Reference number of GTI application: *CBD/GTI-02/2008.*
Date of reception:

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REPORT

Taxonomic training & access to collections in Belgium
(projects executed between 1 July 2008 and 31 March 2009)

NOTICE
The present questionnaire must arrive with the Belgian National Focal Point to the Global Taxonomy Initiative within one month of the official closure of the capacity building visits. Electronic submission on the general e-mail address of the Belgian GTI NFP (cbd-gti@naturalsciences.be) is strongly encouraged. If electronic submission should however be impossible, paper copies may be sent by fax or ordinary mail. The Belgian GTI NFP will acknowledge receipt of all project reports.
If grantees have relevant pictures to illustrate their capacity building visit, these may be annexed to the report. The Belgian National Focal Point might use some of these pictures in one of its reporting activities, but only after the copyright holder has given his permission.

Contact and further information

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PART I – CANDIDATE INFORMATION	
Family name:	TAEDOUMG
First name(s):	Evariste Hermann
Nationality:	Cameroonian
Date of arrival and departure in / from Belgium	14-11-2008/17-12-2008
Number of training days:	22 days
Type of visit	☒ Mainly training in taxonomy and collection management ☒ Mainly access to collections ☒ Other, *specify* How to make a taxonomic revision
Location of training:	☐ Royal Belgian Institute of Natural Sciences, Brussels ☐ Royal Museum for Central Africa, Tervuren ☒ National Botanic Garden of Belgium, Meise ☐ Other, *specify*
PART II - GENERAL INFORMATION	
Describe concisely how you have learned about the Belgian GTI Project	My Ph.D. supervisors, Pr. Bonaventure Sonké and Dr. Petra De Block, introduced me to the Belgian GTI project.
Describe concisely how you have learned about this specific call for proposals	Dr. Petra De Block informed me by mail that this specific call was open for applications. However, I was also checking the GTI website regularly myself.

If this was your first study visit financed via the Belgian GTI National Focal Point, describe concisely why you needed capacity building in taxonomy and collection management	I have just started my Ph.D., the topic of which is the study of the genus *Craterispermum* (taxonomy, phylogeny, population genetics, aluminium accumulation, etc.). The first objective of the study is the taxonomic revision of the genus. Doing a taxonomic revision of *Craterispermum (*Rubiaceae) is impossible at my home institute, the herbarium of which houses less than sixty herbarium sheaths of the genus. None of the western herbaria, which hold the types and the bulk of the herbarium specimens of the genus, will consider sending this material to Africa. Also the other parts of the Ph.D.-study, such as phylogenetic research, cannot be performed in Cameroon, because we lack the necessary equipment and expertise. Therefore, the National Botanic Garden of Belgium (BR) was chosen as the host institute for the taxonomic and phylogenetic work. This institute houses several Rubiaceae experts, a great collection of African plant material and a library containing all reference works needed for the study. During my one-month visit I was introduced to all techniques needed to perform a taxonomic revision. While I have taken a course on taxonomy in Cameroon, I have now realized that botany there focuses mainly on fieldwork. This is because of the lack of teaching materials, plant material (most Cameroonian plant material is held by Western herbaria) and the lack of relevant and recent literature. This visit to the National Botanic Garden of Belgium was the real start of my Ph.D. Before, I had only done some literature study and fieldwork. I now have a much better idea about what it entails to do a taxonomic revision.
If this was not your first study visit financed via the Belgian GTI National Focal Point, describe concisely why you needed further support	

