

Use of DNA Barcoding to combat wildlife crime

Henry Ndithia, National Museums of Kenya

- Wildlife criminals => anti-detections strategies



- ID using morphology difficult
- DNA barcoding: a technique that uses DNA of an organism to identify it as belonging to a particular species



Animal capture



Sample collection



DNA analyzed, uploaded to GenBank

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- Living collection: in the wild, in captivity, Zoos & rescue centers – blood or tissue
- Database – FIMS & LIMS

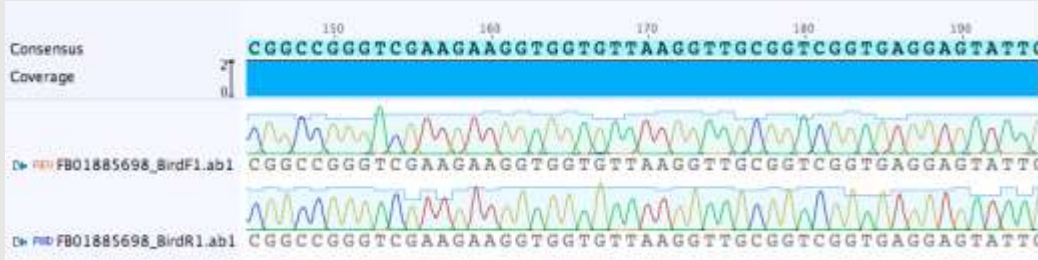


Accession No.	Specimen ID	Specimen Name	Specimen Type	Specimen Source	Specimen Date	Specimen Location	Specimen Collector	Specimen Identifier	Specimen Sex	Specimen Age	Specimen Weight	Specimen Length	Specimen Width	Specimen Height	Specimen Circumference	Specimen Volume	Specimen Surface Area	Specimen Volume Weight Ratio	Specimen Length Weight Ratio	Specimen Width Weight Ratio	Specimen Height Weight Ratio	Specimen Circumference Weight Ratio	Specimen Volume Weight Ratio	Specimen Surface Area Weight Ratio	Specimen Volume Weight Ratio
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LOCUS   COJ_workfile18778             432 bp   DNA   linear   03-MAY-2018
DEFINITION   Kinixys belliana.
ACCESSION   Kinixys belliana.
VERSION     1.0
KEYWORDS   BARCODE.
SOURCE     mitochondrial Kinixys belliana
ORGANISM   Kinixys belliana
            Unclassified.
REFERENCE   1 (bases 1 to 432)
AUTHORS   Mwangi, E.W., Ndithia, H.E., Njuguna, E.G. and Mwaure, A.H.
TITLE     DNA Barcoding to Combat Wildlife Crime [Kenya]
JOURNAL   Unpublished
REFERENCE   2 (bases 1 to 432)
AUTHORS   Mwangi, E.W., Ndithia, H.E., Njuguna, E.G. and Mwaure, A.H.
CONSTRM   MNK Barcoding
TITLE     Direct Submission
JOURNAL   Submitted (03-MAY-2018) Zoology, National Museums of Kenya, Museum Hill, Nairobi, Nairobi 40458-00100, Kenya
COMMENT   ##SWP:1.0-START##
            typeStatus      :: other
            basisOfIdentification  :: guidebook
            identificationConfidence  :: 1
            identificationDate    :: 04-Jun-2017
            ##SWP:1.0-END##
FEATURES             Location/Qualifiers
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                     /country="Kenya"
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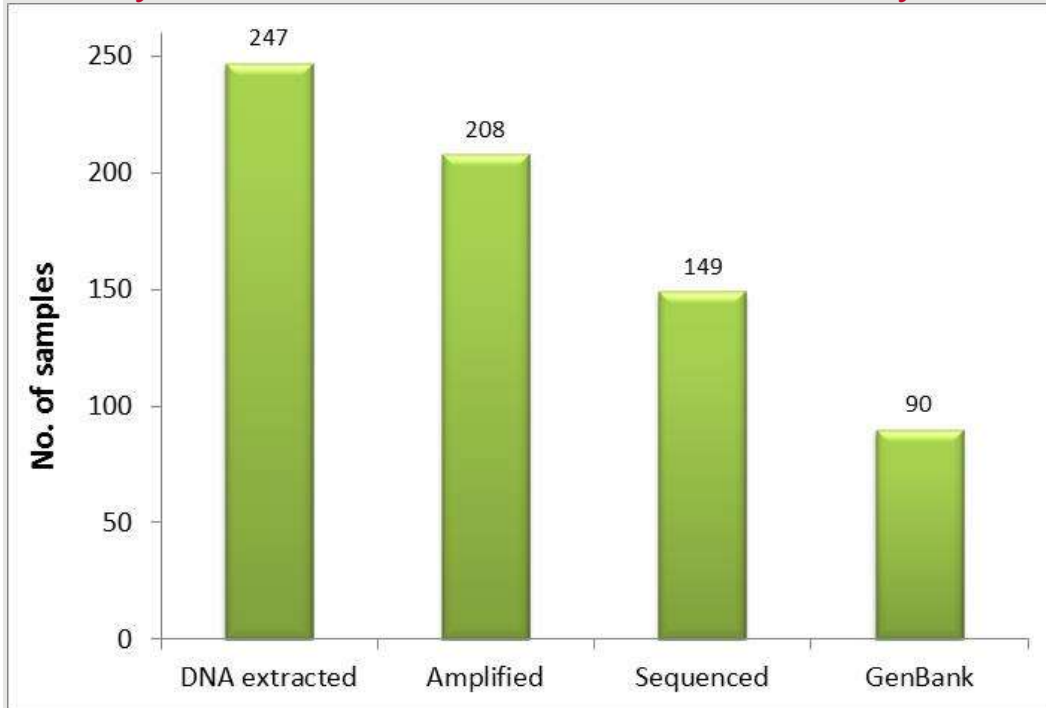
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- Capacity of molecular genetics lab increased through acquisition of 16 state of the art equipment, center for construction of DNA barcode reference library
 - Increased equipment & efficiency, e.g., Thermal cycler has 2 plates, runs 2 PCR protocols
 - Observe international standards: separate equipment for separate procedures, reduce contamination, e.g., with Gel doc, no need for dark room
- PhD student: field data collection almost complete, Lab analyses ongoing
- 12 Trainees from Tanzania trained on DNA chain analysis & informatics, post-training support ongoing, awaiting proficiency test
- 287 animal samples collected, to be added into the barcode reference library
- Strong partnerships: National Museums of Kenya continues to partner with KWS in species ID using both morphology and verifying with barcoding technology



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	Exhibits	Identified as
1	Colobus Monkey skin	Goat skin
2	Rod-Like products	Reticulated Giraffe

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- Complete DNA analyses in the Lab & upload to GenBank
- Enforcement & end of project workshops
- Results dissemination & project reporting
- Provision of confident species ID for courtroom prosecution => Increased No. of successful prosecution, deterrence to wildlife crime, limit revenue to crime networks
- Reduce threat from wildlife crime => long-term increased population size of endangered/traded species
- Positive effects on Kenya's tourism industry, economic growth
- Small wild population of endangered species & trapping difficulties
- Procurement & tax reimbursement procedure challenges
- GoK austerity measures
- challenges related to weather & political climate
- Challenges related to Tanzania: trainees withdrawal; trainees not meeting assignments deadlines, poor internet affect communication & training progress