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Poster Abstract – F.16

FIELD EVALUATION OF *HighCaro*, A TRANSGENIC TOMATO LINE ACCUMULATING BETA-CAROTENE IN FRUITS

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An open field trial* was conducted on the transgenic HighCaro tomato line and control varieties in Metaponto (Basilicata Region, Italy) in 2004. HighCaro line was generated by transformation of tomato Red Setter cotiledons *via Agrobacterium* with a construct containing an expression cassette encoding for the tomato *lycopene beta-cyclase* cDNA driven by *CaMV 35S* promoter. Since T0 generation, the transgene was shown to induce a complete deregulation of chromoplast carotenoid pathway thus that transgenic plants produced singular orange tomatoes as result of almost complete conversion of lycopene into beta-carotene. Field testing was conducted with the aim of evaluating the stability of the transgenic trait and the production of T_6 homozygous HighCaro line in comparison to the Red Setter isogenic control variety and the Perfect Peel, a high productive commercial hybrid. A randomized complete block design (RCBD) was used with 12 replicates for each treatment. Each plot consisted of three double rows of 30 plants each. At maturity, the fruits of plants in the central rows were harvested. Yield production traits were recorded for each plants and a sample of fruits from each plot was used for HPLC analysis of carotenoids and for other laboratory determinations. Analysis of variance (ANOVA) was used to estimate treatment effects on all measured traits and mean comparisons were applied to test the statistical significance of differences. HighCaro line produced fruits containing on average 7.66 mg/g FW of beta-carotene while fruits of Red Setter and Perfect Peel lines contained 0.63 and 0.57 mg/g FW, respectively. As expected, the Perfect Peel hybrid displayed the best marketable yield production, 756,8 g per plant which was statistically different from that of Red Setter and HighCaro lines which were, respectively, 486.7 and 340.1 g per plant and resulted statistically not different between them. Altogether these results demonstrated the ability of the HighCaro genotype to convert lycopene into beta-carotene in open field condition confirming previous greenhouse observations.

This is the first report of an open field evaluation of a transgenic tomato engineered to modulate carotenoid accumulation using an endogenous gene.

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