

## Quality Control of native pupal parasitoids against *Drosophila suzukii*

Martin, Jakob; Herz, Annette

Julius Kühn Institute (JKI) – Federal Research Centre for Cultivated Plants, Institute for Biological Control, Dossenheim, Germany.

Email of corresponding author: jakob.martin@julius-kuehn.de

*Drosophila suzukii* Matsumura (Diptera: Drosophilidae) is a pest of fruit and berries, which has spread in the northern hemisphere in recent decades. It was first recorded in Germany in 2011. Unlike most other Drosophilids, the serrated ovipositor allows *D. suzukii* to oviposit underneath the skin of ripening and undamaged fruit. Larval feeding and secondary damage leads to the collapse of the fruit, rendering it unmarketable and creating considerable economic damage. The attack of undamaged fruit and the concealed life of the larva complicate pest control, and effective means of biological control to regulate *D. suzukii* do not exist yet. In its native range, *D. suzukii* is predominantly attacked by the cosmopolitan pupal parasitoids *Trichopria drosophilae* Perkins (Hymenoptera: Diapriidae) and *Pachycrepoideus vindemmiae* Rondani (Hymenoptera: Pteromalidae), as well as larval parasitoids. Both species are present in Germany, and European populations have shown to successfully parasitize *D. suzukii*. Within the project “ParaDrosu”, a practical strategy for the usage of native pupal parasitoids to control *D. suzukii* in protected berry cultures is being developed, in collaboration with a producer for beneficial insects.

An important criteria for the success of augmentative releases is the quality of the released animals. The “IOBC Quality Control Guidelines for natural enemies” contain standardized methods to assess the quality of 18 species(-groups), among which are ten parasitoids. However, as the guidelines were last updated several years before the invasion of *D. suzukii*, they subsequently do not include its antagonists. Typical parameters for quality control of parasitoids include the quantity and ratio of live animals after shipping, the sex ratio, fecundity and longevity, furthermore, the testing frequency and sample size for each parameter is set. These tests need to be performed under species-specific standardized conditions. Maximum mortality is not always defined in the IOBC guidelines, but if so, it is  $\leq 10\%$ . The minimum ratio of female parasitoids is mostly given at 45% or 50% – an appropriate ratio for *T. drosophilae* and *P. vindemmiae* needs to be set. Longevity of females of both species is expected to be higher than a week after shipping. To test the fecundity, 30 single mated females need to be exposed for 24 h to a surplus of fresh host pupae under suitable conditions. For now, it is necessary to determine the fecundity over several days; data from mass-reared insects of the project partner, which were provided in summer of 2022, could help slim down the testing procedure and link it to other fitness parameters.

The project is supported by funds of the Federal Ministry of Food and Agriculture (BMEL) based on a decision of the Parliament of the Federal Republic of Germany via the Federal Office for Agriculture and Food (BLE) under the innovation support programme (FKZ 2818805A19).