

Efforts towards adding value to *Ruspolia differens*
(Nseenene) in Uganda

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Introduction



- The global picture- Research and knowledge

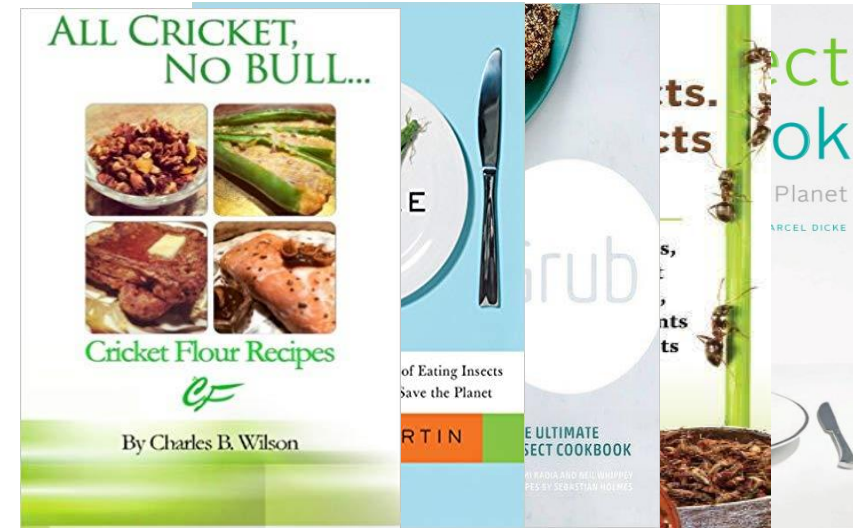
Research in different fields, i.e., Nutrition, Health, Economics, Marketing, Anthropology, etc.



Insects to Feed the World



AFRICAN CONFERENCE ON EDIBLE INSECTS

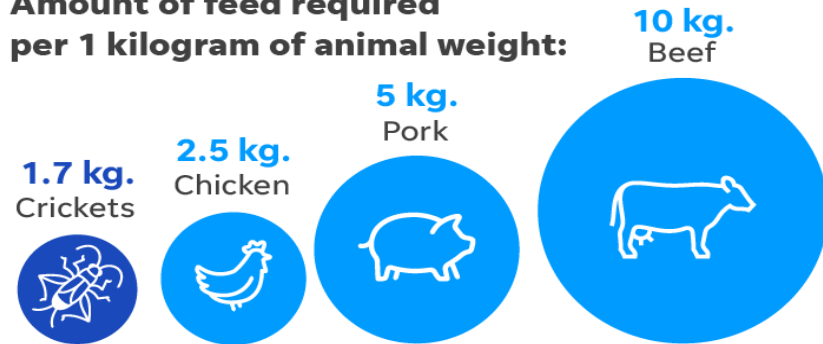


Global picture



The global picture- Why edible insects

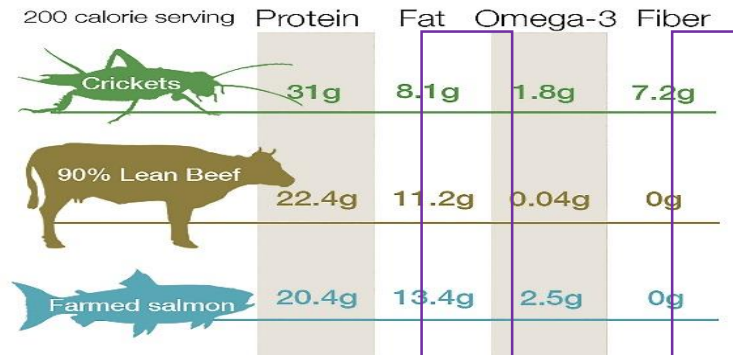
Amount of feed required per 1 kilogram of animal weight:



