

SESSILE OAK RHIZOBACTERIA WITH PLANT GROWTH-PROMOTING POTENTIAL *IN VITRO*



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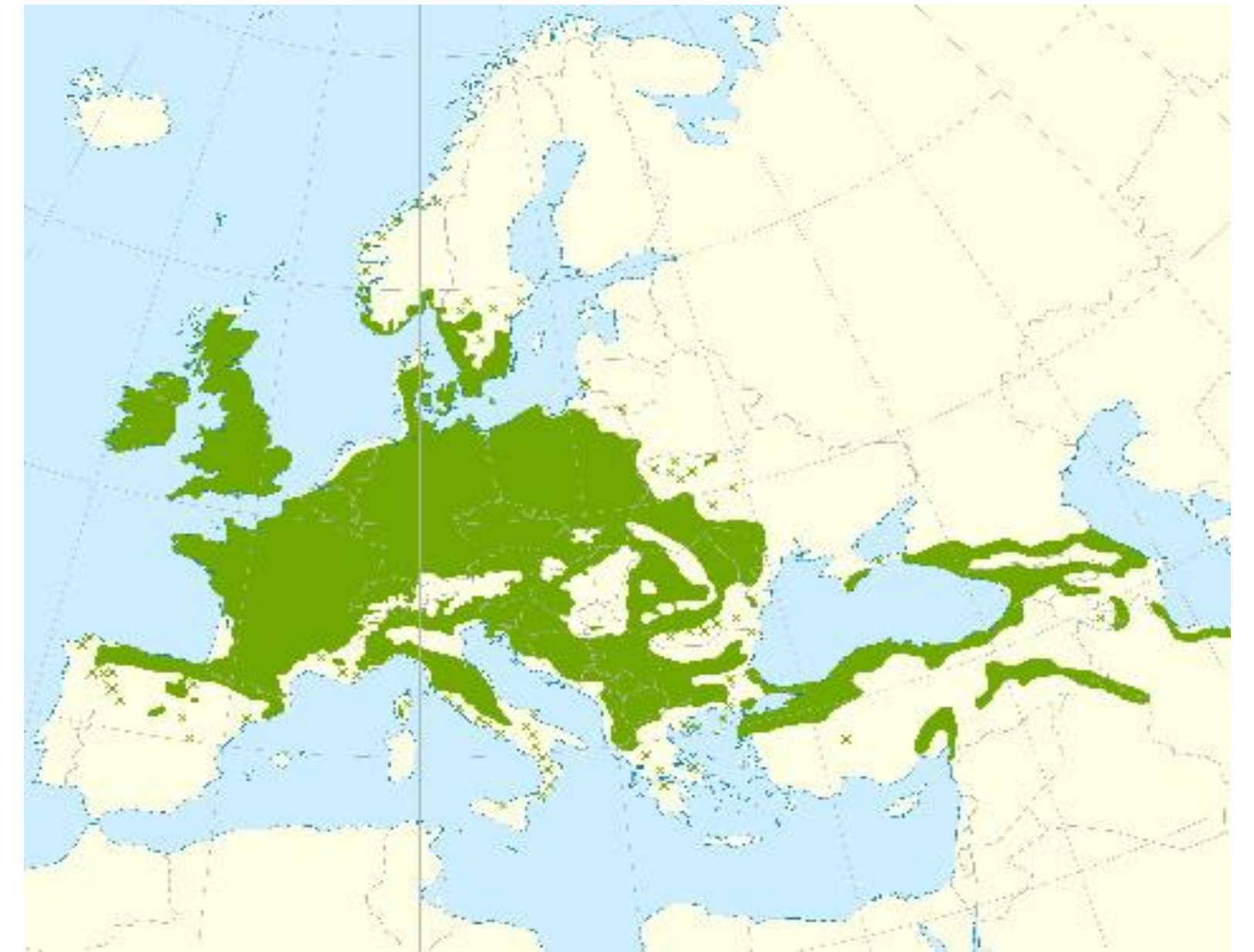


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Introduction



The rhizosphere is a complex habitat with great bacterial heterogeneity. Plant growth-promoting rhizobacteria (PGPR) can be distinguished as a specific functional group that elevates plant characteristics and performance by direct and indirect mechanisms and are often members of genus *Bacillus* and *Pseudomonas*. PGPR of oak species in Serbia are poorly understood. Sessile oak (*Quercus petraea* (Matt.) Liebl) is autochthonous and one of Serbia's most abundant tree species with a percentage of 7.7% in the growing stock (186.179 ha), with great economical, technical, ecological, and cultural importance. Within the belt of its stands, there are 23 different forest types. The main problems of present sessile oak forests are continuous intensive decline, the domination of coppice forests (74.1%), age, and physiological susceptibility to (a)biotic stressors, which all guide to smaller seed yield and difficult natural regeneration. An additional problem is the low percentage of artificial reforestation success.



