

The class from Cotiakou school that we worked with this time in Benin.

# Bugs for Life bites back: Edible insects in northern Benin

Bugs for Life' is a charitable organization focused on traditional entomophagy and the role it could play in food security. Delivering public talks, interactive school classes and attending science festivals; Bugs for Life also promotes ideas about insects as food and feed more generally.

Rudi Verspoor Marthe Jacobsen Laura Riggi Mariangela Veronesi Since Bugs for Life began, in 2012, the subject of entomophagy has exploded in both the national and international media. Only three years later and 2015 has seen the opening of the first dedicated insect restaurant in the UK -'Grub' in Pembrokeshire - putting edible insects on the UK map. Meanwhile, research and development on insects as a sustainable source of protein across the world has been blooming, much of which has contributed towards a comprehensive global review of insects as food and feed from the Food and Agricultural Organization (FAO 2013). More recently the Royal Entomological Society (RES) has formed a special interest group specifically to share ideas and address issues on the subject of eating insects. It really does seem an exciting time for entomophagy with niches to be filled in almost every aspect and across disciplines - from

researching 'entoculture' in the lab and field through to delivering insects to kitchens around the world.

The particular interest of Bugs for Life is the role that insects play as a traditional food in areas where food scarcity is an issue. During our earlier visit in 2012 we learned from the Waama community in northern Benin (Tanguieta commune, Atakora region) about how the Waama use insects traditionally (Riggi et al. 2013, available at www.bugsforlife.com). Building on this knowledge, on our most recent trip (October 2015) we worked with the school of Cotiakou, the hospital of Tanguieta and the wider Waama community of Kosso on three main subjects of entomophagy.

Firstly, working in the local School of Cotiakou and nutritional centre of the Tanguieta hospital we aimed *to engage students and women about the* 



A selection of tasty insects collected by the kids, and brought in during our class about entomophagy around the world. Inset: An image of the flying sexual forms of termites. Termites like these are collected across many areas of Africa when they emerge in huge numbers. Image license termites. Name: Ganesh Subramaniam https://www.flickr.com/photos/ganeshbrhills/474025582 https://creativecommons.org/licenses/by/ 2.0/



Laura and Ouro (the representative of Kosso village) discussing how different insects are farmed in different parts of the world.

nutritional value of insects. In addition to understanding the value of insects nutritionally, we also aimed to put traditional entomophagy in northern Benin in the context of global entomophagy, explaining that insects are eaten in two thirds of countries around the world. Secondly, by working with people at the level of the household about individual habits of entomophagy we are hoping to build a more complete picture of how insects are traditionally eaten in the area and understand individual preferences and use of insects as food. Finally, working with the village of Kosso, we aimed to develop a dialogue about the *potential* of farming insects locally and how this traditional might compliment entomophagy in the future.

## Nutrition: Education and outreach at the college of Cotiakou

In the last twenty years there has been increasing recognition that insects have comparable nutrition to other protein rich foods (FAO 2013) and can play a major role in food sovereignty and sustainability in rural Africa (Van Huis 2003). Many insects are rich in fats, as well as a range of micronutrients. Termites for example, which are favoured by groups in northern Benin, are rich in protein, fats, iron and calcium (Banjo et al. 2006). Sharing this information with the pupils of Cotiakou School, we found that they were particularly interested in the specific nutritional values of some of the insects they eat traditionally. While for some of the insects they eat the nutritional value is known from other parts of Africa, many still remain to be examined in the future.

Another particular hit involved talking more widely to the classes about entomophagy worldwide. With over 2,000 species of insects eaten worldwide we had a plethora of examples to choose from - from the mopane worm (*Gonimbrasia belina*) in South Africa, which can sell for the same price as beef at market, to giant water bugs (*Lethocerus indicus*) whose meat apparently tastes a bit like scallops and prawns (Jongeema 2015). Putting the Waama traditions of eating insects within a global perspective captured the imagination of the students and by the time we offered dried edible insect products that we can find in Europe for a taster session there were queues around the class. Perhaps seeing the insects packaged and processed even caught the attention of a few of the more entrepreneurially minded students.

# Insect favourites: A closer look at household habits of entomophagy in Kosso

It is remarkable that, at almost any scale, differences in preferences for eating insects are so variable, be it comparing across continents through to individuals within communities. We believe that understanding variation in habits of entomophagy locally is one of the fundamental first steps towards developing insects as a reliable food source that could contribute to food security. Speaking to the Waama communities, and various ethnic groups, it was instantly apparent that there were very distinctive attitudes towards the different species of insects



Mariangela speaking to the household head about preferences for insects within his family.

that are eaten in the area. Some insects were no longer eaten at all, or only by the older generations. For example, a species of leaf footed bug (family: Coreidae) that was eaten in the past is now no longer consumed by anyone in the community except for one older man. Looking from household to household there were also large differences in the number and types of insects eaten (ranging from none to up to 15 species), as well as the amount of time that they were willing to spend collecting them. In Benin, where there are more than 45 ethnic groups with their own languages, cultures, and food habits, understanding fundamental preferences and even culinary rules within villages can be extremely interesting. For example, in Kosso, lizard's meat (Agama genus) is considered a food that is only for young men to eat before they are married.

