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EVALUATION OF TOMATO LANDRACES IN DIFFERENT ENVIRONMENTAL CONDITIONS UNDER HIGH TEMPERATURES

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Global warming is one of the most critical problems affecting agriculture in the 21th century. For this reason, the EU TomGEM project has the purpose to design new strategies in order to maintain high yields under harsh temperature conditions. Another aim is to study the genetic mechanisms controlling heat stress response in tomato. The present work aims to exploit the genetic variation of a tomato landrace collection evaluated under high temperatures. During the summer 2016 out of a collection of eighty landraces, ten genotypes were selected for better performances in terms of yield. During the summer 2017, the selected genotypes and four heat-tolerant genotypes were grown in four different experimental fields: 1) Giugliano I (Campania), in open fields at standard transplant time, 2) Giugliano II (Campania), in open field with one month transplant delay, 3) Battipaglia (Campania), under tunnel, 4) Andria (Puglia), in open field with one month transplant delay. Five phenotypic traits were evaluated: number of flowers *per* inflorescence, fruit set, fruit weight, number of fruits *per* plant and yield. A high variability was recorded for the phenotypic traits in the different fields. Around 60 percent of the genotypes grown in Giugliano I had the lowest values of fruit set percentage compared to the other three experimental fields ranging from 4 to 69 %, while in other fields the range varied from 21 to 76 %. Seventy-nine % of the genotypes showed higher yield in Andria compared to the other three fields in Campania with values ranging from 1.53 kg/plant to 5.67 kg/plant. Moreover, 21 % of genotypes showed better yield performance in Battipaglia. From this analysis the most stables genotypes in terms of yield were the determinate E42 and the indeterminate E36, with values above the population mean in three different experimental fields. E42 resulted to be the most productive genotype in Battipaglia with 10.58 kg/plant, whereas E36 the most productive one in Andria with 5.67 kg/plant.

In the future, different management practices in open fields will be performed on a group of selected genotypes to evaluate those allowing a higher stability under different environmental growing conditions. Finally, genotypic data deriving from a GBS analysis will be used to design molecular markers associated to the phenotypic traits analyzed. These molecular markers will be useful to select parents to obtain superior F_1 hybrids.