

# Development of a New PowerPlex® STR System for Human Identification

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## Abstract

As human identification through STR genotyping continues to expand and mature, Promega is developing new systems to meet the evolving needs of the marketplace. Genotyping labs have increased in number and throughput; with these increases the number of profiles generated and the size of databases worldwide have grown rapidly. In turn, opportunities for data sharing and database searching are also more prevalent. Here we describe a new PowerPlex® STR system with increased discriminatory power and data sharing possibilities through the incorporation of common and informative loci used in the United States, Europe, and Asia. In addition to increased database overlap, this new system also incorporates improved chemistry to offer a robust STR solution.

## PowerPlex® 21 System Thermal Cycling Protocol

### PowerPlex® 21 System Cycling

96°C 1 min  
 94°C 10 sec } 30 Cycles  
 59°C 1 min }  
 72°C 30 sec }  
 60°C 10 min  
 4°C ∞

Max Ramp Mode

1:30 total Cycle Time

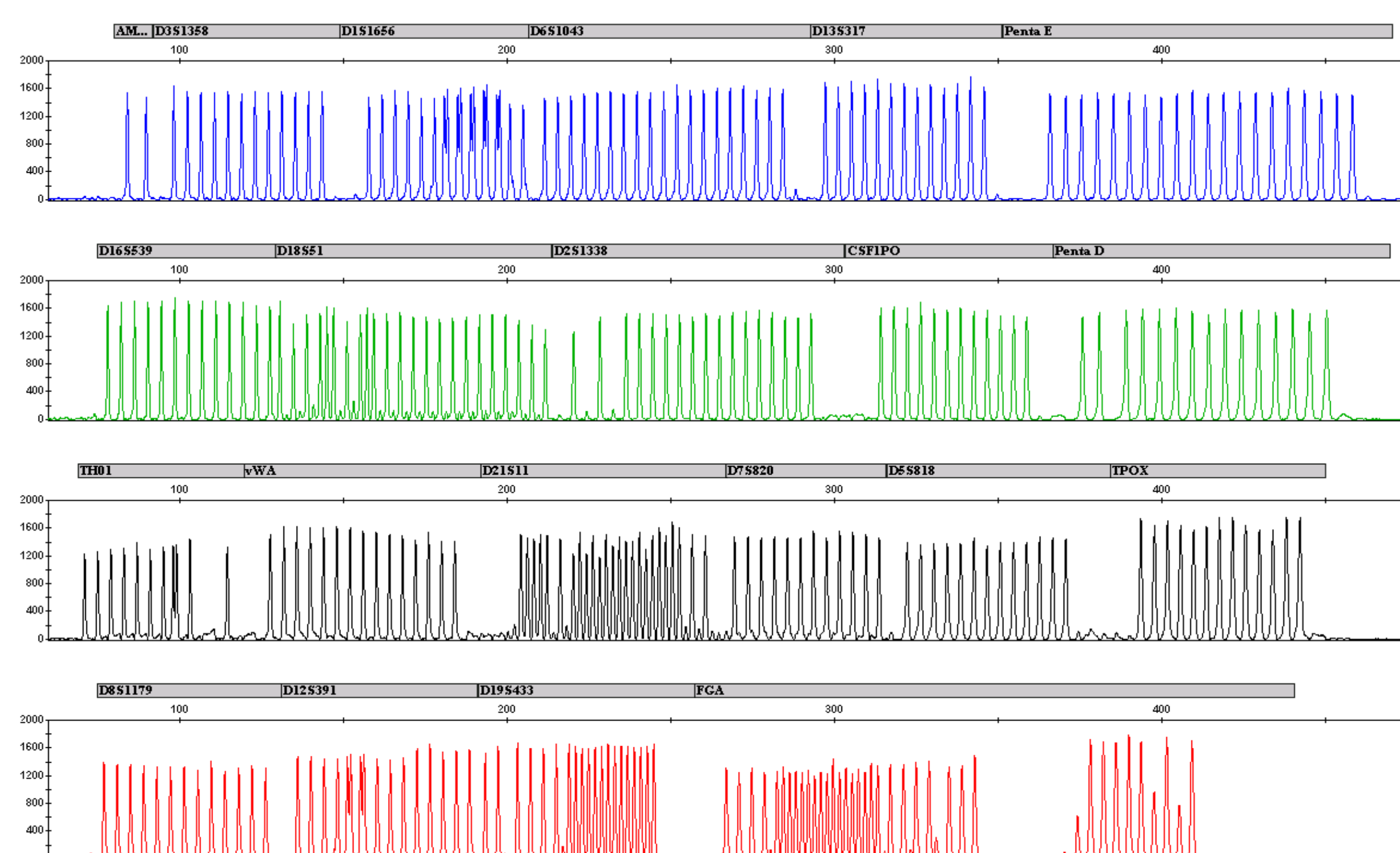
### PowerPlex® 16 HS System Cycling

96°C 2 min  
 94°C 30 sec } 10 Cycles  
 60°C 30 sec }  
 70°C 45 sec }  
 90°C 30 sec } 22 Cycles  
 60°C 30 sec }  
 70°C 45 sec }  
 60°C 30 min  
 4°C ∞

