



Effect of Plowing Conditions on the Tractor Wheel Slippage and Fuel Consumption in Sandy Soil

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Abstract: The aim of this research work is study the influence of soil moisture content at plowing tractor speed and plowing depth on tractor wheel slippage and fuel consumption. The field experiments were conducted during two successive seasons 2014 and 2015 in the experimental farm of National Research Centre at El-Nubaria area, El-Buhera Governorate, Egypt. Three levels of soil moisture at plowing ($\Theta_1=8.60$, $\Theta_2=10.35$, $\Theta_3=11.61$ (w/w), two plowing speed(Speed 1 = 1.79 kmhr^{-1} and Speed 2 = 9.6 km hr^{-1}) and three plowing depth's (10, 20; 30 cm) were used. Data could be summarized as following: The effect of soil moisture, tractor speed, and plowing depth on wheel slippage and fuel consumption could be put in the following descending orders: $\Theta_3>\Theta_2>\Theta_1$, (Speed2> Speed1) and (depth30> depth20> depth10 cm). The interaction among factors as following: the maximum and minimum values of wheel slippage and fuel consumption were (significantly at 5%) recorded at $\Theta_3 \times \text{Speed}2 \times \text{depth}30$, and $\Theta_1 \times \text{Speed}1 \times \text{depth}10$, respectively. In conclusion, it could be noticed that the best conditions for plowing of the studied soil: 8.6 % (w/w) soil moisture content at plowing, 10 cm plowing depth and 1.79 kmhr^{-1} tractor speed.

Key words: Sandy soil, Moisture at Plowing, Plowing Depth, Tractor Speed, Fuel Consumption; Wheel Slippage.

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