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Intercropping Transplanted Pigeon Pea With Finger Millet: Arbuscular Mycorrhizal Fungi and Plant Growth Promoting Rhizobacteria Boost Yield While Reducing Fertilizer Input

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Pigeon pea (Cajanus cajan) and finger millet (Eleusine coracana) are staple food crops for millions of the rural population in Asia and Africa. We tested, in field trials over three consecutive seasons at two sites in India, an intercropping and biofertilization scheme to boost their yields under low-input conditions. Pigeon pea seedlings were raised during the dry season and transplanted row-wise into fields of finger millet, and arbuscular mycorrhizal fungi (AMF) and plant growth-promoting rhizobacteria (Pseudomonas) were added alone or in combination to both pigeon pea and finger millet. Our major findings are (i) effects of the biofertilizers were particularly pronounced at the site of low fertility; (ii) dual inoculation of AMF+PGPR to finger millet and pigeon pea crops showed increased grain yields more effectively than single inoculation; (iii) the combined grain yields of finger millet and pigeon pea in intercropping increased up to +128% due to the biofertilizer application; (iv) compared to direct sowing, the transplanting system of pigeon pea increased their average grain yield up to 267% across site, and the yield gains due to biofertilization and the transplanting system were additive. These technologies thus offer a tool box for sustainable yield improvement of pigeon pea and finger millet.
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