FOOD & BUSINESS APPLIED RESEARCH FUND

Utilizing the genome of the vegetable species *Cleome gynandra* for the development of improved cultivars for West and East African markets – Benin, Kenya, The Netherlands

Consortium Members

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- **Patrick Maundu** - Senior Researcher, Kenyan Resource Center for Indigenous Knowledge.
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- **Eric Schranz -** Chair Holder, Biosystematics Group, Wageningen University.
- **Allen Van Deynze** - Professor Coordinator of the African Orphan Crops Consortium
- **Svein Solberg** - Genebank Manager, Headquarters, AVRDC-World Vegetable Center

Impact activities and preliminary results

- Germplasm collection conducted in West Africa (174 accessions) and Kenya (52 accessions) to complement AVRDC collection
- Demonstration plots on experimental sites and pilot farmers' fields in Benin and Kenya: Forty (40) urban farmers in Benin and Kenya adopted the species and already sell it on local markets.
- Participation to two fairs in Benin with posters displayed and tasting sessions of Cleome
- On-going participatory phenotypic characterization in Benin and Kenya
- Documentation of traditional knowledge of 55 ethnic groups and 52 local recipes in total in Benin and Kenya
- Development of germination protocols for Cleome seeds
- Metabolic diversity in 48 accessions at Wageningen University (contrasting metabolic profiles between African and Asian lines)
- Re-sequencing of 48 East-African and Asian lines

Project description

Aim

Developing improved cultivars of *Cleome gynandra* in Kenya and Benin in order to improve access to healthy diets for the vulnerable people living in marginal lands.

Methods

- Germplasm collection in West Africa and Kenya
- Phenotypic and metabolomics characterization of 100 accessions in controlled conditions
- Participatory characterization and selection for leaf yield potential and drought-tolerance in Benin and Kenya
- Re-sequencing of *C. gynandra* genotypes to facilitate future molecular breeding strategies for improved cultivars
- Creation of new adapted *C. gynandra* cultivars and development of technologies to grow and distribute them effectively

Opportunities

- Additional funding for metabolic analysis (vitamins A, C, E, phenolic compounds, volatile compounds etc.) of 100 accessions of *C. gynandra* at Wageningen University
- Enthusiasm of farmers and consumers who adopted or rediscovered *C. gynandra*
- MSc students in Benin, Kenya and the Netherlands are investigating ethnobotany, reproductive biology, best agronomic practices, QTL analysis for leaf yield, drought tolerance and photosynthesis efficiency in *C. gynandra.*

Challenges

- Poor germination of Cleome seeds.

Fig. 1. Farmers' preferences in Benin and Kenya taken into account at every step of the breeding program

Fig. 2. Tasting sessions of *Cleome gynandra* at National Agricultural Fair organized by ProCAD-Benin (25-30 April 2016, Cotonou)

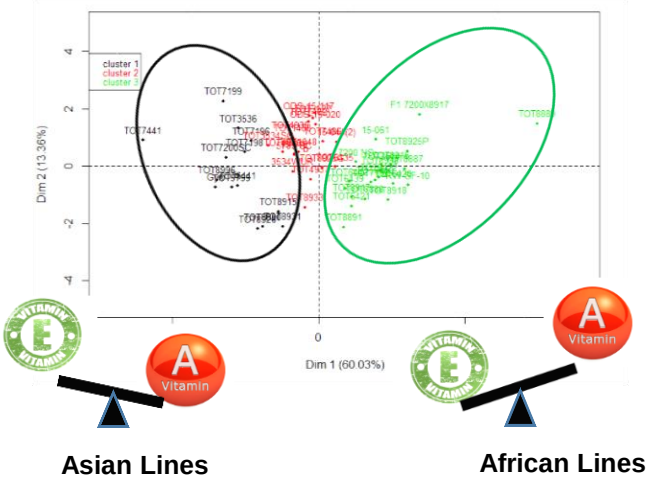

Fig. 3. Principal Component Analysis based on carotenoids, tocopherols and chlorophylls content in *Cleome gynandra*