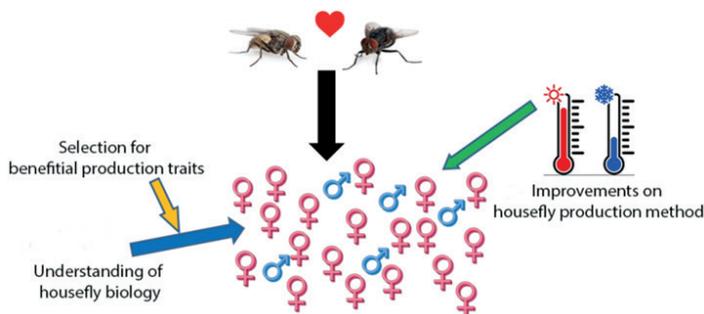


Insects to feed the world: exploring the life-history traits and optimizing the conditions for mass rearing of houseflies

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The European insect sector is an emerging industry which concentrates innovation efforts for insect production at a large scale. Insects pose a viable and sustainable alternative to conventional meat products, while contributing to a circular economy by transferring low value organic side streams into high value protein products. In this

regard, housefly (*Musca domestica*) larvae are considered a future protein source for diets of production animals, and bio-waste converters. Indeed, the housefly is one of the most proliferous insect species and can be cultured at industrial scale throughout the year. Still, industrialization of housefly faces numerous challenges and both fundamental (understanding of housefly biology) and applied (improvements on housefly production method) research are needed.

In a mass-rearing system, high numbers of flies are needed to produce the volume of eggs required. However, it is likely that mass-rearing conditions constitute a form of stress, which could have a detrimental effect on insect reproduction and fecundity. Except rearing at a high density, additional factors including environmental temperature, quality and quantity of diet, mating, oviposition substrate and genetic properties of the housefly strain affect the number of eggs a female can oviposit. Moreover, it was demonstrated that fecundity is strongly correlated to female body size under favourable laboratory conditions. In order to develop an effective technique for producing large numbers of houseflies, factors previously shown to influence egg production should be reassessed and the selection on beneficial production traits should be performed.

This project aims to contribute to improvements of the conditions (temperature, density, sex ratio, diet) under which house fly adults should be maintained in order to increase the effectiveness of the rearing process. We will also incorporate measurements of life cycle and life history parameters relevant for mass rearing.

Methods: Housefly culturing and handling, artificial selection, geometric morphometrics, statistical analyses.

Starting date: open