“Growing in space, do you really need water, air and gravity?”

The Earth is teeming with life and millions of years of evolution have equipped organisms with a vast array of adaptations to our planet’s many and varied environments. However, if all of life’s history on the Earth were compressed to a single year, the longest human mission in space would have lasted about 10 milliseconds. How then does biology fare in these truly novel and alien conditions that are outside of its evolutionary history? Some of the stresses found in spaceflight are identical to those on Earth. However, there are a suite of factors that impact plant physiology and development that are unique to space and where biology’s evolutionary history may be of little help. The space environment profoundly alters the physical world that plants inhabit. How do plants cope with the ‘weightlessness’, the increased radiation exposure, and the altered circadian patterns away from the Earth? Why do space-grown plants exhibit flooding-like symptoms? How do you even water a plant in this weightless environment? Answering such questions is providing us with some surprising insights into how to adapt plants to Earth-bound challenges such as the increasingly severe instances of flooding driven by climate change.