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Seedball Technology Improves Pearl Millet Yield in Sahelian Production Systems

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Abstract

Erratic rainfall and poor soil fertility negatively affect Sahelian pearl millet cropping systems. This leads to poor seedlings establishment, and in turn low yields. Since the early growth stages are determinative for the final crop performance under Sahelian conditions, improvements should first focus on this critical early stage. However, lack of financial resources and skills disallow Sahelian farmers to adopt already existing solutions such as the application of irrigation, mineral fertiliser and seed treatments (coating and priming) to enhance seedlings establishment. Obviously, over forty years of research findings have not been extended to the Sahelian farmers. As a result, pearl millet seedlings establishment, till date, is an utmost topic in the African Sahel. In several greenhouse experiments, we chemically (nutrient concentration) and mechanically (diameter size) optimised seedball technology based on local materials, specifically for pearl millet production. Seedball is an easy and affordable “seed-pelleting” technique that combines indigenous local materials such as sand, loam, water, and seeds in a gravimetric ratio to enhance seedlings establishment. Different amendments such as fertiliser or pesticides can be added depending on target preferences and local problems e.g. seed predation. Seedballs significantly enhanced root and shoot traits compared to conventional sowing. To ascertain these findings, on-station and on-farm experiments were carried out in 2015 and 2016 planting seasons in Senegal and Niger Republic. Yield assessment revealed seedball significantly enhanced panicle production by up to 29%. Seedball yield increments vary according to soil types. No significant differences were found in on-station experiments due to over-fertilised soils. Seedball can increase yield in a typical Sahel environment. It is simple to make and cheap to acquire, it saves seeds and maximally utilises mineral fertiliser. Thus, seedball can be afforded by local farmers for pearl millet production. Additionally, it does not conflict with pre-seasonal labour loads.

Keywords: Local materials, local seed pelleting, smallholder farmers