Forensic Science: Part 2

Jacob Landis

This afternoon's goals

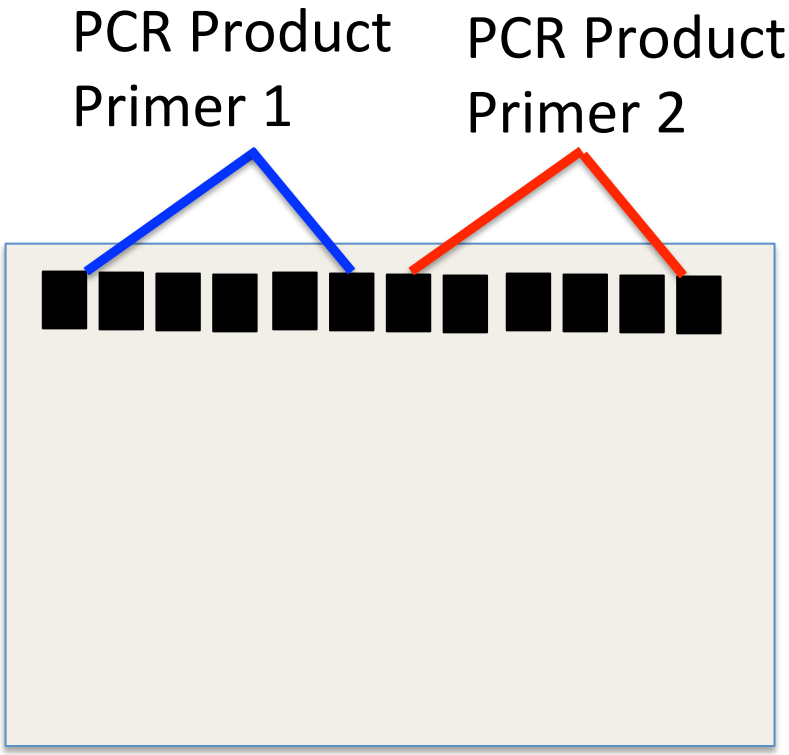
- Run PCR product on gel to see bands
- Finish analyzing fibers (if not done from lunch)
- For each individual piece of evidence (morphology, DNA, fibers) pick a suspect(s) you think did it
- Combine all evidence and identify your likely suspect

Running gels?

Running gels?

