

**Abstract**

**“Biodiversity of symbiotic nitrogen-fixing rhizobia isolated from arable and virgin soils from Huambo province, Angola”**

The aim of the study was the evaluation of the presence of symbiotic BNF rhizobia in different soils in central Angola. Soil samples were collected from natural forest, fallow, and arable land. A total of 221 isolates of potential BNF rhizobia was isolated from the nodules of two promiscuous species used as trap plants (*Phaseolus vulgaris* L., *Vigna angularis* (Willd.) Ohwi & H. Ohashi) and directly from the soil. Twenty-one isolates stimulated the growth of the common bean but did not induce nodules. Most plant growth-promoting bacteria were *nifH* positive. Seventeen of them produced IAA. The most active IAA producers were identified as *Enterobacter huaxiensis*. The majority of PGPB was identified as *Burkholderia diffusa* and *Beijerinckia fluminensis*. Also, *Herbaspirillum huttiense* and *Rhizobium pusense* were identified among PGPB. Seventy-six isolates with phenotypic characteristics of rhizobia were selected. Among them, 22 isolates were selected as effective nitrogen fixation rhizobia. The majority of selected strains were isolated from acidic soils with pH 4.2 - 5.2. The biodiversity of BNF rhizobia in the tested soils was limited. Most of the strains isolated from the root nodule of the adzuki bean were phylogenetically similar to *Paraburkholderia kirstenboschensis*, to *Burkholderia diffusa*, or to *Rhizobium miluonense*. Most isolates from nodules of the common bean were identified as *Rhizobium aegyptiacum*/*R. bangladeshense*/*R. binae* group, or as *R. miluonense*. The most efficient in pot experiment and under field condition were strains HCC321, HBA15a, and HLo8 identified as *R. aegyptiacum*/*R. bangladeshense*/*R. binae*. Under the field condition at Gongoinga (Huambo, Angola) inoculation of seed with the strain HCC321 improved the grain yield of the common bean by 755% in comparison to the uninoculated plants grown on unfertilized plots. Moreover, the application of this strain in combination with NPK fertilization increased the yield by 57.2% in comparison to the yield on plots with NPK fertilization, only. Two strains, HEC1 and HC4 related to genus *Paraburkholderia*, are probably new species because they are not clustered with the any of recognized species.

**Keywords:** BNF rhizobia, PGPB, *P. vulgaris*, *V. angularis*, trapping method

