

EFFECT OF DIGGING DEPTH BELOW LASER SCRAPER BLADE ON FINE LEVELING DEGREE AND SOME SOIL PHYSICAL PROPERTIES

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ABSTRACT

Field experiments were carried out during the agricultural season 2009 at Nasser El Noba, Kom Ombo, Aswan Governorate. The soil has been classified as a clay soil (59.1%clay,30.7%silt and10.2%sand) .The present work was to study the effect of chisel shankes depth blow laser scraper on fine land leveling degree and operative on some soil physical properties(bulk density, soil porosity, void ratio).

The study included four measuring depths under blade scraper (10, 15, 18, and 21 cm), four tractor operating speeds (3.45, 4.19, 4.86 and 5.53 km/h) and tow slopes zero and 0.03% slope level were used for the experimental work. Increasing the quantity of fine pulverized soil was accompanied with a decrease in the large clod quantity for scraper. For leveling purposes, less fine pulverized soil quantity and more large clods are preferred. A little difference in the fine pulverized soil occurred with 0.03% leveling than that of the zero slope. Less fine pulverized soil and higher quantity of the large clod increased the mean weight diameter The higher values of the soil porosity mean better aeration, consequently, better seed bed that is proper for growing plants. Both of them were relatively affected by increasing measuring depth and operating speed, which was related to the soil bulk density. The resultant soil porosity at 0.03% slope was higher than that achieved at zero level . In summary increasing of measuring depth and operating speed decreased the value of soil porosity. Increasing of the measuring depth and operating speed decreased void ratio. The higher void ratio values were desired because of the larger chance for air presence in the seedbed.

INTRODUCTION

Leveling operation significantly increased the soil bulk density at soil layer depth of 10 cm. This increment could be attributed to the effect of land leveling on breaking, loosening and compacting of soil particles. Also, it is evident that the change in soil bulk density was more at the surface layer (from 0-10 cm). This change may be due to effectiveness of working depth of land levelers usage, which actually does not exceed the first layer (0-10 cm). While the load and compaction forces of the equipment usually influence deeper layers with damped effect causing an increase in soil bulk density (Michael -1990). The values of bulk density after laser and traditional leveling were higher in the bottom layers (20 - 30 cm) than the upper layers of (10 - 20 cm) and (0 - 10 cm). The differences in bulk density values between laser and traditional leveling were 23.68 %, 9.16 % and 8.27 % at the (0 - 10 cm), (10 - 20 cm) and (20 - 30 cm) layers depth, respectively. Also, he added that the increase of bulk density after leveling under laser in comparison with their values after traditional leveling is due to the increase in the compaction of laser than traditional land leveling(Youssef -1991) .