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DEVELOPMENT OF A POWER TILLER WEEDER ATTACHMENT

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Weeding is one of the activities, which require higher labour consumption while growing a crop specially in high rainfall areas. It is to be performed within a short span of time (3-4 days) after emergence of weeds in the crop field. So manual weeding is very labour intensive. With increase in wages and shortage of availability of the labour, it has become necessary that the process should be mechanized. Keeping this point in view, a weeder attachment to power tiller was developed and tested for its performance for maize groundnut and mustered crops This weeder attachment is supposed to provide efficient machinery for weeding on one hand and to increase the utility of power tiller possessed by the farmer on the other. To develop the weeder attachment, a power tiller was used with the following specifications : make – Kubota; power – 10.5 hp; fuel – diesel and speed – 6 forward, 2 backward.

The weeder frame

A weeder frame was manufactured using two straight and two curved arms (Fig. 1) to fit on to a power tiller. This frame used 50 x 50 x 5 mm m.s. angle iron with 290 mm width at fitting side and 950 mm width at the blade holding side. The side of frame holding blade was made square by welding two angle irons of 40 x 40 x 5 mm. The frame had holes of 12 mm diameter at a distance of 75 mm each to fit the holders of weeding blade at variable width. Sweep type blade of width 200 and 300 mm were used for weeding purpose. These blades were fitted to a blade holder for fitting it on to the frame. All the blades of power tiller were opened for fitting the frame on the power tiller. The weeder was designed for widely spaced crops viz. maize, mustard etc. Planting of crop was done with optimum population with two types of row to row spacing for testing of weeder.

Row to row spacing

Maize crop was tested keeping row to row spacing at 50 and 60 cm. While planting, adjustable row marker was used so as to maintain exact spacing. Sowing was done in the first week of May.

Weed count

A one m sq. rod frame was used for weed and plant population counting before and after weeding. A total of eleven terraces were taken for testing the weeder attachment of power tiller. The operation was started from the bottom terrace and taken to the top terrace depending

on the visual observation of weed infestation. First weeding was done after 20 days of sowing and weeds of height above 5 cm were counted for weeding purpose.

Plant count

The height of ten plants were taken into account and their average was taken for determination of average plant height. The total number of plants were counted in a row and after operation of weeder, total number of damaged plants were counted for observation of percentage damage of plants.

Weeder blade size

Crop having 60 cm row to row spacing was weeded 40 cm weeder blade and crop having row to row spacing of 50 cm was weeded by 30 cm blade. Wheel tread of power tiller was 60 cm . So only one blade was used in one pass of operation. The weeder blade was fitted nearer to one wheel instead of fitting it in the center. The other wheel was moved in the other side of crop row. Therefore while maintaining the crop line, sometimes the wheel ridded over the crop and crushed the plants.

Wheel trade (inner width of wheel to wheel) of power tiller was 60 cm. While operating the weeder, one wheel was kept running near to the one row of crop and blade of width 30 cm was kept turning on the other side of the crop. It was observed that while maintaining the line of operation, some of the plants were crushed by the wheel which were more in case of row to row spacing of 50 cm.

Average weeding efficiency of this weeder varied from 70.8 to 87.1%. Weeding was done maximum in the centre of two rows where the blade operated, however, the weeds falling among the plants of the row of the crop were left untouched (Fig. 2). While in operation, it was found difficult to maintain the line of operation because of curved rows of crops in terraces and difficulty of streering of power tiller along the curves of crop rows. Due to this the wheels of power tiller crushed maize plants many times. Damage of crop from this crushing varied from 0 to 10.7% of plants. This weeder worked for only one weeding since on the time of 2nd & 3rd weeding, crops height was much higher and gourd clearance of machine was much less to cope up well with the height of the plants.