Describe concisely what support (e.g. training, access to collections,…) you have received and how this training can be related to taxonomy and /or collection management	I have seen how plants in general and Rubiaceae in particular are curated in the herbarium of the National Botanic Garden of Belgium. I was introduced to the different steps of the specimen processing: specimen sorting and decontamination, producing labels, databasing, identification, etc. I have also visited the Rubiaceae greenhouses and have seen how the plants are grown *ex situ*. More specifically, I have learned how to make cuttings and how to germinate Rubiaceae. This will allow me to better curate the Rubiaceae collection at the herbarium in Yaoundé and to start a living Rubiaceae collection at my home institution. As regards the taxonomic revision of *Craterispermum*, I have received training in the many steps necessary for a revision, notably: - how to make a specimen and species database in Excell and Access; - how to find relevant literature (e.g., protologues), and use taxonomic internet resources (e.g., IPNI, ALUKA, World Checklist of Rubiaceae, etc.). In the library, I collected all necessary literature to start the revision; - the meaning of taxonomic words and the different kinds of nomenclatural types; - which morphological and anatomical characters to study: I have identified a preliminary set of potentially taxonomically informative characters which will be useful to delimit species; - how to use a stereoscope and drawing tube; - how to execute flower and fruit dissections; - how to use an identification key and the different types that exist; - how to collect material in the field (many special collections are necessary for the later stages of my study such as alcohol- or silica gel material, etc. I had access to ca. 60% of the existing herbarium material of *Craterispermum* (ca. 1500 specimens from different herbaria) and was able to place most of these into twelve preliminary groups. I had access to most of the type material of the genus. The loan of the rest of the *Craterispermum* material (notably from the herbaria of Paris and Kew) is still being negotiated and was not available during this visit.
Describe concisely how your gained capacity will help you in your professional duties	Collection management training was very instructive and should allow me to better manage our Cameroonian Rubiaceae collection (dried and spirit) in the herbarium of Yaoundé and to start a living plant collection at University of Yaoundé I. I do fieldwork regularly to collect plant material. I have now learned how to make the special collections needed for specialized modern studies such as population genetics, anatomy, etc. Learning how to use floras and identification keys will allow me to help in the identication of Rubiaceae material present in our herbarium. Also the literature I brought back with me will help in this regard. Learning which characters are taxonomically informative and how to do dissections will allow me to continue the revision work by making descriptions of the material available in the herbarium of Yaoundé.

Describe concisely how your gained capacity will be implemented in your institution	Since a few years the Laboratory of Systematic Botany and Ecology at the University of Yaoundé has the plan to produce a Flora of Cameroon for the Rubiaceae family. Producing a revision for the genus *Craterispermum* is a very good preparation for participation in this project. The capacity gained from my first research visit to Belgium will already help since it has given me knowledge about the curation of Rubiaceae material and its identification (use of flora's and identification keys). Documentation (Rubiaceae literature) obtained during my stay is deposited in our library and will be used by other botany students. In the future, I hope to share knowledge acquired during my stay in Belgium by supervising other Cameroonian students in botany.
Describe concisely what other support you eventually would need	While this one-month first visit introduced me to the techniques of a taxonomic revision, I need much more time to study herbarium material of *Craterispermum* (ca. 2500 sheaths in total). During this visit I delimited twelve preliminary groups (species), but these are the 'easy' species. There are several species complexes in *Craterispermum* which need further study. And I need to make detailed descriptions and distribution maps of all species. In order to finish my revision, I will need a minimum period of six months in BR. Later on, I will need to return there to do the DNA sequencing and the phylogenetic study. During my visit, my supervisor and myself have identified one or two smaller research projects within the revision. I would need another visit to BR (ca. two months) to carry out one of them. This would lead to the first scientific paper from my work on the genus.
Describe concisely what infrastructural and human resources you and your institution eventually still need to become fully functional	- My institution needs access to recently published studies on African plants and taxonomy. With this documentation we will be able to progress from simply collecting plant material and storing it to studying it and publishing about it. We both need hard copies of existing literature and Internet access to consult taxonomic sources such as IPNI, ALUKA, etc. - We need computers in order to database our Rubiaceae collection and perform research on it. We also need technical materials such as microscopes, stereoscopes, dissecting kits, etc. - Material like pots, alcohol and silica gel are also needed to build up a Rubiaceae reference collection for morphological, anatomical and DNA studies. We already have an Orchid shadehouse (about 100 m^2). We need to extent this to include the Rubiaceae that we collect during our field trips. - We participate in many field trips with foreign researchers. In our team, many postgraduate students do not have financial support. They also lack technical material and would need tents, sleeping bags, and other field equipment. - We need people trained in taxonomy, morphology/anatomy and molecular phylogeny. Despite an obvious need and demand in these scientific fields, they are currently not taught in Cameroon.

Describe concisely how you think the Belgian GTI National Focal Point could further construct capacity for you and your institution	The bulk of the African plant collections and the literature published on them are held in European and American institutes. Furthermore, most of the specialists on African plants are working outside Africa. The Belgian GTI National Focal Point can help us to further build capacity in Cameroon by funding other students. We need to have specialists in Africa and not only in Europe. Training in taxonomy at Belgian institutes should be funded to give us the opportunity to examine collections of African material and to exchange knowledge with European specialists. However, the GTI should also support training at a regional scale and promote the creation of 'centres of excellence' in the field of taxonomy based in Africa (for example, GTI could facilitate networking between African herbaria and universities).

