

# MONTE BOLCA: an Eocene Lagerstätte in Northern Italy

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## INTRODUCTION

Lagerstätten are sites of abnormally good quality of preservation or number of specimen, making them invaluable resources for paleontologists studying ancient organisms and their environments. These sites form when sediment is deposited in anoxic environments, inhibiting microbial decomposition. Because of this, such sights may even preserve the soft tissues of organisms, enabling unprecedented studies of detailed morphological structures. Monte Bolca is an example of a Lagerstätte located in Northern Italy, where fish of the Eocene (~56-34 Ma) have been especially preserved.

## EXAMPLE TAXON (A):

Round Herring

The image is a lateral view of the skull, and due to the absence of lateral line scales, the image clearly shows that the *Trollichthys bolcensis* is a clupeoid fish. The taxon possesses two post cleithra, which is a feature that represents it's belonging to the family of *Clupeidae*.

## EXAMPLE TAXON (B):

The Eocene Frogfish

It is characterized by the presence of tiny bifurcated dermal spinules on the skin between and on the surface of the second and third dorsal-fin spines, a naked illicium, outermost caudal-fin rays simple, a caudal peduncle, and 11 dorsal-fin rays [5].

## PALEOSITE & ENVIRONMENT

Monte Bolca is a lagerstatte next to Verona, Italy (Figure 1) and is an important source of fossils from the Eocene. The fossils there are so well preserved that their organs are usually fully kept, and even skin color may be determined. The Monte Bolca site is known as “the fish bowl” due to how many Eocene fish fossils were so well preserved there.

During the Eocene, Monte Bolca was a warm coastal area (Figure 2). The Paleocene-Eocene thermal maximum and following warm period in the Eocene meant that oceans were too warm for reefs to flourish. Instead, foraminiferal-algal banks and shoals dominated [6].

Monte Bolca houses a large variety of Eocene fish fossils (e.g., Figure 3). Examples include: *Eophryne barbutii* (Frog Fish), *Eoplatax papilio* (Batfish; **Example Taxon C**), *Godsilia lanceolata* (primitive tuna), *Paranguilla tigrana* (eel; **Example Taxon D**), *Pasaichthys pleuronectiformis* (mooneyfish), and many others. There are over 250 fish species fossils in Monte Bolca as well as some other taxon like lobsters, snakes, and even crocodiles.

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