

The results can be useful for both organic and conventional fruit and grapevine production and will be available at www.isip.de.

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The occurrence and management of *Drosophila suzukii* in Hubei Province, China

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Spotted wing drosophila (*Drosophila suzukii* Matsumura) is an economically important pest damaging to soft skinned berries and stone fruits over the world. In the past years, the population remained relatively low in the main production areas of cherries in Hubei province, China. However there were still several cases of outbreak reported, yet the main cause is still elusive. We monitored the population dynamics using sugar/vinegar liquid traps in cherry orchards and analyzed the relationship of population dynamics with climatic factors. The population dynamics showed very similar tendency between early and middle varieties which have approximately two weeks delay of fruit maturation without exhibiting an obvious correlation with the fruit maturation. The overall dynamics showed two peaks throughout the experimental season, which coincided with the phenology of cherry and neighbouring strawberry, suggesting a potential shift across host plants. The correlation analysis indicated that temperature is the main factor positively affecting the mean number of captured flies whilst precipitation strongly negatively influenced them. The results suggest that the *D. suzukii* population fluctuation was significantly associated with host phenology and climate. Over past years, demonstration blocks were established nationwide under the support of the National Agro-Tech Extension and Service Centre. The various control strategies were integrated to fight against *D. suzukii* including (a) attracting and killing strategies – sugar/vinegar liquid together with sticky traps with different shapes and colors, (b) cultural control – habitats/orchards sanitation, deep plowing or rotary tillage, (c) recommended chemical spray in the case of outbreaks. In addition, strategic research such as gene mining and candidate selection targeting reproductive processes to facilitate SIT were carried out in the laboratory to support the pest control. Those inputs aim to provide the theoretical basis and develop effective and sustainable suppression approaches against *D. suzukii* in the long run.

Assessment of mortality factors for *Drosophila suzukii* in Switzerland

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A life table study for *Drosophila suzukii* was conducted under semi-natural condition at a forest site in Delémont, Switzer-

land. The aim of the study was to examine mortality factors of all developmental stages, such as natural mortality, predation and parasitism. Fruits infested with eggs, L1/L2, and L3 were exposed over a short period of time using potted blueberry plants (*Vaccinium corymbosum*). Groups of pupae were exposed on the ground underneath the bushes. These were then collected for examination and rearing in the laboratory, to quantify mortality factors in the different developmental stages. For each exposure period, controls consisted of non-attacked fruits and fruits attacked by *D. suzukii* kept in screened cages. To estimate the generational mortality of *D. suzukii* in Switzerland, life tables were constructed using the data from the exposure experiments and following the methods described by Bellows et al. (1992). For the egg and L1/L2 stages, mortality was not much different if they were caged or not (respectively 36.05% and 31.25% for the egg stage and 60.64% and 62.43% for the L1 stage). For the L3's, exposed larvae were more attacked (76.12%) than the caged ones (63.75%). The same tendency was observed for pupae in the soil (25.63% for the non-caged and 18.67% for the caged ones). Based on these mortality rates, the total generational mortality was 95.57%, which provided a realistic R0 of 4.7. This mortality cannot be explained by parasitoids because none of them emerged from the larvae and pupae exposed. Mortality was only caused by two parameters here: predation or abiotic mortality. Mortality in the larval and pupal stage could be increased by introducing classical biological control agents from Asia, such as larval parasitoids in the genus *Ganaspis*, or using native pupal parasitoids (e.g. *Trichopria drosophilae*) for inundative biological control. To drop the population growth below 1 (= declining populations), 30% larval parasitism would be necessary (R0 = 0.92), whereas increasing pupal parasitism to 30% would had a much lower effect on the fly populations (R0 = 2.8).

Natural Enemies of *Drosophila suzukii* in Yunnan Province

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Drosophila suzukii is one of the most important pests of many fruit crops. It has a wide variety of natural host plants. Current control measures for *D. suzukii* depend on pesticides to great extent. Biological control using parasitoids plays an important role in population regulation of *D. suzukii*. The objective of our study was investigating the parasitic natural enemy species of *D. suzukii* and studying their biological characteristics in Yunnan Province. More than 45 plant species were collected from 23 sampling sites in Yunnan province, among them there were 15 host plant species of *D. suzukii*. There were four parasitic wasp species in Yunnan province, namely *Ganaspis brasiliensis*, *Leptopilina japonica*, *Trichopria drosophilae*, and *Pachycrepoideus vindemmiae*, which emerged from five host plants. The species, populations and parasitism rates by the parasitic wasps varied with different sites and host plant species as well as with the same plant species at different sites. The highest rate of natural parasitism was 38.5 % in a *Myrica rubra* orchard. *G. brasiliensis* occurred in four generations in a year, the female population was higher than male (sex ratio ♀:♂ = 2:1). This parasitoid parasitized 2nd larval instar of *D. suzukii*. Its average lifetime was about 49 days and the duration from egg to adult emergence was about 29 days. The peak period of oviposition was from the 7th to the 22nd day after emergence of females.