

# Performance evaluation of cono weeder for paddy in farmer's field

■ M. ANANTACHAR, SUSHILENDRA, LOKESH, SUNIL SHIRWAL, RAGHAVENDRA AND MAREPPA

**ABSTRACT :** The cono weeder was procured evaluated for its field performance for long duration in paddy crop (Sona masuri) at farmer's field. The average row spacing, hill to hill spacing and height of crop were found to be 30cm, 10cm and 38cm, respectively. The average plant population of crop in square meter area was 32. The type of weed observed was *Cypruss rotendus* and *Cynodan dectylan*. The average height and population of weed in square meter area were 10cm and 125cm, respectively. The results indicated that, the field capacity was in the range of 0.016 to 0.019 ha/h with a field efficiency in the range of 59.23 to 62.07 per cent. The per cent weeding efficiency was observed in the range of 72.00 to 85.0. The average effort required to push the cono weeder was 14.4kgf. The Brinell hardness number of the weeding cone was observed in the range of 159 to 187. The per cent wear on dimensional basis in the right and left weeding cones was observed 4.75 and 3.80, respectively.

**KEY WORDS :** Cono weeder

**Article Chronicle :** Received : 18.01.2013; Revised : 20.02.2013; Accepted : 12.03.2013

**How to cite this Article :** Anantachar, M., Sushilendra, Lokesh, Shirwal, Sunil, Raghavendra and Mareppa (2013). Performance evaluation of cono weeder for paddy in farmer's field. *Engg. & Tech. in India*, 4(1) : 14-16.

## INTRODUCTION

Paddy crop is widely accepted cereal for food and 95 per cent of worlds paddy production by Asian countries only (Farahmandfar *et al.*, 2009). Weeding in paddy is timely operation to be executed to get maximum yield otherwise weed will compete for the nutrients with crop. During early establishment, the weeds make 20-30 per cent of their growth while the crop makes 2-3 per cent of its growth (Moody, 1990). Manual weeding is one of the time and energy

consuming operation in rice cultivation and also labour cost increasing tremendously from the last decade. Hence, cost of cultivation is getting increased every day. The chemical weeding is one of the effective method but it leads to various environmental and health issues. Hence, there is need of low cost mechanical weeding to minimize the cost operation and execute timely operation to maximize the yield. Mechanical weeding equipment are available in the market, which are either costlier or effectively not suitable for weeding in rice. Hence, the study was undertaken to evaluate the commercially available push type cono weeder for its performance in paddy field as per Indian standards at the College of Agricultural Engineering, Raichur .

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## EXPERIMENTAL PROCEDURE

One unit of commercially available push type cono weeder was directly procured from the market. The push type cono weeder consists of two weeding cones fixed at right and left

side of the main frame. The front end of cono weeder is attached with a float to avoid sinking in the wet soil. The main frame is extended with a T handle with a provision to height adjustment. The schematic diagram of the push type cono weeder is presented in Fig.A and the detailed specification of the cono weeder is depicted in the Table A.

The specifications of the cono weeder were verified as per relevant clauses of IS: 14540 – 1998 and found satisfactory in construction of the cono weeder.

The cono weeder was evaluated for its performance in the paddy field for the duration of 10.5 hours at farmers field, Raichur. The soil, crop and weed details are depicted in Table B.

The wear analysis for the two weeding cones was carried out on dimensional basis for the projected blades on the cones. The hardness of the blade of weeding cone was tested by using Brinell hardness test method.

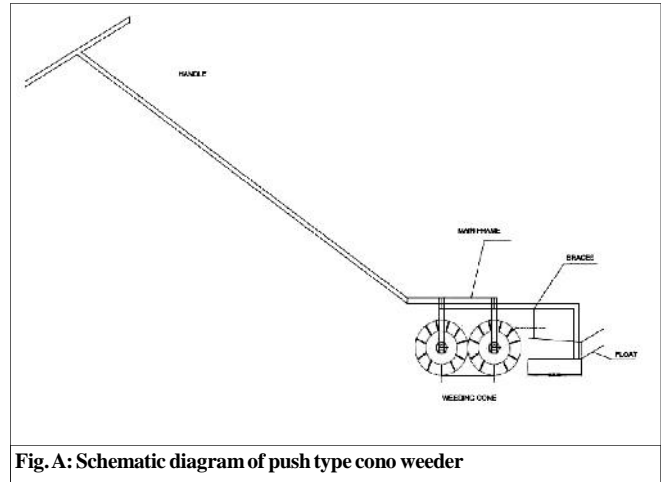


Fig. A: Schematic diagram of push type cono weeder

Sr. No.	Particulars	Observed values
1.	Type	Manually operated
2.	Size, mm	2140 x 500 x 1070
3.	Power sources as recommended	Manually operated
4.	Length, mm	2140
5.	Width, mm	500
6.	Height, mm	1070
7.	Working width, mm	140-160
8.	Weight, kg	6
9.	Number of cones	Two
10.	Type of cone	metallic
11.	Number of blades in weeding cone	Straight blade = 6, Serrated blade =6
12.	Blade thickness, mm	1.6 to 1.8
13.	Height of handle from the ground , mm	1070
14.	Width of handle , mm	500
15.	Float length , mm	330
16.	Float width, mm	120
17.	Float height, mm	70

