

Using DNA barcoding technology to combat illegal wildlife trade in Kenya and Tanzania

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Introduction

Commercial illegal trade is the largest threat to wild plants. These species, valued as herbal remedies, beauty products, ornamentals etc., are trafficked in modified forms that taxonomic experts cannot identify. Wildlife offenders have been arrested and prosecuted, but acquitted due to inconclusive scientific evidence. DNA barcoding is now accepted and commonly used for species identification and wildlife forensics. The technology identifies plant materials to species level, regardless of their form, thus complementing existing diagnostic techniques.



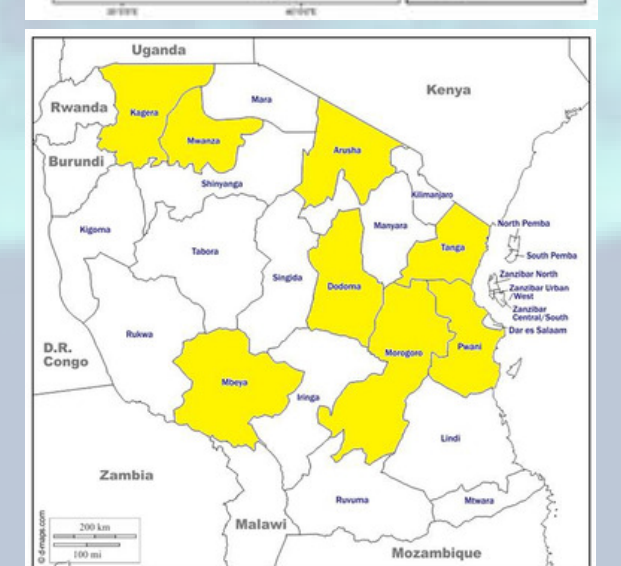
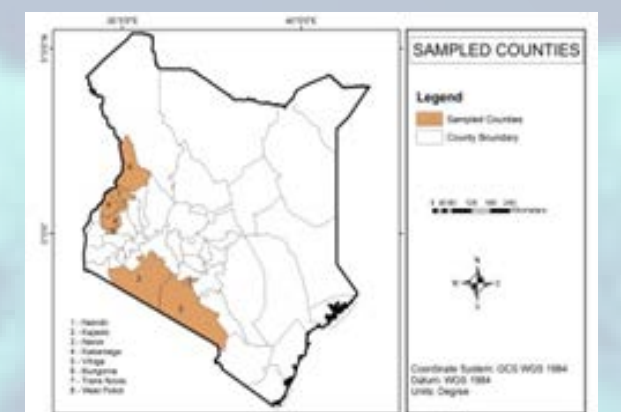
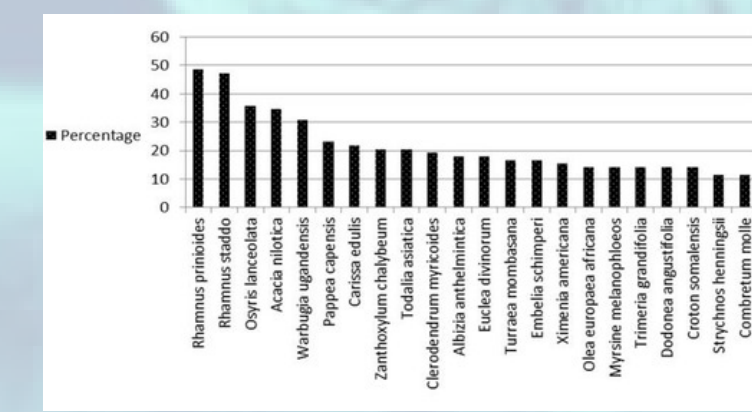
Non-Detriment Findings(NDFs)

NDF Data was generated and analyzed using doc CoP17 Inf. 45: 'CITES Non-detriment Findings Guidance for Perennial Plants. A nine-step process to support CITES Scientific Authorities making science-based non-detriment findings (NDFs) for species listed in CITES Appendix II', Version 3.0.