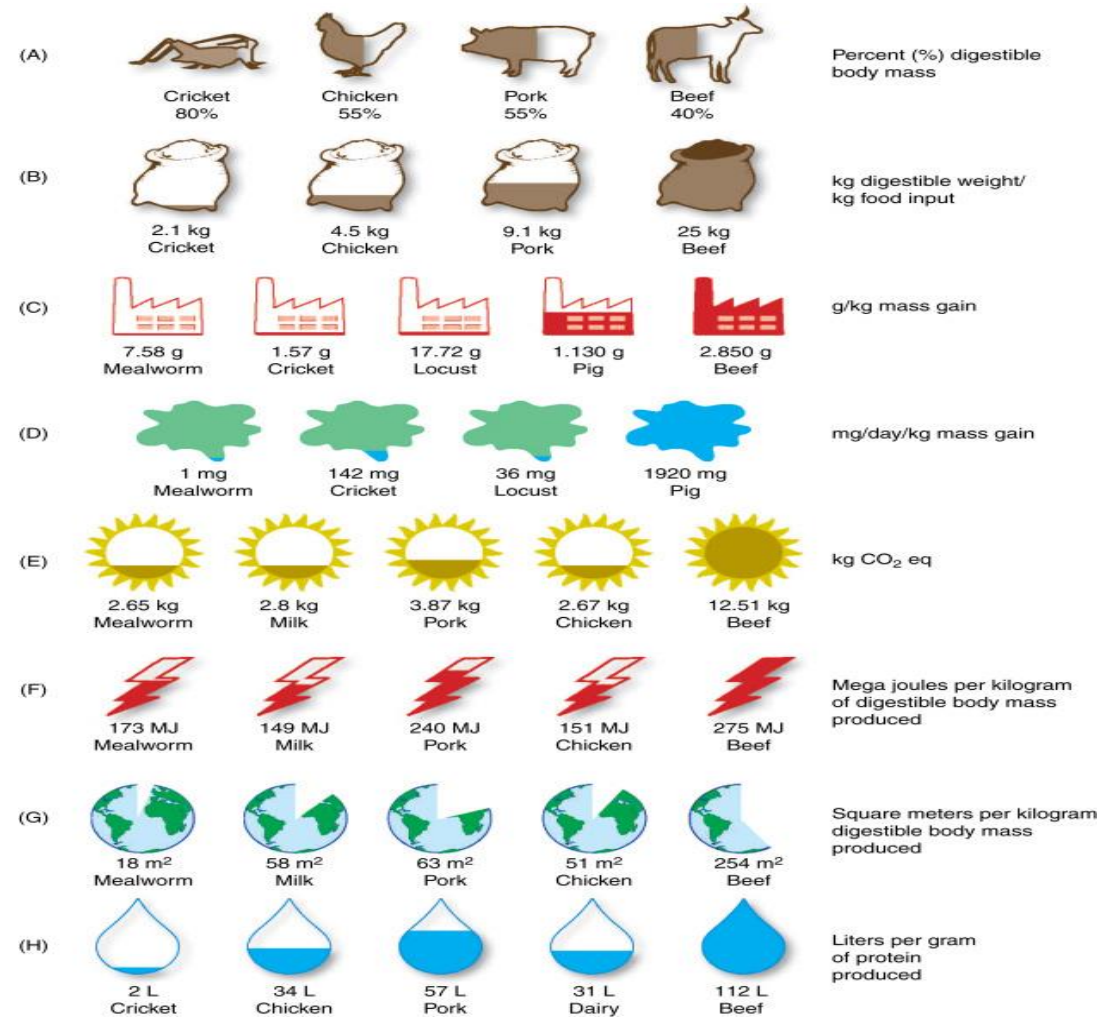
SOURCE UN Food and Agriculture Organization's "Edible insects" report

Why should I eat crickets?

Healthy, sustainable, delicious! 80% of countries and 2.5 billion people already eat them.



Sources: USDA SR-25 and Nutritional composition and safety aspects of edible insects, Birgit A. Rumpold and Oliver K. Schluter Mol. Nutr. Food Res. 2013, 57, 802–823.

