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Poster Communication Abstract – 2.50

SEED GERMINATION IN THE GLOBAL WARMING ERA: STRATEGIES TO INVESTIGATE THE HEAT TOLERANCE IN TOMATO DURING GERMINATION STAGE

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Heat stress is a critical issue affecting crop growth worldwide, correlated with both global warming and climate change impacting on final crop yields. These effects will be even more dramatic in plants, such as tomato, that are usually cultivated in summer. Tomato (*Solanum lycopersicum* L.) is an important vegetable crop, susceptible to elevated temperatures. Indeed, significant fruit yield losses have been recorded under high temperature (HT) conditions leading to a strong decrease in growth revenue. Funded by the European Union Next-Generation EU (Piano Nazionale di Ripresa e Resilienza (PNRR) within the Agritech National Research Center, this research focuses on the phenotypic evaluation of the seed germination in control (25°C) and HT (35°C) conditions with the purpose to select tomato genotypes characterized by heat tolerance during seed germination, regarded as a critical stage. In particular, the seed germination of 100 genotypes selected in previous experiments, admixed for their background, introgressed genes and origin, was assayed. The experimental trial has been performed as follows: with the aid of two incubators maintaining fixed temperatures (25°C and 35°C for control and stressed condition, respectively). Each experiment was 12-day long and nine time points (t0-t8) were collected, considering the first three days as incubation time. Time courses of seed germination at the two temperature conditions were evaluated by estimating total germination rate (GR) and decreasing germination rate (DR) calculated as follow: GR = (n. seeds germinated at t8/n. total seeds)*100 and DR = (GR35°C/ GR25°C*100)-100, respectively. The results evidenced various trends among the genotypes, suggesting genetic variability exists for this trait in tomato. Thus, genotypes have different strategies to react to different germination temperature regimes. Moreover,

retrieving phenotypic data previously collected, regression analysis was carried out comparing fruit weight and fruit shape index with GR at different temperatures, but it did not reveal any correlation. Therefore, it was possible to select 32 genotypes with mild/strong heat tolerance based on a GR higher than 60% at 35°C and a not significant DR. In addition, in order to observe the seedling development, in-house pouches strategy has been set up by growing 10 seedlings germinated at 25°C under two temperature conditions (25°C as control and 32°C as stressed condition) in a grow-chamber with 16/8 hours day/night photoperiod. Further analyses will be carried out on adult plants in order to assess if early markers able to predict heat tolerance in the whole plant life cycle exist.