

PS4-27 Local bradyrhizobia promote plant growth on both maize and legume

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In Ivory Coast (West Africa) food crops are widely produced through a legume-cereal-tuber intermixed culture system. To assess the role and genetic diversity of rhizobial bacteria in this agronomic system, we isolated 74 rhizobial strains from root nodules of groundnut, soybean, and cowpea plants grown as intermixed cultures in fields all around the country. They all belonged to the *Bradyrhizobium* species (16S rDNA sequencing) with a large genetic diversity (16S-23S rDNA intertranscribed spacer [ITS] sequencing). They formed 17 clusters, some corresponding to *B. japonicum*, *B. elkanii*, *B. yuanmingense*, some to *Bradyrhizobium* spp. reference genospecies Ia, IV, V, VIII, XI [1], and six separate groups. We further performed MultiLocus Sequence analysis on five housekeeping genes (*glnIII*, *recA*, *dnaK*, *rpoB*, and *atpD*), using several phylogenetic methods (MP, ML, Bayesian), and obtained a consensus phylogenetic tree. Greenhouse tests were performed to screen the new strains for (i) their nitrogen-fixing potential on groundnut, soybean, and cowpea, and (ii) their plant growth promotion capacity on maize. Eight weeks after inoculation, plants were surveyed for their nodule numbers and dry weights, aerial part and root dry weight, leaf color, and ARA. Statistical analysis show that all strains (100%) are efficient on cowpea, 26% on groundnut (separate genospecies clusters 3, 8, 9, and 10), and 27% on soybean (*B. japonicum* cl. I, Ia, *B. elkanii*, cl. II, *B. yuanmingense*). Six strains (STM3040, STM3080, STM3078, STM3088, STM3070, and STM3079) were selected for their growth promotion on both legumes and cereal. Biochemicals tests showed ammonium production in STM3078, siderophores production in STM3080, STM3078, and STM3088. No AIA production nor phosphate solubilization were detected. Further investigations for 1-aminocyclopropane-1-carboxylate (ACC) deaminase activity, ACC gene sequencing, and endophytic functions are in progress and will be discussed.

[1] Willems *et al.* (2003). *Syst. Appl. Microbiol.* 26:203-210.