

Design modifications of cup in cup feed metering seed drill for seed pattern characteristics study of paddy seeds

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ABSTRACT : Proper design of cup in cup feed metering seed drill is very much important to enhance the performance of a seed drill. Earlier the cups used were of semi circular type. Due to vibration and shock, the seed retention and release for these cups were poor. So the cups were modified to cylindrical at top and conical at the bottom. An experimental test rig was developed in the laboratory in the Department of farm Machinery and Power, OUAT, Bhubaneswar to evaluate the best suitable dimensions of cup for the paddy variety pathara. Five different sizes of cups *i.e.* 14.83 mm, 11.71 mm, 9.48 mm, 7.84 mm and 6.58 mm depths with diameters of 8mm, 9mm, 10mm, 11mm and 12mm, respectively were prepared keeping the volume constant and were used for the study. The five different peripheral speeds of the cup discs were chosen to 6.28 m/min, 9.42 m/min, 12.55 m/min, 18.84 m/min and 23.56 m/min. The belt speed was calculated and maintained to study the seed rate deviation, seed distribution and seed damage. It was found that the dimensions of cup of 10 mm × 9.48 mm were found best with a permissible peripheral velocity up to 23.56m/min. and an overall efficiency of 80.94 per cent. The above dimensions of the cup may be taken to develop a suitable seed drill for use in the field condition for sowing of paddy seeds.

Key words : Farm Mechanization, Seed drill, Cup feed metering mechanism, Paddy sowing

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INTRODUCTION

The seed metering mechanism is the most vital component of the seed drill. The performance of a seed drill is mainly dependent on the type of metering device. In addition to this, the type of soil and field condition, preparation of seed bed, speed of operation and power source also affect the performance of the seed drill (Kepner *et al.*, 2000). The crop yield as well is affected by plant population, row spacing, plant to plant spacing, type and variety of seed and their emergence (Ojha and Michale, 1978).

The fluted roller feed type metering device is very popular in India. This type of metering device is very much suitable for grain crops and not for bold seeds. Moreover there is a concern for this type of metering device when the seed damage exceeds three per cent (Goel and Verma, 2000). Another metering device used was of cell feed type for manually operated seed drill. In this type of metering device, controlling of the seed rate was difficult. It was reported that the slightest displacement of brush contact varied the seed rate to a great extent under the field condition. In recent past, cups having semi circular type have been introduced for seed metering device in manufacturing of seed drill (Sahoo and Srivastava, 2000). Due to vibration and shock, the seed retention and release for these cups were poor. So the cups were modified to cylindrical at top and conical at the bottom for better retention of seeds.

The socio-economic conditions of the farmers in the state Odisha (Anonymous, 2005) do not permit them to have different seed drills for different crops. They are, therefore, bound to follow the traditional practice and face difficulty in intercultural operations and overall management of their crop. As the yield

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