NIST FORENSIC SCIENCES

NIST Applied Genetics

MIX 13
Mixture Interpretation Interlaboratory Challenge

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MIX13 - Purpose

- MIX05 – conducted in 2005. Since then a great deal of effort has been focused on improvements in DNA mixture interpretation.

- 2010 SWGDAM Guidelines approved in January 2010 – many labs have changed their protocols recently.

- MIX13 – Interpretation challenge – no samples to run.

MIX13 - Goals

- (1) To evaluate the current “lay of the land” regarding STR mixture interpretation across the community.

- (2) To measure consistency in mixture interpretation across the U.S. after the publication of the 2010 SWGDAM guidelines.

- (3) To learn where future training and research could help improve mixture interpretation and reporting.

MIX13 – Study Details

- Five cases are provided each with an evidentiary sample file (a mixture of at least one suspect and one victim), and ***depending on the scenario***, a victim reference profile, suspect(s) profiles and other known references.
- We have generated .fsa files on an ABI Genetic Analyzer 3130xl using either PowerPlex16HS or Identifiler (BU)/IdentifilerPlus (NIST) kits.

4 Samples from NIST, 1 sample from BU

MIX13 – Case 01

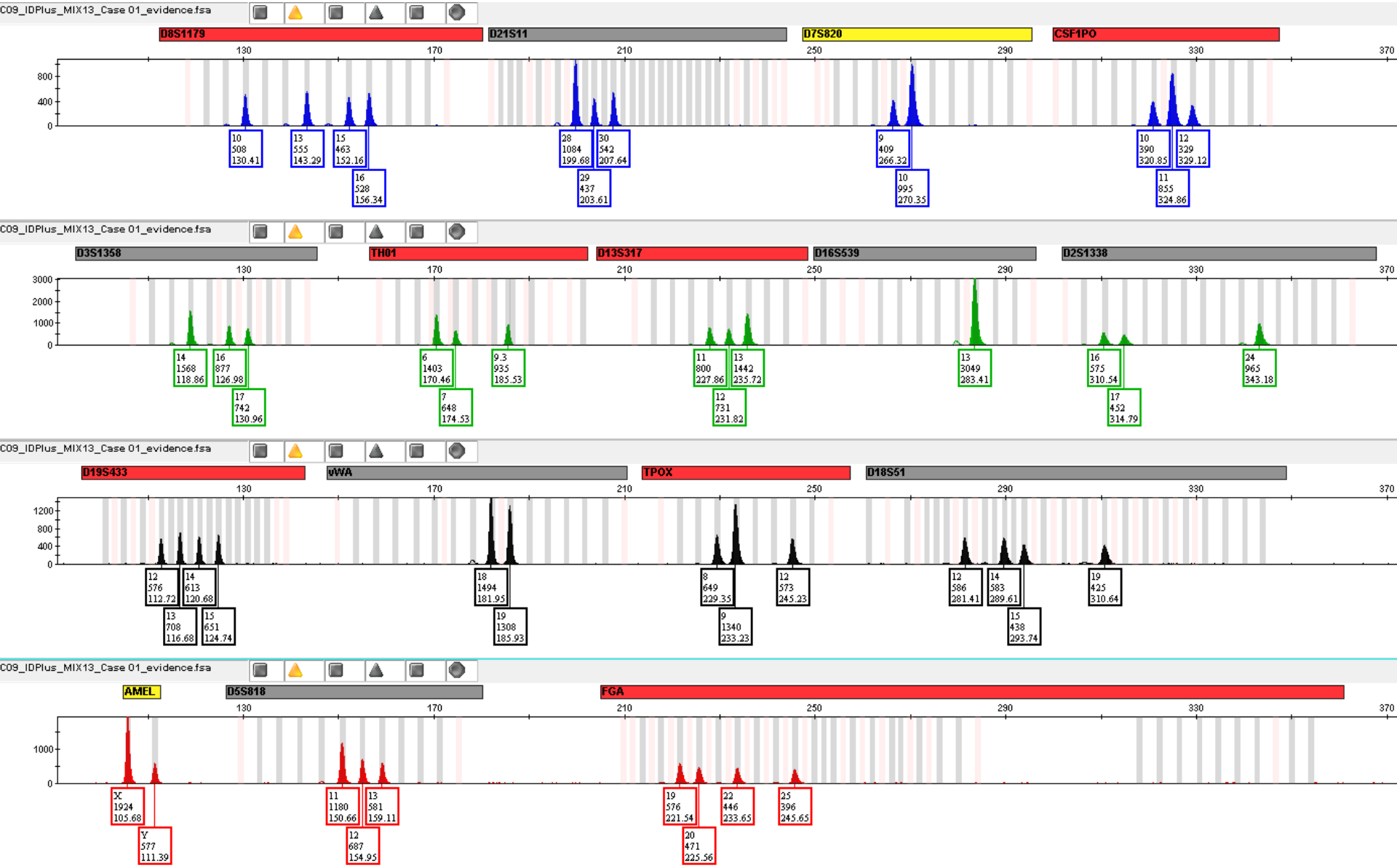
Sperm fraction of a vaginal swab

MIX13 – Case 01 - Scenario

- Evidence: sperm fraction from a vaginal swab.

- A female meets a male acquaintance at a bar after work and they return to her apartment for a nightcap. She recalls the drink tasting funny and then wakes up 14 hours later after a co-worker has her landlord to open her apartment. She is confident that she did not have consensual sex and was probably drugged. She reports the incident to the police and goes to the hospital for an examination. The accused male gives a buccal swab for comparison.

