



Design and Evaluation of Mechanised Seedball Production for Sahelian Smallholder Farmers

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Problem and Objective

- Seedball is a low-cost seed pelleting technique to enhance seed growth in nutrient-poor soil. However, manual seedball production by hand is a time-consuming process.
- The objective of this study is to design, construct and evaluate a seedball machine prototype.

Material & Methods

- Raw Materials: Substrate (pearl millet seeds, loam, sand and wood ash) and water.

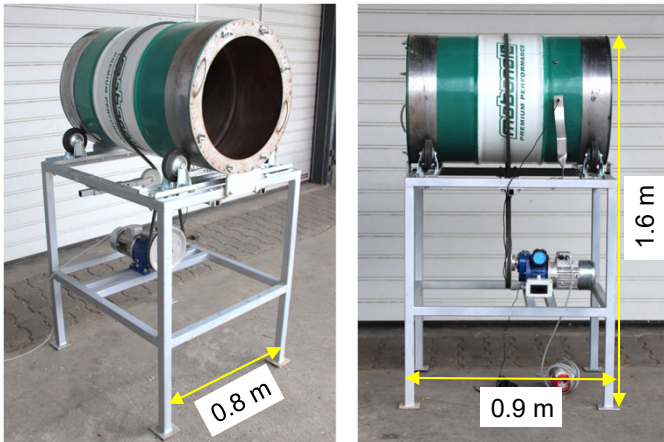


Figure 1. Seedball machine prototype constructed at University of Hohenheim.

- A perforated shovel was used to collect the desirable seedballs, which have diameter between 20 and 25 mm.

Results

- Seedball diameter and number of seeds in a seedball are the important physical parameters.



Figure 2. Dried desirable seedballs (Ø 20-25 mm).

- Loam in substrate, residence time and rotational speed had a significant effect on seedball formation at $p < 0.05$.

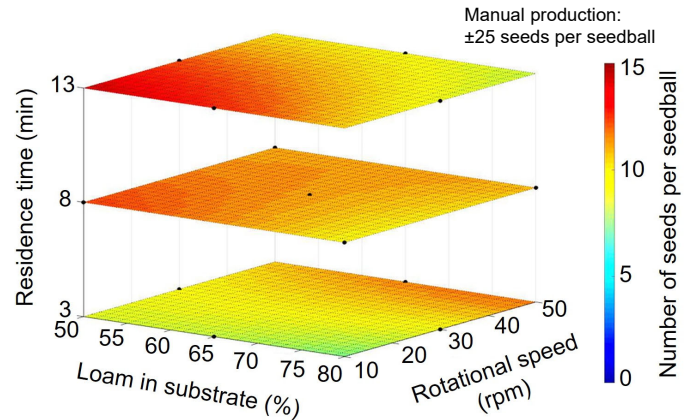


Figure 3. Effect of loam in substrate, residence time and rotational speed of the drum on number of seeds per seedball.

- Number of seeds per seedball can be easily increased by adding more seeds in the substrate.

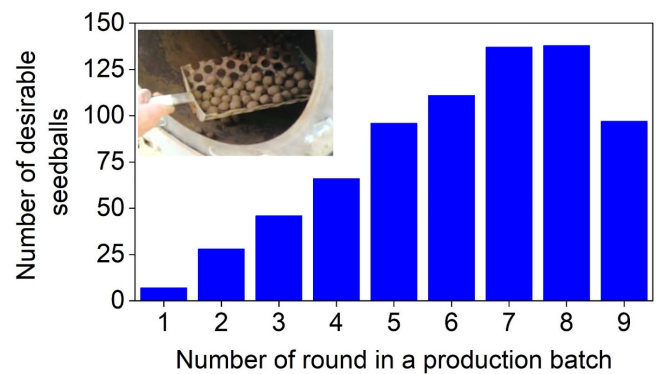


Figure 4. Number of desirable seedballs collected from each round in a production batch.

- The production capacity (±44 seedballs/min) was much higher than manual production (±4 seedballs/min).

Conclusions

- A successful proof-of-concept has been presented. On-site tests of the machine are recommended in cooperation with partners in the Sahel.

