Proceedings of the Joint Meeting AGI-SIBV-SIGA
Assisi, Italy – 19/22 September, 2011
ISBN **978-88-904570-2-9**

Poster Communication Abstract – 2C.15

EFFECT OF UREA ON GENE EXPRESSION AND ACTIVITY OF ENZYMES INVOLVED IN NITROGEN METABOLISM IN MAIZE SEEDLINGS

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Nitrogen metabolism, urea, nitrate reductase, glutamine sinthetase, Zea mays

Urea is one of the three forms widely used for nitrogen soil fertilization in agriculture. Even if urea in the soil is degraded to ammonium and CO_2, an appreciable amount could still be present and would represent an alternative source of nitrogen. Indeed, the transport of urea through the plasma membrane in *Arabidopsis* has been recently described (Kojima et al., *Plant Journal*, **52**, 30-40, 2007). Once urea enters the plant, it could follow two main pathways, being directly metabolized in the root or translocated to the epigeal part. Therefore, in this work we examined the effects of different form of nitrogen supply, including urea, on two enzymes of the soluble cellular fractions involved in nitrogen metabolism, namely nitrate reductase (NR) and glutamine synthetase (GS), in roots and leaves of maize. Five-day old seedlings were transferred for 24h in growing media under different nitrogen supply: control (no N); nitrate; nitrate+ammonium; urea; urea+nitrate. *Real time* RT-PCR experiments showed that expression levels of gene coding for NR2 and GS2 enzyme isoforms in roots were transiently induced by treatments with nitrate and urea+nitrate. Furthermore, root exposition to urea+nitrate showed higher transcripts levels and a faster response with respect to the sole nitrate treatment. The enzymatic activity of GS was not significantly modified, both in roots and leaves in all nitrogen supply treatments. Nevertheless, the activity of NR was increased in all nitrogen treatments, but not in the presence of urea, that was even lower than the control. Remarkably, after both 8 and 24h incubation, the plantlets showed a significant increase of NR activity in the samples grown in the presence of urea+nitrate. Results of the present work indicate that the contemporary supply of nitrate and urea to maize seedlings might favour nitrogen assimilation through an enhancement of gene transcription and activity of key enzymes.

Work supported by NORGEF project (Friuli Venezia Giulia, LR/26)