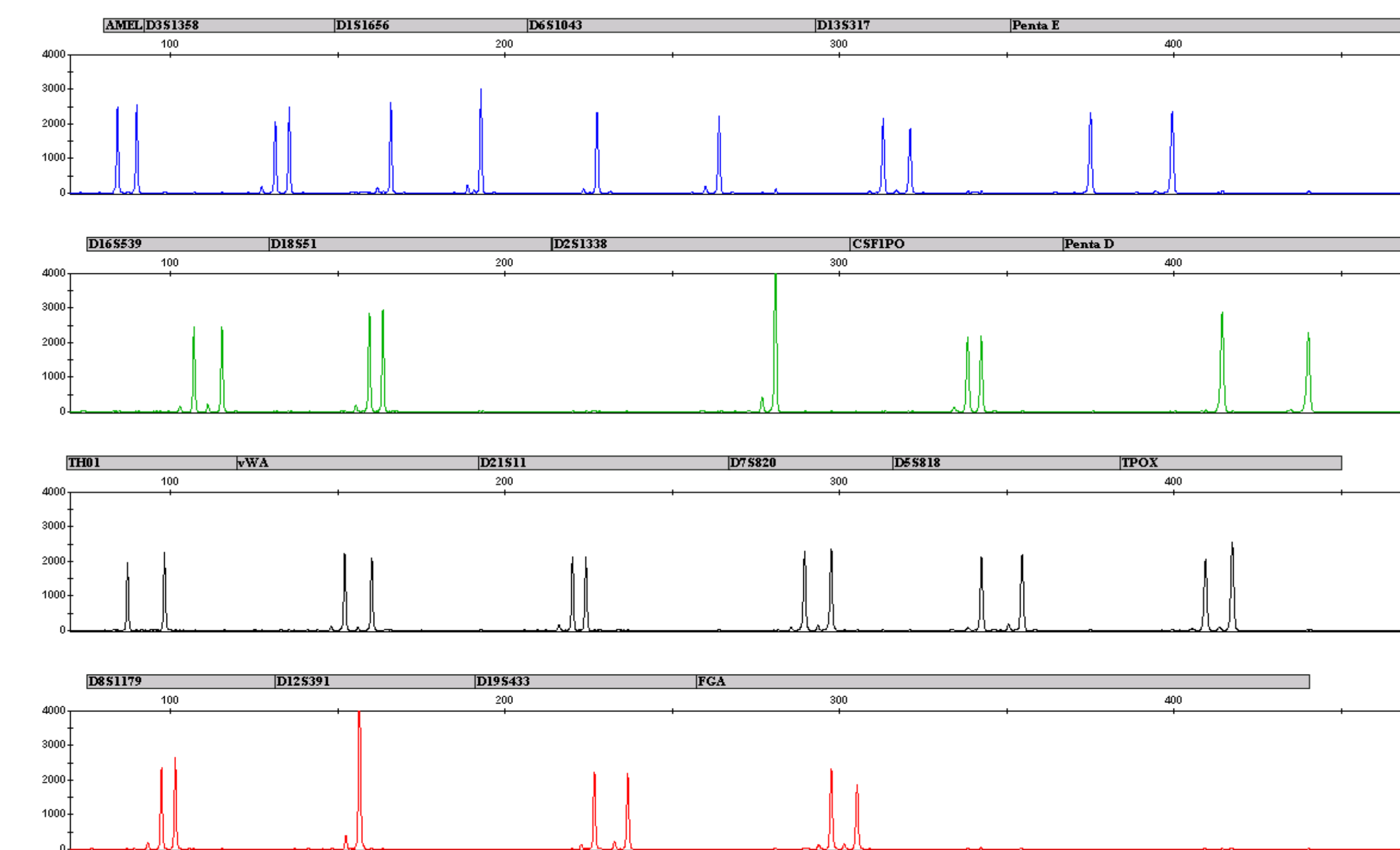
Programmed Ramps  
 9600 Ramp Mode

3:30 total Cycle Time

## Allelic Ladder

