invertebrate Biology*, vol. 140, 2021, p. 270.
[2] Zuzana Balounová, Eva Pechoušková, Josef Rajchard, Vít Joza and Jan Šinko, ‘World-wide distribution of the bryozoan *Pectinatella magnifica* (Leidy 1851)’, *European Journal of Environmental Sciences*, 2018, pp. 96-100.
[3] Ibid. p.96.
[4] M. S. Oda, A. Tanaka, K. Matsuura, and G. Sato, "Global Expansion of the Freshwater Bryozoan *Pectinatella magnifica*," *Aquatic Invasions* vol.7, no. 4, 2012, p. 495.
[5] Hawkes, "Freshwater Bryozoa (Phylactolaemata) of Australia," p. 8.
[6] D. F. Aldridge, "Filter Feeding Rates of Freshwater Bryozoans," *Freshwater Biology* vol.37, no. 1,1997, p. 53.

diameter. Colonies of *Pectinatella magnifica* typically begin as small, encrusting patches early in the season and develop into multi-lobed spheres or masses as they mature.[7] The Lake Eacham colony displays the smooth, uniformly coloured lobes characteristic of an active growth phase before the late-season production of statoblasts, durable asexually produced capsules that allow bryozoans to survive unfavourable conditions.[8] The absence of darkened or deteriorating tissue reinforces the conclusion that this is an actively expanding colony.

Understanding the colony's anatomy clarifies the structure visible in the image. Each granular dot on the colony surface is the opening through which individual zooids extend their lophophores, delicate tentacular crowns used for filter feeding. [9]Beneath this lies a hydrated extracellular matrix containing interconnected zooid chambers. The rounded lobes represent modular expansions formed as zooids replicate, extending the colony outward from its initial attachment site. [10]A simplified diagram (above) illustrates these components for interpretive clarity.

The ecological significance of freshwater bryozoans is considerable. Colonies can filter hundreds of litres of water per day, removing suspended particulates and contributing to water clarity.[11] Their presence is typically associated with stable, low-disturbance freshwater environments, conditions consistent with Lake Eacham's protected, oligotrophic character. Moreover, bryozoans may serve as bioindicators, as some species are sensitive to pollution and habitat disruption.[12] *Pectinatella magnifica*, however, is known for its adaptability and, in some regions, its potential to form nuisance biomasses.[13] There is currently no evidence of ecological harm in Australia, but documentation remains limited.

Within Queensland, published records of freshwater bryozoans are relatively sparse. The available biogeographical literature indicates that multiple species of *Plumatella* occur in the region, and observations of gelatinous bryozoan colonies

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[7] Smith, "A Review of the Morphology and Ecology of *Pectinatella magnifica*," p. 122.
[8] Timothy Wood, "Statoblast Formation in Freshwater Bryozoa," *Invertebrate Reproduction and Development* vol. 33, no. 2, 1998, p. 152.
[9] Ryland, *Bryozoans*, p. 44.
[10] Ibid., p. 45.
[11] Aldridge, "Filter Feeding Rates of Freshwater Bryozoans," pp. 55–56.
[12] Hawkes, "Freshwater Bryozoa (Phylactolaemata) of Australia," p. 12.
[13] Oda et al., "Global Expansion of the Freshwater Bryozoan *Pectinatella magnifica*," p. 497.

suggest the sporadic establishment of *Pectinatella*, likely introduced via waterfowl or human activity, as its statoblasts are highly durable and easily transported.[14] The Lake Eacham specimen therefore contributes to the growing recognition of freshwater bryozoan diversity in tropical Australia and illustrates the need for further taxonomic and ecological study.

In conclusion, the photographed organism from Lake Eacham is most consistent with a freshwater bryozoan colony, almost certainly *Pectinatella magnifica*. Its lobed gelatinous morphology, granular surface texture, and size correspond closely with documented mid-growth-stage colonies. Understanding such organisms enriches our appreciation of freshwater biodiversity and highlights the often-overlooked complexity of colonial invertebrates inhabiting Australian lakes. Continued documentation and study will help clarify the distribution, origins, and ecological roles of these remarkable colonial animals.

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[14] Ibid., p. 498.

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