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Research Paper :

Development and performance evaluation of manually pull type two row rice seeder for wet seedbed condition in India

R.S. DEVNANI, **N.H. TAYADE**, S.K. THAKARE AND J.S.NIKHADE

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See end of the article for authors' affiliations

Correspondence to:
N.H. TAYADE
Department of Farm Power and Machinery, College of Agriculture Engineering and Technology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, AKOLA (M.S.) INDIA

ABSTRACT

Two row rice seeder of manually pull type with operator walking backwards was developed and evaluated at the Agricultural Mechanization Division, Central Institute of Agricultural Engineering, Bhopal for sowing of pregerminated seed in wet rice field. The seeder consists of the seed drum, seeder handle, furrow markers, seeder skids, wheels and front end support. The weight of the machine is about 11 kg. Seeder requires only one operator to do the seeding of pregerminated seeds. The work capacity of the seeder varied from 198 m^2/h to 353 m^2/h. Crop established with a drum seeder resulted in grain yield level from 3.07 t/ha to 4.33 t/ha. The average pull required for operating the machine was 8 kgf. The physiological load on the operator while operating the seeder increased the heart rate from 100 to 135 beats/min for the above field capacity. The seeder is quite simple in design and cost of Rs.750/- ($17). The small two row rice seeder is within the physiological load for the operator.

Key words : Two row rice seeder, Wed seed bed, Manually pull type

Rice (*Oryza sativa*) is major crop that is grown in more than 110 countries. The total area planted to rice in India is 42-20 million hectares, which is largest in the world against a total area of 148.40 million hectares. The total rice production of the world was 527 million tones out of which 84.74 million tones were produced in India, second after china's 187 million in an area of 31 million hectares (Survey of Indian Agriculture, 1999). Though India has largest area planted to rice, it is still among the countries with low yield of only 1.9 t/ha in comparison of Egypt (8.3 t/ha) and China's (6.1 t/ha). The yield level of rice has to increase by 25 to 30 per cent from the present level of 1.9 t/ha if the country is to remain self-sufficient by 2010 (Survey of Indian Agriculture, 1999 and 2000). The labour involved in cultivation of rice raising, uprooting, cleaning, transport and transplanting of seedlings is 100-110 man-days/ha. This labour requirement is very intense at the time of transplanting season. Wet paddy seeding can reduce the labour requirement during transplanting season. The direct wet paddy seeding also reduces the water requirements of crop and it saves at least 10 days in the crop growth period. Therefore, direct wet seeding of pre-germinated seed would be very useful for the small rice farmers in eastern and southern India especially in areas of rainfed rice ecosystem.

The wet seeding technology is very simple and can be adopted by the farmers easily. The pre-germinated seeds are prepared by soaking the paddy seeds for 24 hours in water and after soaking they are incubated for 12 hours till 1 to 2 mm size sprouts are visible. The wet seedbed is prepared by shallow puddling with tractor cage wheel in fully saturated soil and allowed 12 hours with a thin layer of water is good for sowing the pre-germinated rice seed preferably under anaerobic conditions.

Shrivastava and Pawar (1985) and Devnani (2002) reported the use of seeder as superior to broad casting method of raising the rice crop. As rice is mostly raised in the high rainfall areas, the weeds are the main problem that affects the establishment of plants. Thus control of weeds by appropriate chemical means is must and to make use of mechanical weeders, the line sowing of rice seeds will be most desirable compared to broad casting of seeds. Thus, the present day recommendation for the rice farmers is to go for wet seeding of rice as an alternative to the transplanting operation because of reduction in labour requirements, saving of water application and cost of operation etc. even on a small scale of farming. Hence, the study on the design of manually operated rice seeder for wet seeding of pre- germinated seeds, which should be within the physiological work capacity of the farm operator was taken up.

METHODOLOGY

Description of two row rice seeder:

It is a manually pull type two-row rice seeder for