S05-A Evaluating the effect of various bacterial consortia isolated from arid wild legumes on heat stress tolerance of *Pisum sativum*

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High-temperature stress affects the growth and developmental process of cool-season grain legumes. We hypothesized that endophytic bacteria associated with arid plants could be a potential resource to ensure the tolerance of cold-season legumes to high temperature stress events. To test our hypothesis, *Phyllobacterium salinitolerans* (PH), *Starkeya* sp. (ST) and *Pseudomonas turukhanskensis* (PS) endophytes of different spontaneous legumes localised in Tunisian arid regions were selected to evaluate their potential in improving *Pisum sativum* growth and pea-rhizobia symbiosis under a heat stress event. Three consortia (containing different combinations of endophytes) were used along with the pea microsymbiont *Rhizobium leguminosarum* 128C53 (WT) or with its Δ*acdS mutant* derivative (MT) (Ma et *al*., 2003). Uninoculated plants without or with nitrogen supplement were used as negative (NC) or positive controls (PC), respectively. The heat stress event was applied 2 weeks after sowing for a period of 2 weeks with consecutive cycles of 30-35°C/16h and 20°C/8h. Interestingly, the shoot dry weight (SDW) of all plants co-inoculated with WT and any of the consortia containing PH increased significantly compared to that of plants inoculated with WT alone. A similar effect was observed on the root dry weight (RDW) in the treatments WT+ST+PH and WT+PS+PH. On the other hand, the best results either in terms of SDW or RDW with the mutant strain was the treatment that included all endophytes (MT+ST+PS+PH), even overcoming all treatments inoculated with WT and equalling the PC. As expected, plants inoculated with the MT had a lower number of nodules (NN) compared to plants inoculated with WT, except for MT+ST+PS+PH with similar NN. A significant increase in the NN was observed in plants co-inoculated with WT+ST+PH and WT+PS+PH compared to those in WT. The highest total chlorophyll content was in WT+ST+PS, which was significantly different from all other treatments while no differences were observed in phenolic compounds content among the inoculated treatments. Overall, our results suggest that endophytic isolates from arid leguminous plants are good candidates for increasing the resilience of plants not adapted to heat stress.

References

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