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A novel strain of *Pseudomonas fluorescens* WS1 Forms biofilm on root surface and enhances growth of wheat plant

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Various factors are known to influence the performance of bioinoculant under field conditions. It is believed that a strain capable of colonizing plant root and compete with native soil bacterial strains will be more effective in enhancing the plant growth consistently. Biofilm forming bacteria is expected to colonize better and can survive under stress condition. To test this hypothesis, a total of 36 strains of *Pseudomonas* sp. were isolated from rhizopsheric soil of wheat (*Triticum aestivum* L.) and subjected to plant growth promoting screening *in vitro*. Of these, 6 strains showed promising multiple desirable PGP traits. These strains were screened for biofilm formation *in vitro* and root colonization in sterile soil-plant system. Although all the 6 isolates exhibited multiple PGP traits but isolate WS1 was selected for further study based on strong biofilm forming capacity. The strain WS1 produced indole-3-acetic acid (31.08 µg ml^{-1}), solubilized phosphorus (412.60 µg ml^{-1}), siderophore (16.41 µg ml^{-1} salicylic acid and 11.71 µg ml^{-1} DHBA) and showed the production of 1-amino-cyclopropane-1-carboxylate (ACC) deaminase. Strain WS1 identified as *Pseudomonas fluorescens* based on biochemical and 16S rRNA gene sequence analysis. The crystal violet assay indicated that the strain WS1 formed strong biofilm on 96 well microtiter plate and glass coverslip. The biofilm formation by *Pseudomonas fluorescens* WS1 on plant root was visualized by scanning electron microscopy (SEM). The test strain colonized the roots efficiently and formed biofilm. Further inoculation with WS1 enhanced a significant increase in root length (41%), shoot length (45%), root and shoot dry weight (72 and 50% respectively) of wheat plant (var. PBW343) under pot experiments over the untreated control. The findings revealed that *Pseudomonas fluorescens* WS1 is an efficient root colonizer and could be exploited as bioinoculant for local use. Further investigation on role of biofilm on plant growth promotion under stress condition is to be evaluated.

Biography

Mohd. Musheer Altaf completed MPhil from Aligarh Muslim University and presently doing Ph.D. under the supervision of Dr. Iqbal Ahmad in the Department of Agricultural Microbiology, AMU, Aligarh. His main area of research is on biofilm formation by PGPR and its impact on plant health. Some of his work has been presented in conferences.

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Evaluation of per se performance of parents on grain yield and its component traits in rice (*Oryza sativa* L.)

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Selection of parents based on *per se* performance and *gca* effects is of great relevance in breeding programme, in the event of the characters being under the complicated genetic control such as epistasis and linkage. Evaluation of parents based on *per se performance* and *gca* effects separately might lead to contradiction in selection of promising parents since *per se performance* of parents was not always associated with high *gca* effects. Combination of both per se *performance* and *gca* effects would be able to identify parents with good reservoir of superior genes. So, the parents were evaluated for high *per se performance* as well as for high *gca* effects together. A Line × tester analysis in rice involving fourteen lines and four testers was undertaken with a view to estimate the per se *performance* and gca effects (seven quantitative and five qualitative). Based on *per se performance*, *gca* effects, the following parents *viz*., ACK 09009, IR 8, CO 43 and ASD 16 were identified as the best. Hence crosses involving the above parents would result in the identification of superior segregants with favourable genes for grain yield and component traits.

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