Developing Molecular Genetic Assays for the Detection of Mountain Lion (Puma concolor) DNA from Snow-Tracks

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The mountain lion (Puma concolor) is a large felid endemic to North and South America. Mountain lions were nearly extirpated across much of their range due to anthropogenic encroachment, habitat fragmentation, and systematic extermination campaigns. While mountain lion populations have rebounded in the United States, threats from anthropogenic expansion and resulting conflict threaten their persistence. Appropriate management of this important carnivore requires accurate population distribution data, however, this can be challenging to obtain with traditional surveys due to the widespread and elusive nature of mountain lions. Alternatives to traditional surveys include non-invasive surveying techniques such as hair collection, but these techniques have had variable results, and camera stations and scat have been misidentified as closely-related species. Recent molecular approaches, particularly environmental DNA (eDNA) analysis, have proven useful in detecting small concentrations of DNA in snow tracks of rare carnivores. To more accurately monitor the presence of mountain lions, an eDNA assay was developed to detect mountain lion in snow tracks. The eDNA assay consistently detected mountain lion DNA in concentrations as low as two copies per reaction and was validated using field samples previously collected as snow-tracks of mountain lion, fisher (Pekania pennanti), wolverine (Gulo gulo) and Canada lynx (Lynx canadensis), and one unknown track. The assay successfully detected mountain lion in field samples as well as the unknown track, and did not DNA in tracks left by non-target species.

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