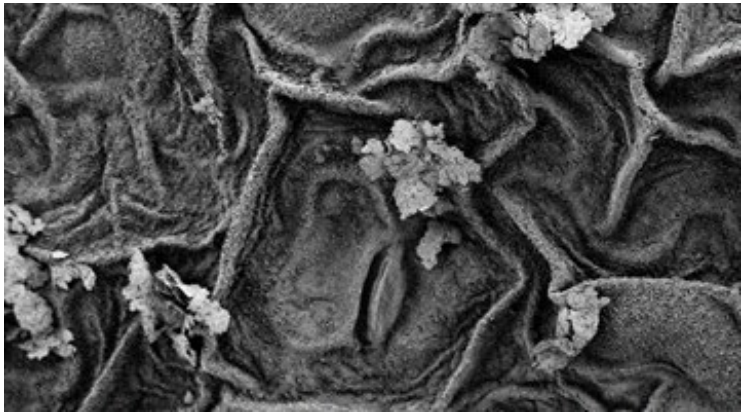
Advanced material modulation of nutritional and phytohormone status alleviates damage from soybean sudden death syndrome

Image Credit: Image: Ella Marushenko and Kate Zvorykina (Ella Maru Studio).

Chuanxin Ma, Jaya Borgatta, Blake G. Hudson, Ali Abbaspour Tamijani, Roberto De La Torre-Roche, Nubia Zuverza-Mena, Yu Shen, Wade H. Elmer, Baoshan Xing, Sara E. Mason, Robert J. Hamers, Jason C. White. Advanced material modulation of nutritional and phytohormone status alleviates damage from soybean sudden death syndrome. *Nature Nanotechnology*, 2020: 5, 1033–1042

Low use efficiency of agrichemicals confounds global food security, particularly given the 60-70% increase in food production needed by 2050. Nanoscale micronutrients can uniquely enhance plant growth, but an understanding of the basic chemistry at the leaf surface and how material properties control uptake and activity is lacking. Here, we show that foliar application of Cu-based nanomaterials (NMs) significantly suppressed *Fusarium* infection in soybean as determined by phenotype, physiological parameters, photosynthetic endpoints and the transcription of several gene networks. Our findings, which are featured on the cover of the December 2020 issue of *Nature Nanotechnology*, highlight the importance and tunability of NM properties such as morphology, composition, and dissolution. Early seedling foliar application of nanoscale Cu to modulate nutrition and enhance plant immunity offer great potential for sustainable agriculture.



Award Information
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