

Requirements and Indicators of the Energy and Capacity for Some Secondary Equipment to Prepare the Soil and Fragmentation Index of Soil

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Abstract. A survey was carried out in the field of the Faculty of Agriculture, Basra University. The mechanical field try was done by isolating the field's property as indicated by the Randomized Completely Block Design (R.C.B.D) included two factors, the first factor uses two primary tillage implements was mounted moldboard plough and digger plough, and second factor was four kinds of auxiliary culturing implements: Disk harrows, Axe harrows, spring cultivator and Rotary plough. The research was conducted in silty loam soil to investigate the influence of fuel consumption, traction force, field efficiency and the soil Fragmentation index. The purpose of this study was to investigate the influence of trowel type on the performance indicators of mechanical units to adapt them to the soils studied. The use of agricultural machinery contributed significantly to reducing the time, costs, effort and wages of workers in the field. The most prominent of these processes are the primary and secondary preparation of the soil and the mixing of manure residues with the surface layer of the soil. In this research, the superiority of the rotary plow over the rest of the machines was observed by recording the lowest pulling force and the lowest fuel consumption rate that it needs while moving and it was 1.60 kN and 14.42 L. ha⁻¹ respectively, in addition to that giving it the best field efficiency and the best fragmentation degree and it was 68.66%, 6.5 mm respectively.

Keywords. Disk harrows, Spring cultivator, Rotary plough, Traction force, Fuel consumption, Field efficiency, and Fragmentation index.

1. Introduction

Cultivating the soil is considered one of the biggest home jobs and requires most of the energy expended on pastures [1]. Tillage is considered one of the greatest duties of a ranch, as it requires the greatest amount of kinetic energy of any kind in crop production, and is considered an inconceivable part of the cost of creation. The energy used as fuel corresponds to the area of production being developed. In any case, any rationalization will reduce overall consumption, but also natural pollution from burning objects and leaks that deplete the ozone layer [2-4]. As a result of the difficulty of securing fuel and its high price, the amount of fuel needed for agricultural operations should be used. [5] It is important to note that primary ploughing and ploughing with moldboards consume the most fuel, and the increased depth and speed of the mechanized units also lead to high fuel consumption.

