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Oral Communication Abstract – PH.06

A NOVEL TOMATO GENOTYPE CONTRASTING THE GLOBAL WARMING: BREEDING AND MOLECULAR STRATEGIES TO IMPROVE TOLERANCE TO HIGH TEMPERATURES

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To face the challenge of global warming, the research in agriculture should focus on the selection of yield-stable crops, which exhibit adaptation to changing environmental condition. In this context, the H2020 TomGEM project aimed to identify tomato genotypes showing tolerance to high temperatures and constitute novel F1 hybrids maintaining good yield performances. Here, we reported the identification of a novel genotype (E42) selected from a collection of 80 tomato genotypes for its good yield stability index (YS) in different open-field trials. In addition, E42 was grown at Paiporta (Valencia, Spain) in glasshouse under three different temperature regimens: T1 (25°C/20°C day/night) T2 (30°C/25°C day/night) and T3 (35°C/30°C). The fruit set (FS) and fruit weight (FW) were evaluated and for both the analysed traits, E42 showed no statistical reduction in T2 temperature compared to T1, underlying a mild tolerance to heat stress. Since the promising results obtained from different experiments, the whole genome of E42 was re-sequenced and compared to the reference genome (version SL4.0). The prediction of missense variants in candidate genes involved in flowering and reproductive stages, heat tolerance and biotic resistance genes was carried out. This analysis allowed the identification of 15 heat stress-related, three and seven genes involved in resistance to biotic stress and reproductive stage, respectively other 25 polymorphic genes mapping in well-known QTL regions associated to flowering traits were detected. Finally, E42 was used as parental genotype for the constitution of different F1 hybrids combining quality and heat-tolerance traits. The four hybrids obtained were evaluated under high-temperatures in two years for the final yield (YP) and for qualitative traits. They showed positive heterotic effects for YP, in at least one year of evaluation. Therefore, further phenotypic investigations will be carried out on these hybrids to verify their stability in adversus climatic conditions.