Running gels or gel electrophoresis

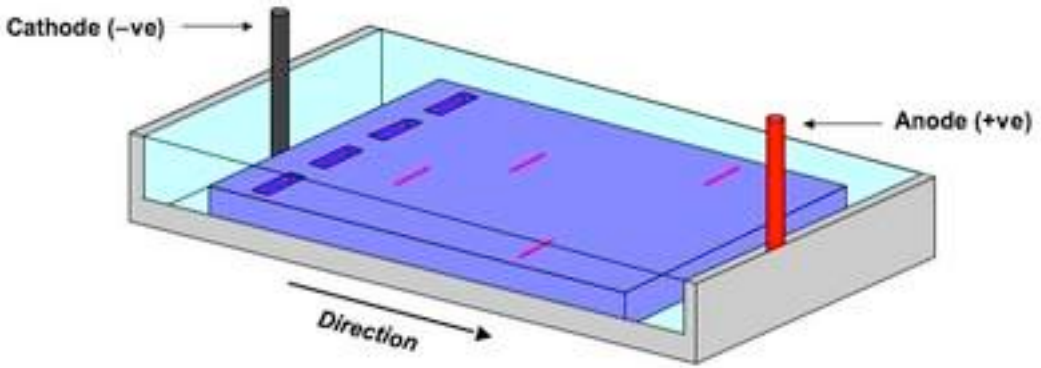
Loading the gel



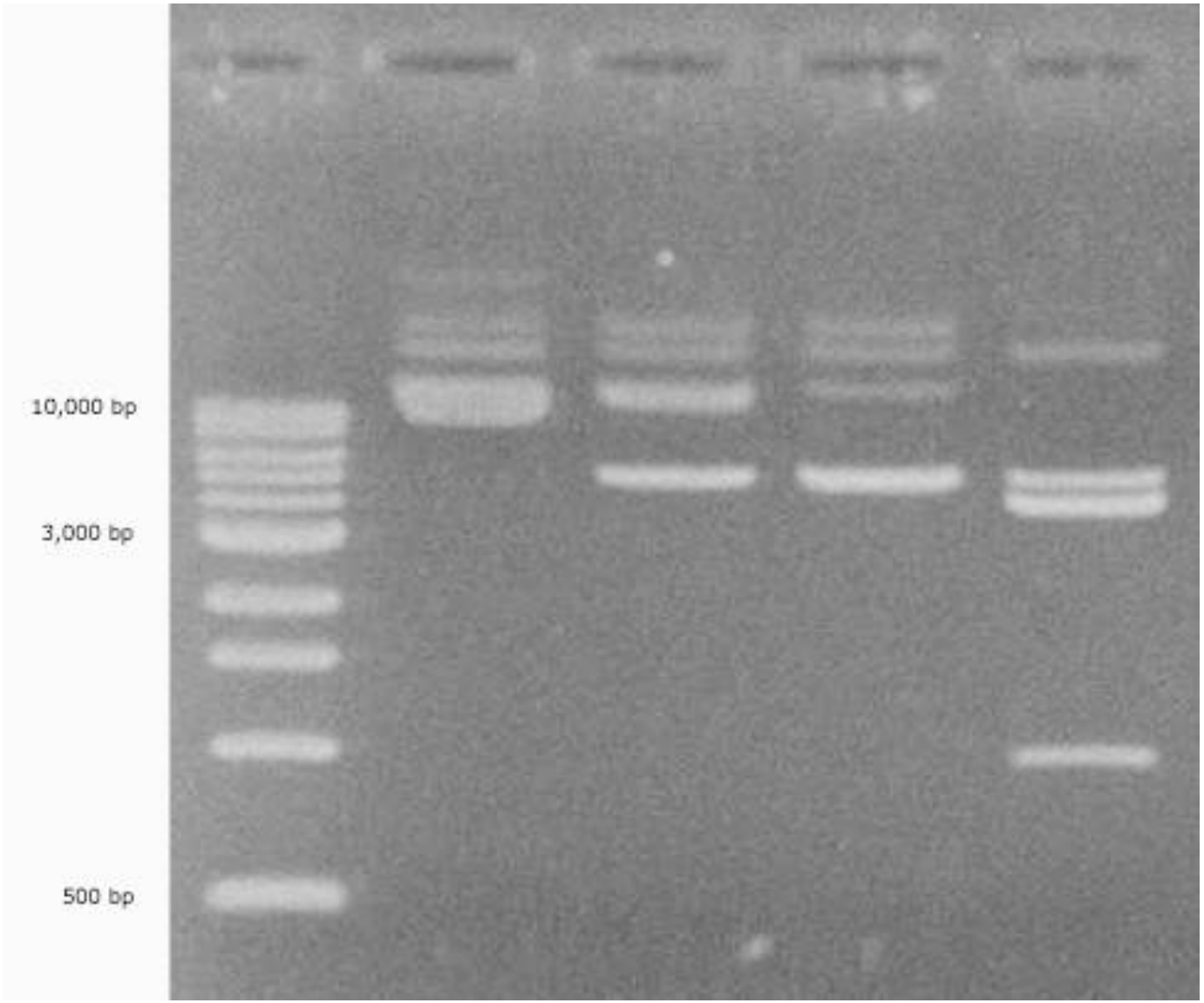
Run for 30 minutes

What happens

- Method of separating molecules by size
  - DNA negatively charged
  - "Runs to positive" charge
  - Smaller fragments move faster than larger fragments



Example



Viewing gels

- Usually view under UV light to illuminate DNA
  - Buffer has special dye that lights up