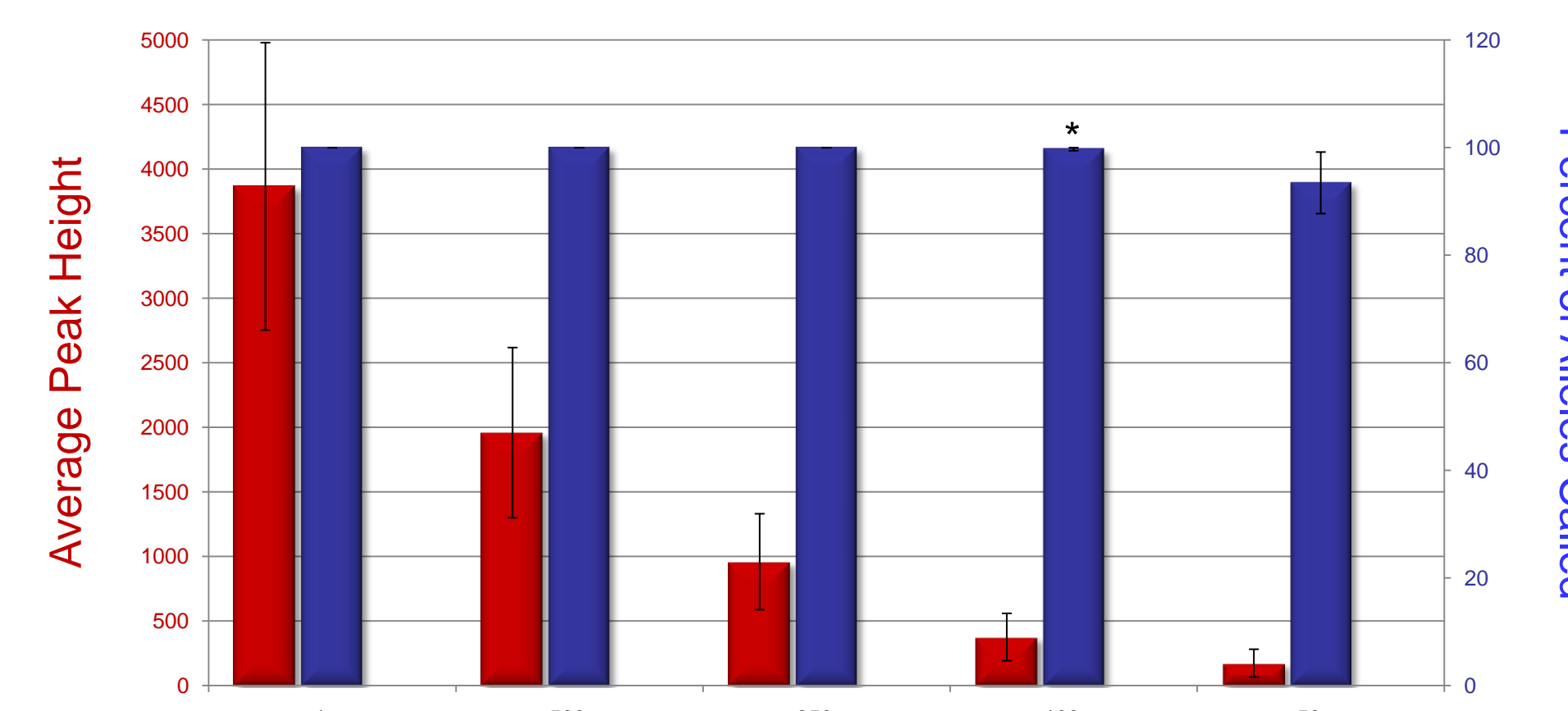


## PowerPlex® 21 System Amplification



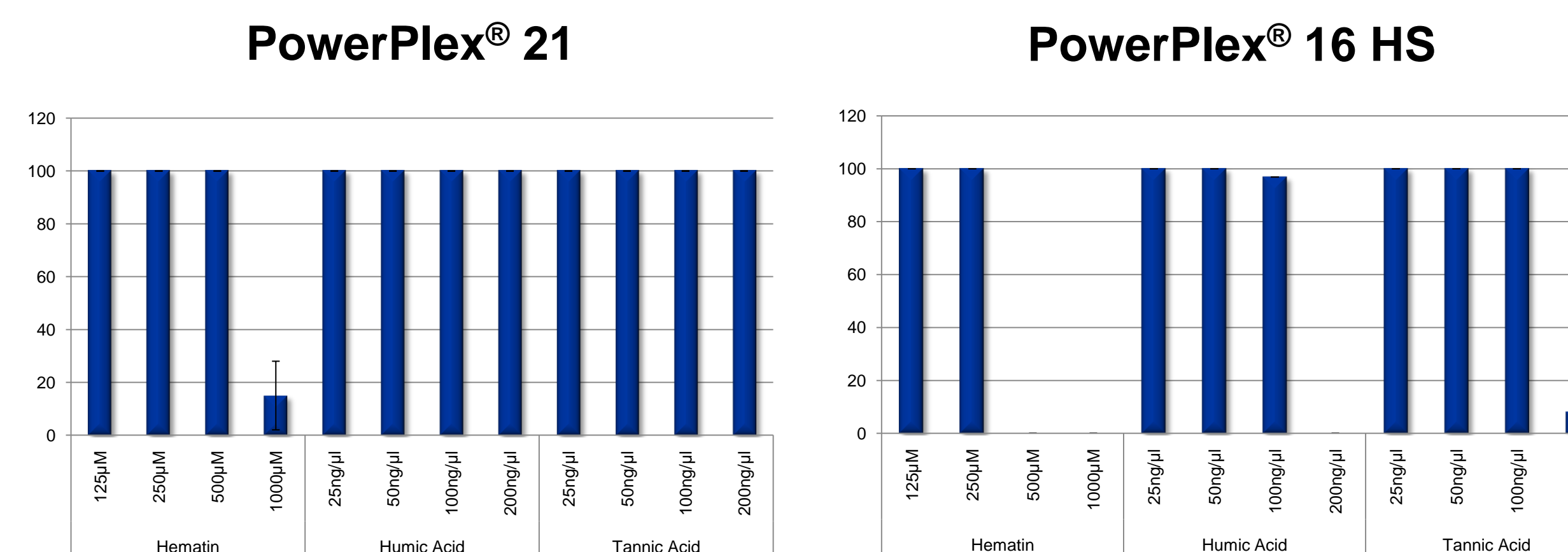
500pg human genomic DNA source. Amplified according to recommended protocol. Separated on an Applied Biosystems 3130 Genetic Analyzer (3kV, 5sec injection)

