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# Rhizodeposition of Mucilage, Root Border Cells, Carbon and Water under Combined Soil Physical Stresses in *Zea mays* L.

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**Abstract:** We investigated the effects of combined soil physical stresses of compaction and drought on the production of fully hydrated mucilage (mucilage) and root border cells (RBCs) in maize. The exudation of carbon and water were also estimated using stable isotopes of $^{13}C$ and deuterated water ($D_2O$) under same soil conditions. As plant age progressed during seedling stage, mucilage production increased, however, RBCs release did not. Soil compaction increased the release of $D_2O$, RBCs, and production of mucilage which implies the function of roots to reduce mechanical impedance during root penetration. Drying stress increased only carbon release, but reduced the others. This indicates that RBCs adhere more strongly to the root cap due to drying of mucilage, and water release may be reduced to save the water loss. The highest rhizodeposition of mucilage, RBCs and $D_2O$ were occurred under wet compact soil condition, however, that of carbon occurred under dry compact soil condition.

**Keywords:** Crushed cells, Deuterium, Drought, Maize, Rhizodeposition, Root exudation, Soil compaction

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