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Poster Communication Abstract – 4.07

EVALUATION OF RESISTANCE TO BROOMRAPES IN TOMATO INTROGRESSION LINES

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Phelipanche and Orobanche (commonly known as broomrapes) are obligate root parasites that constantly steal water and nutrients from the roots of the host plants as they are unable to carry out photosynthesis. Broomrapes pose a serious long-term threat to tomato cultivation as they reduce yield and fruit quality.

Different control methods - aimed at broomrape containment - have been proposed including chemical (herbicides or seed germination inhibitors), cultural (crop rotation, fertilization, introduction of inhibitory allelopathic species, or trap crops), and biological (fungi, bacteria, insects as biocontrol agents). As most of these approaches are not sufficiently effective alone, an additional control strategy to be used in combination with the previous ones is the development of resistant varieties through classical or innovative breeding strategies.

Within the cultivated tomato gene pool there are a few sources of resistance; however, some lines of evidence indicate that *Solanum pennellii* , a close wild relative of *S. lycopersicum*, is resistant. Indeed, *S. pennellii* does not release the classic tomato strigolactones in the root exudates, that are known to act as both germination stimulants and chemoattractants for broomrape seeds.We developed a reproducible protocol to collect and filter-sterilize the root exudates of seedlings of the available *S. pennellii* x *S. lycopersicum* introgression lines (ILs) and evaluated their ability to induce germination of *Phelipanche ramosa* seeds. We also developed a strategy to spot equal amounts of *P. ramosa* seeds in multi-well plates for efficient standardization of seed germination

experiments. The ratio of germinated seeds to total seeds 7 days after treatment with host root exudates was then used as an indicator of the resistance or susceptibility of each IL tested. The result of these experiments will allow us to identify the two most resistant and susceptible ILs to be used in dual RNA-sequencing experiments to simultaneously track gene expression changes in the selected tomato ILs and Orobanchaceae.