



Research Paper

## The fatty acid composition of edible grasshopper *Ruspolia differens* (Serville) (Orthoptera: Tettigoniidae) feeding on diversifying diets of host plants

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### Abstract

*Ruspolia differens* (Serville) (Orthoptera: Tettigoniidae) is a highly valued edible grasshopper species in Africa. However, the effects of plant diets on lipid content and fatty acid composition of *R. differens* are not well understood. We tested the effects of four diets on the total lipid content and fatty acid composition of *R. differens*. Sixth instar nymphs of *R. differens* were reared on one, and mixtures of two, three, and six natural plant inflorescences. Individuals collected from the field constituted a control treatment. We extracted lipids and analyzed the fatty acid methyl esters using gas chromatography–mass spectrometry. We analyzed if the total lipid content, body weight, and fatty acid composition differed among diets and between the sexes using two-way ANOVAs and a PERMANOVA model, respectively. The total lipid content and weight of *R. differens* did not differ among the diets. The nine common fatty acids were palmitic (mean across treatments, 26%), oleic (22%), palmitoleic (18%), linoleic (13%), stearic (7%), myristic (6%), myristoleic (4%),  $\alpha$ -linolenic (2%) and arachidic acid (1%). The composition of fatty acids and the proportion of essential fatty acids significantly differed among the diets. The proportion of essential fatty acids was highest in the control treatment (21%) but low in less diversified (one to three feed) diets (12–13%). This study demonstrates that the fatty acid composition in *R. differens* can be influenced through diet. Thus, with dietary manipulations, using local plants in Africa, it is possible to produce *R. differens* with preferred high quality essential fatty acids for human consumption.



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