

The Influence of Plow Types, Tillage Depth and Amendment Addition on the Mean Weight Diameter (MWD) of Clay Soil

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Abstract. The experiment was carried out in spring 2021 at the Agricultural Research Station of the Faculty of Agriculture, University of Basrah, in clay soil. The experiment included three factors: the plow type (chisel, moldboard, and disc plow), the tillage depth (15 and 30 cm) and the addition of amendments (cow dung and anionic polyacrylamide). All three factors were examined to determine their influence on mean weight diameter (MWD). The study used a split-split block randomized complete block design. The results indicated that the chisel plow outperformed the moldboard plow and disc plow in achieving the highest mean weight diameter. Furthermore, the results showed that a tillage depth of 30 cm was better than a depth of 15 cm for increasing MWD. Moreover, all amendments addition improved soil properties and increased (MWD), and the mixed treatment (T5) recorded the highest value of mean weight diameter..

Keywords. Tillage types, Soil amendments, Mean weight diameter, Tillage depth.

1. Introduction

The soil in southern part of Iraq spatially in Basrah suffers from deterioration of its physical properties due to soil salinity and low organic matter content, that negatively influence soil productivity. The tillage and adding soil amendments are important factors in improving soil properties and increasing productivity of soil. (1) showed that chisel plow outperformed in achieving the highest average weight diameter (MWD) more than moldboard and disc plow when treating clay soil at two plowing depths of (0 – 12) cm and (15 - 17) cm, and the results showed that the chisel plow recorded MWD values of 3.078 mm, while the moldboard and disc plows recorded MWD values of 3.004 mm and 2.795 mm, respectively. (2) chisel plow was found to outperform all other tillage treatments by providing the highest mean weight diameter (MWD) value of 3.0 cm. In contrast, moldboard plow and direct tillage with cultivation treatments recorded mean weight diameter values of 2.09 cm and 3.2 cm, respectively. (3) found that the chisel plow with disc harrow achieved the highest MWD value of 2.78 mm among the three tillage systems which are the moldboard plow with disc harrow, the moldboard plow with rotary harrow, and the chisel plow with disc harrow. On the other hand, the treatment of moldboard plow with disc harrow recorded 2.25 mm while the moldboard plow with rotary harrow treatment