## Sensitivity



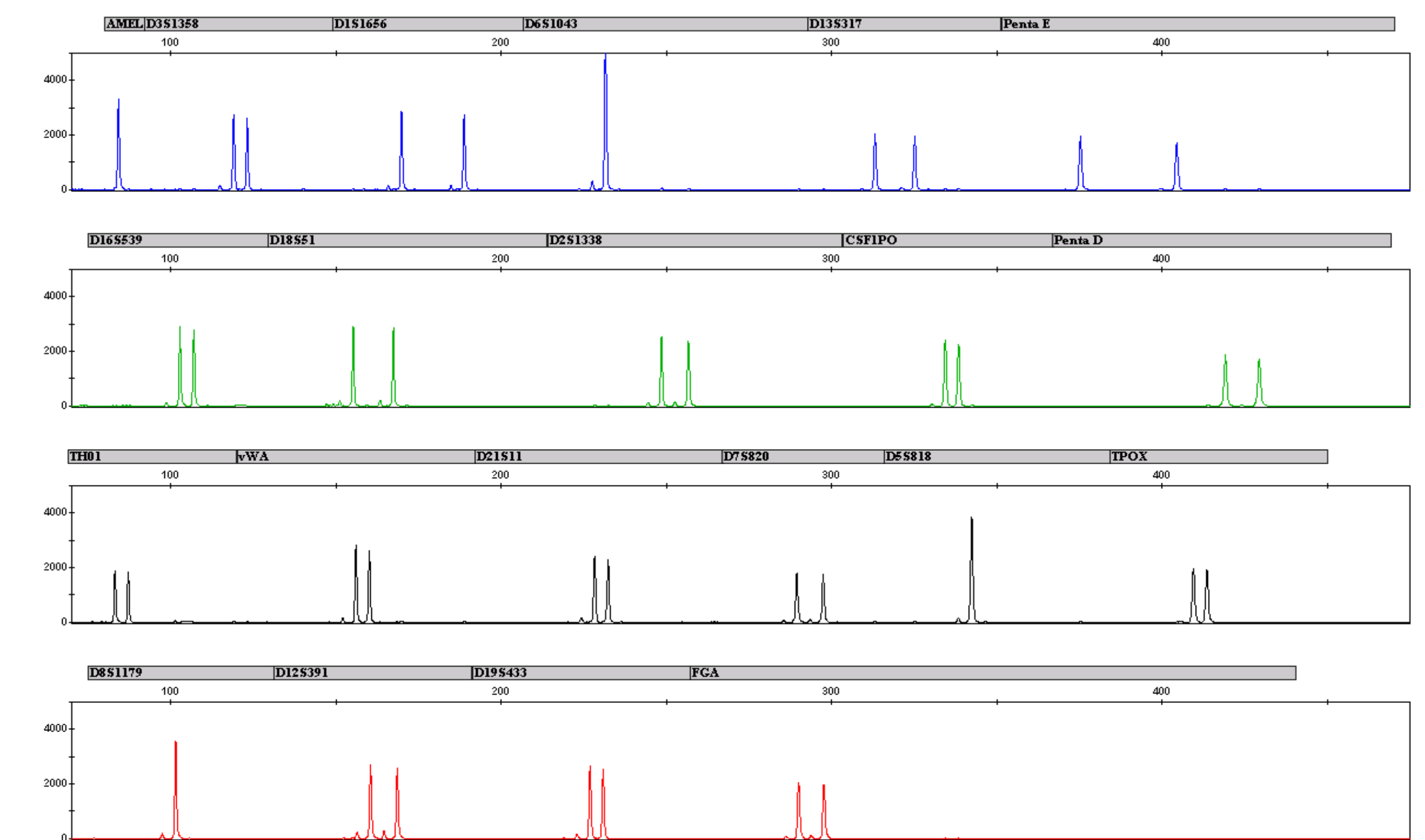
Data from triplicate amps of three genomic DNA sources with a total of 354 possible alleles per concentration. 50RFU threshold. \*353/354 alleles called

