

Summary

Chamaecytisus albus (Spanish broom) is a legume shrub with ever-declining population and area in Poland, despite the protection of this specimen in our country. *Ch. albus* is able to form root nodules, however, endophytic microorganisms which can be found inside plant tissues were not studied yet.

The 92 bacterial strains were isolated from Spanish broom root nodules and characterized. Sequence analysis of few housekeeping genes (*atpD*, *gyrB*, *recA* and *rpoB*) allowed for classification of studied strains into *Bradyrhizobium*, *Rhizobium*, *Agrobacterium*, *Phyllobacterium*, *Bosea*, *Sinorhizobium*, *Mesorhizobium*, *Tardiphaga* and *Allorhizobium* genera. In genomes of 34 strains *nodA*, *nodC* and *nodZ* genes were found, with sequences similar to *Bradyrhizobium* symbiotic genes.

The *in vitro* plant tests revealed that only 28 of 92 strains (30,4%) were able to nodulate *Ch. albus* plants. One strain (KW98) inducing the highest number of root nodules was selected, and used in greenhouse experiments. It was shown that inoculation of Spanish broom seedlings with KW98 strain resulted in doubling of wet mass of plants, and increasing the height of plants by 27% as well as the width and length of leaf blades (by 84% and 42%, respectively), therefore this strain could be a good candidate for production of biofertilizer improving the growth of Spanish broom.

Numerous endophytes isolated from Spanish broom nodules possessed favorable physiological traits characteristic for PGPR microorganisms, e.g. siderophore production (best results for 2058B, KW4 and KW51 strains), cellulase secretion (CAS21, KW60, KW126), phosphate solubilization (2012, CAS16, CAS21), HCN synthesis (CAN1 and KW126), IAA production (2058B, 2059C, KW60) or indole production (CAS16, KW51). Such traits were found more often among strains non-nodulating *Ch. albus*, therefore one or more PGPR-like Spanish broom endophytes could be applied together with KW98 as a multistrain inoculant promoting *Ch. albus* growth in natural environment, which could help in restoration of native population of this specimen in Poland.

Key words: Spanish broom, *Chamaecytisus albus*, endophytes, rizobia, symbiosis

