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Soil water can affect release patterns of controlled-release fertilizers

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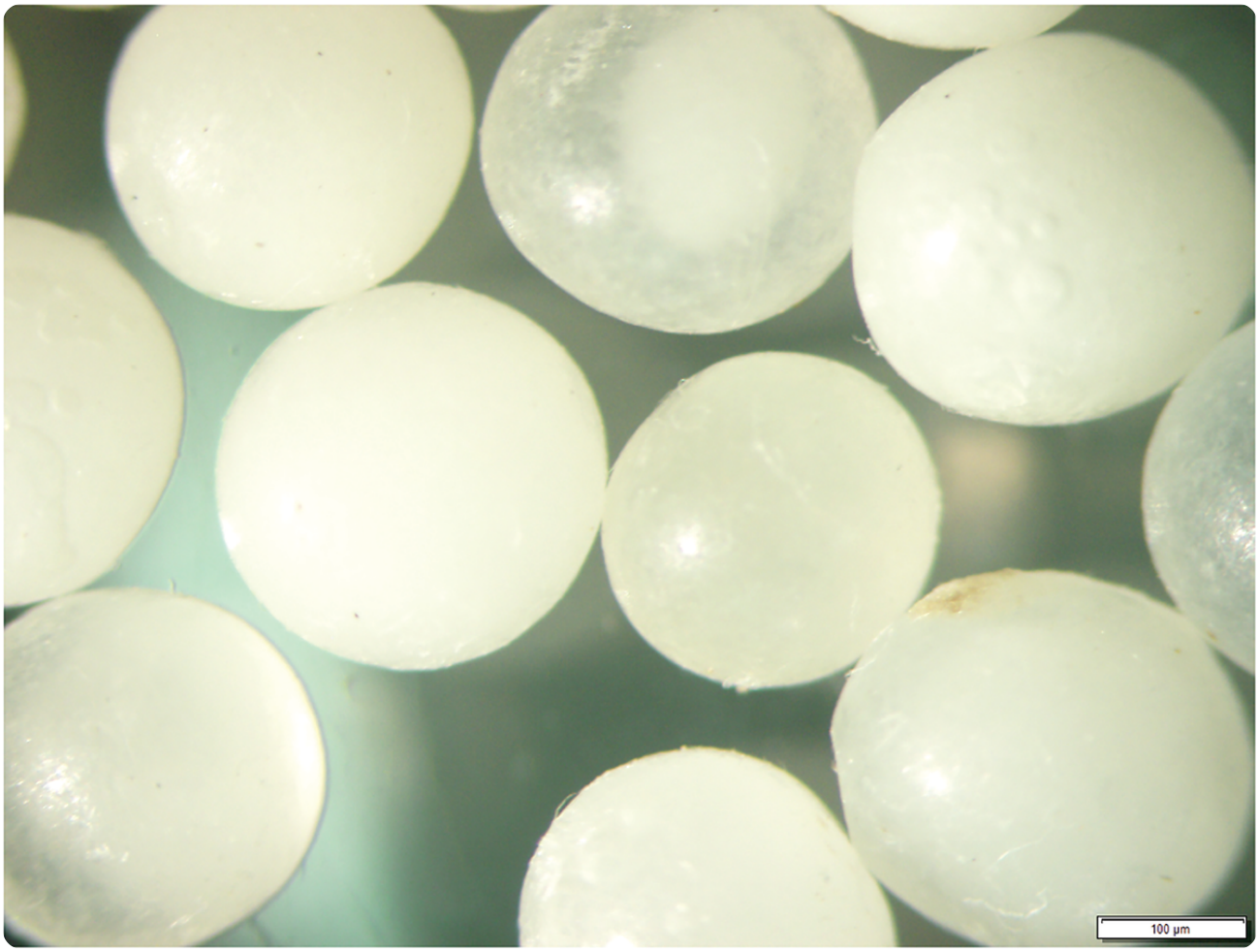

Using microscopy to characterise the release stage of controlled-release fertilizers helped explain the effect of soil water on nitrogen release, highlighting the strengths of collaborating across disciplines. Photo by J.M. Poole.

Controlled-release fertilizers (CRFs) are used in various agricultural industries to increase fertilizer nitrogen (N) use efficiency and decrease N loss to the environment. New research published in the *Soil Science Society of America Journal* examines the effect of soil water on N release at set matric potentials (which measure how tightly the water is held by the soil). Soil physics equipment normally used to determine soil water retention properties was used. This approach unified results across two soils with contrasting textures and hydraulic properties.

One of the polymer-coated urea fertilizers exhibited a pronounced lag in release at drier matric potentials. Optical stereo microscopy identified that water absorption by the granules, a prerequisite for release, was delayed. With the magnitude of the soil water effect varying among products, the nature of the fertilizer coatings plays an important role in determining the sensitivity of release patterns to soil water.

It is, therefore, important to evaluate the release patterns of CRFs, especially those with new coating types, under a range of soil conditions and not rely on release patterns measured in water. Quantifying the effects in terms of soil matric potential instead of water content will provide more robust and transferable data across soils.

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Verburg, K., Bristow, K.L., McLachlan, G.D., Muster, T.H., Poole, J.M., Mardel, J.I., … & Wong, T.F. (2021). Understanding soil water effects on nitrogen release from controlled-release fertilizers. *Soil* Science Society of America Journal, 85, 59–72. **https://doi.org/10.1002/saj2.20141**

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