To highlight one result, CIAT 899 on seed (0.7x 107 cells/seed) overcame a stable population of 106 cells/g of soil of Rhizobium sp. NAK 120 to occupy 79% of the nodules but occupied only 1% of nodules when Rhizobium sp. NAK 287 was in the soil. It was found that nodule occupancy outcomes depended on the type of strain in the potted soil and less on the numbers in the soil. These findings help explain the hit and miss results experienced in the field with bean inoculation, as they clearly demonstrate the influence of the type of strain resident in the soil, independent of the commonly studied factor - the population numbers. Studies that may emanate from these findings include the identification of the major characteristics of strains that provide the greatest impediment to successful bean inoculation.

Paper Number: 1037

On-Farm Yield Response of Chickpea [Cicer Arietinum (L)] to Inoculation and Phosphorus Fertilizer in Ethiopia.

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On-farm yield response of chickpea [Cicer arietinum (L)] to inoculation and phosphorus fertilizer application in Ethiopia

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Chickpea is the third most widely cultivated food grain legume in Ethiopia and the country is the largest chickpea grower in Africa with market share of 40% in the continent. Despite its potential yield (>3 ton ha-1) current chickpea productivity is low in Ethiopia (>1.6 ton ha-1). Chickpea is specific for its rhizobial requirement and phosphorus enhances nitrogen fixation. An on-farm study was conducted to evaluate the response of chickpea to inoculation and P-fertilizer at Damote-Gale in Ethiopia. Four treatments, inoculation with Mesorhizobium sp. strain CP 41 (+I), P fertilizer (TSP) (+P) and the combination of both (+P+I) including control (-P-I) were tested on twenty farms. In addition, the MPN count of rhizobial population size in the study site was determined. Analysis of collected data on symbiotic, yield and yield related traits indicated that inoculation and P fertilizer improves nodulation, growth and yield of chickpea. Inoculation, P+ and the I+P+ treatments increased grain yield by 26%, 19% and 33% over the control, respectively. Similarly, the total nitrogen content of the straw increased by 56% and 85% due to inoculation and combined treatment, respectively, thus indicating improved nutritive value of the residues for livestock feed. The population of soil resident compatible rhizobia was very low (< 10 gram-1 of soil), warranting the benefit of inoculating chickpea. The improved performances of chickpea and the benefit to household income due to inoculation and the potential role that it plays in sustainable intensification of crop-livestock system in the target area are discussed.

Key words: Inoculation, P fertilizer, Chickpea, MPN count.

Paper Number: 1038

Symbiotic N2 Fixation in Field Grown Kersting's Groundnut (Macrotyloma geocarpum) Landraces in Response to Inoculation with Bradyrhizobium Sp. in Ghana.

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Kersting's groundnut is an under-utilized grain legume that faces extinction due in part to lack of research to improve the crop. Presently, reports on the amounts of N-fixed by the crop via the legume-Rhizobium symbiosis is scanty. In the present study, N2 fixation in eight Kersting's groundnut landraces were assessed in response to inoculation with two Bradyrhizobium strains (B. japonicum CB756 and B. sp. BR3267) at three locations (Savelugu, Tamale and Nyankpala) Ghana.

The results revealed marked differences in the shoot ⊠15N of the test landraces due to variations in N2 fixation. Symbiosis accounted for between 48 – 71% of the N demands of most landraces, and was evidenced by relatively lower values of both soil N uptake (21 – 49 kg N ha-1) and ⊠15N across the three locations. The amounts of N-fixed by the landraces ranged between 41 to 72 kg N ha-1, and closely mirrored patterns of plant growth. Inoculation with either Bradyrhizobium strains resulted in lower shoot ⊠15N values relative to the un-inoculated plants at Savelugu, translating into greater dependence on symbiosis by the inoculated plants. The landraces Heng Milk Mottled, Heng Red Mottled, Nakori and Sigiri fixed higher amounts of N in at least two of the loations. Grain yields of the landraces were generally low, and ranged from 164 – 959 kg.ha-1. Studies on the symbiotic efficacy of indigenous rhizobia nodulating Kersting's groundnut could help enhance their role in soil fertility enhancement in traditional cropping systems of the tropics where most nutrient depleted soils occur.