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Microbes that purify groundwater show resilience to drought

Microbes found in groundwater may be resilient to periods of drought. A new study measured the enzyme activity of microbes, which shows whether they are alive and active, in a groundwater well. No significant difference in enzyme activity was found between those microbes that had experienced drought for four months and those that had not.

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Groundwater — water held beneath the Earth's surface — is an important source of drinking water. However, human activity and climate change is placing increasing pressure on groundwater resources.

Microbes present in groundwater, known as biofilms, are important as they can remove contaminants that enter the water from run-off of agricultural fields, for example. Previous studies have shown that biofilms are able to adapt to increasing water contamination; however, it is not known how periods of extreme drought affect them.

In this study researchers in New Zealand established a well in an area where groundwater was present. Three sets of bags were left in the well in order to collect samples of biofilm; one set was left in the groundwater for the entire experiment, one set was removed from the groundwater after five months but left in the well above the water level for a further four months to mimic a period of drought, and one set was also removed for a period of four months but then returned to the groundwater for the remainder of the experiment. The researchers measured the level of enzyme activity in the bags during the experiment. Each experiment was also repeated under laboratory conditions.

The authors found that there was no significant differences in enzyme activity between the biofilms that had experienced a period of drought and those that had not, in either the well or laboratory experiments. This result suggests that biofilms are resilient to a period of drought. The authors hypothesise that this is due to the biofilms reducing their activity and entering a phase of dormancy, as has been seen in other studies. They subsequently become increasingly active when returned to groundwater.

However, the authors also indicate that there were limitations to the study. They found that, in the well, the bags, although raised above the water level for four months, were damp — suggesting that the biofilms may not have experienced an extreme drought.

In addition, the study only simulated a single period of drought. Prolonged exposure or repeated cycles of drought could affect the activity and structure of biofilm communities in the long term. The authors aim to study this in their forthcoming research.