STUDY ON THE PLOWING OPERATION BY A POWER TILLER

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Plowing

Plowing is the process of opening soil with a plow. Plowing is the principal tillage operation, which aims to produce the tilth required to make a good seedbed and provide better soil conditions for plant growth.

Principles of plowing

- Plowing at the right moisture condition (Zoe condition).
- Plowing soils that are hard and in poor physical condition.
- Using the right types of plows.

Some glossary of terms on plowing

Furrow: The 'V'-shaped opening made by a country plow at the time of plowing.

Ridge: The raised part of soil between two furrows is termed a ridge.

Furrow stripe: The unplowed land or narrow stripe between two 'V'-shaped furrows made by a country plow is termed a furrow stripe.

Furrow slice: The soil that comes out while making a furrow by a country plow.

Pulverization: The process of altering soils and converting them into small pieces or dust is termed pulverization.

Plow pan: The hard layer formed at a certain depth beneath the soil surface due to continuous plowing by the same plow on the same land for several years is known as a plow pan.

Tilth: The physical condition of soil after tillage.

Procedure of plowing by a power tiller

- We, the students of 'Group- *' of B.Sc. Ag. (Hons.) Level-1 Semester-I, 2023, performed the plowing operation with a power tiller equipped with a rotary plow (rotovator).
- First, we picked an appropriate tilling depth and speed, which were controlled by a unit. Because our plot was moderately hard, we set it to a medium depth.
- Then we started plowing from a corner and maintained straight rows. We used the tiller's controls to work slowly down the plot in a straight line, turning around and doubling back at the end.
- We have also re-tilled to break down the soil. We broke any clods into roughly dime-sized pieces or smaller.
- At the end of plowing, the land was leveled down by a leveler.

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Calculation of plowing efficiency

Length of the land: 30 m
Breadth of the land: 6 m
Area of the land = 30 × 6 m = 180 m^2
Time of ploughing: 20 min

We know,

$$\text{Efficiency} = \frac{\text{Area}}{\text{Time}} = \frac{180\ m^2}{20\ min} \times \frac{1\ ha}{10000\ m^2} \times \frac{60\ min}{1\ h} \times \frac{8\ h}{1\ working\ day}$$

$$= \frac{180 \times 60 \times 8}{80 \times 10000} \frac{ha}{working\ day}$$

= 0.432 ha working day^{-1}

Factors affecting the efficiency of plowing

- The condition of the field
- The condition of the bullocks
- The types of plow
- The plowing depth
- Expertise of the plowmen
- The weather conditions of the day

Quality of good plowing

- There will be no unplowed land or furrow stripes
- Furrows should be straight
- Furrows should be of the same depth
- Plowing should be criss-crossed
- Clods should be minimal
- The field must be free from weeds, stubble, straw, etc.
- Corners and ailes should be well-spaded

Precautions for plowing

- Engine gears and clutch should be controlled properly
- Care should be taken to protect the legs from the rotovator

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