Sr. No.	Parameters	Observed values			
		Test I	Test II	Test III	Test IV
1.	Date of test	27.09.2012	28.09.2012	29.9.2012	29.9.2012
2.	Type of crop	Paddy	Paddy	Paddy	Paddy
3.	Variety of crop	Sona masuri	Sona masuri	Sona masuri	Sona masuri
4.	Maturity stage, days	28	29	30	30
5.	Average row spacing of crop, cm	19	21	20	20
6.	Hill to hill spacing of crop, cm	11	8	9	12
7.	Average height of crop, mm	35	38	37	40
8.	Average plant population, no's/m <sup>2</sup>	36	28	32	32
9.	Type of weed	Cypruss, rotendus, cyndan, dectylah	Cypruss, rotendus, cyndan, dectylah	Cypruss, rotendus, cyndan, dectylah	Cypruss, rotendus, cyndan, dectylah
10.	Average height of weed, mm	88	92	92	100
11.	Average weed population, no's/ m <sup>2</sup>	116	129	125	127
12.	Type of soil				

**Table 1 : Field performance test results**

Sr. No.	Parameters	Observed values			
		Test I	Test II	Test III	Test IV
1.	Date of test	27.09.2012	28.09.2012	29.9.2012	29.9.2012
2.	Duration of test, h	1.99	2.55	3.35	2.25
3.	Average travel speed, kmph	1.66	1.99	1.75	1.82
4.	Average depth of operation, mm	27	32	31	30
5.	Average working width, mm	160	160	160	160
6.	Percentage of plant damaged, %	0	1.0	1.5	1.5
7.	Area covered, ha/h	0.016	0.019	0.017	0.018
8.	Time required, h/ha	62.5	52.63	58.82	55.56
9.	Field efficiency, %	59.23	59.38	60.71	62.07
10.	Weeding efficiency, %	85	74	70	72
11.	Average implement draft, kgf	13	16	13.8	14.8
12.	Power requirement, kW (Ps)	0.08	0.12	0.09	0.10

**Table 2 : Wear analysis of the blade**

Left weeding cone of the cono weeder					
Sr. No.	Reference point	Initial dimensions, mm	Final dimensions, mm	Percentage of wear	
				Total	Per hour
1.	Height of the blade on the cone at left end	35	34	2.85	0.27
2.	Height of the blade on the cone at centre	35	34	2.85	0.27
3.	Height of the blade on the cone at right end	35	33	5.71	0.54
Right weeding cone of the cono weeder					
1.	Height of the blade on the cone at left end	35	33	5.71	0.54
2.	Height of the blade on the cone at centre	34	33	2.85	0.27
3.	Height of the blade on the cone at right end	35	33	5.71	0.54

## EXPERIMENTAL FINDINGS AND ANALYSIS

The field performance results are depicted in Table 1. The results indicated that the average area covered was observed to be 0.16 to 0.019 ha/h and the speed of operation was 1.66 to 1.99 kmph in the black soil. The required for intercultural operation of one hectare area was recorded as 52.63 to 62.5 h. The weeding efficiency by weed count method was recorded as 72.00 to 85.0 per cent. The percentage of plants damaged during the operation was recorded as Nil to 1.5 per cent. The draft required to operate the cono weeder was measured as 14.4 kgf, which is considered normal for one hour continuous operation by one unskilled labour.

The per cent wear of blades of the two weeding cones was measured on dimensional basis and the results are

depicted in Table 2. The average per cent wear per hour in the left and right weeding cones were observed in the range of 2.85 to 5.71 and 2.85 to 5.71, respectively.

The results of hardness testing are depicted in the Table 3. The hardness of weeding cone was recorded in the range of 159 to 187 HB against the requirements of 350 to 450 HB as per the Indian standards.

**Table 3: Hardness of the blade**

Notations	Hardness as observed	Hardness as per IS: 14540 - 1998
	HB	HB
1	187	
2	159	
3	187	350 to 450
4	187	

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