In addition to differences between individuals, we were interested in learning if there were some insects that were generally favoured across all or most of the people we spoke to. In the end, there were two clear winners. The tobacco cricket (*Brachytrupes membranaceus*), a nocturnal species which lives underground in burrows up to 30 cm long, ended up coming out on top with almost everyone we spoke to eating it already. It also topped the list of insects that people would like to have greater access to. Although difficult to collect in the wild in large quantities, it seemed the taste of this cricket grilled on a fire sets it apart. Winged termites came out a close second (Macrotermes falciger), as the highly nutritious sexual forms can be collected in large quantities during their synchronized dispersal flight. Either cooked fresh straight after collection, or dried and incorporated into sauces, termites were enjoyed by all ages in the family. They were also one of the few insects eaten more widely in other ethnic groups in the area, perhaps due to the ease with which they can be collected due to their seasonal abundance.

#### Grow your own: Developing access to edible insects within communities

While insects are consumed in Benin, the practice differs hugely between ethnic groups. In addition, some groups do not consume insects at all and many people stop eating insects when they live in cities. This is linked to the fact

that insect collection is usually done in fields, and there is also a stigma towards traditionally rural practices in urban centres. These issues brought us to the third aim of our trip; asking if insects, an available but only seasonally abundant food, can play a larger role in food security in the area. Considering the seasonal shortage of food that coincides with the end of the long dry season in this part of sub-Saharan Africa, both the amount of insects available and when they would be available are important aspects to consider. With the aim to continue to work with communities that already collect and eat insects traditionally, we decided to gauge the interest and attitudes of the communities, using targeted questionnaires. We also explored whether they believed there would be a market for insect products locally.

After speaking to a number of households in the village of Kosso it became clear that there was an interest in having greater access to insects, particularly for some species of cricket and grasshoppers, as well as termites. They were interested in the potential of farming crickets, especially their favourite the tobacco cricket. Having



The tobacco cricket (Brachytrupes membranaceus) is one of the favourite insects to eat in Kosso.

brought some examples and images from Thailand and Cambodia, where cricket farming is more widespread, we sparked an immediate interest from a number of adults in Kosso. Overall, the preferred method of trialling farming was considered to be at the community level (as opposed to individually owned farms), where the work could be distributed across multiple households. This could be a way of spreading risks and costs amongst different families, as well as allowing them to collectively support one another in the process of rearing the insects. Interestingly, most of the community also felt there would be a market value for insects if they could be produced in sufficient quantity. In their terms, 'since people do eat them – why would they not buy them? As long as they are affordable, people will buy insects'. Such enthusiasm certainly could provide a good basis on which to pilot community based farming projects

during our next visit. Indeed, one such project in Kenya is carrying out a similar initiative whereby individual farmers are pre-paid to trial the efficiency of farming crickets as an alternate source of income (www.flyingfoodproject.com).

### What Next?

Following our visit to northern Benin, we are excited to build on the results of this trip. Reconnecting with old friends and working more closely with the Waama communities of Kosso and Cotiakou has certainly provided a fresh perspective on future directions for Bugs for Life. Discussing the potential of insect farming and food preservation techniques and realising the appetite for trialling projects with the community led to plenty of ideas for the next chapters of Bugs for Life's work. Meanwhile, engaging with the next generation of 15-20 year old students about the nutritional value and potential of insects as food might provide a platform on which to expand the reach of this work. Already, there has been some interest from neighbouring schools in the programme. We are keen to produce additional educational material, and develop our interactive outreach activities further.

2016 is also going to provide many exciting opportunities to continue with our events and work in the UK. National Insect Week promises to be an excellent opportunity to showcase all things that are great about insects and we look forward to being involved and getting as many people as possible to think about insects as food, and maybe even eat them. Undoubtedly, the interest generated by discussing insect farming and insect nutritional value, as well as the positive responses of many people in the communities we worked with, will help to develop and gather funds for future projects in northern Benin and across the UK. What an exciting few months to come! For more information about our activities, or to get in touch, please visit our website www.bugsforlife.com, or follow our work on Facebook and Twitter.

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All images are from Bugs for Life except for the image of flying termites. The details of the images permissions and licences can be found under the caption.

## References

Banjo, A. D., O. A. Lawal, and E. A. Songonuga (2006). "The nutritional value of fourteen species of edible insects in southwestern Nigeria." African Journal of Biotechnology 5.3, 298.
FAO (2013). Edible insects Future prospects for food and feed security. http://www.fao.org/docrep/018/i3253e/i3253e00.htm.
Jongema, Y. (2015). List of edible insect species of the world. Wageningen, Laboratory of Entomology, Wageningen University. http://www.wageningenur.nl/en/Expertise-Services/Chair-groups/
Plant-Sciences/Laboratory-of-Entomology/Edible-insects/Worldwide-species-list.htm.

Flant-Sciences/Laboratory-of-Entomology/Edible-insects/worldwide-species-list.ntm.

Riggi, L., Veronesi, M., Verspoor, R., Macfarlane, C. and Tchibozo, S. (2013). Exploring edible insects in Northern Benin available at; www.bugsforlife.com

van Huis, A. (2003). Insects as food in sub-Saharan Africa. Insect Science and Its Application, 23, 163–185.