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The utilisation of Amino methyl phosphonic acid by soil micro-organisms as a phosphorus nutrient source

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Our global climate continues to change, and with that comes the change of our soil climate. Reports by the IPCC indicate annual increases in prolonged rainfall events within temperate climates; thus exacerbating widespread autumn/winter waterlogged conditions within in the years to come. For our soils, this means the development of anaerobic systems as wetland areas and frequent flooding become more common. Reducing systems like these are capable of facilitating conditions in which alternative oxidation states of the vital elements needed for soil health present themselves. The change of our soil climate is rarely considered when attempting to understand how phosphorus is cycled and how it might be affected in an alternative environment. Existing knowledge from the marine sector demonstrates that a low oxidation state group of compounds known as phosphonates (+3) are successfully utilised by micro-organisms instead of phosphate (+5) as their phosphorus source; thus demonstrating that the phosphorus biogeochemical cycle is much more complex than previously regarded. In the case of the soil environment, there is a large quantity of inaccessible phosphorus present that might be utilised through similar microbial mechanisms when considering a reducing system. The aim of this research is to alter the understanding of global phosphorus cycling and additionally of ecosystem phosphorus limitation. This is done by assessing the capabilities of certain biological species to process phosphorus in alternative oxidation states, highlighting the importance of reduced phosphorus compounds on the global redox cycle.