

Design and Fabrication of Power Weeder

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Abstract: Weed control in crops is major problem in India. Generally Indian farmer use traditional way for doing fieldwork that is weeding is done by bulls or workers with the help of khurpi. This method is useful but it is very demanding of labour. To overcome this problem we introducing an alternative solution that is “power weeder”. These power weeder will remove grass between two rows and also do the cultivation. We will use rotary adjustment for doing weeding as well as cultivation which is power operated. With the help of this machine we are trying to reduce human efforts with less maintenance cost. The weeder driven by man to move in forward direction and the blade is attached at front end is placed at the roots of weeds, once blades get rotated then they starts cutting the weed, like this the complete land of cultivation is made as weed free. Main benefit is reducing labour cost by reducing the number of labours with less time consumption.

I. INTRODUCTION

Weed removal process requires huge human efforts and cause reductions in crop yields and which increase cost of cultivation, obstruct with agricultural operations, act as alternate hosts for several weeds and compete with crop plants for various inputs like water, nutrients, sunlight. Weeds are the most rigid and excessive biological constraint to crop production, and it cause viewless damage till the crop is harvested. The compositions of weeds are dependent on soil, climate, cropping and management factors. Valuable share of farmer's time is wasted for weeding of crops. A weed is unwanted plant which is grow at wrong place at wrong time and which is harmful to crop. It is a plant that emulate with crops for water, nutrients and light. This can reduce crop production. Weeding is an important but equally labour intensive agricultural unit operation. Presently agricultural sector requires chemical free weed control that gives food safety. Consumers requires high quality food products and special attention towards food safety. Weed management is as old as agriculture itself, but the methods and concept of controlling weeds have changed over the years.

The general weed control processes in India are chemical, mechanical and biological. Mechanical method characterized by intensive use of manual labour and animal power. Both of them are in short supply and are increasingly becoming uneconomical. Manual weeding is not only being laborious, is inefficient (not done on time in most cases) and always not practical because of adverse soil conditions. The weeds are more competitive with crops during the initial stages of their growth (2-6 weeks after planting). Controlling weeds during this time is very essential for realizing maximum crop yield. Because of this, chemical weed control method is rapidly gaining ground in the country, which on the other hand is raising several environmental concerns. With increased public awareness on environmental pollution, the focus would shift to development of ecofriendly weed management technologies in the new millennium. Weed control by Mechanical process is more effective because it helps to reduce the human efforts involved in manual weeding, kills the weed. Demand by consumers is high quality food products and pay special attention to food safety. More specifically, in crops like soybean, maize, gram there is no any power operated mechanical weed control method is available. Therefore, there is need to have a low-cost power weeder for small and medium farmers. In view of above, the present study is proposed to design and develop a power-operated rotary weeder for crops like soybean, maize.

II. OBJECTIVES

1. To design and development of rotary type power weeder for inter row crops whose distance between two rows is 15 inch.
2. To reduce use of harmful pesticides for weed control.
3. Reduce process time.

III. CONSTRUCTIONAL FEATURES

Different component of power weeder are

- A. Wheel support with chassis



Fig 3.1 : wheel support with chassis

Chassis frame was made using L angle having length and width equal to 38 mm, and having thickness equal to 3 mm. Chassis frame having size of length equal to 914.4 mm and width is equal to 762 mm is fabricated by welding process.

B. Assembly of rotor disc with blade



Figure 3.2 : assembly of rotor disc with blade

L shape rotor blade made from boron steel having standard size length 356 mm of and width of 90 mm was assembled on rotor disc by using lock nut and bolts. Lock nuts and bolts having size equal to 6 mm diameter of hexagonal head are used for assembling the blade on disc. The main purpose of using lock nuts is to avoid slippage during working of machine.

C. Working



Fig 3.3 : engine operated power weeder

1. Initially start the engine with the help of handle. We used the 4 hp diesel engine.
2. The rotary blades are used for the forward movement of the machine.
3. Belt drive is used to transmit power from engine to intermediate shaft.
4. Chain drive is used to transmit power from intermediate shaft to rotor shaft.
5. The blades are mounted on the front side of the machine. When blades starts rotating forward motion occurs.
6. hence weeding is done with less effort and less cost.

IV. ADVANTAGES

1. Helps to reduce manpower.
2. Replace traditional method of weeding by using bulls.
3. Remove unwanted grass as well as provide rotary cultivation for crops like soybean, maize and gram etc.
4. Help to reduce process times.
5. Provide low cost and compact design.
6. Reduce use of harmful pesticide for weed control.

V. DISADVANTAGES

1. Use of diesel engine require fuels which is non-renewable.
2. It can be only used for limited crops.

VI. CONCLUSION

The main conclusion is as follows:

1. The machine requires one operator for operating the machine.
2. The machine can be used to a minimum 15 inch row spacing.
3. The average depth of operation was 25 mm. effective width of cutting tool is 8 inch.
4. Labour requirement in case of power weeder is least.
5. Overall working of power weeder was satisfactory, trouble free and smooth, there was no breakdown and accidental incident during operation.

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