

## **The dynamic growth performance of maize on runoff and sediment reduction on the Loess Plateau, China: A plot rainfall simulation approach**

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**Soil erosion on agricultural land has been identified as an environmental issue in the Loess Plateau, China. Maize is one of the major crops on this region. However, limited studies have investigated runoff and sediment loss from sloped farmland during maize growth season and their roles in controlling runoff and sediment acted as one of vegetation types. In this paper, we investigated the impacts of growth maize (R1-R5 growth season) on reducing runoff and sediment in laboratory plot under simulated rainfall conditions. And bare plots were set as control group. The simulated rainfall was conducted at  $80 \text{ mm h}^{-1}$  for one hour at  $4.0 \text{ m}^2$  plot with three slope gradients ( $5^\circ$ ,  $10^\circ$ ,  $15^\circ$ ). Two indices, runoff reduction benefits (RRB) and sediment reduction benefits (SRB), were selected to evaluate the effects of maize on controlling runoff and sediment. The results showed that the presence of growth maize delayed the runoff initiation time and were effective in reducing the magnitude of runoff and sediment loss as well as improving infiltration amount. With the growth of maize, the capacity of maize in reducing runoff and sediment loss increased and decreased as the slope increased. The RRB for R1-R5 in three slopes were 9.1-63.4%, 8.5-56.7%, 14.9-53.4%, respectively and the corresponding SRB were 19.9-90.0%, 25.9-89.6% and 16.8-70.8%, respectively. In particular, the SRB was greater than the RRB, indicating that the benefits from sediment reduction were more effective than the benefits from runoff production. Since the agricultural land is main source of sediment in the Yellow River, these results could provide insights into the growth performance of maize in reducing runoff and sediment on sloping cropland on the Loess Plateau region.**