

## Planter design in relation to the physical properties of seeds

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### Abstract

Physical properties namely, length, breadth, surface area, roundness, equivalent diameter, sphericity, seed weight, true density, angle of repose and coefficient of restitution of maize, red gram and cotton seeds were evaluated as design parameters for a planter. Thickness and cell diameters of the seed metering discs were designed in reference to the maximum breadth and length of seeds. Both roundness and sphericity affect seed flow through the various components of the planter. Roundness of maize, red gram, and cotton were  $1.14 \pm 0.14$ ,  $1.15 \pm 0.10$ , and  $1.26 \pm 0.10$  respectively, while sphericity of these seeds in the natural rest position were  $0.621 \pm 0.065$ ,  $0.750 \pm 0.016$ ,  $0.550 \pm 0.016$  respectively. To ensure free flow of seeds, the slope of the seed hopper was, therefore, fixed at 30o, which is modestly higher than the average angle of repose of seeds. In addition, the inner surfaces of the seed transfer cup was imbedded with 3 mm thick rubber sheet as its coefficient of restitution was lower than mild steel sheet of same thickness.

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