**INHERITABLE INDUCED RESILIENCE FOR CIRCULAR PLANT PRODUCTION SYSTEMS.**

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Circular production systems are associated with a higher risk of accumulating contaminants. Therefore innovative strategies are needed to significantly increase the resilience of these systems with a minimum input of water, nutrients and pesticides. Generating transient epigenetic phenotypes by treatments mimicking biotic changes in the environment of the parental plants could be one of the potential answer to this problematic. It is thus needed to investigate whether the phenomenon of epigenetic inheritance of resilience provides innovative, practical preventive tools that can be implemented relatively easily to obtain a clean, robust and resilient crop production. To explore this, inbred parental lines of two tomato cultivars (cv Moneyberg and cv Bolstar Granda) were primed (induced for resistance) during four different moments in their development, i.e. once in the vegetative phase, once in the generative phase at early flowering, multiple times in the generative phase during flowering, and once during ripening of the first fruit bunch. The primers were ß-aminobutyric acid (BABA), 2,6-dichloroisonicotinic acid (INA), methyljasmonate (MeJA), and water as control; they were selected for their ability to induce different plant resistance pathways. Parental plants were tested for the presence of induced resistance against a biotrophic fungus (powdery mildew), a necrotrophic fungus (Botrytis cinerea), a phloem sucker (whitefly), and a herbivore (thrips). In december 2018/january 2019 the ripe first fruit bunches were harvested. From these bunches the seeds were isolated, cleaned and dried. In 2019 germination studies were performed for all these seed batches. Seed batches derived from the parental cultivars primed were investigated by detached leaf bioassays for inherited induced resistance and for potential side effects on shoot growth. Finally using the seed batches, we looked at the effect of priming the tomato plants with those different chemicals on the plant genome methylation level.