PART III – TAXON SPECIFIC INFORMATION	
What is your taxon of interest	Plants/Dicotyledons-Euasteridae/Gentianales/Rubiaceae/ *Craterispermum*
Describe concisely the different methodologies for collecting your taxon.	We dry fertile branches (with flowers or fruits) in a plant press (several duplicates to send out to different institutes). When collecting a plant, we take copious notes on the habitat, the ecology and the altitude. We take GPS coordinates and make photographs. Whenever possible, local communities will be questioned concerning the vernacular names and local uses of the collections made. We also collect appropriate material for several studies: - leaves in silica gel for DNA-sequencing - flowers and fruits in different development stages in alcohol 70% for morphological-anatomical studies - entire leaves with nodes and stipules in alcohol 70% for morphological-anatomical studies (during my study visit to BR it became clear that leaf nervature and stipule morphology will produce species delimiting characters) - seeds and plant cuttings to grow plants for chromosome aluminium accumulation studies - wood for wood anatomical and aluminium accumulation studies - soil samples to calculate aluminium concentration. Furthermore, in order to study comparative genomics we need to work at population level and as such special fieldwork needs to be undertaken, collecting more samples within a single population.
Describe concisely how to best preserve collected specimens of your taxon for taxonomic purposes	Like all Rubiaceae specimens, *Craterispermum* specimens are preserved as herbarium sheaths (dried in a plant press). Several duplicates are distributed to different herbaria. A collector's label with abundant information on location, habitat, ecology, colour of flowers of fruits is very important. Pressed specimens are dried in a gas oven, then decontaminated (frozen or microwaved) to avoid insect damage. They are conserved in special cupboards, arranged by taxon. Flowers, fruits and leaves can also be preserved in 70% alcohol (for morphological and anatomical studies). Alcohol pots are labelled inside and outside and kept separate from the herbarium collection (fire risk). Leaves are rapidly dried in silica gel for DNA studies.

Describe concisely the best practice in the management of a collection of your taxon	Specimens are encoded in a database, containing information on collector, collecting number, additional collectors, collecting date, identification, locality, ecology, local name, uses and herbaria were specimens are deposited. Several specialized databases exist, such as BGBase or Brahms, but Access can also be useful. The database can be used to generate labels for the specimens, checklists, distribution maps, etc. It also keeps track of the movements of each specimen, e.g. in case of a loan. It would be best if specimens are provided with barcodes. Herbarium specimens are best kept in metal cupboards and should be checked regularly for insect damage. In case of insect problems, specimens can be frozen for ca. a week or microwaved to kill the pest species
Describe concisely how you intend to make your taxonomic data available to other colleagues	Publication of results is very important. My supervisors and myself have identified several smaller projects within the *Craterispermum* research project. Each of these will be published as soon as it is finished. The publications will be as widely disseminated as possible, e.g. by publishing the revision of the genus in AbcTaxa, the volumes of which can be downloaded for free from the website. A good system to disseminate information would be to create an e-mail network of Cameroonian and foreign botanists in collaboration with the herbarium of Yaoundé. In fact, we already have something like that: Promo 2000 is a network of some botany researchers and students from Cameroon . Another possibility is to make the *Craterispermum* database available online after the revision is finished.
Have you been briefed on the aims, scope and contents of the journal *AbcTaxa*?	Yes, It is a series of manuals dedicated to help capacity building in taxonomy and collection management. Four volumes have already been published. They are available in book form but can also be freely downloaded from the AbcTaxa website.
Do you think you have enough capacity to make a contribution to *Abc Taxa*?	☐ No, I still lack capacity ☒ Yes, if I get adequate guidance and support from my tutors ☐ Yes, I feel able to do this autonomously ☒ Other, *specify* after finishing my revision of the genus *Craterispermum*
If you feel capable to contribute meaningfully to *Abc Taxa*, are you willing to do so	☐ No ☐ No, I have no time to develop such a capacity building manual ☒ Yes, I will send a proposal along the lines stipulated on the website

Brussels, 30 April 2008