



News Release

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Life on Earth kept to darkness for much of history, study finds

Tiny creatures that lived in the dark – either underground or below the sea floor – were the dominant life forms on Earth for much of the planet’s history, a study suggests.

Microscopic organisms, including bacteria, were the most abundant forms of life on Earth from about 2 billion years ago until 400 million years ago, when plants began to spread across the land, researchers say.

During this era, these organisms weighed around 10 times as much as all other life on the planet combined, according to the study, which offers insight into the evolution of life on Earth.

Researchers from the Universities of Edinburgh and Aberdeen used data on the current make-up of life on the planet to work out how this has changed over billions of years.

They did this by estimating how changes to the chemical composition of the atmosphere and oceans through time – which are recorded in rocks found around the world – would have affected the ability of different life forms to thrive.

Life on Earth is thought to have begun around 3.8 billion years ago with single-celled organisms. Dinosaurs first appeared around 230 million years ago, and the earliest mammals are believed to have evolved millions of years later.

Plants dominate life on the planet today in terms of their combined weight of carbon, which is about 500 billion tonnes, researchers say. Underground bacteria are now the second most abundant life form, with a combined weight of about 100 billion tonnes of carbon.

Researchers hope their work will help develop new techniques to study microscopic fossils from ancient underground regions. The study, published in *Journal of the Geological Society*, was supported by the European Union’s Horizon 2020 Research and Innovation Programme.

Dr Sean McMahon, of the University of Edinburgh’s School of Physics and Astronomy, said: “Prehistoric life on Earth was like an iceberg – most of it was found below the surface. The total mass of life on the planet was far smaller before plants took over.”

Professor John Parnell, of the University of Aberdeen’s School of Geosciences, said: “Life underground was the norm on Earth. Until quite recently, the biggest habitat was below ground.”

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