and 'Polka' showed an infestation rate of 2.9 larvae per fruit and female. Here, the infestation rate was significantly higher compared to the cultivars 'Autumn Best' and 'Aroma Queen'. However, these results were received from annual data and further research is needed. The evaluation of existing genetic resources is the first step of the identification of possible donors for further breeding purposes.

Natural compounds and their effect against *Drosophila suzukii*

Annette Reineke, Melanie Dahlmann
Hochschule Geisenheim University, Department of Crop Protection, Von-Lade-Str. 1, 65366 Geisenheim, Germany

The recent worldwide spread as well as the polyphagous nature of the Spotted Wing Drosophila *Drosophila suzukii* Matsumura (Diptera: Drosophilidae) calls for efficient and selective control strategies. The use of insecticides is one option for management of this invasive pest insect. However, problems associated with the application of insecticides on ripening fruits include the consideration of preharvest intervals and pesticide residue levels as well as an exposure of nontarget organisms present on fruits. Biopesticides based on natural plant extracts offer an alternative to synthetic insecticides. Here, we report on laboratory bioassays using three different types of substrates allowing a thorough screening of four biopesticides (NeemAzal-T/S: a.i. azadirachtin; SpinTor: a.i. spinosad; Spruzit: a.i. pyrethrine; Piretro Verde: a.i. pyrethrine) and one synthetic insecticide (Mospilan, a.i. acetamiprid) for their effects against *D. suzukii* eggs, larvae and adults. An application of all products except for NeemAzal-T/S on water-apple juice agar before oviposition significantly reduced the number of eggs laid since adults died within the first 24 h after contact with the treated medium. A similar effect was visible if grape berries were treated with the products SpinTor and Mospilan. NeemAzal-T/S significantly reduced the number of larvae hatching out of eggs. Treatment of apple-nutrition medium after oviposition significantly reduced the number of individuals reaching the adult stage for all insecticides except for Spruzit. Moreover, the use of biopesticides in an attract-and-kill strategy is currently assessed in different set-ups. One option is an application of the biopesticide as small droplets onto leaves with the aim of adult feeding and an accordingly lower female fertility. A second option are traps containing a substrate for egg deposition, the biopesticide and an attractant. First results show that trap design matters and point to various avenues for the design of attract-and-kill strategies.

Sterile Insect Technique for *Drosophila suzukii*

Marc F. Schetelig, Jonas Schwirz, Ying Yan, Predrag Kalajdzic, Sabine Otto
Justus-Liebig-University Gießen, Institute for Insect Biotechnology, Gießen, Germany
Fraunhofer IME, Gießen, Germany

The Spotted Wing Drosophila or cherry vinegar fly (*Drosophila suzukii*) is native to Asia but has invaded other continents since 2008 and has spread throughout Europe. The females have a serrated ovipositor allowing them to penetrate the skins of intact ripening fruits to deposit their eggs, and the developing larvae rapidly destroy the fruits close to harvest. *D. suzukii* has a rapid life cycle and the larvae develop well beneath the fruit surface. This means that the use of pesticides is problematic and often not effective, first due to their restricted use close to harvest to protect consumers, and second because the larvae are deep enough inside the fruit to avoid contact. There are currently no cost-effective and environmentally sustainable pest control methods for this species available, resulting in extensive damage to fruit crops. The potential of new technologies as a basis for the urgently needed specific and long-term control of this species should be considered. In this respect, molecular technologies for eco-friendly control of agricultural pests have been developed for other species already and can be transferred to *D. suzukii*. Different technologies, from the development of transgenic conditional lethal systems to new genome editing methods like CRISPR/Cas, are compared and benefits and risks discussed.

Low temperature survival of German populations of *D. suzukii* in relation to food availability and *Wolbachia* infection

Wolfgang Jarausch[1], M. Runne[1], Barbara Jarausch[2]
[1] RLP AgroScience, Neustadt/W.
[2] Julius Kühn-Institut Siebeldingen

Drosophila suzukii was first recorded in Southern Germany in 2011, including the viticultural area of Palatinate in the Southwest of Germany. Since 2012, regular monitoring is carried out at Neustadt/W., located within this region. Overwintering was studied at a hot-spot site in the following winters of 2013/2014, 2014/2015, 2015/2016 and 2016/2017. The results showed that overwintering does not take place in human shelters or in the ground. Active flies are readily captured when temperatures rise above 8°C during day and it is assumed that they hide on conifer trees. This way, they were able to survive conditions of −10°C and up to 11 ice days within a winter period. Males and females overwinter equally well. Therefore, we addressed the questions in laboratory trials whether German populations adapted to colder climates and whether sex or food supply have a major impact. For this we worked with two different populations: one old "laboratory" line (KEF4W) established in 2013 and one recent line (KEF8) established from the hot spot site just before starting the trials. PCR testing showed that KEF4W individuals where 100% infected with *Wolbachia* whereas all tested KEF8 individuals were negative. Flies were caged individually or in groups of 5 in 50 ml culture tubes. They did not survive without food supply for longer than 6 days at 10°C. However, on artificial diet they survived for more than 260 days at 10°C without loss. Therefore, all further experiments were carried out with food supply. At 3°C at constant darkness flies were still able to feed and survived more than 100 days (lethal time 80). Chill coma was observed at temperatures below 1°C and flies were no longer able to feed. At constant 0.5°C and −1°C maximum survival dropped to 20–25 days. Whereas cold hardened flies (1 week at 10°C) were still regarded as summer morphs, we also induced winter morphs experimentally by letting them develop entirely at 10°C. These winter morphs survived longer at −5°C (up to 6 days) than summer morphs. In conclusion, we observed neither a difference between *D. suzukii* populations nor an influence of *Wolbachia* on cold tolerance. At temperatures below 0°C females survived longer than males and winter morphs longer than summer morphs.