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Performance evaluation of bullock drawn groundnut digger suitable for MAU multi purpose tool carrier

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ABSTRACT

MAU multipurpose tool carrier is developed by Department of Farm Machinery and Power, College of Agril. Engineering Marathwada Agricultural University, Parbhani. A groundnut digger suitable for MAU WTCs was developed and tested in the experimental plot for finding its suitability. The machine was tested for digging of bunch variety of TAG-24 of groundnut. The field performance was compared with CIAE Bhopal model and local groundnut digger. The performance results of the developed groundnut digger were found better in all respect. Its field capacity was 0.126 ha/hr with field efficiency of 80.25% at an operating speed of 2.1 kmph. It performed the harvesting operation with a total pod loss of 8.01% and digging efficiency 92 per cent. With this digger, the cost of operation was Rs.168.30/ha for groundnut harvesting.

Key words : MAU multipurpose tool carrier, Pod, Vines bunch.

Groundnut cultivation requires various operation such as seed bed preparation, sowing fertilizer application, intercultural, harvesting and threshing (Anonymous, 2003). The harvesting of groundnut is the most important field operation. The working width of the existing local groundnut devices is less than what is required for bunch type varieties. Some of the groundnut digger are operated at more depth than required which leads to greater depletion of moisture conserved in the soil. The developed digger had a concept of V shape blade which was found suitable in harvesting of groundnut. The plot size for testing the implement was 0.025 ha. The length and width of plot were 25 and 10 m, respectively. Experiment was undertaken in black cotton soils and observed soil moisture was14.3% at the time of harvesting. The working performance was evaluated in terms of depth and width of cut, field capacity, field efficiency, draft requirement, pod losses and digging efficiency. The performance evaluation of developed digger was compared with CIAE, Bhopal mode groundnut digger (Devnani 1987) and locally available groundnut digger.

METHODOLOGY

Specification of the MAU tool carrier developed digger are as follows.

- Width of blade - 60 cm
- Angle between 'V' plates - 120^0
- Shake - Straight with angle of 23^0 at ground.
- Ground clearance - 20 cm
- MAU multipurpose tool carrier attachment - 2 'U' shape clamps

Moisture content of soil :

Moisture content of soil was determined by oven drying method. Five soil samples were collected randomly from the test plot. Samples were kept in oven for 24 hours at the temperature of 105^0C. The samples were weighed before and after drying.

Bulk density of soil :

Metallic core samplers of 100 mm diameter and 128 mm length was used to take soil sample from field. Samples were weighed and dry weight of the samples was calculated the ratio of dug weight of soil to the volume gave the bulk density.

Moisture content of pods and vines :

In a similar way, moisture content of pods and vines were determined by oven dry method. The samples were in oven at 110^0 for 2 hours.

Depth and width of digging:

The depth of cut was determined by measuring the vertical distance between horizontal surfaces to bottom of dug out furrow. The width of cut was determined by measuring the horizontal span of cut.

Speed of operation :

The forward speed of the machine was determined by observing the time required to travel 25 m distance with the help of stop watch.