Sessile oak areal in Europe

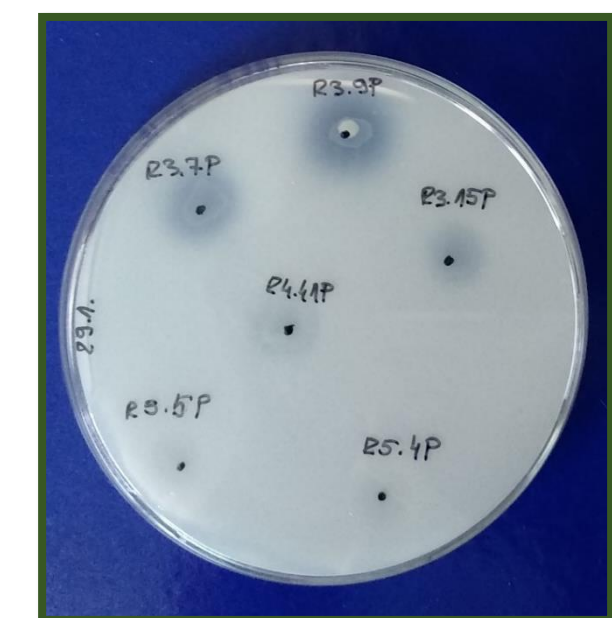
Source: ec.europa.eu/jrc/en/research-topic/forestry/qr-tree-project/sessile-oak

Method

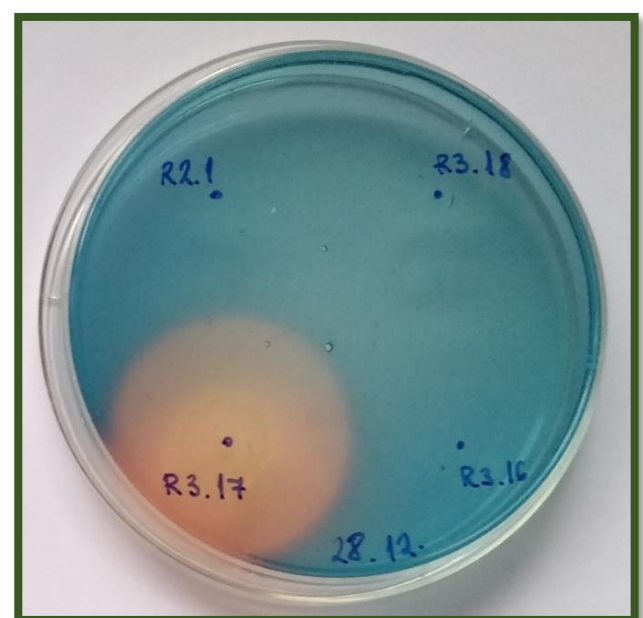


The greatest IAA production

The bacteria of the genus *Bacillus* and *Pseudomonas* were isolated by culturing methods from the sessile oak rhizosphere samples from mountain Rudnik where it naturally occurs. The Gram, catalase, and oxidase tests were performed, as did the fluorescent pigment production for potential pseudomonads. In addition, its plant growth-promoting abilities (IAA synthesis, siderophore production, and phosphate solubilization) were investigated *in vitro*. The selected isolates were molecularly identified based on the 16S rRNA gene sequence.



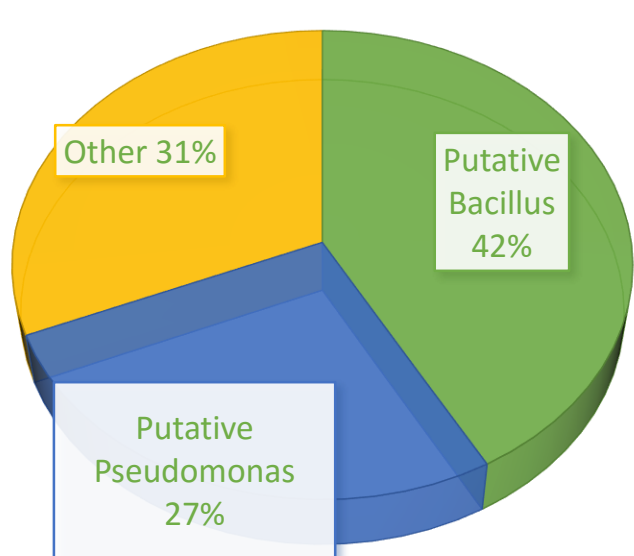
Phosphate solubilization screening on NBRIP medium



