Review of PhD thesis

Ing. Anna Maňourová: *Garcinia kola*: diversity, utilisation and domestication in Cameroon. Department of Crop Sciences and Agroforestry, Faculty of tropical Agrosciences, Czech University of Life Sciences Prague, 2023

Study programme: Tropical Agrobiology and Bioresource Management

Supervisor: prof. Ing. Bohdan Lojka, Ph.D.

Co-supervisors: Ing. Olga Leuner, Ph.D. and Dr. Zacharie Tchoundjeu

Form of the work:

The work comprises of 217 pages, including tables, pictures, and annexes. The dissertation is divided into 11 chapters: Introduction, General methodology, the Results are consisting of 6 chapters containing published or submitted papers and manuscripts, followed by Conclusions, References and Appendices. The author wrote thesis as a set of articles yet managed to compile it with logical structure. Finally, Ing. Anna Maňourová wrote thesis in an excellent English.

Objectives:

The first chapter presents the problem statement, especially the role of *G.kola* in traditional medicine, its other ethnobotanical uses and conservation status is mentioned here too. The aims of the study are clearly presented here. The main goal of this study was to analyse the morphological, genetic, and chemical diversity of various *G. kola* populations in Cameroon as well as to document the use of the species as necessary steps towards its domestication. The specific aims were set up as:

(i) Description of the utilisation and management of *G. kola* across Cameroonian regions;

(ii) Characterisation of the morphological diversity of *G. kola* and preparation of its preliminary botanical descriptor;

(iii) Determination of the genetic diversity of *G. kola* populations;

(iv) Assessment of the nutritional and chemical value of *G. kola* seeds;

(v) Comparison of differences among populations based on their geographical location and origin;

(vi) Select of individuals which are superior in traits favoured in the domestication process.

Scientific content of the work:

Presented thesis represents a comprehensive study on selected African ethnobotanically important tree species *Garcinia cola*. Author demonstrated ability of scientific work in very broad focus. General methodology valid for all result chapters includes clearly written description of the study area and the way of data collection. Specific methodological notes are part of individual papers listed in Results. Despite all the difficulties she had to face while

collecting data in the field, the author was able to follow the main principles of good scientific sampling design, so I have no more comments on this Chapter.

The study starts very appropriately with an already published review article (Maňourová A, Leuner O, Tchoundjeu Z, Van Damme P, Verner V, Přibyl O, Lojka B. 2019. Medicinal Potential, Utilization and Domestication Status of Bitter Kola (Garcinia kola Heckel) in West and Central Africa. Forests 10: 124.) that compiles general information on the species, ranging from botany to market accessibility and nutritional value.

Chapter 4 (Manourova A, Polesny Z, Lojka B, Ann Degrande, Ondrej Pribyl, Patrick Van Damme and Vladimir Verner. 2023. Tracing the Tradition: Regional Differences in the Cultivation, Utilization, and Commercialization of Bitter Kola (Garcinia kola, Clusiaceae) in Cameroon. Economic Botany 77: 48–62) presents results on *G. kola* utilisation, management and commercialisation, based on personally made questionnaires complementing the rest of the chapters with a socio-economic and ethnobotanical perspective. Author rightly felt the need to describe the value chain with *G. kola* products as a first step of her study.

Chapters 5 (Maňourová A, Chinheya IP, Kalousová M, Ruiz-Chután JA, Okafor UC, Tchoundjeu Z, Tsobeng A, Van Damme P, Lojka B. 2023. Domestication Potential of Garcinia kola Heckel (Clusiaceae): Searching for Diversity in South Cameroon. Plants 12, 742) and 6 (Maňourová A, Polesný Z, Ruiz-Chután JA, Tsafack SM, Tchoudjeu Z, Potgieter L, Lojka B. 2023. Genetic Resources and Crop Evolution. Submited for publication on May 18, 2023) target the species' morphological and genetic diversity. The level of *G. kola* domestication was determined by assessing levels of diversity in both genotype and phenotype and comparing geographical populations as well as wild and managed trees. Based on these results, *G. kola* ideotypes and "elite trees" were identified, that could be used in the species' future breeding strategies were identified.

Chapter 7 (Tauchen J, Frankova A, Manourova A, Valterova I, Lojka B, Leuner O. 2023. Garcinia kola: A critical review on chemistry and pharmacology of an important West African medicinal plant. Phytochemistry Reviews) demonstrates a detailed review of the species' phytochemistry and bioactivity, particularly medicinal effects of the kolaviron biflavonoid complex. Regarding this compound, the findings are far from conclusive, and additional chemical compounds merit further investigation. To support the theoretical background, chemical analysis results of *G. kola* seeds and hulls, as well as experiments with kolaviron-rich extract, are presented in Chapter 8.

From scientific point of view, I have no comments, because most of the thesis passed a demanding review process being published.

Importance of the work:

The work brings very interesting and complex results based on solid dataset that was very difficult to collect in Cameroon, and its analysis. The dissertation combines practical and theoretical outputs, what is very valuable. Substantial part of thesis was published by author and her collaborators in journals listed in WoS. The topic of the work is very important not only from local and regional points of view in Cameroon but also for the other African countries where the species occurs. Some results exceed African continent and are generally important for science like chemical analysis. Last but not least, the results bring the valuable ideas for nature conservation of this endangered species.

Conclusion:

The given above mentioned objectives were completely fulfilled in my opinion, therefore I strongly recommend the work for defence.

Question:

One of the frequently used terms in the thesis is domestication, the author defined ideotypes and/or elite trees, but what is missing in the work is their propagation. Could you briefly suggest the possible way of propagation of selected plus trees within domestication process? Are there any already published results or local practical experiences in breeding of this species?

Brno, August 24, 2023

prof. Dr. Ing. Petr Maděra

Digitálně podepsal prof. Dr. Ing. Petr Maděra
Datum: 2023.08.24 11:23:40 +02'00'

Prof. Dr. Ing. Petr Maděra