



Blueberry
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FROM SCIENCE TO FORK
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Sant'Orsola
Piccoli produttori, grandi sapori.

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5] Current status of *Drosophila suzukii* management in Trentino (Italy), research achievements and perspectives for sustainable control

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Drosophila suzukii Matsumura (Diptera Drosophilidae) is an invasive alien insect in Europe that threatens many fruit crop production systems and has become nowadays the most important pest on blueberry. To tackle this new issue, we started an array of investigations aiming at unveiling the different aspects of the complex biology of the insect, assumed to be fundamental knowledge for developing alternative control methods.

Particular attention was devoted to elucidate the issues regarding winter diapause in *D. suzukii*. The integration of evidences from behaviour, morphology, and genetics increased our knowledge of *D. suzukii* overwinter diapause and highlighted the importance of early host plants and population bottleneck after diapause.

A survey to determine the presence, seasonal phenology and biological control status of indigenous parasitoid populations of *D. suzukii* was also carried out. Afterwards, the ability of the most effective pupal parasitoid, *Trichopria drosophilae*, to reduce early *D. suzukii* populations was assessed by means of augmentative releases with an area-wide approach. Results clearly showed a mitigation of the *D. suzukii* population in the treated areas, associated with a higher *T. drosophilae* parasitism.

The active daily and seasonal dispersal capacity at either orchard scale or wider territorial range was also investigated. Results clearly indicate both daily movement from the crop to the surrounding woody vegetation and seasonal long migrations along altitudinal gradients. Our data suggest that these migrations have multiple functions for *D. suzukii*, including conferring the ability to exploit gradual changes of temperature, food, and ovipositional resources, as well as assist in the search for suitable overwintering sites in late autumn.

These observations will help direct more optimal pest management for this pest and could help blueberry farmers and industries decide when, where and how to manage *D. suzukii* pest populations.

[17] The experience of Spotted Wing *Drosophila* (*Drosophila suzukii*) management in Trentino on berry fruits

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In Trentino region (Northern Italy), *Drosophila suzukii* was detected for the first time in September 2009. As a first reaction, our local cherry and soft fruit growers increased the use of registered insecticides, but even if they used to spray many times during the ripening period, the efficacy in the control of the infestations showed to be unsatisfying. The development of alternative control measures appeared urgent to ensure an economic future for the concerned local fruit industry. The contribution of the Edmund Mach Foundation on this already started in 2010, with the organization and management of a territorial monitoring. Data from the monitoring show an increasing demographic trend year after year, demonstrating that this small region of Italy and Europe is likely one of the most infested areas in the world.

The research and experimental activity at FEM concentrated also on the development of control strategies, their contribution to the control of the infestation, particularly if they are applied on an area as wide as possible, must be considered essential.

Some agronomical practices (e.g the use of a black mulching on the soil) tend to manipulate the plant growing habitat in order to create unsuitable conditions for the pest development. Sanitation and preventive measures (e.g short harvest intervals) may give a great contribution in the control of the infestation on their own.

The mass trapping technique, through the containment of the immigrating adult population in a crop during the ripening period and particularly in the case of a low-medium pest pressure, showed to improve the control with insecticides.

Several experiences with insect-proof nets proved that this is currently the most effective method to control the Spotted Wing *Drosophila* infestation on soft fruits. In Trentino, their use is particularly widespread in highbush blueberry production, where the possibility to avoid the use of nylon rain protection coverings limits the dangerous over-heating of the microclimate into the orchard and its side-effects on the crop.

Recently, research and experimentation at the Edmund Mach Foundation are particularly focused on the development and evaluation of new approaches, like the biological control (by means of augmentative releases of indigenous pupal parasitoids), the use of Attract and Kill (ATK) devices and the Sterile Insect Technique (SIT).

[18] Overview of blueberry diseases in Trentino

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Compared to other fruit crops, blueberry is affected by few widespread diseases. In facts, most diseases of this crop are reported in specific growing areas or occur occasionally. Nevertheless, during the years, some pathogens causing damages on blueberry have been identified in Trentino region. Among them, plant showing poor growth and blight were found in highbush blueberry (*Vaccinium corymbosum*) orchards. Symptomatic plants had rotted roots. Two *Armillaria* species (*A. gallica* and *A. mellea*) were identified as the causal agent of the disease. *Armillaria* spp. was identified on blueberry plants, on mulching barks spread on rows, on bark heaps and on fruit/forest trees at the field margins. Barks used as mulch and infected roots of old trees could therefore act as inoculum source of the pathogen. In semi-field trials, *Trichoderma* strains resulted the most effective biocontrol agents against *A. gallica* and *A. mellea*. In the same area, highbush blueberry and rabbiteye blueberry (*V. ashei*) plants showed symptoms associated to Blueberry Scorch Virus (BIScV). Symptomatic plants resulted positive to BIScV in specific DAS-ELISA. Molecular analysis of the coat protein coding region demonstrated that the virus strain identified in Trentino was different from the strain previously identified in Piedmont (North-west Italy) and similar to strains from Washington State (USA). Monitoring, control and prophylactic measures were carried out and to date the disease is under eradication. In the last years, wilting of highbush blueberry stems has been observed in some cultivation areas in Trentino. Brown discoloration of the wood and cankers were also observed. Fungi belonging to the family *Botryosphaeriaceae* were isolated from symptomatic stems. Further studies will be necessary to understand the biology and the epidemiology of these fungi and to find effective control methods.

[8P] Focus on the influence of substrate volume on development and the blueberry production in container

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The cultivation of the Highbush blueberry in Trentino normally takes place in the areas with favorable pedoclimatic characteristics.

In recent years there has been an interest in the production of blueberries also in areas that are unsuitable from the point of view of the lithological characteristics of the soils; in particular the pH that is too high for species with an optimal pH-range between 4.5-5.5.

The need therefore to carry out this experiment of soilless cultivation of Highbush blueberry to investigate whether productivity is maintained as in plants on the ground and if the size of the containers can have an impact on the final product. The first results show a positive correlation between the containers size and the vegetative-productive data.