

Pleiotropic role of *Bradyrhizobium* in legume – cereal intermixed cultures in Côte d'Ivoire

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In Côte d'Ivoire 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 in intermixed culture fields all around the country. All strains belonged to *Bradyrhizobium* (16S rDNA sequencing) and genetically diversity (16S-23S rDNA inter-transcribed spacer -ITS- sequencing). They formed 15 clusters, some corresponding to *B. japonicum* I and Ia, *B. elkanii*, some to *Bradyrhizobium* spp. reference genospecies IV, X, XI**, and nine separate groups. We further performed Multi Locus Sequence analysis on six housekeeping genes (*gnIII*, *recA*, *dnaK*, *rpoB*, *atpD*, *gyrB*), using several phylogenetic methods (MP, ML, Bayesian), and obtained a consensus phylogenetic tree. Greenhouse tests were performed to screen the new strains for (1) their nitrogen-fixation potential on groundnut, soybean and cowpea and (2) 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 weights, leaf color, and ARA. Statistical analysis show that all strains (100 %) are efficient on cowpea, 26 % on groundnut (separate genospecies clusters 3, 8, 9, 10), and 27 % on soybean (*B. japonicum* cl. I, Ia, *B. elkanii*, cl. II, *B. yuanmingense*). Six strains (STM 3040, STM 3080, STM 3078, STM 3088, STM 3070, STM 3079) were selected for their growth promotion on the three legumes and maize. Biochemical tests showed ammonium production in STM 3078, siderophore production in STM 3080, STM 3078, STM 3088. Neither AIA production nor phosphate solubilization was detected. Further investigations for ACC déaminase activity, ACC gene sequencing are in progress. Maize root cell colonization was observed by light microscopy using a GUS-labelled derivative of strain STM 3079. The invasion process involved large quantities of bacteria colonizing cracks at lateral root junctions and progressing more deeply towards pericycle via intracellular parenchyma. Further tests, on more beneficial strains are in progress.

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