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Development and testing of a self propelled coleus harvester

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Abstract : A self propelled coleus (*Solenostemom rotundifolius*) harvester was developed to alleviate the drudgery of farmers associated with harvesting of coleus. The harvester consists of a frame made of GI pipes with propelling and harvesting units mounted on it. The propelling unit is a 2- stroke engine of 7.5 bhp drives the ground wheel with a chain and sprocket mechanism. The harvesting unit is attached to the main frame by an extension of MS angle, which can be dismantled if needed. The harvester was tested in a field of 40 m^2 with three different types of tynes *viz*., angular, flat and cylindrical. The specific fuel consumption increased with load and was found maximum in flat tynes and minimum in cylindrical tynes. The effective field capacity was the highest for cylindrical tynes with 0.0764 ha h^{-1}. The highest harvesting efficiency was found to be 80.12 per cent for angular tynes.

Key words : Coleus, Harvester, Tuber crop, Rhizome harvester, Chinese potato

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Coleus (*Solenostemom rotundifolius*) commonly known as Chinese potato, is a minor tuber crop of tropical regions of India, Indonesia, Malaysia, Sri Lanka and Africa (Peter, 2007). The nutritive status of coleus is favorably good compared with many of the major crops. Low cost of cultivation, high production potential, consumer preference, good market demand and almost assured high returns make the crop highly popular among vegetable growers. It is usually planted on raised beds at a spacing of 30 cm x 15 cm at a depth of 4 to 5cm. Harvesting is done when the haulms dried, mostly 4 cm to 6 months after planting (Kerala Agricultural University, 1999). Tubers are taken out from the soil using spade and forks. The manual harvesting of coleus is laborious and tedious work. Thus a self propelled coleus harvester was developed to alleviate the drudgery of workers and to reduce the cost of production. The developed harvester was tested and evaluated for its performance in the field using different tynes.

METHODOLOGY

The harvester comprises of two parts *viz*. the propelling and harvesting unit. The prime mover is a 2-stroke 7.5 hp petrol engine. The use of such engine as the prime mover to the harvester proved to be advantageous for a wide variety of reasons like, the compactness and smaller in size, helped to move on narrow terrains, easy operation for women and ensured the smooth mobility. The engine drive is taken and speed is reduced to 12 times by using a reduction gear mounted on a shaft. This drive is further taken to the ground wheel with a chain and sprocket mechanism. Through this, the speed is reduced to 4 times to the cage wheel ensuring a walk-able speed for easy operation. The harvester is provided with a supporting wheel at the front end. The engine and the transmission unit are mounted on the main frame made of Φ 30 GI pipes.

The harvesting unit consisted of a frame made of MS angle of size 35 x 35 x2 mm fitted with tynes. It is attached to the propelling unit by extending the MS angle to a length of 22 cm. The specification of the harvester is shown in Table A. The slots provided at the rear end of the main frame helped to adjust the operating depth of tynes. The performance of harvester was evaluated with three types of tynes made of mild steel angle, flat and rod. Also these tynes are provided with a slight bending for better penetration and earthing up of rhizomes from the soil. In each type, 6 tynes were placed at equidistance from each other (Fig. A and B) in the harvesting unit.

The harvesting unit consists of tynes fitted on a frame attached to the rear end of the harvester. The cutting tynes are flat, angular and cylindrical types. The adjustments were done at various operating depths of 7, 9 and 11 cm. Power was