Slime mould builds an ancient road network

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Scientists from Greece and the UK have used slime moulds to help look back to a period from the 1st century BC to the 4th century AD when Roman roads were being built in the Balkans.

A paper entitled 'Slime Mould Imitates Development of Roman Roads in the Balkans' has just been published in the *Journal of Archaeological Science: Reports*. The unique heuristic abilities of the slime mould, Plasmodium polycephalum, inspired the scientists to apply the method for the first time in archaeology.

Co-author Andrew Adamatzky, a professor in unconventional computing from UWE Bristol, said, "We used acellular slime mould P. polycephalum to analyse the historical development of the ancient Roman road network in the Balkans.

"Plasmodium is a single cell organism which - when foraging for food - spans its environment with a network of tubes that under strictly controlled conditions can reproduce human-made transport networks such as roads or railways. Research done during the last decade has shown that the slime mould can physically imitate technological artefacts and processes in a variety of ways undetected by conventional computational methods.

"After conducting a series of experiments and with the help of a computer-based simulation the team discovered that the slime mould managed to develop a network of tubes providing a good match to the network of roads that served the needs of Roman Empire from around 100 BC to 400 AD and its expansion into the Balkans 2000 years ago.

"The living mould not only reproduced the two major military roads that crossed the area, Via Egnatia and Via Diagonalis but also the smaller roads or routes connecting the hinterland of the Balkans with the coastal Aegean area."

Although archaeology has systematically during the last 20 years used different quantitative methods in order to verify archaeological evidence and occasionally explore new ways to approach ancient cultures, truly successful interdisciplinary approaches are few. The experiments conducted by the team, and also future applications in 3D environment which will bring modelling closer to reality, could provide archaeology with a new research tool that can allow a new dynamic way of representing or even reproducing the past.

More information: Vasilis Evangelidis, Michail-Antisthenis Tsompanas, Georgios Ch. Sirakoulis, Andrew Adamatzky, "Slime mould imitates development of Roman roads in the Balkans," *Journal of Archaeological Science*: Reports, Available online 18 February 2015, ISSN 2352-409X, dx.doi.org/10.1016/j.jasrep.2015.02.005.

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