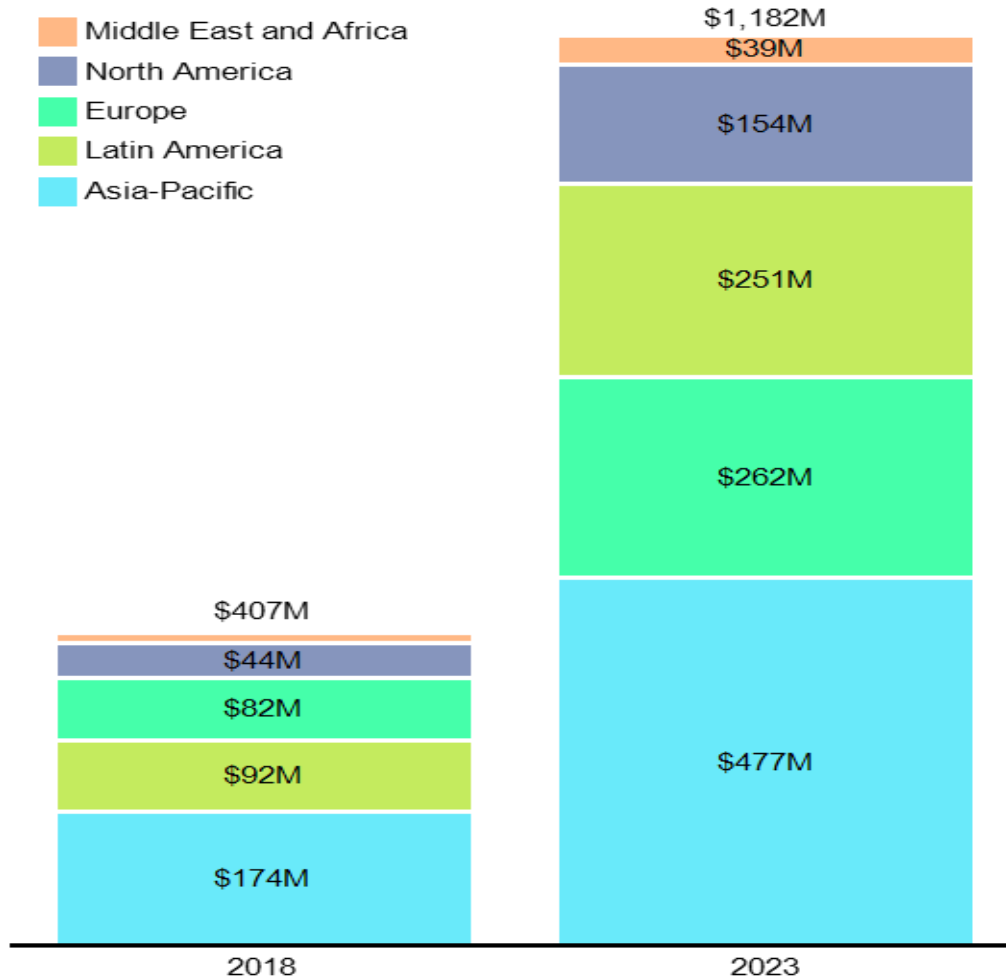


Source: Sciencedirect.com

Global picture



- The global picture- Market and legislation



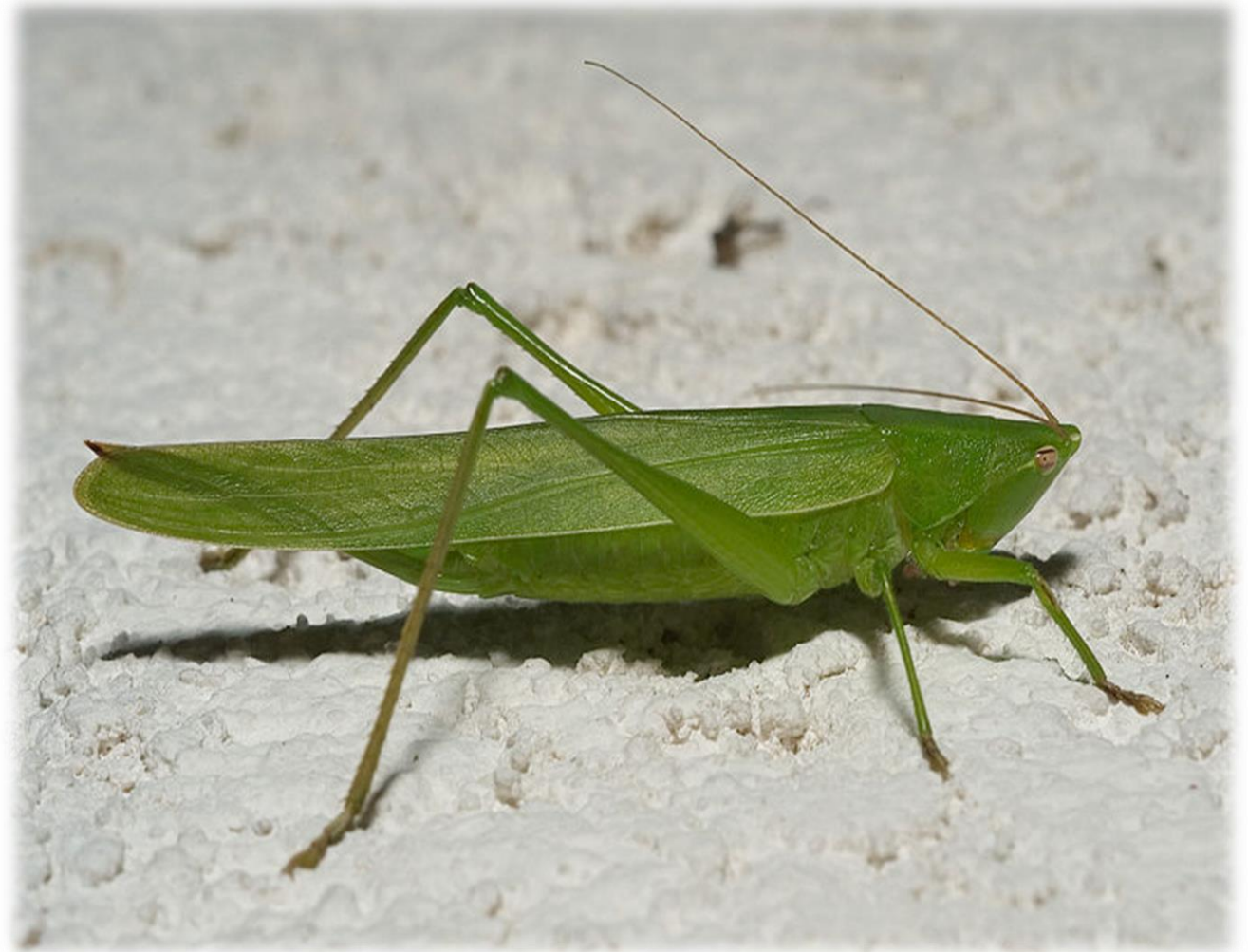
- Legislation & Technology advancement

- Europe
 - Specific laws (Novel foods)
 - Specific rules on hygiene
 - High food related technology
- Asia and America
 - Sound legal regime
 - High food related technology
- Africa
 - Poor food legal regime
 - Low food related technology

Africa & Uganda



- Species of edible insects
 - > 1900 species- world
 - 324 - 470 i.e., almost a quarter of the world's species population
 - > 10 species in Uganda
 - 2 most common species of commercial importance
 - *Macrotermes spp* (Termites, Nswa)
 - *Ruspolia differens* (long horned grasshoppers, Nseenene)



