ABSTRACT

Edible long-horned grasshoppers (*Ruspolia differens* Serville) are very important source of food and income in East Africa. Although grasshoppers present great potential in contributing to better food and income security of the East African people, their seasonal availability is a challenge. There are no established effective protocols for articial rearing of these grasshoppers. This study therefore investigated the factors which influence artificial mass production of the grasshoppers. The study was conducted in Uganda and Kenya. The edible long-horned grasshopper species prevalent in East Africa were identified using molecular and morphological tools. Further the host plants associated with *R. differens* were identified by characterising the plants recovered from the insects' gut using molecular tools. The temperatures requirement for *R. differens* development, longevity, fecundity, oviposition and distribution were determined using Insect Life Cycle Modeling software based on linear and non-linear models. Natural enemies of *R. differens* were isolated and identified through molecular tools. The performance of *R. differens* reared on identified host plants mixed with important food components for artificial mass rearing were investigated. Edible long-horned grasshoppers from different locations in Uganda were identified as *R. differens*. Host plants of *R. differens* were identified as *Ageratum conyzoides, Citrus depressa, Cynodon dactylon, Digitaria gayana, Eragrostis mexicana, Eucalyptus saligna, Indigofera arrecta, Persicaria nepalensis,* and *Sorghum halepense*. The optimum temperatures for incubation of *R. differens* eggs ranged between 30 and 32°C, while the optimum temperature for nymphs and adults ranged from 28 to 30°C. The potential areas for *R. differens* distribution in current scenario were predicted as East, Central, West, Southern and the Horn of Africa. In future scenario, the areas with high potential of *R. differens* distribution were predicted as East and Central Africa where as the distribution potential will be reduced in West, Southern and the Horn of Africa. Major pathogenic fungi identified in *R. differens* were *Serratia marcescens, Bacillus thuringiensis, Enterobacter cloacae, Enterococcus faecalis, Staphylococcus sciuri, Proteus vulgaris, Klebsiella pneumoniae* and *Proteus penneri*. Entomopathogenic bacteria observed infesting *R. differens* included *Serratia marcescens, Bacillus thuringiensis, Enterobacter cloacae, Enterococcus faecalis, Staphylococcus sciuri, Proteus vulgaris, Klebsiella pneumoniae* and *Proteus penneri*. *Glaurocara flava* was the only identified parasitoid of *R. differens*. Survival of *R. differens* in all diets mixed with individual host plants exceeded 50% unlike the control with survival rate less than 30%. Artificial diets with *C. dactylon* and *P. maximum* were the best for rearing *R. differens* compared to the other diets. The number of eggs laid by *R. differens* raised on the diet mixed with *P. maximum* was significantly higher than fecundity of the rest of the diets. However, inclusion of host plants in the diets had no influence on *R. differens* adult weight. Information generated from this study can help in development of protocols for effective mass rearing of *R. differens.*