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## **INVESTIGATING HOUSEFLY BIOLOGY TO FOSTER CIRCULAR ECONOMY**

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Commercial livestock (cattle, pigs, and poultry) consume 1466 million tons of feed protein annually, of which 53% is imported in the EU. In the Netherlands, 69 million tons of manure are produced, which need to be managed. This is an impelling, and often costly, task for farmers. Additionally, nutrients from this manure can leach into the soil and negatively affect its quality.

The common housefly (*Musca domestica*) is often seen as a pest in livestock rearing facilities: a nuisance for animals and a vector of diseases. However, housefly larvae are adapted to grow in decomposing, microbe-rich environments and can efficiently convert animal manure to valuable protein and lipids.

Our consortium addresses the development of circularity by harnessing housefly biology to convert manure to valuable proteins for livestock feed. Funded by NWO under the 'Transition towards a circular economy', we investigate how manure conversion by housefly larvae can be improved and scaled up to an industrial level. Our consortium consists of three academic research groups (Groningen, Amsterdam and Wageningen) and a private company (AMUSCA BV). The academic groups investigate various aspects of housefly biology. These include adult and larval life-history traits (e.g., sex ratio, size, fat content, growth), the optimization of manure as housefly larvae diet, and genetic selection of housefly strains with reduced fat content. The private company developed the first fully-automated prototype for the large-scale rearing of houseflies and production of larvae.

Our work should be considered as proof of principle as, to date, the European Union legislative framework does not allow the utilization of insect larvae reared on chicken manure as feed for animals.

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*Keywords:*