Dose-response effects of starch in chicken excreta on *Musca domestica* larval performance and bioconversion efficiency

L.W. Pisa, D.G.A.B. Oonincx, G. Bosch and W.H. Hendriks
Wageningen University and Research, Animal Nutrition Group, De Elst 1 building 122, 6708 WD Wageningen, the Netherlands; lennard.pisa@wur.nl

Housefly (*Musca domestica* L.) larvae can convert animal manures into valuable protein and fat. Bioconversion of manure might be limited by energy available to the larvae or microbiota present in the manure. In this study we assessed the effects of differential starch content in unsterilised (UE) and heat sterilised chicken excreta (SE) on larval performance and bioconversion. Gelatinised corn starch was added to excreta to construct substrates with 0 to 50% starch based on total substrate dry mass with 3 replicates per dose. Substrates were inoculated with housefly eggs (8/g wet substrate) and larvae harvested by floatation after 5 days. Individual larva wet mass (n=30 /replicate) increased from 12±0.2 (UE) and 13±0.4 (SE) mg at 0% starch up to 18±0.4 (UE) and 18±0.5 (SE) mg at 15% starch and decreased to 5±0.4 (UE and SE) mg in 50% starch. The decrease at higher starch content was faster in UE than in SE. Highest total larva wet yield in UE was 39±2.3 g at 10% starch, 43±2.8 in SE at 15% starch, decreasing to a minimum of 3±1.5 g (UE) and 4±1.3 g (SE) in 50% starch. The decrease in yield was faster in UE compared to SE. Larval survival was highest in 0% starch, 80±8% (UE) and 72±13% (SE), decreasing gradually to 14±7% (UE) and 18±3% (SE) in 50% starch. Dry matter bioconversion increased from 4±0.1% (UE) and 4±0.3% (SE) in 0% starch to 6±0.2 in UE with 10% starch and 7±0.3 in SE with 15% starch, with minima of 0.2±0.0% (UE) and 0.6±0.2% (SE) in 50% starch. The highest nitrogen bioconversion was 15±0.5% in UE with 10% starch and 15±0.5% in SE with 15% starch, decreasing with higher starch content. These optimal starch inclusions to UE and SE increased nitrogen bioconversion with 40 and 100% respectively, compared to pure excreta. This indicates that adding easily digestible energy to chicken excreta can substantially increase larval yield and nitrogen bioconversion.

Adventurous or conservative: inbreeding or outbreeding preference and its consequences for *Tenebrio molitor*

D. Deruytter[1], C. Adamaki-Sotiraki[2], C.L. Coudron[1], C. Rumbos[2] and C. Athanassiou[2]
[1]Inagro, Insect Research Centre, Ieperseweg 87, 8800, Belgium, [2]University of Thessaly, Department of Agriculture, Crop Production and Rural Environment, Phytokou, 38446 Volos, Greece; david.deruytter@inagro.be

The potential for artificial selection with insects for food and feed is a massive but largely unexplored territory. Most of the work on genetics and selection has been done on laboratory model species like Drosophila melanogaster. Although this research vastly increased our basic knowledge on insect genetics and physiology, it is rarely studied with the explicit aim of improving the economic potential. For two species, the honey bee and silk moth, both academical and industrial research has been done to significantly improve the species towards a higher production of respectively honey and silk. In this study we used *Tenebrio molitor* as a model species for insects for food and feed. We assessed the growth speed, maximum size and reproductive potential of 4 potentially inbred parental strains (bred for >10 years without outside interference) and their hybrid offspring by mixing two parental populations (6 hybrid strains) on a pilot scale. The hybrids were created by mixing pupae of equal age from the different pure strains. However, because of the at random mixing, we first assessed the preference for in or out-breeding of the emerging beetles from the different strains. This was done by presenting either a two week old virgin male or female simultaneously with two virgin beetles of the opposite sex from the same strain or another strain. The initial results indicate that different strains have extremely wide different preferences and there are variations between the males and female choices, as some were more 'conservative' than others. As a result, the percentage of hybrids when two strains are mixed randomly may be different compared to true 'at random' copulation. This may therefore influence potential future genetic experiments and programs relying on mass hybridisation.