Use of DNA Technology in Combating Illegal Trade and Promoting Conservation and Sustainable Use of Plants in Kenya and Tanzania

Beatrice Khayota/National
Museums of Kenya

- Global demand for plant products has increased
- Commercial illegal trade is the largest threat to wild plant populations.
- Species are trafficked in modified forms.
- Offenders not prosecuted due to inadequate scientific evidence
- DNA barcoding technology identifies plant materials to species level regardless of life stage, level of processing and gender




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Plant products

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Research Approach:

Market and points of entry/exit surveys

- Visits were made to various markets and boarder points, questionnaires administered
- Plant products on sale purchased, sub-sampled and used for lab protocol test
- All interviewees signed PIC forms-in compliance with Nagoya Protocol.

Field Study

Field trips were undertaken to collect DNA specimens, plants for living collection and herbarium voucher specimens.

DNA Barcoding Reference Library creation and Training

- Field data (FIMs), Lab data (LIMs) generated , analyzed with Geneious Software
- SOPs used for DNA extraction, PCR with standardized PCR makers-rbcL, MatK, nrITS, purified and sequenced
- Generated barcode sequences submitted to NCBI GenBank with tag “barcode”

Non-detriment Findings

- NDF Data was analyzed using, CoP17 Inf. 45

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Key results of your research/project so far:

Market survey and Field collection:

- 17 localities visited, over 929 specimens collected, trends and chain of commercial trade in plant products established

DNA barcoding

- Barcodes generated and deposited in GenBank
- Over 300 exhibits identified and expert evidence reports submitted and defended in court, three convictions secured, over 100 tonnes of wood products confiscated using DNA evidence

Capacity building

- Tanzania analysts trained in DNA barcoding techniques
- 1 PhD studentship for Kenya, 1 MSc. Studentship for Tanzania
- 5 presentations at international Conferences (AETFAT & iBOL)
- Following the PEER Legal Standards meeting, Tanzania considering new Act on non-human DNA including plants, microbes and animals.

NDF and Domestication.

- Plants/products most frequent in trade, identified, domestication initiated

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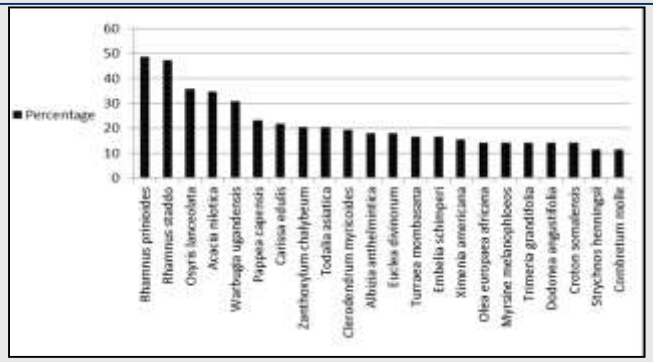
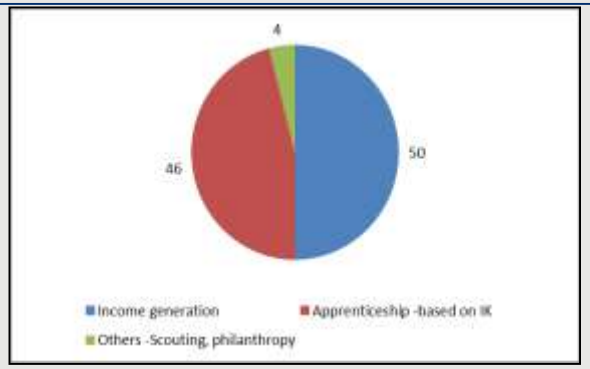
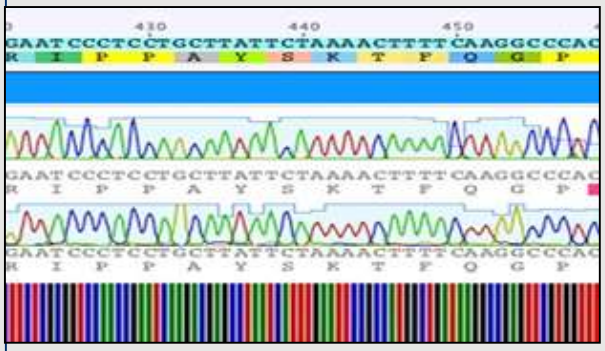
Chain of commercial trade



Plants in frequent trade



Motive for engagement in plant trade



DNA Barcode

Confiscated shipment

Court Exhibit

Training

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Top next steps for your project:

- Mapping of hot spots and Pilot domestication of priority species
- Training visit by PhD. and MSc students to Naturalis Biodiversity Centre
- Construction of DNA barcode reference library and submission in GenBank
- Completion of proficiency test and sample extraction
- Dissemination to communities, policymakers and enforcement officers' seminars
- End of project report workshop

Impact

- Generation of scientific (conservation, restoration , domestication) and trade data (biotrade) to inform policy formulation, decision making and compliance
- Creation of a DNA reference Library and trained analysts, a national resource
- Exhibits identification of confiscated plant samples and securing convictions
- Species frequent in trade have been identified for domestication
- Tanzania changing policy to include non-human DNA evidence in prosecution

Challenges:

- Prolonged procurement processes; electioneering season, unpredictable weather conditions; migration of data hosting from Amazon to NMK; delays in Proficiency test; propagation issues and support for the proposed enactment of wildlife DNA law in Tanzania

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Acknowledgements

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Smithsonian Institution

NATIONAL MUSEUMS OF KENYA
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ELIMU TIBA UTAFITI

Naturalis Biodiversity Center

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