Results

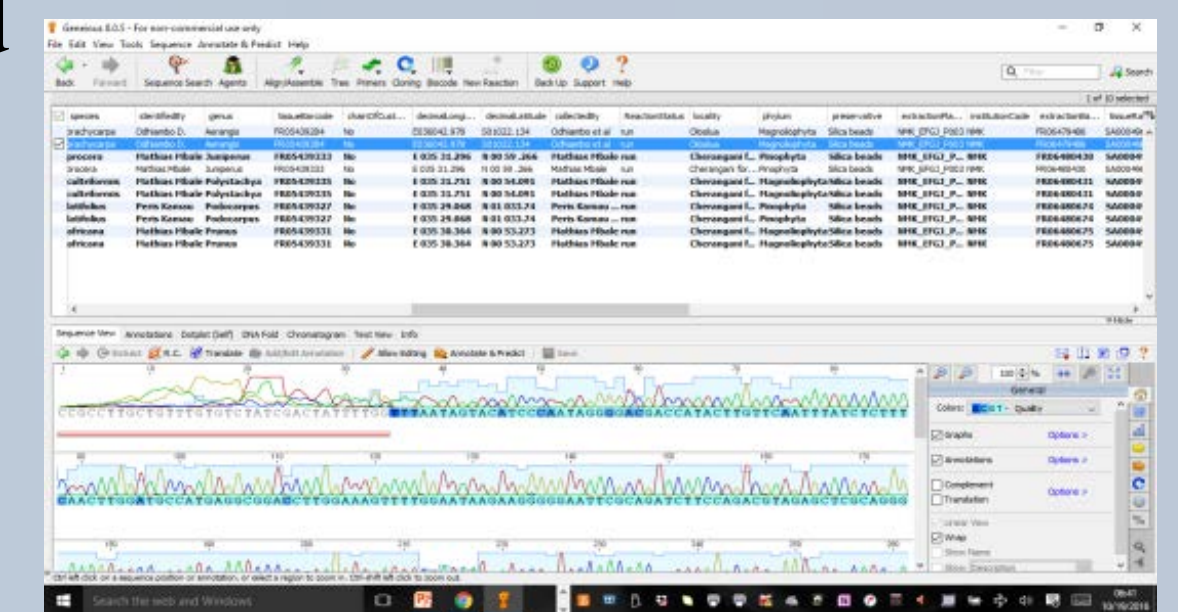
Market Survey and Field collection

- 26 localities were visited, over 929 specimens collected.
- Trends and chain of commercial trade in plant products established



DNA Barcoding

- Barcodes were generated and deposited in GenBank.
- Over 300 exhibits identified and expert evidence reports submitted to court, three convictions secured, over 100 tons of wood products confiscated based on DNA evidence.



Objectives

- Create a database for plants in illegal trade
- Promote sustainable use of plants for ecosystem security and economic development
- Generate DNA Barcodes and create reference library
- Enable natural resources and CITES management authorities in Kenya and Tanzania to use barcode reference library for investigations and prosecution of wildlife crime

