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Reliable noninvasive genotyping: fantasy or reality?

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Source

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Abstract

Noninvasive genotyping has not gained wide application, due to the notion that it is unreliable, and also because remedial measures are time consuming and expensive. Of the wide variety of noninvasive DNA sources, dung is the most universal and most widely used in studies. We have developed collection, extraction, and amplification protocols that are inexpensive and provide a high level of success in amplifying both mitochondrial and nuclear DNA from dung. Here we demonstrate the reliability of genotyping from elephant dung using these protocols by comparing results from dung-extracted DNA to results from blood-extracted DNA. The level of error from dung extractions was only slightly higher than from blood extractions, and conducting two extractions from each sample and a single amplification from each extraction was sufficient to eliminate error. Di-, tri-, and tetranucleotide loci were equally reliable, and low DNA quantity and quality and PCR inhibitors were not a major problem in genotyping from dung. We discuss the possible causes of error in genotyping with particular reference to noninvasive samples and suggest methods of reducing such error.

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