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## THE OPTIMAL GROWTH STAGE OF MAIZE FOR *Azospirillum argentinense* FOLIAR INOCULATION\*

García, Julia E.<sup>1</sup> - Zamora, Martín<sup>2</sup> - Giacobbe Boggio, Dalila<sup>3</sup> - Santella, Gisela<sup>3</sup> - Puente, Mariana L.<sup>1</sup>

1) Instituto Nacional de Tecnología Agropecuaria (INTA), Instituto de Microbiología y Zoología Agrícola, Hurlingham, Buenos Aires, Argentina.

2) Instituto Nacional de Tecnología Agropecuaria (INTA), Chacra Experimental integrada Barrow (INTA-MDA), Buenos Aires, Argentina.

3) Novozymes BioAg S.A., Parque Industrial Pilar, Buenos Aires, Argentina.

Contacto: [garcia.julia@inta.gob.ar](mailto:garcia.julia@inta.gob.ar)

*Azospirillum argentinense* is a plant growth-promoting rhizobacteria (PGPR) used as an active ingredient of microbial bioestiumlants for maize (*Zea mays* L.) mostly applied on seeds before sowing. Foliar inoculant spray could overcome the limitation of a potential incompatibility of the inoculants with pesticides also commonly used in seed treatments. This study aimed to determine the optimal growth stage of maize for foliar inoculation with *A. argentinense*. Experiments were initially conducted under greenhouse conditions and subsequently validated in the field. The treatments included a control non-inoculated group, seed inoculation, and leaf-sprayed inoculation at the V2-3 (2 or 3-leaf vegetative growth stage), at V4 and at V5-6 growth stages. *A. argentinense* Az39, the reference strain in Argentina, was evaluated in the greenhouse. In the field experiment, *A. argentinense* Az19, selected for its osmotic tolerance, was also included. In the greenhouse, a month-and-a-half-old plants grown in sterile substrate were harvested and aerial fresh and dry weights were measured (n=15 pots/treatment). In the field experiment, carried out in Barrow, southeast of Buenos Aires province (38°18'00" S, 60°13'59.88" W), the effect of the treatments on the grain yield was measured and the treatments were arranged in a randomized block design with four replications. The experimental units had dimensions of 2 m × 7 m. In both experiments, the dose of liquid inoculants (1 × 10<sup>9</sup> CFU/mL) were 12 mL/kg for seed inoculation and 1L/ha for spray inoculation (with a wetness volume of 100 L/ha). The data were analyzed by ANOVA and Duncan's Test. In the greenhouse, the higher response in the aerial dry weight was obtained with the foliar inoculation at V5-6 producing a significant increase of 43% compared to control plants. There was no significant effect on aerial fresh weight. In the field experiment, although all inoculated treatments produced higher yields compared to the control, the greatest increase was also achieved when it was applied at V5-6. This treatment was the only one that differed significantly from seed inoculation. The seed treatments increased by 3,5% the yield compared to the control, while foliar inoculation at V5-6 resulted in 9,5% increase (average of the 2 strains). Both strains did not differ significantly. In conclusion, under both greenhouse and field conditions, foliar spray at V5-6

was the optimal stage for maximizing the benefits of *A. argentinense* inoculation on vegetative growth and grain yield.

Palabras clave: *Azospirillum argentinense* - maize -foliar spray inoculation