

Cage the fly: Walk-in field cages to assess mating compatibility in pest fruit flies

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Female fruit fly, *Anastrepha fraterculus*, over an artificial lek. Credit: M. Laura Juterez et al.

Fruit flies mating compatibility studies have been examined by an international team of researchers to assess the usefulness of walk-in field cages in studying the sexual behavior within fruit fly species complexes and recognition of taxonomically misplaced flies. In addition, they have also evaluated the relevant chemical signals during pheromone emission for species discrimination. The experimental part was conducted with the support of Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture in Seibersdorf, Austria. Their findings are published in the open-access journal *ZooKeys*.

Evolution has led to divergence in some groups, which sometimes results in new, yet very similar species. Hence, they might successfully confuse taxonomists, making them coin terms like 'cryptic' species, or in other words, distinct species misplaced under the same name.

However, these species are kept isolated from each other via reproductive barriers. Preventing interbreeding and hybridization, they can be ecological and mechanical, but also behavioral (i.e. sexual). The latter are behaviors or signals that affect recognition within a species, as well as attractiveness and mate choice. They affect their evolution and therefore, are key elements in species differentiation.

The authors of the present paper have found that the walk-in field cages methodology provides an appropriate ground to study these issues. By applying it, researchers around the world are able to detect pest species among others when occurring in the same populations.

Apart from taxonomic value, the scientists also point out the significance of these findings to pest management. As the studied pest fruit fly species are agricultural pests of major economic importance, assessing their mating behaviour, including the pheromones the males emit when

attracting partners, can be utilised in the development of highly specific control methods. For instance, there is the [sterile insect technique](#) that involves releasing males reproductively sterilised via ionizing radiation into a wild population, where they inseminate the pest females with sterile sperm so that they end up with unviable offspring.



A walk-in field cage set up to evaluate female response to male pheromone, presenting an artificial lek hanging from a host tree. Credit: M. Laura Juterez et al.

The main advantage of using walk-in field cages, rather than small laboratory-based ones, is that they provide semi-natural conditions under which they are "reliable and powerful tools to measure the level of mating compatibility among different species and populations of a putative single species."

However, the present paper highlights that such an approach is only to be applied as a part of integrative taxonomic analyses, together with molecular, physiological and morphological approaches when assessing to which [species](#) a particular pest population belongs.

More information: María Laura Juárez et al. Evaluating mating compatibility within fruit fly cryptic species complexes and the potential role of sex pheromones in pre-mating isolation, *ZooKeys* (2015). [DOI: 10.3897/zookeys.540.6133](https://doi.org/10.3897/zookeys.540.6133)

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