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Seedball Technology Development and its Application for Pearl Millet Production in West African Sahel

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Abstract

In quest for an effective local material-based innovation for West African Sahelian smallholder farmers, the seedball technology was developed. Seedball is a cheap seed pelleting technique that combines sand, loam, seeds and optionally wood ash or mineral fertiliser (NPK) as an additive to enhance pearl millet seedlings growth in chemically infertile soils. To form pearl seedballs, a mixture of 80g sand+50g loam+25ml water+2.5g seeds serves as the standard recipe; either 3.0g wood ash or 1.0g NPK can be added as effective nutrient compounds. About 10 seedballs of 2.0 cm diameter size could be formed from the standard recipe. This study summarises about 7 years of seedball technology and its application findings in greenhouse and field trial conditions. Our greenhouse results showed that seedball increases shoot (height, leaf count, dry matter and stem diameter) and root (length, density, diameter, fine root and dry matter) variables of pearl millet seedlings in different folds, depending on the soil nutrient condition (low and normal) and seed size (high and low TGM); the lower and smaller the soil nutrient status and seed sizes, respectively the higher the enhancement effect of seedball most likely associated with nutrient supply to seedling by seedball. The effects of seedball were often relatively higher in the local seed variety. The field trial results showed that seedball does not suppress seedlings emergence. An average of about 30 % panicle yield increase was observed, with a slight decline from 2014 to 2020 trial years, attributed to differences in production practices and annual rainfalls over the years. Panicle yield comparison was made with respect to (i) seedball type – wood ash- vs NPK-additive, (ii) sowing time – wet vs dry, (iii) weed management – complete vs partial, (iv) local-soil type (v) cropping system - sole vs mixed and (vi) gender. Seedball-derived plants produced fewer but denser panicles. The average panicle yield of NPK-amended seedball was relatively higher. Wet sowing, partial weeding, sole cropping, and male farmers produced relatively higher panicle yield. Seedball technology seems to have favourable adoption conditions in the Sahel. A recommendation is socio-economic evaluation of the seedball technology as an innovation.

Keywords: African Sahel, dry farming, local farmers, low-income farmers, millet, peasants, WAS farmers