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Shock Compression of Seeds in Impacts at $1 - 5 \text{ km s}^{-1}$

MARK BURCHELL, GIUSEPPE LEVOCI, Univ. of Kent, DAVID TEPFER, Institut National de la Recherche Agronomique, France — Panspermia (“seeds everywhere”) is an old idea, suggesting that life can naturally migrate through space. The survival of microbial life under the shock compression involved with transfer of a body through space between planets has been much studied; e.g. Burchell et al., *Origin of Life and Evol. of the Biosphere*, 33, 53 – 74, 2003 showed that micro-organisms could survive in high speed ejecta from a hypervelocity impact (the favoured launch mechanism to spray life into space from its home planet) and Burchell et al., *Icarus* 154, 545-547 2001; *MNRAS* 352, 1273 – 1278, 2004 showed that micro-organisms carried on projectiles in hypervelocity impacts can successfully transfer to a target (with survival rates that fall with a power law for GPa shock pressures). Here we address survival of more complex biological materials under shock compression, namely seeds. We report on experiments firing seeds at speeds of $1 - 5 \text{ km s}^{-1}$ into water targets ($\sim 0.5$ to 5 GPa for short durations). The method is described in a preliminary report (Jerling et al., *Int. J. Astrobiology* 7, 217 – 222, 2008). In new data presented here we are finding intact capture of seeds at $1 \text{ km s}^{-1}$, but above this speed increasing fragmentation occurs. Tests are underway to try to germinate the seeds captured at $1 \text{ km s}^{-1}$ and the results will be described.

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