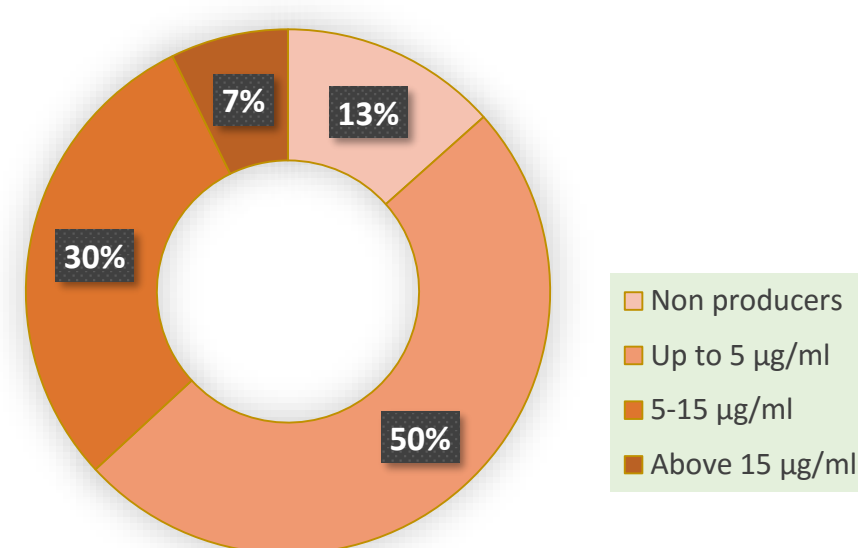
The greatest siderophore production

Results

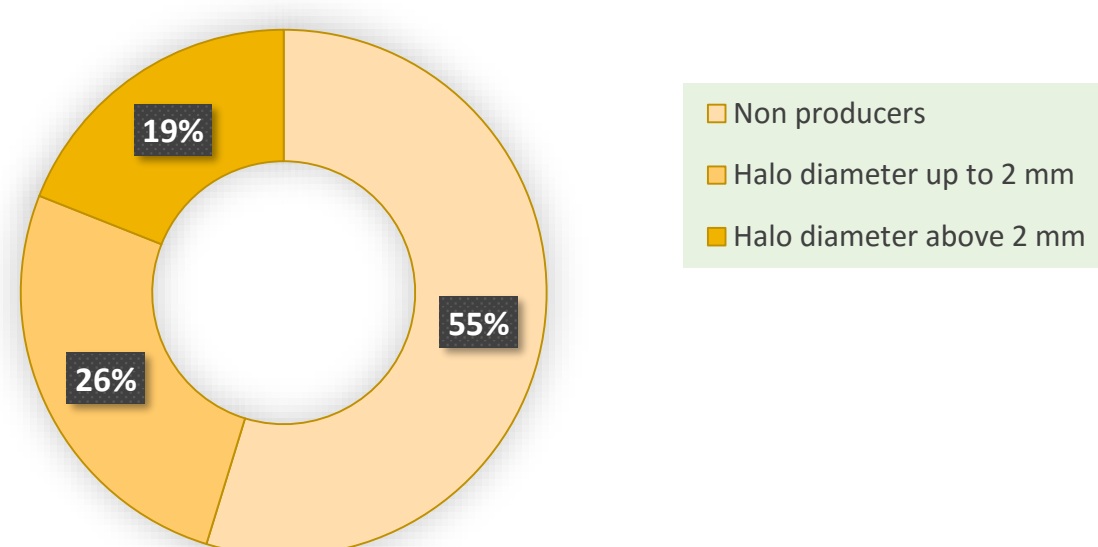
ISOLATE GENUS ABUNDANCE



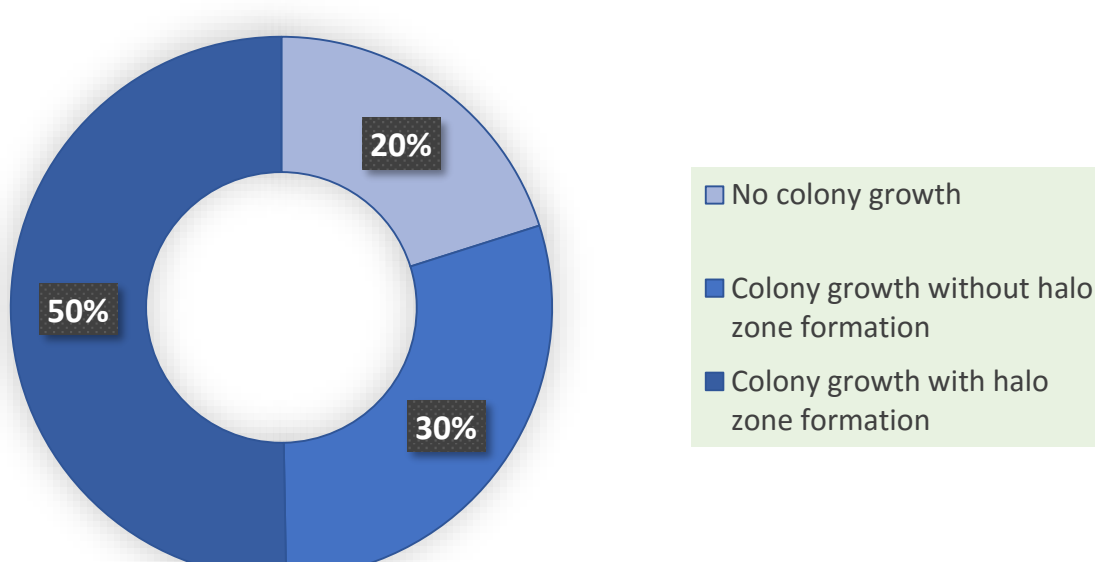
IAA PRODUCTION



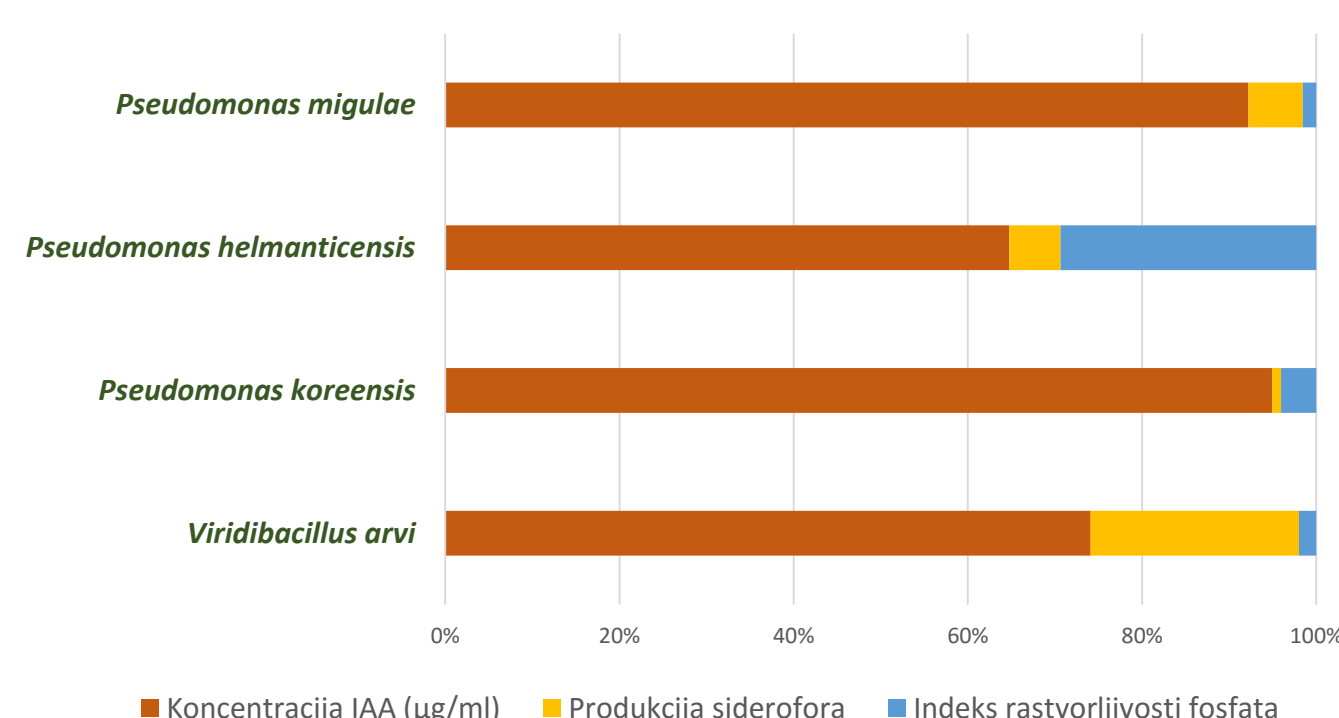
SIDEROPHORE PRODUCTION



PHOSPHATE SOLUBILIZATION



THE FOUR MOST PROMISING ISOLATES



Conclusions

- From sessile oak rhizosphere samples there has been isolated 179 bacteria, 75 of them being putative *Bacillus* and 48 putative *Pseudomonas* species.
- The four isolates, out of 179 isolated and investigated, were selected as potential sessile oak plant growth promoters for two of three tested PGP features, being *Viridibacillus arvi*, *Pseudomonas migulae*, *Pseudomonas koreensis* and *Pseudomonas helmanticensis*.
- Further research is needed to confirm the plant growth-promoting potential of the bacterial isolates *in vivo*.