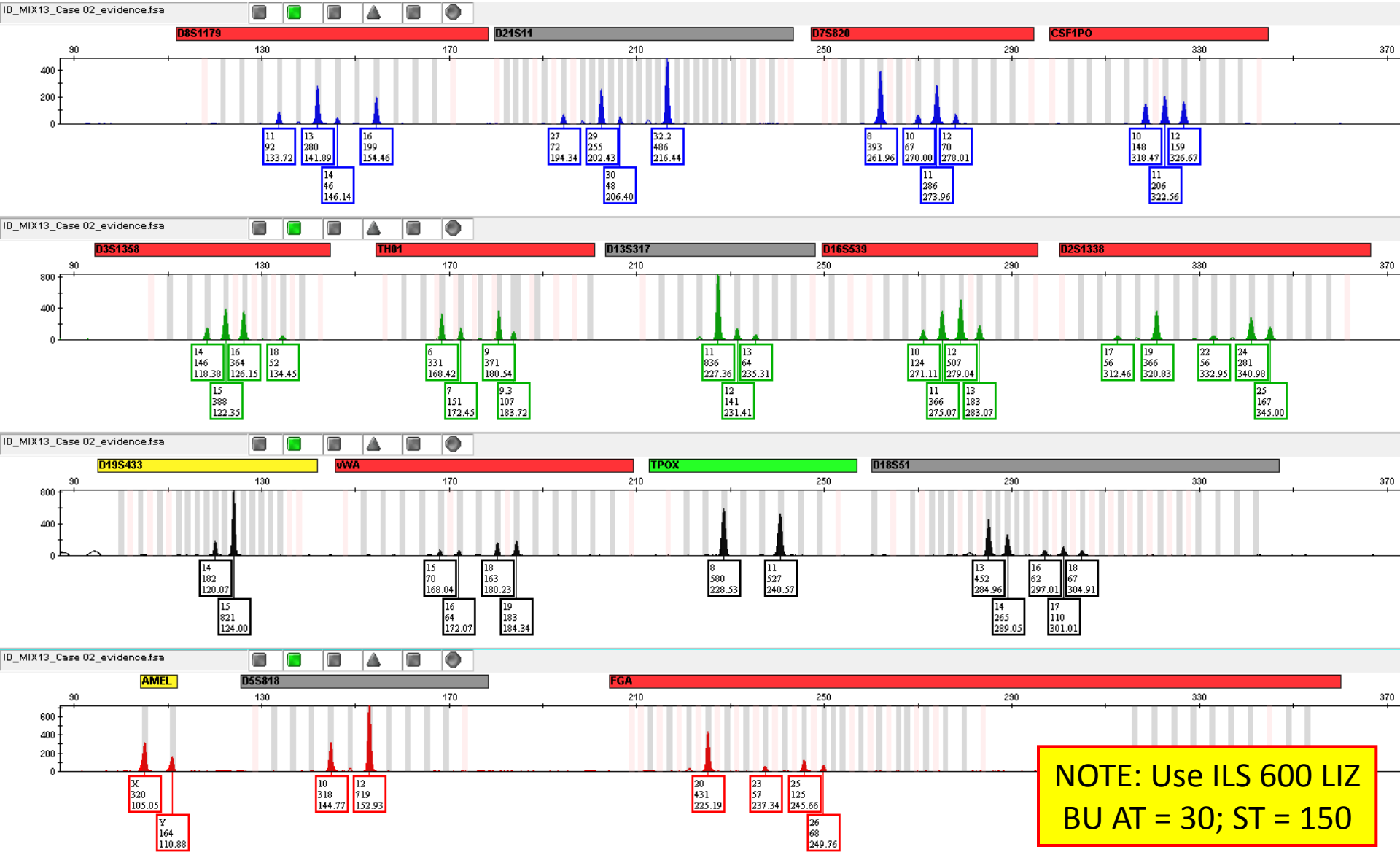
MIX13 – Case 01 - Evidence



MIX13 – Case 02

Handgun evidence

MIX13 – Case 02 - Evidence

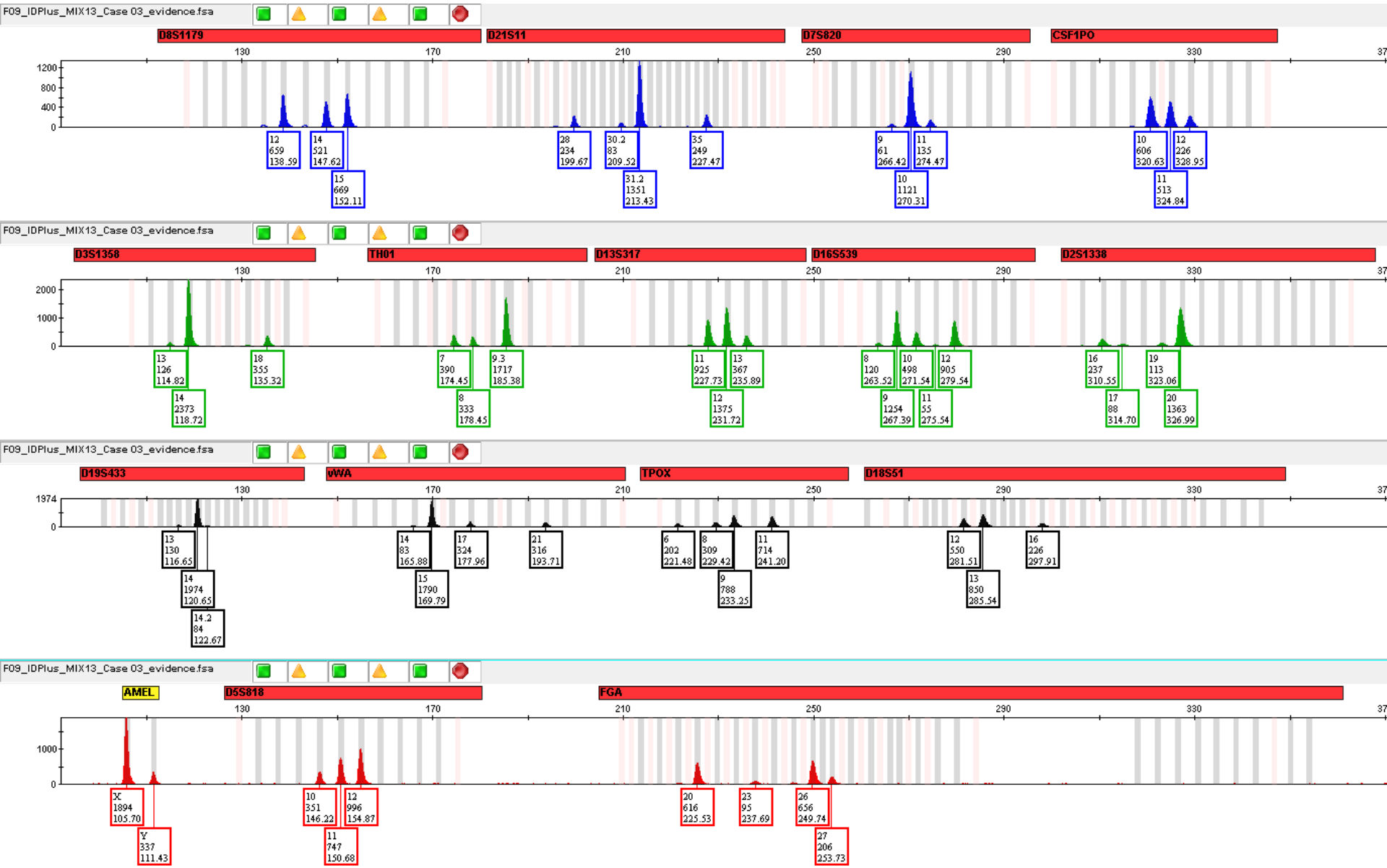


NOTE: Use ILS 600 LIZ
BU AT = 30; ST = 150

MIX13 – Case 03

Sperm fraction of a vaginal swab

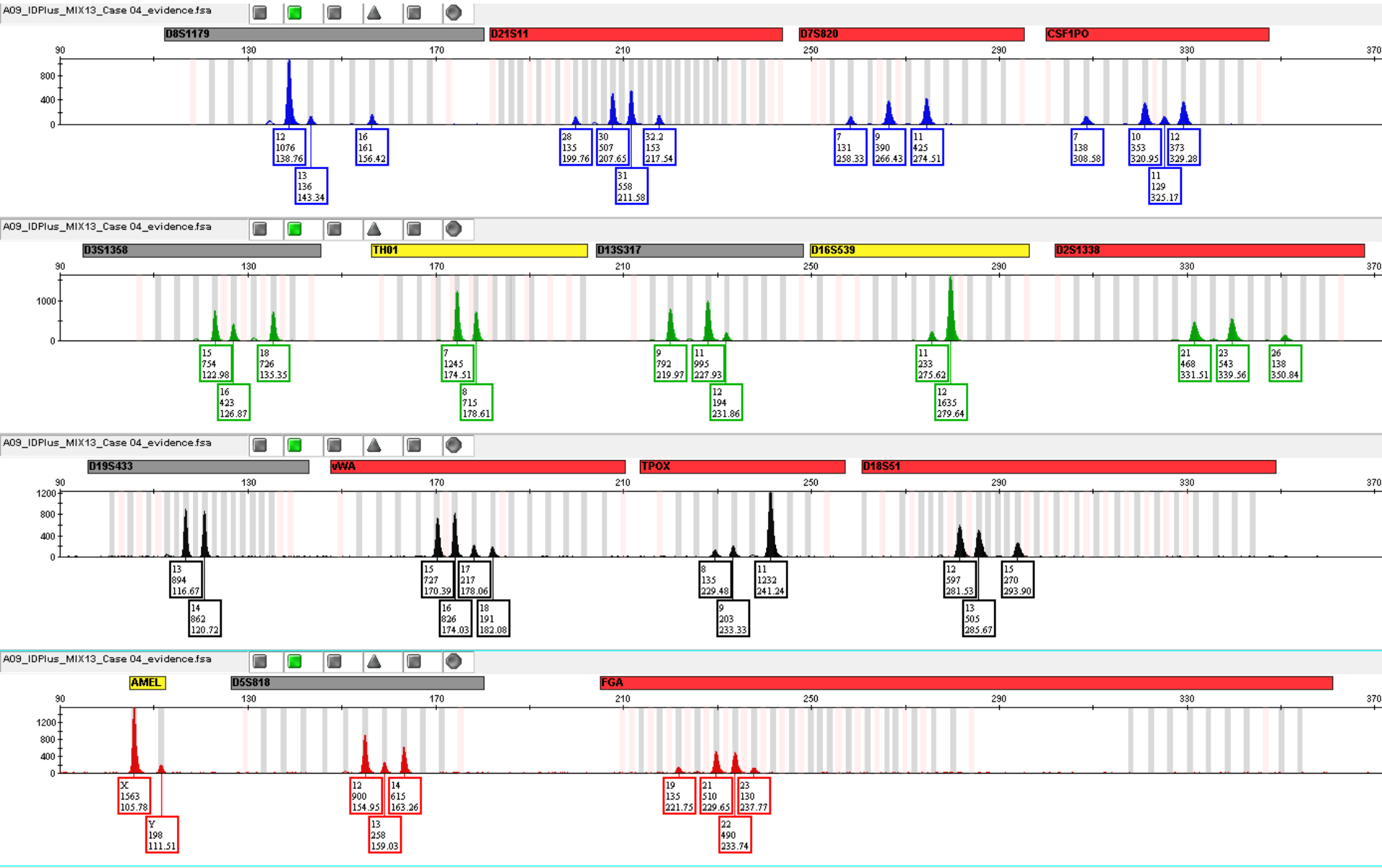
MIX13 – Case 03 - Evidence



MIX13 – Case 04

Bite-mark evidence

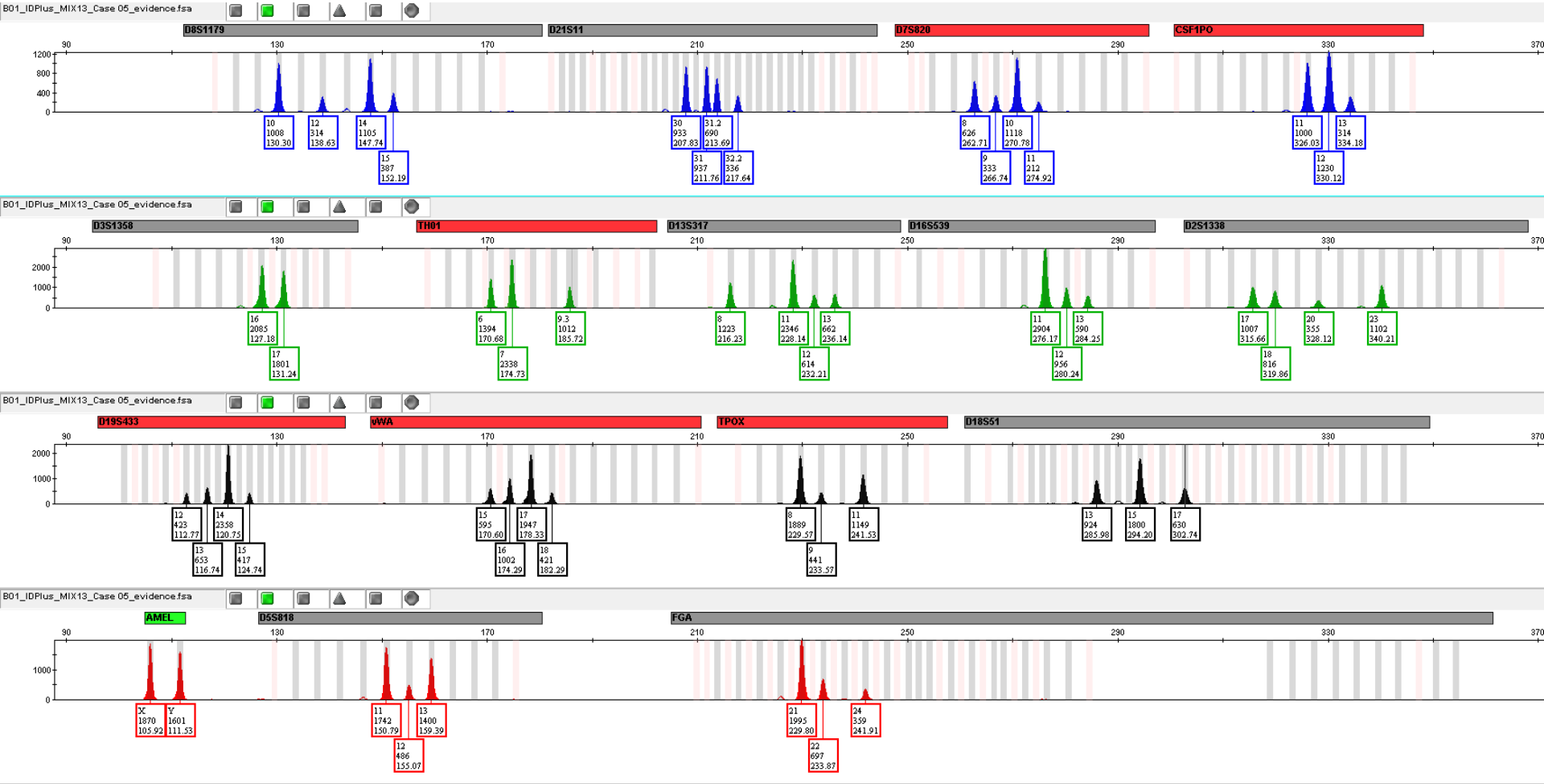
MIX13 – Case 04 - Evidence



MIX13 – Case 05

Ski mask evidence

MIX13 – Case 05 - Evidence



MIX13 – Data Interpretation

- (1) Each lab is welcomed to use the NIST and BU established thresholds for interpretation (NIST: AT = 50 RFU, ST = 150RFU; BU: AT = 30 RFU, ST = 150 RFU).

