

Optimization of vacuum manifold design for seeding of SRI seedling tray

ABSTRACT

The manual seeding of system of rice intensification (SRI) seedling tray is time and labor intensive. Hence, there is need to mechanize the seeding process. In this study, a vacuum-based seeding manifold was proposed for automatic seeding of SRI seedling tray. Pressure maldistribution is believed to be the cause of low performance in many pneumatic systems. The manifold design was optimized using computational fluid dynamics (CFD) software to achieve high pressure uniformity. Two manifold designs with cylindrical and rectangular vacuum chamber types, each with 924 seeding nozzles (equal to the seedling cavities on SRI seedling tray) were compared for better vacuum distribution. Manifold with rectangular vacuum chamber was found to have a better pressure uniformity than manifold with cylindrical vacuum chamber and was adopted for development of the seeding manifold.

Keyword: Pressure distribution; Computation fluid dynamic; Single seeding; Seeding manifold; SRI seedling tray