Biology and Biochemistry

Invited Speaker 3

## Development of a viral vector to control TSWV in tomato plants

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*Tomato spotted wilt virus* (TSWV) is a virus that causes a disease of major concern in tomato plants all over the world. TSWV is responsible for extremely significant economic losses in this crop, which constitutes 72% of the value of fresh vegetables produced worldwide. So far, plant viral control strategies rely only on preventive sanitary measures or genetic resistance as antiviral products are not available for field use which turns essential the development of innovative and efficient means of control.

Viruses are responsible for several important plant diseases, however, they have also been used in biotechnology with different purposes. Virus induced gene silencing (VIGS) allows specific silencing of foreign genes that can be inserted in an optimized virus vector and then inoculated in plants. When a sequence of a viral gene is introduced in a VIGS vector, the plant infected with this vector will be signalized to target that foreign viral RNA. This will give to the plant a significant advantage in its protection against a possible infection of that virus. The VIGS approach provides the generation of rapid phenotype, no need for plant transformation and can be used for plant protection purposes, at a relatively low cost. Several plant viruses have been used as VIGS vectors however, their large genomes, their difficult manipulation and the reduced number of hosts they infect restrain their use as vectors. The Alphanecrovirus *Olive mild mosaic virus* (OMMV) has characteristics that place it as a very promising vector tool. Its small genome makes it easy to manipulate, in addition, it causes only mild systemic symptoms in a wide range of crops, which will facilitate their manipulation into symptomless constructs and allow its application to a high number of plants. To our knowledge no studies have been done so far concerning this matter using necroviruses.

This new virus-based vector for protection of tomato plants against TSWV through silencing, with no need of plant genome transformation, is being developed under the project TOMVIRPROTECT (ongoing, from October 2018 to October 2021) here presented, and where it is also intended to turn the vector available for the control of other important plant diseases.

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