

## GROWTH IMPROVEMENT OF BANANA SEEDLINGS INOCULATED WITH *AZOSPIRILLUM*

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### Introduction

Banana plants have been observed to produce above-ground or aerial roots under waterlogged conditions. Growth of plant tops seemed to be physically retarded and physiologically inhibited. *Azospirillum*, an associative N<sub>2</sub>-fixing bacteria, has been shown to induce root hair formation in legumes, a possible requirement in overcoming water stress. A glass-house experiment was undertaken to observe the effects of *Azospirillum* inoculation on N<sub>2</sub> fixation, plant growth and biochemical processes, and alleviation of water stress in banana seedlings.

### Materials and Methods

Drained and undrained pots with Bungor Series soil (Typic Paleudult, pH 4.5) were used. Four treatment combinations were applied: (i) IFC: *Azospirillum* inoculation at field capacity; (ii) UFC: without *Azospirillum* at field capacity; (iii)

IF: *Azospirillum* inoculation under flooded condition; (iv) UF: without *Azospirillum* inoculation under flooded condition. Inoculation with four *Azospirillum* strains (UPMB12, 13, 14 and Sp7) was done on three occasions; at commencement and three days before and after commencement of water treatment (D<sub>-3</sub>, D<sub>0</sub>, D<sub>3</sub>). one banana plant cv. Berangan (tissue-cultured dessert banana) was planted per pot. Plant roots were soaked and washed clean of the nursery soil before planting them to reduce transplanting shock. Harvesting was done at 3.5 days interval from planting through D<sub>21</sub>

### Results and Discussion

Results showed that *Azospirillum* inoculation increased soil and plant P and K concentrations and the stomatal conductance, and lowered the proline concentrations in leaves. It also alleviated plant stress due to flooding. Flooding reduced leaf growth, leaf chlorophyll, new root formation, and lowered N and P uptake, and stomatal conductance.

### Conclusions

*Azospirillum* inoculation alleviated plant stress due to flooding by significantly contributing to higher plant and soil P and K, increasing the stomatal conductance and lowering the proline concentrations in banana leaves. Flooding inhibited growth by reducing leaf growth, leaf chlorophyll, new root formation, and lowering N and K uptake, and stomatal conductance.