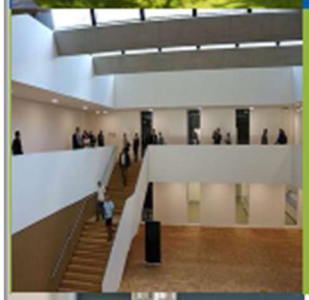

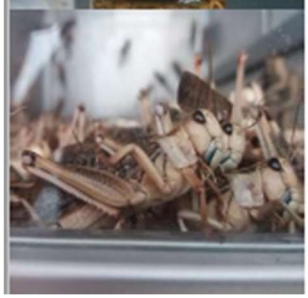

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INSECTA 2024

International Conference

Book of Abstracts

14th – 16th May 2024
Potsdam, Germany

INSECTA 2024

Bornimer Agrartechnische Berichte
Heft 108
Potsdam 2024

Assessing amino acid requirements of neonate larvae of the black soldier fly, *Hermetia illucens*

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Dietary requirements of amino acids (AA) in black soldier fly larvae (BSFL), particularly during the neonatal phase, remain poorly investigated. Our targeted feeding trial consisted of a semi-artificial low-protein nursery diet (NC) to which 20 free AA were added to obtain a diet with 18% protein content (PC) that simulated the AA profile of a commercial feed for laying hens (RC). In addition to these three control diets, contents of six AA, i.e. Lys, Met, Thr, Arg, Ile, or Trp, were individually varied by either omitting or doubling respective supplementations of free AA, resulting in a reduction or excess of 31 to 46% relative to their levels in PC and RC (-AA and +AA treatments, respectively). Per triplicate tray of each treatment 10,000 freshly hatched sober neonates were provisioned with 10 mg dietary dry matter per BSFL.

Growth rate was most compromised in NC and -Lys treatments. While -Met and -Trp growth curves were similar to that of PC, responses for -Arg, -Ile and -Thr were intermediate between PC and NC. Surplus levels of Met, Thr, Trp, and Ile did not improve performance over PC, but +Lys and +Arg both speeded up growth translating into premature achievement of the fattening status that is reached around 10 mg larval live weight. Notably, BSFL of each -AA treatment took 1-5 days longer to achieve the fattening status than their +AA counterparts. Referring to the effectively used dietary baseline our inferences are i) Lys is first limiting in NC, ii) Arg, Ile and Thr co-limit growth, and iii) Met and Trp do not seem to limit growth in neonate BSFL. Interestingly, despite strong treatment effects on temporal growth dynamics, all treatments finally reached the fattening status with largely invariable total BSFL biomass. Survival was not affected and showed similarly high rates across treatments (>90% on average), thus allowing overall comparisons of rations, except for RC which induced substantially higher mortality.