- (2) Each lab is welcomed to use their own thresholds and analysis parameters according to their own guidelines.

- Since we expect to find variation from individual laboratories using their own AT and ST values, we ask for ***Case #4 (bite-mark example)*** that all labs analyze this example using the NIST threshold values (you can also analyze with your own guidelines).

A Caveat to Interpretation…

- The success of this study depends on two major factors – lab participation and data generated from the analysis.

- We tried to develop “realistic” scenarios in our examples, and realize that your options are limited for generating “better” profiles via re-extraction, re-amplification, and re-injection.

- ***Please*** make every effort to analyze these cases “as is” instead of abstaining from interpretation because, “I would re-inject this example.”

MIX13 - Goals

- **Prior to October 4, 2013** we would like to receive the following information:

- **Report the results as though they were from a real case** and include a brief explanation as to why conclusions were reached in each case scenario. Please summarize the alleles present in the mixture and the perpetrator(s) alleles in each "case" as they might be presented in court or in a laboratory report. Please indicate the AT and ST parameters used for the analysis.

MIX13 - Goals

- **Prior to October 4, 2013** we would like to receive the following information:

- **If a statistical analysis is performed, please present this and indicate how this was determined.** Please include the source of the allele frequencies used to make the calculation. Also indicate how your statistical calculation was performed (e.g. Popstats, in-house Excel, etc…)

MIX13 - Goals

- **Prior to October 4, 2013** we would like to receive the following information:

- **If you are interpreting the mixtures with your own laboratory mixture interpretation guidelines** it would be useful to include a copy if possible.

Post-MIX13

- As with previous NIST interlaboratory studies, each participant will receive (*after providing results*) a *certificate of study participation and a summary report of the findings.*

- Participants will be provided a review copy of the final report prior to its submission to a peer-reviewed journal.

- Results of individual laboratory or analyst performance will be provided directly to the lab *upon request* and overall study metrics ***will be reported anonymously*** for presentations and publications.

Questions?

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