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Effect of Moldboard Plow Types on Soil Physical Properties Under Different Soil Moisture Content and Tractor Speed

Aqeel J. Nassir

Department of Agricultural Machines and Equipment, College of Agriculture, University of Basrah, Iraq

*Corresponding author: e-mail: aqeelwafi@gmail.com

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Abstract: An experiment was conducted in fields of Agriculture college, University of Basrah. The experiment was designed with split-spilt plots in Complete Randomized Blocks Design Treatments included three types of moldboard plows: helical, semi digger and general –purpose, three soil moisture content levels (10.23,16.47 and 24.68%), and four tractor speed of 0.41, 0.56, 0.86 and 1.21 m sec $^{-1}$. The soil physical properties were determined after plowing soil by using three types of moldboard plow. The results showed that there was significant effect of moldboard plow types, soil moisture content and tractor speed on soil physical properties including bulk density, soil porosity, soil penetration resistance and pulverization ratio. Results also indicated that the effect of interaction among plow types, soil moisture content and tractor speed was significantly on soil penetration resistance and pulverization ratios while it had not significantly effect on bulk density, soil porosity. In general, soil physical properties, had been improved when using high tractor speed and moderate soil moisture content whereas optimal operation was obtained when using general-purpose plow type and high tractor speed of 1.12 m sec $^{-1}$ and soil moisture content of 16.47% where this combination gives low bulk density (0.96Mg m^{-3}), high soil porosity (63.90%) high soil pulverization ratio (74%) and low soil penetration resistance (623.47 kN m^{-2})

Keywords: Helical, semi digger and general –purpose, Soil moisture content, Soil physical properties.

Introduction

The moldboard plow considered to be the most important tillage implement, it's available with different types depend to design of shape (degree of curvature) of moldboards. The main job of all types of moldboard plow is cutting, lifting, inverting and pulverizing the furrow slice (Dahab, 2011); therefore; that moldboard plow achieved most of tillage aims (Olatunji and Davies, 2009),. Tillage operating improvement the soil physical properties, thereby, available a suitable seedbed for germination and root growth (Lal, and Stewart 2013). Physical manipulation of soil do to kill weeds, fill crop residues and modifications into soil, increase infiltration, decrease evaporation, prepare seedbed and loose hard layers to assistance roots