

Comparison of chickpea rhizobia isolates from diverse Portuguese natural populations based on symbiotic effectiveness and DNA fingerprint



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Abstract: Aims: To test the hypothesis that differences in chickpea yields obtained in four distinct Portuguese regions (Beja, Elvas-Casas Velhas, Elvas-Estacao Nacional de Melhoramento de Plantas (ENMP) and Evora) could be due to variation between the natural rhizobia populations.

Methods and Results: Estimation of the size of the different rhizobial populations showed that Elvas-ENMP population was the largest one. Elvas-ENMP population also revealed a higher proportion of isolates carrying more than one plasmid. Assessment of genetic diversity of the native rhizobia populations by a DNA fingerprinting PCR method, here designated as DAPD (Direct Amplified Polymorphic DNA), showed a higher degree of variation in Elvas-ENMP and Beja populations. The symbiotic effectiveness (SE) of 39 isolates was determined and ranged 13-34%. Statistical analysis showed that SE was negatively correlated with plasmid number of the isolate.

Conclusions: The largest indigenous rhizobia population was found in Elvas-ENMP. DAPD pattern and plasmid profile analysis both suggested a higher genetic diversity among the populations of Elvas-ENMP and Beja. No relationship was found between SE of the isolates and their origin site.

Significance and Impact of Study: The large native population, rather than the symbiotic performance of individual rhizobia, could contribute to the higher chickpea yields obtained in Elvas-ENMP.

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1. Univ Evora, Dept Biol, P-7002554 Evora, Portugal
2. Univ Evora, ICAM, P-7002554 Evora, Portugal
3. Univ Evora, Dept Fitotecn, P-7002554 Evora, Portugal

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