



Tropentag, September 20-22, 2017, Bonn

“Future Agriculture:
Socio-ecological transitions and bio-cultural shifts”

Development of a Semi-Synthetic Diet for Mass Production of the Edible Desert Locust *Schistocerca gregaria* Forskål (Orthoptera: Acrididae)

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Abstract

Due to a fast-growing world population, demand for food, especially high quality protein is increasing drastically. Insects as human food and feed supplements for animals is emerging as a potential option. Desert locust, *Schistocerca gregaria* Forskål is one among the edible insects considered. Currently communities consume desert locusts when they swarm. Mass-rearing protocols for desert locust under laboratory conditions, based on natural or half-synthetic diets such as wheat seedlings or fresh grass are widely available. However this requires constant supply of these substrates which makes the systems more sensitive to fluctuations. Hence there is a need to standardise alternative, storable food substrates that are readily available. In this regard, the effects of different, dried and therefore storable feeding substrates on growth and development of the desert locust was assessed. Five different formulations of feeding substrates were used in the study: Feed A: cornmeal: cowpea leaf powder (50:50); Feed B: corn stover powder: soybean powder (50:50); Feed C: cornmeal: Cowpea leaf powder: carrot powder (40:40:20), supplemented with multivitamins; Feed D: Corn stover powder: soybean powder: carrot powder (40:40:20), supplemented with multivitamins; Feed E: Cowpea leaf powder: Soybean powder: Carrot powder (40:40:20), supplemented with multivitamins. Increase in biomass of locust was monitored at 3 days' interval. Although all animals started to feed on all diets, diet B ended up in complete mortality until day 14. With diet C only a few animals survived until the end of the study with low individual weight gain. Diet A resulted in good individual body weight gain, however associated with high varying survival rates, up to complete mortality within individual cages. Diet D and E performed well with diet D being superior compared to all other diets regarding feed consumption, individual body weight gain, development rate and survival rate. Hence, a protein rich diet comprising of soybean and cowpea leaf powder, supplemented with carrot powder and a source of multivitamins proved to be an effective storable food substrate for locust rearing. We anticipate that these findings will lead to further efforts to refining mass rearing protocols for locust.

Keywords: Feeding substrates, locusts, nutrition