

Research Paper :

Development of tractor drawn inter-row rotary weeder

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ABSTRACT

The tractor drawn inter-row rotary weeder was developed with an objective of mechanical means of weeding and keeping in view the crop, soil and machine parameters. Weeding is an important practice to be carried out during the initial stages of crop growth especially for controlling the weeds competing with the crop, stirring the soil for aerating the crop root zones and for burying the weeds into the soil. The weeder is suitable for crops having maximum row spacing. The width of inter-row rotary weeder could be change according to the crop row spacing. The developed weeder was evaluated at different test fields for different crops from the field tests it is seen that weeding efficiency 92.23 per cent field efficiency 86.34 per cent and field capacity was 1.43 ha/day.

Key words : Power weeder, Tractor operated weeder, Inter row rotary weeder, Weeding parameters

Weed control in Indian Farm is a serious concern weeds pose major problem during warm and humid climate especially affecting *Kharif* crops. The problem of weed control is more acute in black soil during *Kharif* season. Weed control is one of the most expensive operations in crop growth. The high cost of weeding can be understood from a comparative study of the losses in the farm due to various causes. Infection of weeds is more in *Kharif* than in *Rabi* season often weeding is incomplete or delayed as a result there is significant loss of 20% or more. Weeds increase cost of production and lower the quantity as well as the quality of the crop. Depending on the weed density 20-30% loss in grain yield is the quite usual which may increase to 50%, when crop management practices are not properly followed. In production technology plant protection is a key in increasing the productivity of crop. Under plant protection, weed control plays an important role for increasing the yield. Weed alone was found to be reducing the yield of the extent of 58-85%. The yield losses in cotton due to weeds alone was assessed as 13.60 per cent than that of insects and diseases which is about 35.80 per cent, while the losses due to weeds alone was assessed was 33.80 per. This shows the necessity of effective weeding operation. Usually tractor mounted cultivators are used for weeding and inter-culturing operations in farm. The rotary type weeder stirs the soil more accurately, disturb the weed root and remove them from the soil. In addition this helps in keeping the soil in loose condition for proper aeration. Especially for the wide row spaced crops like cotton, maize where the tractor can be run in the rows. Looking the above facts tractor drawn Inter-row rotary

weeder was developed for widely spaced row crops.

METHODOLOGY

Design considerations:

A due attention was provided on the following design aspects while designing and fabrication tractor drawn inter-row rotary weeder: A machine was designed by keeping in mind the various agronomical requirement of crop, spacing of crop about 45- 90 cm. Height of the crop about 15 -45 cm from the ground level. Machine should be simple in design and it should easy to operate, Cost of the machine should be low, It should be easily repairable by farmer or village artisan, crop variety is an important parameter, which influence the mechanical weeding operation since the growth factor and foliage varies for each variety, normally the recommended row spacing for cotton ranges between 450 mm to 900 mm depending upon the crop variety. While in operation the tractor tire may cause damage to the crop, so the tread width of the tractor wheel should be reversed to allow the tire to run in between the rows, machine movement in the field mainly depends on height of the crop. Since the tractor ground clearance is 450 mm, to achieve efficient weeding with minimum crop damage, the crop height should be less than 550 mm, the weeding has to be done before the specified days at which the crop is achieving the restricted height. Moreover the weeds will compete only at the early stages of crop growth. Weeds take about 8 weeks to reach maximum canopy cover due to its quick growth while cotton takes at least 16 weeks to cover 90 per cent space. Weeds are getting matured within a period of 30 to 45 days, the weeding has to be