

DNA-based identification of individual white rhinoceros (*Ceratotherium simum*) from horn and other samples for forensic use



Cindy Harper , Lindsay Peppin, Anette Ludwig, Anandi Bierman

VETERINARY GENETICS LABORATORY

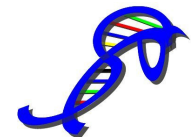
Faculty of Veterinary Science

University of Pretoria



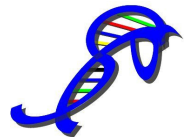
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Denkiers • Leading Minds • Dikgopolo l̥ša Dikalefi



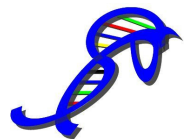
Background

- **Rhino - primary target species for illegal hunting**
 - Traditional Asian Medicine in Far East
 - Dagger handles in Yemen
- **Wildlife DNA Forensic course in 2007 at VGL**
 - Rhino priority for validated forensic test
- **Individually identify horn and tissue from white rhino**
 - Evidence in poaching cases
 - Identification for translocation purposes
 - Identify horn from stockpiles and dehorning operations
 - Genotype for permit applications?



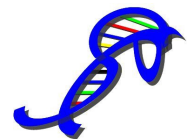
DNA Test Format: Extraction

- DNA extraction from horn (0.5 to 1cm³)
- Horn contains cells = Nuclear DNA - NOT a clump of hair
- DNA quality affected by sample age and exposure to UV light
- Horn samples - SANParks
 - collected from various sites of the horn
 - did not affect DNA recovery

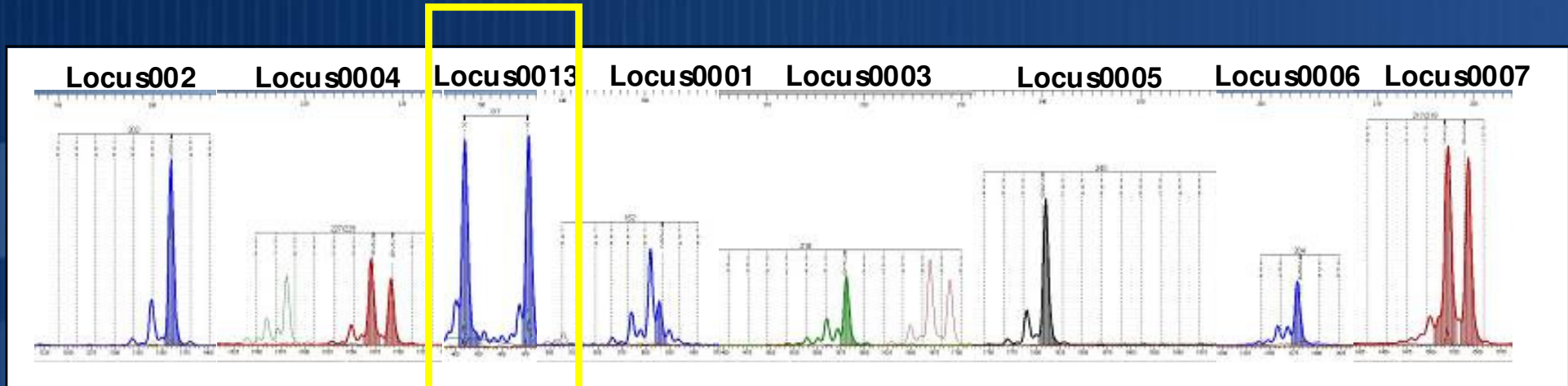


DNA Test Format: Genotyping

- **Nuclear DNA**
 - **Microsatellite (STR) markers**
- **Set of 13 markers:**
 - **Ease of allele calling**
 - **Consistent amplification**
 - **Ability to multiplex in PCR**
 - **reduced cost**
 - **Increased throughput**
 - **Sex marker – zinc finger protein**
 - **Forensic validation**

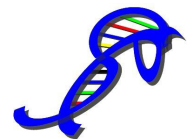
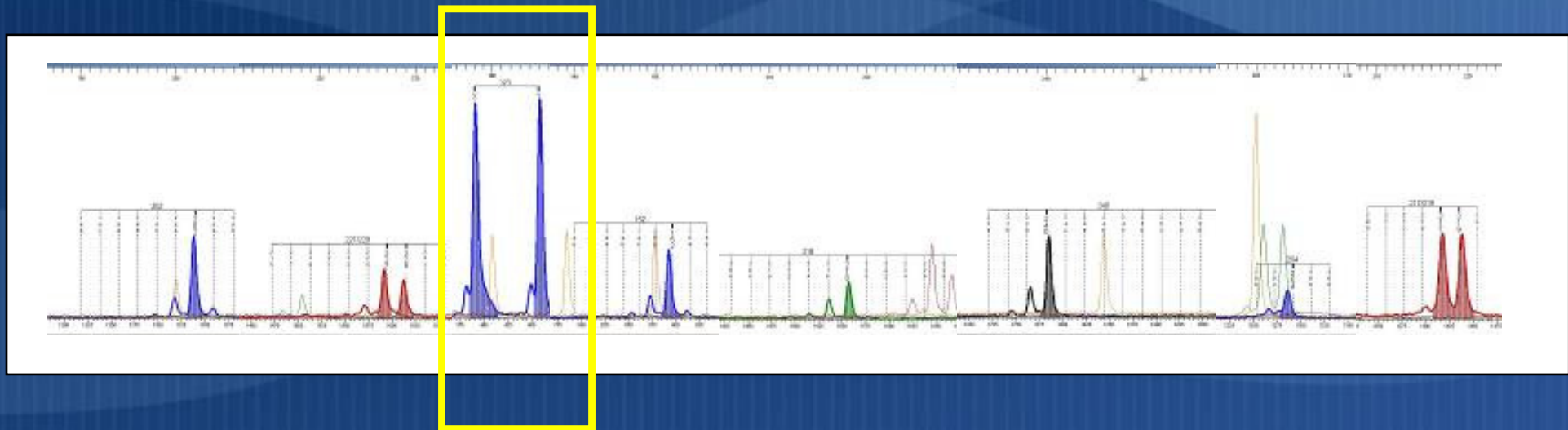


