

Automation of Pneumatic Seed Planter for System of Rice Intensification

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Abstract : Seed singulation and accuracy in seed spacing are the major challenges associated with the adoption of mechanical seeder for system of rice intensification. In this research the metering system of a pneumatic planter was modified and automated for increase precision to meet the demand of system of rice intensification SRI. The chain and sprocket mechanism of a conventional vacuum planter were now replaced with an electro mechanical system made up of a set of servo motors, limit switch, micro controller and a wheel divided into 10 equal angles. The circumference of the planter wheel was determined based on which seed spacing was computed and mapped to the angles of the metering wheel. A program was then written and uploaded to arduino micro controller and it automatically turns the seed plates for seeding upon covering the required distance. The servo motor was calibrated with the aid of labVIEW. The machine was then calibrated using a grease belt and varying the servo rpm through voltage variation between 37 rpm to 47 rpm until an optimum value of 40 rpm was obtained with a forward speed of 5 kilometers per hour. A pressure of 1.5 kpa was found to be optimum under which no skip or double was recorded. Precision in spacing (coefficient of variation), miss index, multiple index, doubles and skips were investigated. No skip or double was recorded both at laboratory and field levels. The operational parameters under consideration were both evaluated at laboratory and field. Even though there was little variation between the laboratory and field values of precision in spacing, multiple index and miss index, the different is not significant as both laboratory and field values fall within the acceptable range.

Keywords : automation, calibration, pneumatic seed planter, system of rice intensification

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