## Common PCR Inhibitors (Percent of Alleles Called)



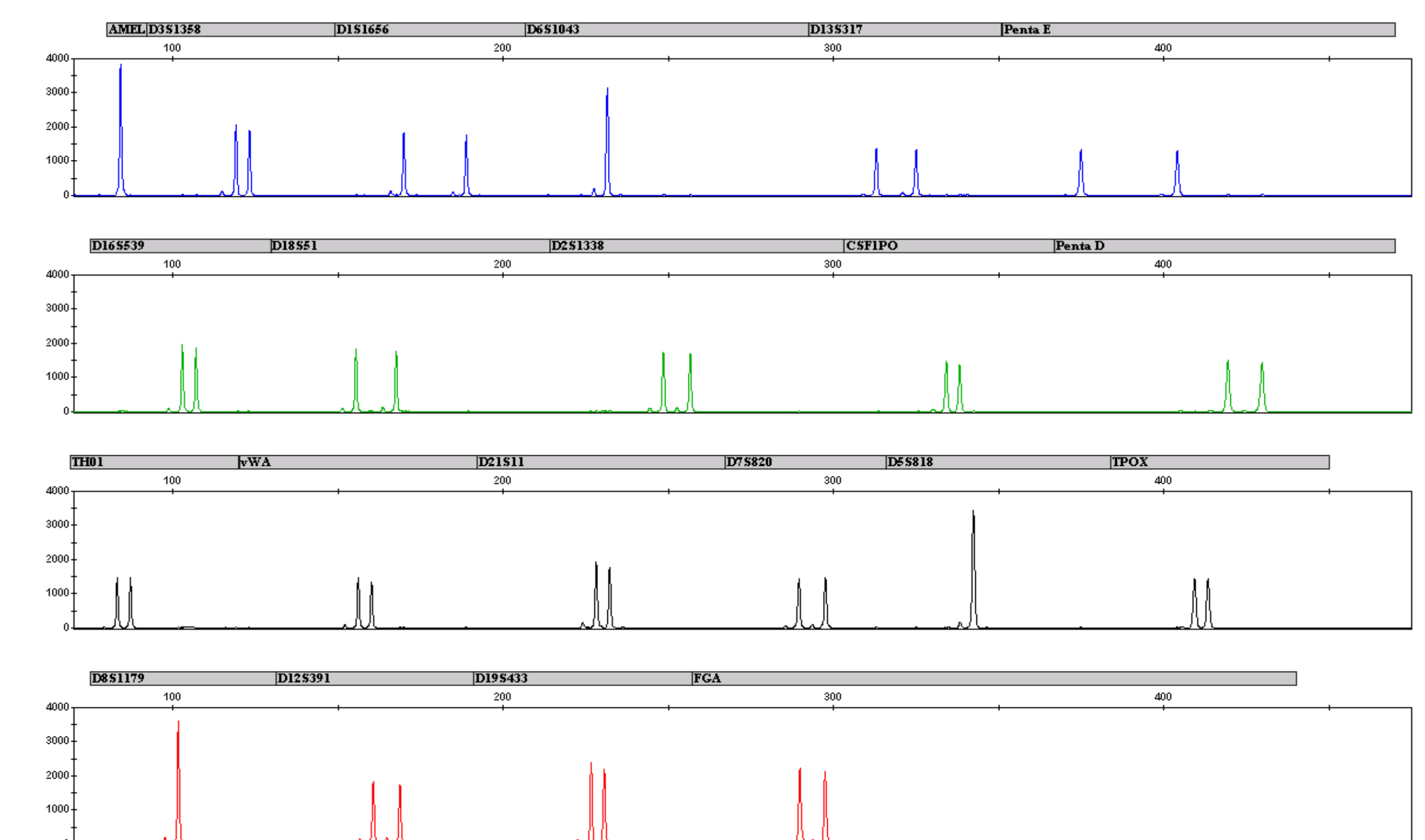
500 pg of genomic DNA (n=3) was amplified with each kit in the presence of the listed inhibitors. Amplification reactions were done according to their recommended protocol. 50 RFU threshold.

## Direct Amplification: FTA



1x1.2mm punch from blood on FTA. Amplified according to recommended protocol. Separated on an Applied Biosystems 3130 Genetic Analyzer (3kV, 5sec injection)

## Direct Amplification: S&S903



1x1.2mm punch from buccal on S&S 903. Pre-treated with SwabSolution™. Amplified according to recommended protocol. Separated on an Applied Biosystems 3130x Genetic Analyzer (3kV, 5sec injection)

## The PowerPlex® 21 System...

- incorporates a simple, rapid thermal cycling protocol.
- includes all core CODIS loci as well as informative loci used in Europe and Asia.
- can reliably genotype samples with as little as 50pg of human genomic DNA.
- improves upon the already robust performance of PowerPlex® 16 HS System.
- is suitable for direct amplification.
- is fully compatible with 3500 series Genetic Analyzers.

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