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Extremely Rare Finding of a Chiton (Mollusca, Polyplacophora) in a Rocky Intertidal Habitat in Nova Scotia (Canada)

Julius A. Ellrich [1] and Ricardo A. Scrosati [2,*]

[1] Shelf Sea System Ecology, Biologische Anstalt Helgoland, Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, 27498 Helgoland, Germany; julius.ellrich@awi.de
[2] Department of Biology, St. Francis Xavier University, Antigonish, NS B2G 2W5, Canada
* Correspondence: rscrosat@stfx.ca

Abstract: Chitons are a group of mollusks (polyplacophores) that differ from the mollusks that are most often found on marine rocky shores (bivalves and gastropods). On the Atlantic coast of North America, chitons have been reported in subtidal habitats from Newfoundland (Canada) to New England (USA). Here, we report the finding of *Boreochiton ruber* in an intertidal habitat in Nova Scotia (Canada). After surveying various coastal locations across Nova Scotia for 20 years (2004 to 2024), this was the only intertidal chiton we ever found, making this an extremely rare occurrence. Rare species may contribute in unique ways to community functioning, making their reports valuable for biodiversity and ecosystem research.

Keywords: *Boreochiton ruber*; marine diversity; mollusk; rare species

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Chitons are a group of mollusks (class Polyplacophora) that differ from the most common mollusks (classes Bivalvia and Gastropoda) found on marine rocky shores, so they add to biodiversity in a unique way. Many chitons are subtidal, although intertidal species exist as well. For example, on the Pacific coast of North America, intertidal chitons can be abundant and thus ecologically important [1,2]. On the Atlantic temperate coast of North America, however, chitons are thought to be subtidal. On this coast, chitons were found in subtidal habitats from Newfoundland, Canada [3,4], to New England, United States [5–8]. In Nova Scotia (Canada), chitons were reported for subtidal habitats from the Gulf of St. Lawrence [9–12], Atlantic coast [13,14], and Bay of Fundy [15,16]. Here, we report an extremely rare finding of a chiton in an intertidal habitat on the Atlantic coast of Nova Scotia.

As part of annual surveys of rocky-intertidal species along Nova Scotia's Atlantic coast [17], we sampled West Point (43.6533 N, 65.1309 W) on 18 August 2017 at low tide (Figure 1). At the mid-to-high intertidal zone of a wave-exposed bedrock habitat, we found a chiton on a substrate that was covered mainly by coralline and non-coralline crustose red algae (Figure 2). The two most common chiton species reported for Nova Scotia are *Boreochiton ruber* (Linnaeus, 1767) and *Tonicella marmorea* (O. Fabricius, 1780) [9–16]. *Boreochiton ruber* was reported for cobble fields at 3–4 m of depth off McNutts Island and Cape Negro Island [13], near West Point. Both chiton species (which have been reported under various synonyms [18,19]) are morphologically similar but can be distinguished based on the size of the granules on their shells and dorsal girdle areas: *B. ruber* has small shell granules and large girdle granules, whereas *T. marmorea* has large shell granules and small girdle granules [20]. Our encountered specimen was examined and returned immediately to its habitat because of its rarity, so its shell granules were not obvious due to reflections on its then-wet shell (Figures 2 and 3). However, the comparison of its girdle granules with published pictures for these two species [20] revealed that the size of the girdle granules of our specimen was similar to that reported for *B. ruber* and larger than for *T. marmorea*, indicating that our finding corresponded to a *B. ruber* specimen.

Figure 1. Rocky intertidal habitat at West Point viewed at low tide on 18 August 2017, when we found the rare chiton at the mid-to-high intertidal zone under calm seas and cloudy conditions.

Figure 2. Photograph of the chiton *Boreochiton ruber* as it was found at the mid-to-high intertidal zone in an area with a high cover of coralline and non-coralline crustose red algae.

Organisms of this species are usually 1–1.5 cm long, occasionally reaching 2.1 cm [20]. Thus, the encountered organism was of adult size (about 2 cm in length; Figure 3). It may have been present at the intertidal zone after local recruitment from a pelagic larva, as crustose coralline algae are thought to enhance chiton larval settlement [14]. Alternatively, the chiton may have migrated to the intertidal zone in search of crustose red algae as food or to avoid subtidal predators such as American lobsters [21], which are common in the area [22]. Either way, this finding extends the known bathymetric habitat

range for *B. ruber* on this coast. We have surveyed rocky intertidal habitats at various elevations, wave exposures, and locations in Nova Scotia for 20 years between 2004 and 2024 [17,23–28] and this was the only intertidal chiton that we ever found, making this rare finding remarkable. Rare species frequently remain unnoticed, but they are valuable to understand overall ecosystem function and resilience because of their uniqueness [29–31]. This notion emphasizes the value of reporting findings of rare species in natural ecosystems.

Figure 3. Closer view of the encountered specimen of *Boreochiton ruber*.

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