

# LIGHT WEIGHT POWER TILLER



Designed and developed by : PAU Ludhiana Centre



*All India Coordinated Research Project on*  
**FARM IMPLEMENTS AND MACHINERY**  
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# LIGHT WEIGHT POWER TILLER

## Introduction

Power tillers are commercially successful only in areas under wetland cultivation. In paddy cultivation especially on small and medium farms and for the farm operations in hilly areas, orchards and forestry, power tiller are highly acceptable. A light-weight and affordable power tiller has been developed to meet these requirements. The development of this machine is expected to help mechanize hilly area, small land holding, and plantation crops and also wide row crops like cotton, sunflower, sugarcane etc.

Traditional practices in hilly areas, cultivation is generally done by using bullock-operated implements and intercultural operation is carried out manually. In Punjab, weeding in row crop is carried out using manual hand tools like wheel hand hoe, khurpa, khaola etc., or by using weedicides. Manual weeding is very labour intensive and it costs about Rs 2500/ha.

## Salient features of machine

The light weight power tiller consists of a 4.1 kW diesel engine mounted on the power tiller chassis, power transmission system, two MS wheels, a frame and a rotary soil working tool. Power from the engine is transmitted to the rotary unit by chain and sprocket and through gears to the ground wheels. The machine was shown in Fig.1. has a rotary unit provided with 16 blades fitted on heavy duty pipe of 37.5 mm diameter. For depth adjustment, two skids made of flat were provided. A power cut off device was provided to engage or disengage power to the rotary system. The rotary blades were made of high carbon steel (EN-31), which acted as working tool for weeding or seedbed preparation. The working width of the machine was about 45 cm (adjustable).



**Modified power weeder in Operation.**

The detailed specifications are given in Appendix-A. The machine was evaluated at research farm of the university and at the farmer's field for weeding in orchard, flowers and wider row crops. The main features of the unit are:

- (i) Self propelled machine with 4.1 kW diesel engine.
- (ii) Suitable for tillage and weeding operation.
- (iii) Easy manageability because of two turning clutches.
- (iv) High output capacity (about 0.48 ha/day).
- (v) Very handy and compact in size.
- (vi) Added advantage for weeding in floriculture.

### Performance of machine

The power tiller was operated in orchards for weeding purposes (Figs. 2). The performance of the machine was found satisfactory. The field capacity of the machine varied from 0.05-0.06 ha/h when operated at a speed of 1.5-1.8 km/h (Table 1). The depth of weeding varied from 40-70 mm and weeding efficiency was 75-93.9%. The effective working width of the machine was 400-450 mm. The cost of weeding in one hectare area was Rs 1375.

**Table 1 Performance results of light weight power tiller**

Sl. No.	Parameters	In orchard	In wider row
1	Width of coverage, mm	400-450	350-450
2	Depth of weeding, mm	40-50	40-70
3	Type of weeds	Mostly grass	Mixed
4	Weed density, no./m <sup>2</sup>	120-145	150-250
5	Height of weeds, mm	40-100	--
6	Weeding efficiency, %	75-82	82.0-93.9
7	Root injury, %	Negligible	0.87-2.88
8	Speed of operation, km/h	1.52-1.74	1.5-1.84
9	Fuel consumption, l/h	0.9-1.1	0.9-1.15
10	Machine field capacity, ha/h	0.05-0.06	.058-0.061

### Labour requirement and economics of operation

Particulars	Manual method	Light weight power tiller	Saving, %
Cost of operation, Rs/ha	2500	1375	45.0
Labour requirement, man-h/ha	224	17	92.5

## Present status of technology

The machine is commercially available from two manufacturers. The machine is useful for weeding in vegetables, fruits and other horticulture crops.

## Specification

Sl. No.	Parameter	Specification
1	Type of machine	Self propelled
2	Power source	4 kW light weight diesel engine, 1800 rpm
3	Machine suitability	Tillage and weeding
4	Overall dimensions of machine, L x W x H, mm	1690 x 600 x 970
5	Working width, mm	450
6	Power cut off device	Dog clutch
7	Speed ratio from engine to wheels	48:1
8	Spacing between two adjacent blades, mm	35
9	Shape of blade	L-type
10	Type of mounting of blades on rotary shaft	Through flange and fasteners
11	Weight of machine (without attachment), kg	118
12	Price of machine, Rs	App. 50,000/-

## Available from:

1. Principal Investigator  
Department of Farm Power and Machinery,  
College of Agricultural Engineering and Technology,  
Punjab Agricultural University, Ludhiana - 141 004, Punjab.
2. M/s Amar Agricultural Implements  
Janta Nagar, Gill Road, Ludhiana (Punjab)
3. M/s Gurunanak Agriculture Implements  
BDO Office, Mansa (Punjab)