Blood Sample

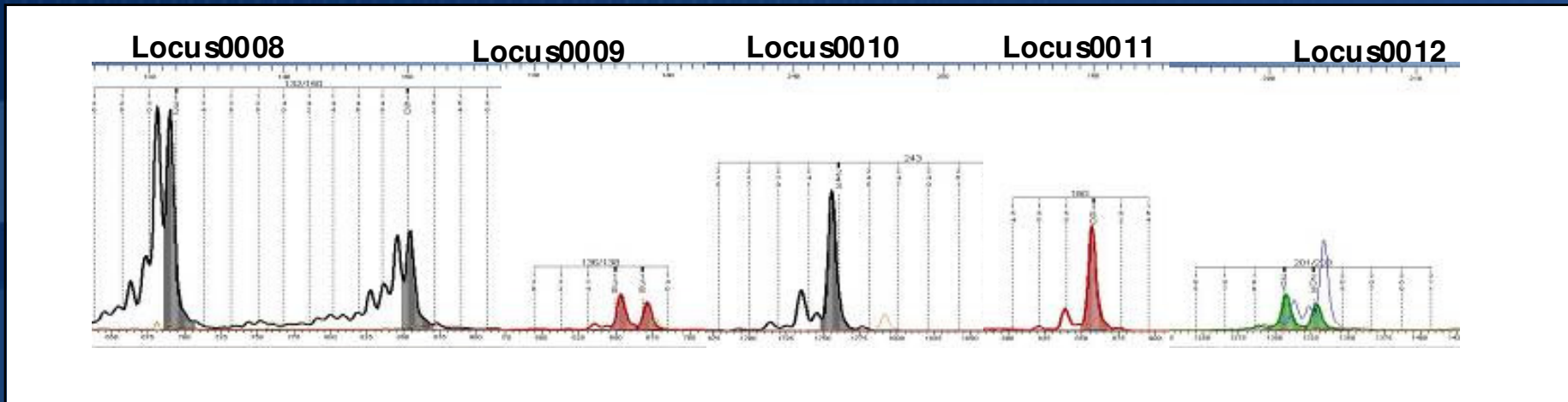


Horn Sample

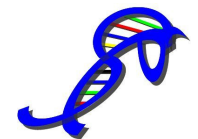
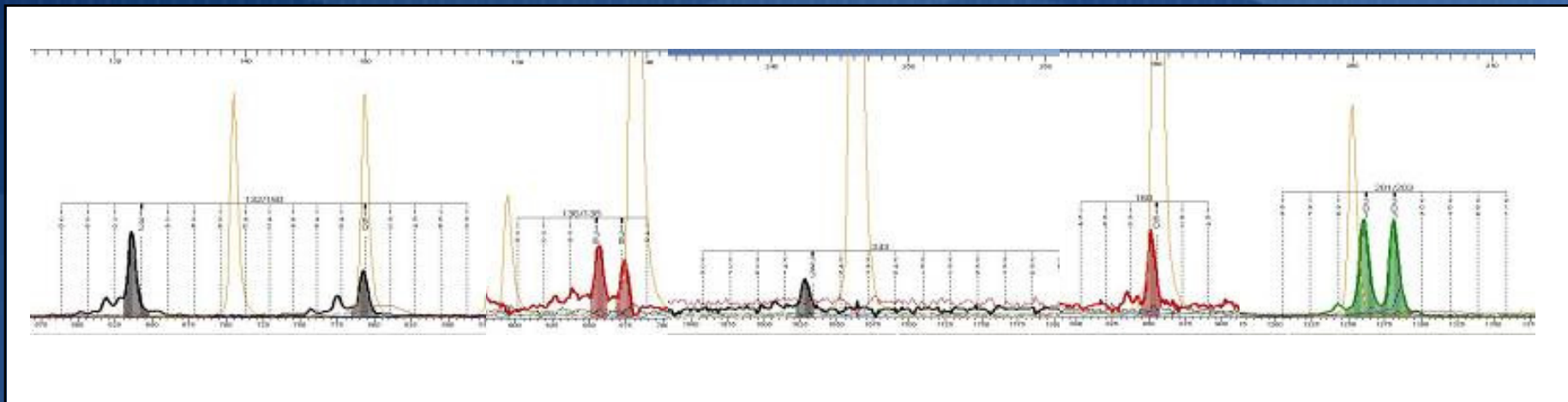
ZF - XY



Blood Sample



Horn Sample



Conclusions

- DNA extraction method for horn developed
- STR based DNA fingerprinting test developed
- Forensically validated

- Identification of horn and tissue from white rhino
 - evidence
 - individual identification
 - traceability of horn stockpiles
 - genotypes for certification

