

# SOILS 2003

## Towards Maximum Land Use and Productivity



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Zainol Eusof  
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MSSS is a professional body dedicated towards fostering the advancement  
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## THE INOCULATION EFFECTS OF AZOSPIRILLUM AND MYCORRHIZA ON THE GROWTH AND CANOPY ARCHITECTURE OF MAIZE (*ZEA MAYS* L.)

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Interactions between N<sub>2</sub>-fixing bacterium *Azospirillum brasilense* Sp7 and the Mycorrhiza fungi were studied in relation to their effects on the canopy architecture and growth of *Zea mays* L. The differences in the canopy architecture and growth of maize grown in pots and in the field were also examined. This study was divided into two parts. The first was the potted experiment, whereby maize plants were inoculated either with *Azospirillum brasilense* Sp7, Mycorrhiza fungi or both microorganisms together. The second part was the field experiment (without inoculation of any microorganisms) at Field No. 2, UPM. Field size was 18 by 18 m, with six plants per m<sup>2</sup> ground area. The maize growth parameters measured were the leaf area index, plant height, fresh and dry plant weight and root volume. The maize canopy architecture parameters measured were the leaf inclination density, leaf azimuth density and the extinction coefficient. Results showed that the inoculation effects on the maize growth by *Azospirillum* (A), Mycorrhiza (M), and both *Azospirillum* and Mycorrhiza (A+M) were significant at the 5% level of significance as compared to the growth of the non-inoculated (control) maize plants. Nonetheless, there were no significant differences at the 5% level of significance among the three inoculation treatments (A, M and A+M) on any of the maize growth parameters. As compared to the control, the inoculated maize plants had higher leaf area index by 40%, fresh plant weight by 31%, dry plant weight by 31%, and root volume by 37%. None of the four treatments (A, M, A+M and control), however, had a significant effect at the 5% level of significance on the maize canopy architecture. This showed that although inoculation with microorganisms improved maize growth, their effects on the maize canopy architecture were absent, and that there were no differences between the effects of *Azospirillum* and Mycorrhiza (or their combination) on the maize growth. Comparisons between the potted control experiment and field experiment showed that maize growth in the field experiment was higher than in the potted experiment. This was probably because of the limited soil volume and soil fertility in the potted experiment. The leaf azimuth orientation for the field experiment was arranged in perpendicular to the North-South planting row direction at the final growth stages, while the leaf azimuth orientation was randomly distributed (no preference to any direction) at the early growth stages. Leaf inclination density for both potted and field experiment were similar, where the maize leaves tended to shift from horizontally-inclined angles at the early growth stages to vertically-inclined angles at the late growth stages.