Cultural significance in Uganda



- Embedded in the traditional norms and customs
 - Provides identity to some people
 - “*Abalyannaka*” from “Bulemeezi” county
 - Totem (clan symbol) to some people
 - “Nsenene clan”
 - Shape behaviour
 - Wise sayings
 - Its often a co-curricular activity during peak swarming periods
 - Cultural significance of termites (van Huis et al., 2017)

[DOI: 10.1186/s13002-017-0137-z](https://doi.org/10.1186/s13002-017-0137-z)



Value chain challenges



- Low shelf life = early & fast spoilage
 - 24 hours (raw & stir-fried)
 - Related challenges
 - Transportation (Traffic rules)
 - Packaging (volume/air/mass ratio)
 - Storage & presentation
 - Lack of/phobia to technical guidance
 - Necessary improvements
 - Other challenges
 - High electricity bills and market dues, etc.



Value chain challenges



- **Short-term** solutions

- Early and fast transportation
- Processing into ready-to-eat forms
- Processing into dehydrated forms
 - 2-3 months (dehydrated)
 - Reduced sensory appeal



- Insufficient information about the *R. differens* matrix & interactions therein



Ruspolia differens: Oxidative rancidity and shelf stability



- Conclusions

- Shelf stability of 22 weeks
 - processed & dried
- Oxidative rancidity plays a role in spoilage of dried grasshoppers
 - Esp. Oxygen and Temperature
- Hurdle technology, MAP ?

- Questions?

- What is the major cause of fast spoilage in fresh *R. differens*?
 - Chemical? Microbiological? Enzymatic?
- Can we increase shelf stability and sensory acceptability?





Microbial characterisation of the edible grasshopper *Ruspolia differens* in raw condition after wild-harvesting in Uganda

Article Sep 2018

 Geoffrey Ssepunya ·  Enya Wynants ·  Christel Verreth · [...] ·  L. Van Campenhout

...



Nutrient composition of the long-horned grasshopper *Ruspolia differens* Serville: Effect of swarming season and sourcing geographical area

Article

Jul 2019

 Geoffrey Ssepuyuya ·  Ruben Smets ·  Dorothy Nakimbugwe · [...] ·  J. E. Claes

This research investigates the effect of swarming season and sourcing geographical area on the nutrient composition of *R. differens*. On a dry matter basis, protein (34.2-45.8%) and fat (42.2-54.3%) are the major macro-nutrients. Leucine (80.9-88.5), lysine (54.0-69.8) and valine (59.2-61.8) are the most abundant essential amino acids (EAA) (mg/g p...



Effect of heat processing on the nutrient composition, colour, and volatile odour compounds of the long-horned grasshopper *Ruspolia differens* Serville

Article Nov 2019

 Geoffrey Ssepunya ·  Dorothy Nakimbugwe ·  Ann De Winne · [...] ·  Mik Van Der Borght



Spoilage mechanisms of the long-horned grasshopper *Ruspolia differens* Serville

Geoffrey Ssepuyya^{a,b,c}, Dorothy Nakimbugwe^c, Leen Van Campenhout^{a,b}, Ann De Winne^d,

Johan Claes^{a,b}, Mik Van Der Borgh^{a,b*}



Specific spoilage microorganisms for the edible grasshopper *Ruspolia differens* with high water bio-availability

Geoffrey Ssepunya^{a,b,c},^{a,b}, Christel Verreth^{b,d}, Sam Crauwels^{b,d}, Bart Lievens^{b,d}, Johan

Claes^{a,b}, Dorothy Nakimbugwe^c, Leen Van Campenhout^{a,b*}

Future work on *Ruspolia differens* processing



- Safety aspects
 - Microbiological
 - Chemical
 - Physical
- Quality criteria
 - What defines the appropriate quality of the *Ruspolia differens*
- Post harvest handling
 - Harvesting
 - Transportation
 - Presentation
- Policy/regulation
 - Do our policies and regulations promote utilization and trade?
 - Work on developing/revising standard for food and feed ongoing

Thank you for listening!!



Questions are welcome!