Safe Imager

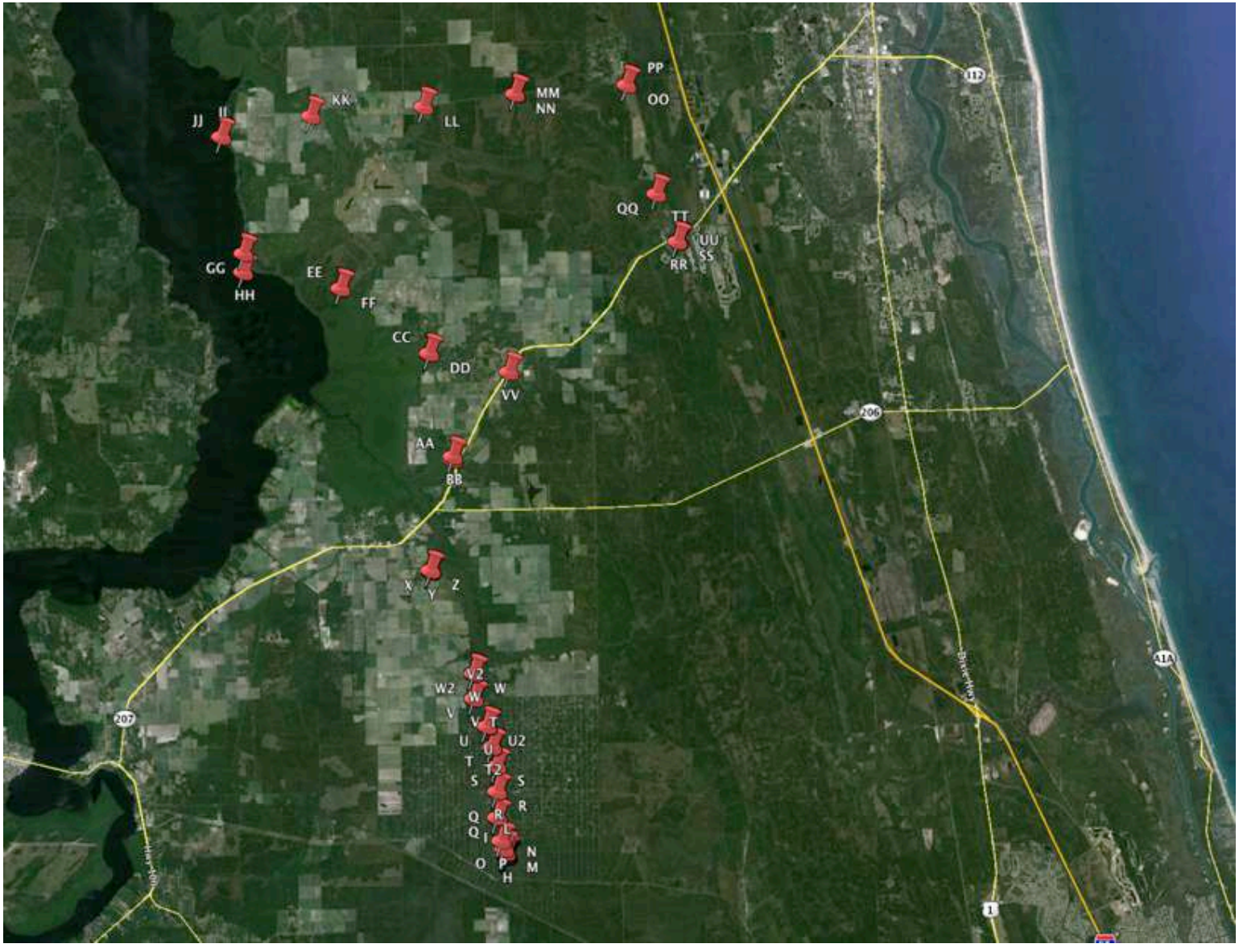

E-Gel
Safe Imager
ALWAYS USE FILTER OR GOGGLES
WHEN LIGHT IS ON
invitrogen
invitrogen

Real world examples?

