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The role of olive trees in rainfall erosivity and runoff and sediment yield in the soil beneath

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Abstract. The modification of raindrops by the canopy of olive trees increases the kinetic energy of the rain per unit area. The kinetic energy computed from the measured drop size distribution under the tree canopy in simulated rainfall experiments is greater than that received in the open, 17.1 J mm^{-1} , as against 15.7 J mm^{-1} . This causes higher soil detachment and loss than that observed outside the canopy. Tillage treatments of the soil modify its erodibility, accelerate soil detachment and reduce, simultaneously, the velocity of runoff. Both effects reduce the amount of sediment compared to that observed in the non-tilled soil. The average values of soil lost per unit of rain depth and unit area were $5.81 \text{ g mm}^{-1} \text{ m}^{-2}$ (conventional tillage) and $4.02 \text{ g mm}^{-1} \text{ m}^{-2}$ (zero tillage) under the canopy compared to $0.89 \text{ g mm}^{-1} \text{ m}^{-2}$ (conventional tillage) and $0.95 \text{ g mm}^{-1} \text{ m}^{-2}$ (zero tillage) in the open.

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