Growth, survival and nutritional composition of the edible long-horned Grasshopper *Ruspolia differens* (Serville) reared on diets from oil seed by-products

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Francis Sengendo ✉, James Peter Egonyu, Anu Valtonen, Isabelle Noyens, Harriet Angwech, Martha Franny Alaroker, Philip Nyeko, Geoffrey Maxwell Malinga & Sabine Van Miert

Abstract

The long-horned edible grasshopper *Ruspolia differens* (Serville) (Orthoptera: Tettigoniidae) is a significant food source in Southern and Eastern Africa due to its rich nutritional profile. The declining yields from wild harvests have driven research into developing methods for mass rearing of *R. differens*. Despite extensive efforts, identifying cost-effective nutritious diets has been challenging. This study tested eight diets including seven diets constituted from oil seed by-products, i.e., sunflower seed cake, shea seed cake, oil palm seed cake and one control diet (germinated finger millet). The experiment was arranged as a randomised unreplicated block design. Survival of neonates to adults and adult weight of *R. differens* reared on sole sunflower seed cake and combinations of either oil palm seed cake or shea seed cake with germinated finger millet

were statistically comparable to the *R. differens* reared on sole germinated finger millet (control); whereas no *R. differens* survived on any of the diets containing shea seed cake and the sole oil palm seed cake diet. Germinated finger millet increased the insect's crude fat, carbohydrates and mono-unsaturated fatty acids. Conversely, *R. differens* reared on oil seed by-products-based diets had the highest contents of protein, minerals and polyunsaturated fatty acids than those raised on germinated finger millet. We conclude that (i) sole sunflower seed cake and/or a combination of the same or oil palm seed cake with 50% germinated finger millet are alternative diets to sole germinated finger millet in the mass rearing of *R. differens* and (ii) the diets based on oil seed by-products can be used to enhance the content of protein, mineral and polyunsaturated fatty acids of *R. differens*. We recommend further studies to increase the content of alpha linolenic acid in these diets to produce *R. differens* which is more nutritionally suitable for human consumption.

Data availability

Data will be available upon request from the corresponding author.

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Author information

Authors and Affiliations

Department of Biology, Gulu University, P.O. Box 166, Gulu, Uganda
Francis Sengendo, Harriet Angwech, Martha Franny Alaroker & Geoffrey Maxwell Malinga

Faculty of Agriculture and Animal Sciences, Busitema University, P.O. Box 203, Soroti, Uganda
James Peter Egonyu

Department of Ecology and Environmental Science, Umeå University, Linnaeus Väg 6, Umeå, Sweden
Anu Valtonen

Centre of Expertise Sustainable Biomass and Chemistry, Thomas More University of Applied Sciences, Kleinhoefstraat 4, 2440, Geel, Belgium
Francis Sengendo, Isabelle Noyens, Martha Franny Alaroker & Sabine Van Miert

Department of Forestry, Biodiversity and Tourism, Makerere University, P.O. Box 7062, Kampala, Uganda
Philip Nyeko & Geoffrey Maxwell Malinga

Contributions

FS conceptualized the study, developed the methods, investigated, analysed the data, wrote the original draft, reviewed and edited the manuscript, JPE, AV, PN, GMM, SVM and IN conceptualized and validated the methods, revised and edited the manuscript, HA and MFA revised and edited the manuscript. All authors have read and approved the manuscript.

Corresponding author

Correspondence to Francis Sengendo.

Ethics declarations

Conflict of interest

The authors declare no conflict of interest.

Clinical trial number

Not applicable.

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