

Module 9: Genomic Applications in Genetic Resource Management: Cross-Disciplinary (e.g. Diagnostics, Forensics, Ecological Genomics, & Case Studies)

Introduction

Previous modules introduced genetic principles geared primarily towards using genetic markers and genomic tools for breeding applications. This module introduces other tools and approaches geared toward broader questions involving genetic resource management. For example, allozymes have long been used to describe population structure and gene flow in forest tree populations. Similar questions can now be addressed using DNA-based marker systems that may offer greater precision. Examples of other applications include DNA profiling for tracing population origins, DNA fingerprinting for forensic analyses, disease diagnostics, forest health assessments, or possibly predicting health declines from anticipated climate change. Many of these applications could play important roles in managing gene resources at the landscape scale, or for related disciplines such as conservation biology and wildlife or fisheries management.

Key Messages

- Genetic markers and genomic tools can be applied to a diverse collection of genetic resource management issues
- Approaches encompass diagnostic tools, forensic analyses, and descriptive methods, among others
- Timescales include contemporary populations, historical interpretations, and predictions of future situations.

Outcomes

Course attendees will:

- have a better understanding of how genetic markers and genomic applications can be used as genetic resource management tools in ways other than applied breeding
- become familiar with several case studies illustrating how these diverse tools have been applied
- be better prepared to plan, implement, or coordinate such activities in the course of their own research or professional responsibilities