The Use of Cross-linked Polyacrylamide as a Soil Amendment

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Abstract.  
Cross-linked polyacrylamide (CLP) has a number of well-established industrial and household uses due to its high water absorbency. Over the past decade, CLP has been promoted by industry as a soil amendment purported to serve as a storage reservoir for plant available water and helpful in alleviating plant stress during periods of drought. Though it is clear that CLP absorbs water, the purpose of this research is to verify that the absorbed water is, in fact, plant available. On first wetting, CLP absorbed about 130 times its weight in distilled water. Of this, however, about 25% would typically be lost to rapid soil water drainage and about 50% is held at energy levels too low for plant extraction. The estimated plant available water is about 30 g water per g of CLP. After the first drainage cycle, the estimated plant available water holding capacity of CLP is reduced to about 11 g/g. Upon exposure to dilute salt solutions, CLP water holding capacity is reduced due to a structural collapse. This effect is more prominent with divalent cations. A field study using CLP banded at manufacturer recommended and 50 times the recommended rates is performed to test the robustness of CLP to enhance drought tolerance in legumes.