
Surface seal formation and its implication in calcareous soils characteristics degradation.

BY

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5. Summary and Conclusion

The current work aims at evaluating sealing rates of calcareous soil and its impact on soil characteristics thus seedling emergence. Soil were collected from the surface 0-30 cm from four different locations at northwestern coast of Egypt namely,

1. Soil 1 from Borg El-Arab site
2. Soil 2 from Swani Jaber site
3. Soil 3 from El-Kasr site
4. Soil 4 from Sidi Barrani site

The study was conducted under greenhouse conditions using a modified rainfall simulator and the “Germiometer”.

1. Soil sealing ranged between 5.00 and 64.58%. The effect of rainstorm on depended on factors which affect aggregates stability such as texture, CaCO₃ content and sodicity. Soil characteristics had a direct effect on sealing rates. High sodicity encourages strong sealing in heavy textured soils. High bulk density associated with sealing in coarse textured soils. The effect of slope was restricted on expansion of sealing impacts on soil properties.
2. Soil erosion was associated with sealing. Soil loses ranged between 0.02 and 42.56 Mg ha⁻¹ which increased by slope up to 0.18 and 70.87 Mg ha⁻¹.
3. Translocation of soil salinity was associated with sealing, depending on sealing rates and soil salinity. Translocated salts ranged between 0.007 and 1.20 Mg h^{a-1} and increased by slope up to 0.02 and 3.13 Mg ha⁻¹.
4. Soil compaction was associated with sealing rate and negatively with initial bulk density. Sealing increased bulk density at 7.15 and 96.10% and decreased by slope to 3.26 and 81.58%.
5. Nutrient losses was related with sealing rates, due to sealing rates nitrogen loss was ranged between 0.08 and

11.64 kg ha⁻¹, while phosphorus loss ranged between 0.010 and 0.182 kg ha⁻¹, and potassium loss ranged between 0.51 and 64.03 kg ha⁻¹. Due to slope these rates were increased, where nitrogen loss ranged between 0.38 and 20.67 kg ha⁻¹, phosphorus loss ranged between 0.013 and 0.245 kg ha⁻¹ and potassium loss ranged between 1.24 and 94.64 kg ha⁻¹.

6. Soil resistance for seedling emergence was affected negatively by moisture, this relationship between soil resistance and moisture content was negatively correlated with soil depth. The maximum germination resistance of soil (GR_{max}) was at 5-4 depth and ranged between 0.91 and 7.63 MPa. The severity of soil resistance on seedling emergence varied between slight to extremely severe. The maximum resistance of crust for seedling emergence was at 4-3 cm depth and ranged between 0.59 and 3.75 MPa. The severity of crust resistance varied between slight to severe.
7. Planting depth could be the major impediment for seedling emergence. Surface crust, under northwestern coast area conditions causes planting depth not to exceed 3 cm at moisture content between 45 - 75% of the field capacity.

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