Methodology

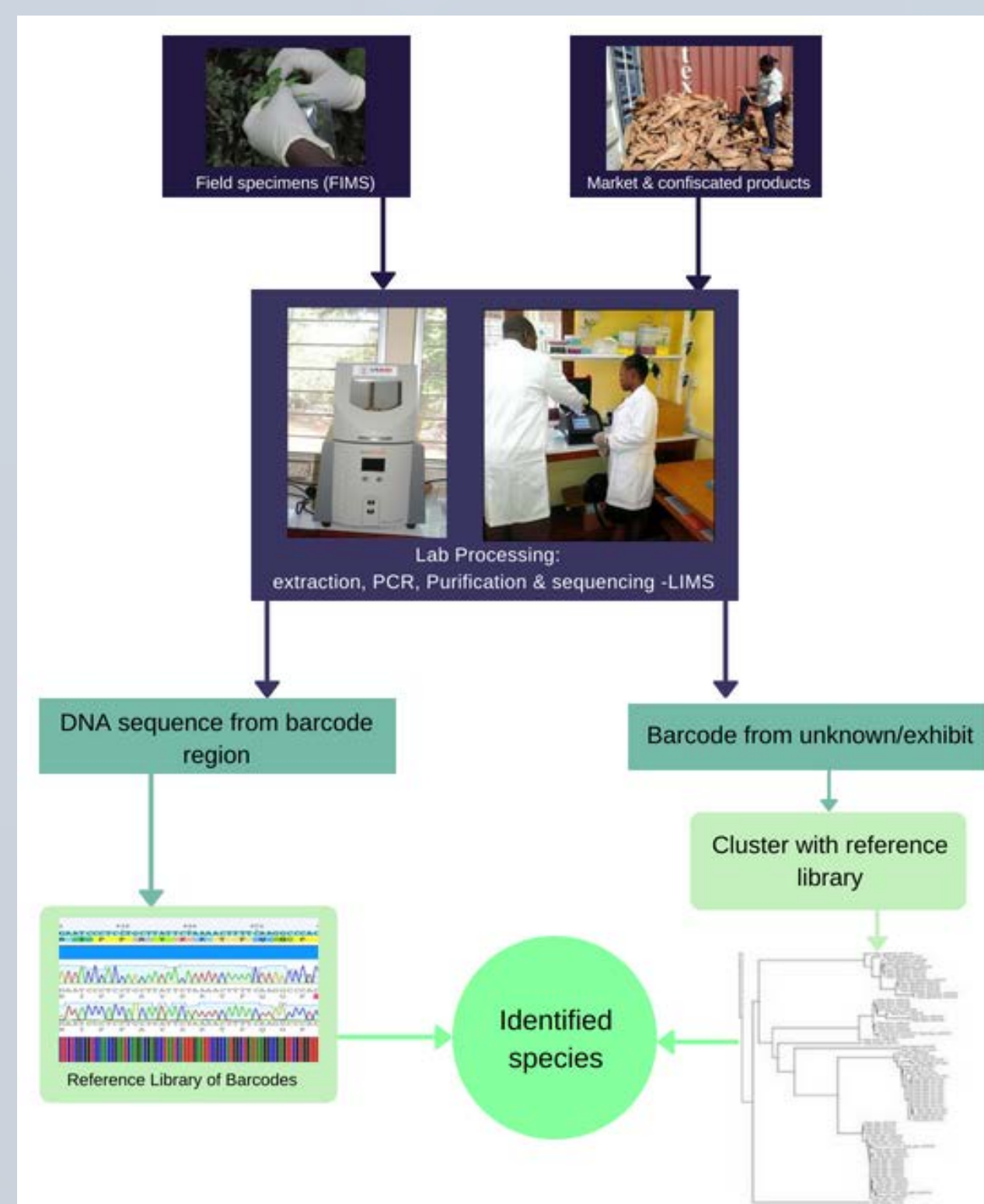
Market/Points of entry Survey

- Markets and border points were visited, questionnaires administered to vendors and plant products on sale were listed and purchased.
- Market samples were used for DNA lab protocol test. Interviewees signed PIC forms-in compliance with Nagoya Protocol.



Field Study

- Specimens for DNA Library creation, plants for living collection, herbarium voucher specimens and digital images were collected.
- Voucher specimens were deposited at NMK and MUHAS Herbaria, and Botanic Garden for curation and management. Field information Management systems (FIMS) for the collected samples were developed.



Capacity Building

- 11 analysts were trained in DNA barcoding techniques.
- 1 PhD studentship for Kenya, 1 MSc. Studentship for Tanzania
- Tanzania amending the wildlife act to include use of non-human DNA.

NDF and Domestication

Plants/products most frequent in trade were identified, domestication initiated.



Discussion Impact

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

References

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Conclusions

Preliminary results indicate that the global demand and illegal trade in plant products is increasing at an alarming rate. Use of DNA barcoding technology in identification and verification of species, regardless of their form, can complement other diagnostic methods. Coupled with capacity building, there will be increased convictions, potential for sustainable bio-trade and change in policy and relevant legislation, to include DNA barcoding for combating wildlife crime.

Acknowledgements

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