

# Diversity and Nutritional Characteristics of *Garcinia kola* in Southwest Cameroon

A. Maňourová<sup>1</sup>, B. Lojka<sup>1</sup>, O. Leuner<sup>1</sup>, P. van Damme<sup>2</sup>, Z. Tchoundjeu<sup>3</sup>, J. Houška<sup>4</sup>, O. Přibyl<sup>5</sup>

<sup>1</sup>- Department of Crop Sciences and Agroforestry, Faculty of Tropical AgriSciences, Czech University of Life Sciences; <sup>2</sup>- Department of Plant Production, Faculty of Bioscience Engineering, Ghent University; <sup>3</sup>- World Agroforestry Centre (ICRAF), Yaoundé, Cameroon; <sup>4</sup>- Department of Soil Science and Soil Protection, Faculty of Agrobiolgy, Food and Natural Resources, Czech University of Life Sciences Prague; <sup>5</sup>- Department of Economics and Development, Faculty of Tropical AgriSciences, Czech University of Life Sciences

## INTRODUCTION

- Garcinia kola* Heckel (Clusiaceae) is fruit tree species indigenous to West and Central Africa. The tree, commonly called bitter kola, plays a crucial role in the local ethno-medicine and belongs to the most commercialized non-timber forest products in this region<sup>1</sup>. Each part of *G. kola* can be used as medicine.
- The most valued product are seeds which are chewed by local people to treat gastric problems or for their typical astringent taste<sup>2</sup>.
- The kernels contain a wide range of useful phytochemicals such as tannins and flavonoids. Biflavonoid complex kolaviron is one of the most promising components. It has a great potential in treatment of malaria<sup>3</sup> and is recently studied for its therapeutic potential on benign prostatic hyperplasia<sup>4</sup>.
- However, basic information on intraspecific diversity and the exact nutritional values of the kernels are missing.



### AIMS

Characterization of morphological diversity and nutritional status of *G. kola* populations in Southwest region of Cameroon



## METHODOLOGY

- Data were collected during June-July 2016 in four different locations (Kumba, Mamfe, Lebialem, Tombel) in Southwest region of Cameroon.
- To examine management and utilization of *G. kola*, 50 farms were visited and 48 farmers questioned. For morphological evaluation, 403 leaves, 759 fruits and 1,821 seeds coming from 81 trees were analyzed.
- Due to lacking botanical descriptors on *G. kola*, pattern for the study was modified from mangosteen (*Garcinia mangostana* L.)<sup>5</sup>.
- To evaluate nutritional content of the seeds, ash, moisture, crude fat, crude fibre, crude protein and nitrogen-free extractives (NFE) were determined. All laboratory analyses were performed at least in duplicates based on Commission Regulation (EC) No 152/2009<sup>8</sup>.

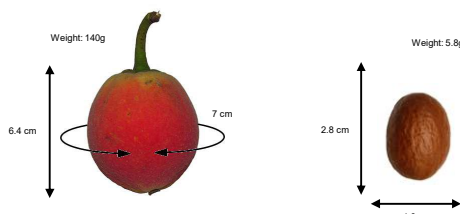
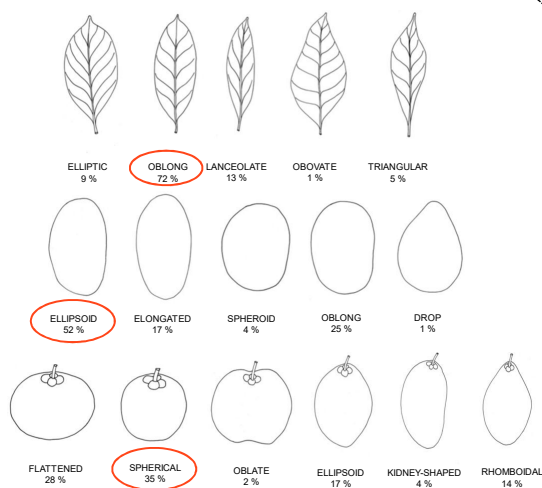


## RESULTS

- Most of the trees were grown in agroforestry systems (AFS) and purposefully planted → 53 % coming from cocoa AFS, 39 % found in homegardens and 8 % in oil palm AFS
- Just two from 48 respondents tried to propagate the species vegetatively
- Important source of income: 16-98 USD per 15 l bucket
- High level of tree-to-tree variation
- 2.4 seed per fruit on average; correlation: in heavier fruit we can expect a higher seed mass ( $r = 0.524$ )



### MORPHOLOGICAL DIVERSITY

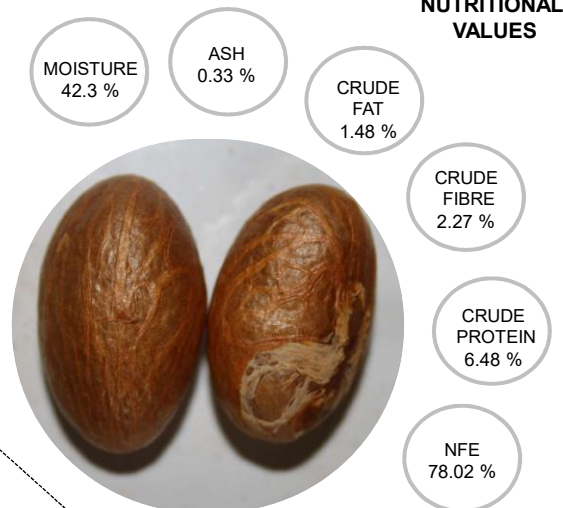


## CONCLUSION

- We revealed reliable data on the nutritional values of *G. kola* seeds and made a first draft of botanical descriptors for the species.
- Diversity of morphological and nutritional characteristics within a single population is much higher than the diversity among different sample sites.
- The species has a good adaptability to various external conditions.
- Efforts detected in terms of species targeted cultivation and selection.
- Process of *G. kola* domestication is at its very beginning.**
- Our results provide basics for the domestication process and future research.**

## REFERENCES

1. Jouda JB, et al. 2016. BMC Complementary and Alternative Medicine 16: 1-9. 2. Leakey RRB. 2012. Living with the trees of life. Oxfordshire: CABI. 185p. 3. Adaramoye O, et al. 2014. Asian Pacific Journal of Tropical Medicine 7: 97-104. 4. Kulu WO, et al. 2016. Biomedicine & Pharmacotherapy 83: 1436-1443. 5. ICPRI. 2003. Descriptors for Mangosteen (*Garcinia mangostana*). Rome: International Plant Genetic Resources Institute. 56p. 6. European Commission. 2009. Commission Regulation (EC) No 152/2009. Official Journal of the European Union. 130p.



## FUTURE PERSPECTIVES

- Need for vegetative propagation methods development → superior tree multiplication, faster tree maturity
- Extension of study sites: different regions of Cameroon, other West and Central African countries
- Focus on fluctuation of secondary metabolites content in both seeds and bark
- Kolaviron and its bioactivity
- More data on population genetics and market/value chain



## ACKNOWLEDGEMENTS

The study was financially supported by: 'Podpora mobility studentů' (FTZ, CULS), Foundation 'Nadání Josefa, Marie a Zdenky Hlávkových' and ICRAF (World Agroforestry Centre)