



DNA Profile Analysis for Zoo Animals

Applications:

- Estimation of Genetic Variation for Breeding Management
- Parentage Verification
- Individual Identification for Studbook Registry
- Population / Subspecies Differentiation



Zoo Animal Genetic Analysis

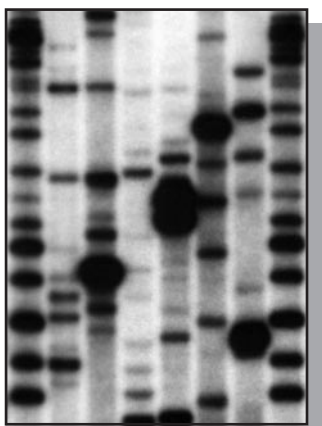
The ability to address questions of genetic identity in zoo animals is now dramatically enhanced. The DNA profile test offered by Therion International is more powerful than conventional blood protein analysis because it detects DNA-sequence information which is highly variable. This technology provides a sensitive method for sire/dam verification and population genetics analysis for captive breeding programs. To date, our staff has successfully processed samples from over 350 species/breeds of animals including: mammals, birds, reptiles, amphibians, fish, and invertebrates.

Following are descriptions of three of the many DNA-based projects which have been conducted by Therion.

Estimation of Genetic Variation

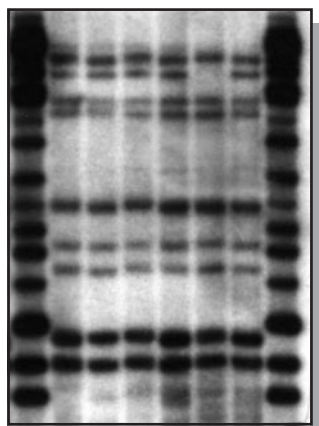
To ensure the long-term reproductive success and survival of captive-bred populations of animals it is essential to routinely monitor levels of genetic variation. Pictured below are two sets of DNA profiles (probe OPT™-05)

Population A



MWSS O1 O2 O3 O4 O5 O6 MWSS

Population B



MWSS T1 T2 T3 T4 T5 T6 MWSS



Pygmy Marmoset

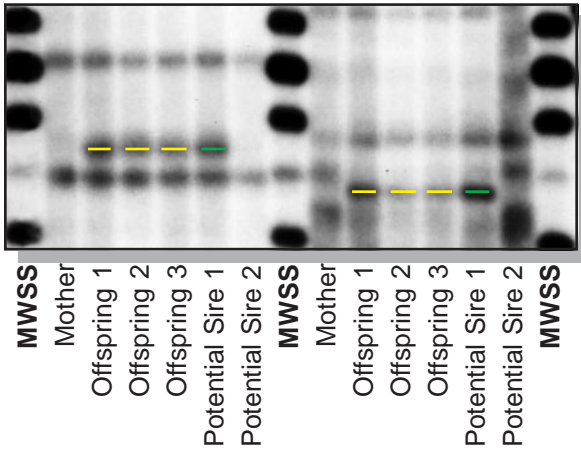
generated from individuals belonging to two separate colonies of New World primates. Population A exhibits high levels of genetic variation (as indicated by a low level of band sharing among individuals). In contrast, population B exhibits a low level of genetic variation (as indicated by high levels of band sharing among individuals). Note the nearly identical DNA profile banding patterns among individuals of population B. DNA profile results can be used to generate estimates of heterozygosity, genetic distance and relatedness.

Parentage Verification

A female river otter who had been housed with two males produced a litter of three pups. To verify paternity, DNA profiles were produced from the



River Otter DNA Profiles



female, her offspring and the two males. The autoradiograph to the left depicts DNA profiles produced using DNA probe OPT™ -02.

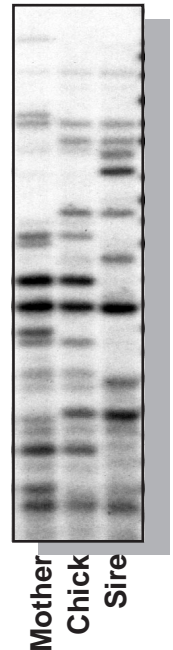
Two genetic markers (bands) found in the DNA profile of the offspring (indicated in yellow) were not present in the DNA profile of the mother. These two genetic markers (indicated in green) were observed in the DNA profile of sire 1 but not in sire 2. Other genetic markers and additional DNA probe assays corroborated the conclusion that sire 1 was the true sire of the three offspring.

A study was conducted to verify parentage in captive nesting pairs of scarlet and Waldrapp ibises. The autoradiograph at right depicts the DNA profiles of a nesting pair of scarlet ibises and their chick. Note that each genetic marker observed in the DNA profile of the chick can also be observed in the DNA profile of one or both adults thus verifying parentage. No scarlet ibis chicks were found to be the product of an extra pair copulation, however some Waldrapp chicks were “excluded” from being the offspring of the mated pair who's nest they were found in.



Scarlet Ibises
(photo courtesy of S. Elbin)

ibises. The autoradiograph at right depicts the DNA profiles of a nesting pair of scarlet ibises and their chick. Note that each genetic marker observed in the DNA profile of the chick can also be observed in the DNA profile of one or both adults thus verifying parentage. No scarlet ibis chicks were found to be the product of an extra pair copulation, however some Waldrapp chicks were “excluded” from being the offspring of the mated pair who's nest they were found in.



Specimen Requirements

(Please call before shipping **any** samples)

Specimen Type	Volume	Container	Shipping Instructions
Whole Blood containing: Nucleated RBC Non-nucleated RBC	0.1-2 ml 5-10 ml	EDTA Purple Top Vacutainer™	Liquid— overnight on ice packs Frozen— overnight on dry ice
Tissue	Call for instructions		

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