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Groundnut Weeder cum Earthing-up Tool for Drudgery Reduction

Kamaraj A.^{1*}, V. Sivakumar² and P. Pavithra¹

¹Dept. of Crop Management, Agricultural College and Research Institute, Eachangkottai, Thanjavur, Tamil Nadu (614 902), India

²Dept. of Horticulture, Coconut Research Station, TNAU, Aliyarnagar, Coimbatore, Tamil Nadu (642 101), India

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Corresponding Author

Kamaraj A

e-mail: kamaraj.a@tnau.ac.in

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E-mail: bioticapublications@gmail.com

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Abstract

Groundnut is one of the oil seed crop. It is grown as both a rain-fed and irrigation crop. The main problems faced by the farmers are its weeding and earthing-up. Groundnut weeder cum earthing-up tool was developed to reduce the drudgery of farm women labour and increase the income of the farmer. The tool was fabricated with MS steel and was tested for its performance and economic evaluation. The tool was tested for its smoothness of operation and damage of the crop.

Introduction

Globally, groundnut is the sixth important commercial crop. It is a 'food-income-industrial-commercial' crop. Groundnut contains 48-50 % oil and 26-28 % nitrogen. High in fiber, it has many nutrients necessary for the human body. Around the world, about 26.4 million hectares are under groundnut cultivation. Total production is 37.10 million tonnes. Its average yield is 14 quintal per hectare (World Food and Agriculture Union, 2003). About 94% of the total production is in developing countries. But the yield is low. Yield varies from one country to another, from one state to another, and from one province to another. Weed control is one of the most difficult tasks in agriculture that accounts for a considerable share of the cost involved in agricultural production. Manual weeding requires huge labor force and accounts for about 25 percent of the total labor requirement which is usually 900 to 1200 man h/ha (Ayyadurai and Thiyagarajan, 2020). Farmers generally expressed their concern for effective weed control measures to arrest the growth and propagation of weeds. Chemical method of weed control is more prominent than manual and mechanical methods. However, its adverse effects on the environment are making farmers to consider and accept mechanical methods of weed control.

Drudgery and Weeding

The use of mechanical weeder will reduce drudgery and ensure a comfortable posture of the farmer or operator during weeding. This will resultantly increase production. Also earthing-up is a prominent operation in groundnut which is laborious and time consuming operation. Farmers adopt manual earthing-up. Increasing the net income per unit area particularly for the small land holding farmers is the ultimate objective. Considering their economic condition, it is quite necessary to have alternate weeding method by which farmers can increase the net income and reduce the drudgery. Earthing-up and weeding are simultaneous operation to groundnut cultivation. Also this operation is the unique and compulsory operation. It is against this background that a groundnut weeder cum earthing up implement was developed.

Mechanized Weeder cum Earthing-up

The weeder is driven by man to move in forward direction and the blade attached in the front end. By moving forward the blade will cut the weed. Also at the back there is the sand separator which is used for earthing up. The designed manually operated weeder is tested in groundnut crop at Agricultural College And Research Institute, Eachangkottai, Thanjavur, which has red loamy soil and moisture content was 8.74 percent at the testing time. The designed weeder is tested for the efficiency; the results revealed the depth of coverage is only 1 cm. The side earthing component also does not serve the purpose. The design of the weeder was not satisfactory and hence the weeder was re-modified. The machine was re-modified for weeding cum earthing up purpose. The weight of the modified weeder is 4.4 kg and the remaining structure was same but without wheel. The field performance of the developed implement was evaluated. The test was conducted in the row planted garden land field. The area coverage depends on the ploughing and moisture content of the field, in addition the weight of the operator, height of the operator and physique of the operator. The developed weeder was easy to operate at the speed of 0.3 Km/hr which is similar to results indicated by Gyanendra Singh (2006). The present attempt was found to be advantageous as it can reduce the cost of weeding to an extent of 50.64 percent from Rs. 2,104.00 to Rs. 1,020.00. It is concluded that the developed weeder is efficient and will be highly use full for the garden land small and marginal farmers. Special features of the weeder cum earthing up of groundnut are for garden land crop row spacing of 30 cm. Light weight weeder (4.4 Kg) can be operated and lifted by one person easily to change rows. Complete cutting of weeds at a depth of 2 to 3 cm with less than 1% plant damage which is similar to results indicated by Hiroyuki Takeshima and Sheu Salau (2012). Area Coverage is 16:40 hrs/acre.



Figure 1: Groundnut weeder cum earthing-up tool before and after modification



Figure 2: Weeds collected from Groundnut weeder cum earthing-up tool

Conclusion

Groundnut weeder cum earthing-up tool was developed to reduce the drudgery of farm women labour and increase the income of the farmer. The weight of the modified weeder is 4.4 kg and with sturdy structure but without wheel for smooth operation. The tool was easy to operate at the speed of 0.3 Km/hr. Complete cutting of weeds at a depth of 2 to 3 cm with less than 1% plant damage.

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