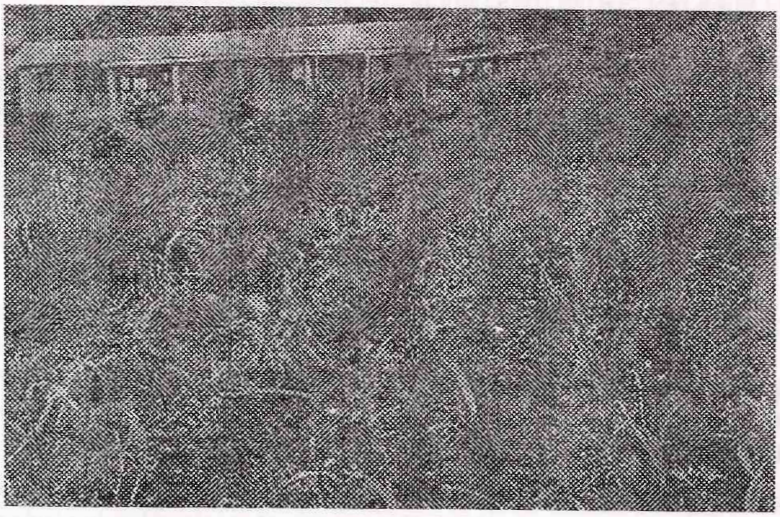

Fig. 1

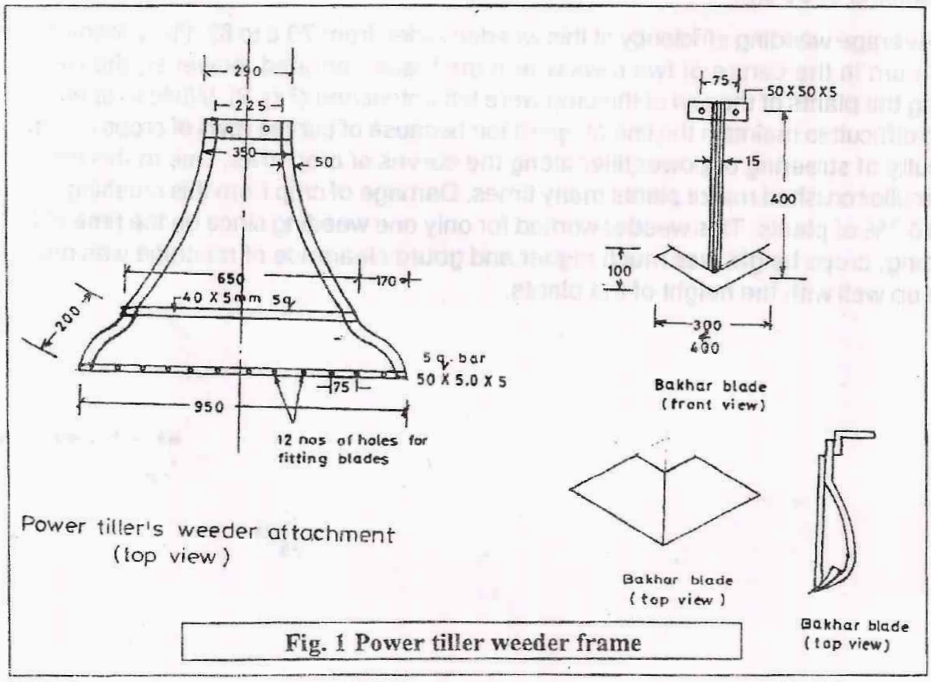

Fig. 1 Power tiller weeder frame

Table 1 Plant and weed population before and after weeding

Row to row spacing 50 cm							
Area of terrace (sq. m)	Average plant height cm	before weeding		After wedding		Wedding Percent	Plant damage Percent
		Total Plant Population	Weed population (2 counts)	Total Plant population	Weed population (2 counts)		
122.3	24.5	525	829	501	206	75.2	4.6
111.0	26.3	683	907	140	646	84.6	5.4
98.5	26.2	1072	1014	982	215	78.8	8.4
130.5	22.1	540	1031	516	213	70.8	4.4
173.4	19.8	550	849	521	173	76.8	5.3
Row to row spacing 60 cm 469							
178.6	23.9	469	1309	419	353	73.0	10.7
166.6	21.1	619	1304	553	218	83.3	10.7
219.4	20.9	104	1412	104	409	71.0	0
184.5	22.7	631	1301	601	313	75.9	4.8
					Grand average	76.6	6.0