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SPECIAL ISSUE: INSECTS AS FOOD IN AFRICA

Contribution to the knowledge of entomophagy in Africa

EDITORIAL

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The use of insects as food and feed is probably one of the most exciting topics in entomology in recent times. It is estimated that over 2 billion people worldwide consume insects and with the expanding interest on the subject, an exponential increase of this figure is highly likely. Insects are the largest and the most diverse group of organisms in the animal kingdom, with over 1 million species identified. Globally over 2,000 species are known to be edible and Africa alone consumes ~500 different species.

Entomophagy is being advocated for a variety of reasons including their high nutrient composition, high feed conversion efficiencies, organic wastes conversion, the lower requirements for land and water, lower emissions of greenhouse gases and the fact that they have a significant role to play in today's debate surrounding food and nutritional security. In Africa, entomophagy is not only practiced as a healthy eating habit and consumption must be encouraged, but taking into consideration cultural, religious and socio-economical aspects.

Access to animal protein remains a major obstacle to the expanding livestock industry in Africa due to increasing costs of animal feeds, high costs of fishmeal, fish oil, soybeans, and grains. Research emerging from various public and private sector entities has clearly demonstrated that insect-based protein can replace fishmeal and soymeal in fish and poultry feed. In fact there is a general assumption that substitution of animal protein in animal feed should release large quantities of fishmeal and soybean meal for use either as animal feed or human food and increase income to smallholder farmers. Furthermore, the foreseen increase of the demand for protein either for food or feed should promote insect farming as a lucrative and sustainable option for global food supply. An insect-based enterprise for food and feed should promote income generation and employment opportunities for youths and women along the value chain (production, harvesting, processing techniques and marketing).

The last FAO global conference on 'Insect to feed the world' held in Ede, the Netherlands in May 2014 was well received by African entomologists. About the same period, the International Centre of Insect Physiology and Ecology (*icipe*), a leading insect research institution on the African continent had developed a comprehensive strategy covering all aspects of the use of insects as food and feed including aspects of inventory, mass production, nutritional profiling, storage, and safety to legislation. Since then various initiatives focusing on the contribution of insects for food and feed security and livelihood improvement continues to dominate R&D activities on the continent.

The African Association of Insects Scientists (AAIS) has been at the forefront in the debate on the use of insects as food and feed and organised its first symposium on the subject in Yaoundé, Cameroun in 2013 at its 20th Scientific Conference. Building on this momentum and the global conference in Ede, another symposium was held in Cotonou, Benin during its 21st Scientific Conference in 2015 (19-23 October). Indeed, the topic has received a tremendous amount of attention and this needs to be supported and guided. The same momentum recently gave rise to the recent International Conference on Legislation and Policy on the Use of Insects as Food and Feed in Kisumu, Kenya in March 2016 as standards for use of insects as food or feed are lacking in most African countries.

This special issue of *Journal of Insects as Food and Feed* covers various facets of entomophagy in various regions of Africa. Inventory remains the first pillar in the promotion of greater recognition of insects as food in Africa and encourage up-scaling of their sustainable utilisation. Robert Musundire of Chinoe University in Zimbabwe presented information on the host plants and habitat associations with 14 edible insects. The analysis of their nutritional value suggest that insects can match with plant and animal product diets and can be considered as potential viable alternative nutritious food sources. Indigenous knowledge, an important asset of a community, is transferred from generation to generation, contributing to resilience. As a continuation of the African edible insects' inventory

published in 2015, the *icipe* team centred the debate on indigenous knowledge and some key information on the importance of insects in Africa and its integration to the research portfolio. The information provided in those papers is instrumental in the promotion of entomophagy in Africa. We also presented socio-economical work on commercialisation and consumption of edible insects in Cameroon. Felix Meutchiey of the University of Dschang described the value chain of palm weevil in Yaoundé; he described the business as lucrative but at the same time indicating that it affects the palm tree ecosystem in Cameroon. Sevilor Kekeunou of the University of Yaoundé explained the consumption of *Zonocerus variegatus*, a very common edible insect in Africa. This insect is a pest of cassava and produces a strong smell of alkaloids which might constitute a risk and therefore prevent its consumption. The study also showed that custom religions could actually be barriers to edible insects' consumption. Moreover, the way insects are processed sometimes releases rotten odours that lead to rejection. Prof. Joseph Lebel Tamesse presented very interesting facts on medicinal values of edible insects in Cameroon. Although insects are mainly consumed because of their good taste, they could be eaten for many other reasons including stimulation of speech in children, a cure for vomiting of infants, rheumatism, chickenpox, spleen inflammation, the large navel and many other diseases.

We also presented some information in developing technologies for insect mass production and processing methods. One of the key components of insect mass production is the identification of cheap and accessible substrates but also development of easy rearing techniques. Cricket rearing is becoming a very popular business in Kenya. Prof. Monica Ayieko discussed the introduction of cricket farming in western Kenya and the various steps including microbial tests to comply with national standards. While emphazing on nutrient composition, she also reported the role of food design in attracting consumers. In Nigeria, Cordelia Ebenebe compared various types of substrates for the rearing and mass production of edible palm weevil.

There is no single bullet to tackle the food security issues in Africa. The use of insects as food and feed can significantly contribute to reducing hunger, stimulate enterprise development and contribute to job creation especially for youth and women. A clear research and development agenda at national and regional level is needed with strong legislation and policy framework for sustainable use of insects as food and feed. Recent advances in ICT, communication networks and infrastructural development could enhance knowledge transfer and open markets for business.

Finally, we are grateful to the editor-in-chief, the associate editors, the editorial board members and reviewers, and the *Journal of Insects as Food and Feed* team for this opportunity and support for a special issue. Our thanks to all the contributors to this special issue for their time and effort to make this project a success. We look forward to working with all of you in the future, as we continue to publish cutting edge research content on the use of insects as food and feed.