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ABSTRACTS



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Oral Presentations

Drosophila Suzukii I

O DSU I-3

Mating behaviour in spotted wing Drosophila species - example of coordination between visual and acoustic stimuli

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Understanding the mating behaviour of an insect pest is an important condition for developing successful control strategies. In *Drosophila suzukii*, like in most other Drosophila, males produce several types of acoustic signals to facilitate female's mating acceptance; some of these signals are substrate-borne and are produced by abdominal vibrations. Compared to the common model *D. melanogaster*, the *suzukii* subgroup, is further characterised by the emission of a specific vibration, the so called "toot" signals, which is characterized by an harmonic frequency structure. This peculiar signal is associated with wing movements and thus is likely produced in the thorax, rather than in the abdomen like all other acoustic signals. In this work we tested whether the "toot" signal is a specific characteristic of the *D. suzukii* group, and if it co-evolved with another key sexual character, the presence of spots on wings. To test this hypothesis we studied the courtship strategy and associated acoustic signals in several members of the melanogaster group, by carefully comparing the behaviour of spotted wings species (*D. suzukii*, *D. subpulchrella*, *D. biarmipes*, *D. elegans*) with the behaviour of unspotted species (*D. takahashi*, *D. melanogaster*).

Our results show that all species characterised by spotted wings, including *D. elegans* which does not belong to the *suzukii* subgroup, can produce a toot signal. Conversely, the "toot" signal was never recorded from unspotted wing species. During courtship, spotted wing males combine wing exposure with sound emission so that visual and acoustic cues work together to increase female acceptance. Only in one case (*D. biarmipes*), wing exposure and "toot" emission appeared completely unrelated.

This study advances our understanding of the toot signal in Drosophila and indicates that the "toot" signal is not a clade-specific feature, but rather an ancient Drosophila character associated with the presence of spots on wings.

O DSU I-4

Rapid spread of the invasive Spotted Wing Drosophila through Germany, its seasonal phenology and research approaches for managing the pest

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Introduction: Since its first record in Germany in 2011 the invasive Spotted Wing Drosophila (SWD), *Drosophila suzukii* (Diptera, Drosophilidae), spread rapidly through the country which resulted in high levels of fruit crop damage. As it oviposits in healthy, ripening and ripe fruits close to harvest, controlling the pest is extremely difficult.

Objectives: We tried to develop sustainable strategies to control the populations of SWD by identifying habitats during winter and spring, when the number of individuals is lowered. Research on food resources at this period of the year and on olfactory cues, used to orientate in the environment, are being explored to identify overwintering sites. This should lead to selective control strategies.

Material and methods: We determined the occurrence of SWD at landscape level and its re-immigration into fruit crops in spring by monitoring traps all year round. At locations with high captures at winter onset soil emergence traps were placed to check for survival rates. Moreover, we investigated food resources used during winter and spring by classical ecological and molecular methods. We tested, if odors of potential host plants or food resources were used for olfactory orientation by SWD in a Y-shaped olfactometer.

Results: In fall to early winter, trap captures in orchards decreased while they increased in forests and forest edges. Significantly higher numbers of SWD were caught in forest tree crowns compared to lower heights. In lab tests, flies survived several days when feeding on mistletoe berries. We succeeded in detecting chloroplast DNA using general plant primers in the digestive tract of field-caught SWD and started to establish olfactory studies.

Conclusion: Different trap captures in orchards, forests and forest edges during fall and early winter demonstrate the migration behavior of adult SWD searching for sheltered overwintering sites. During a mild winter, continuous captures in forest traps indicate the activity of SWD. We made progress in detecting food resources during winter and spring as well as in establishing olfactory studies. This knowledge will significantly contribute to the development of new control strategies.