



Random and oriented roughness influence on soil erosion rate using wind tunnel experiment

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Wind erosion is one of the deleterious phenomena that lead to desertification and land degradation in arid and semi arid regions. The rate of wind erosion and its sediment yield depends on wind velocity and soil properties as erosivity and erodibility factors, respectively. In agricultural lands, besides of random roughness, oriented roughness due to tillage activities is strongly affects on wind erosion. This study investigates the effect of random and oriented roughness on soil erosion rate using wind tunnel experiment. The soil was air-dried, crushed to pass through 2, 5 and 15 mm sieves to obtain different particle size distributions. Each soil sample was placed in the experimental tray and ridges with height of 0, 2 and 5 cm were formed. Then, soil samples were blown by free-stream wind velocities of 2, 9, 15, and 18 m/s. The results showed that increasing wind velocity from 2 m/s to 18 m/s, sediment yield increased 6.5 fold. The results also indicated that the largest particles on the soil surface have significant influence on erosion rate as increasing random roughness, sediment yield decreased nonlinearly. Ridges with height of 2 cm found to result in similar erosion rates with flat surface, while increasing ridge height to 5 cm, erosion increased, significantly. This can be attributed to higher wind velocity and it's turbulence on the top of ridge.