

Effect of Tillage Methods on Some Physical Properties of Soil and Yield Components Oats (*Avena sativa* L.)

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Abstract. An experiment was conducted on in the field of Agriculture College, University of Basrah, Iraq, during the 2021-2022 season to determine the effect of different tillage strategies on some soil physical characteristics as well as oat growth under three different plowing depths. The experiment was designed according to a randomized complete block design with four tillage methods, namely, moldboard plow following by single pass of disc harrow (MPDH), chisel plow following by one pass of disc harrow (CPDH), two passes of disc harrow (2DH) and one pass of rotary tiller (RP). Three tillage depths 10,15 and 20 cm were used for each primary or secondary implement tillage as a subplot. The results showed that tillage depth and increasing the tillage depth led to significant increases in soil porosity and reducing in MWD (high soil pulverization) and soil bulk density. The plowing depth had a significant effect ($p < 0.05$) on the growth and yield of the oat. Whereas the plowing depth of 20 cm registered the highest values of percentage of emerged seedlings, plant height, leaf area, number of spikes per square meter, thousand kernel weight, and grain yield of oat was 82.83%, 95.05 cm, 23.12 cm², 251.33 spike m⁻², 17.87 g, and 2.98 Mg ha⁻¹ respectively. Moreover, the results demonstrated that the tillage methods significantly affected oat growth and production. The 2DH registered the highest value of the percentage of emerged seedlings, plant height, leaf area, number of spikes per square meter, 1000 kernel weight, and grain yield of oat was 85.78%, 102.30 cm, 24.15 cm², 256.44 g, 19.03spike m⁻² and, 2.99 Mg ha⁻¹ respectively. The optimal operating was at a tillage depth of 20 cm and using DH method followed closely by CPDH method then MPDH and the latest was RT.