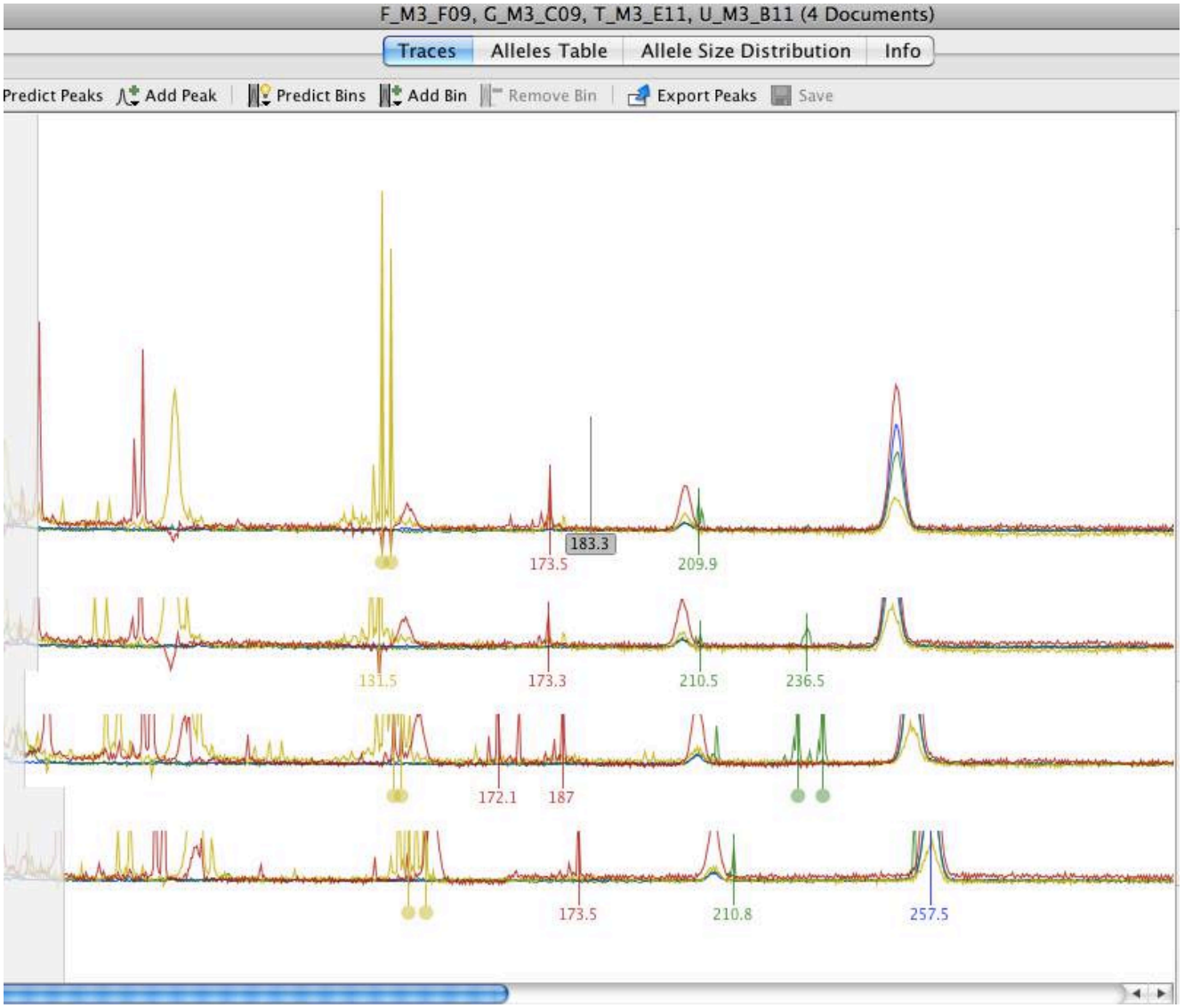
Actual Forensic case

- Genotyping samples for forensic case
- Body was found in the woods
- Piece of plant material was found in suspects car
- Goal is to tell whether material came from crime scene by matching particular individual, or has matching alleles of population

Sampling

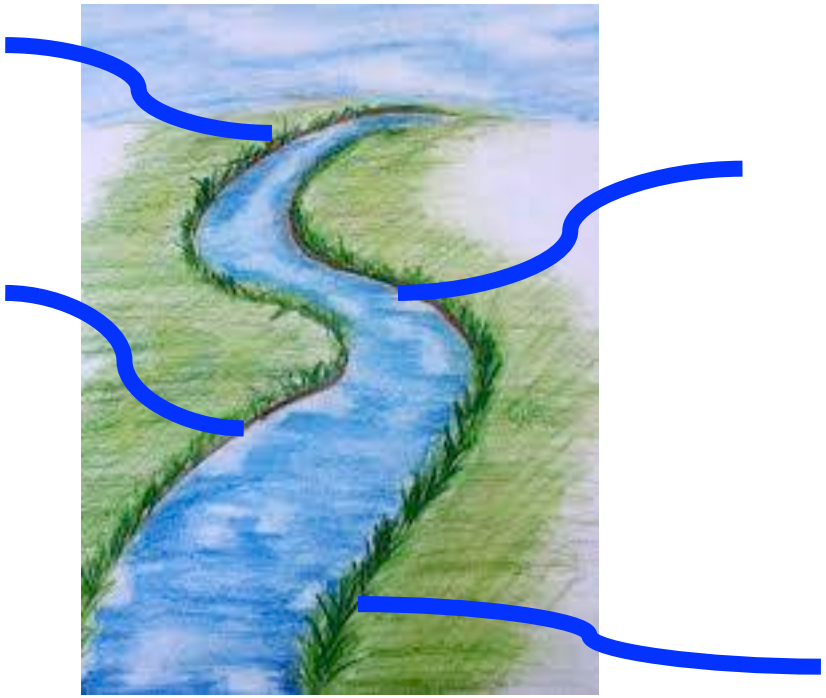

JJ
II
KK
LL
MM
NN
PP
OO
QQ
TT
UU
SS
RR
GG
HH
EE
FF
CC
DD
VV
AA
BB
X
Y
Z
V2
W2
W
V
T
U
U2
T2
S
R
Q
I
L
N
M
O
P
H
207
206
A1A
1

Data

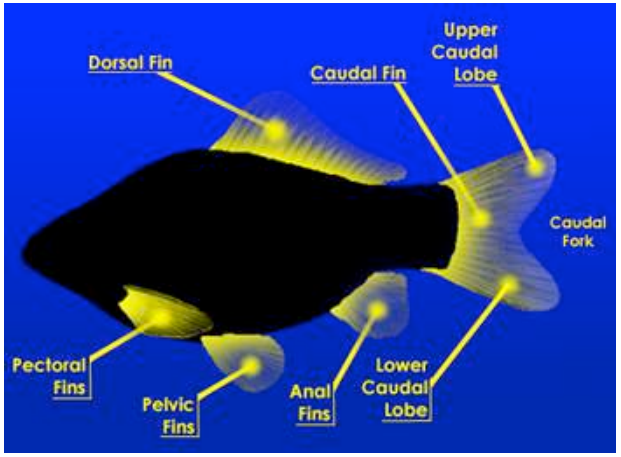

F_M3_F09, G_M3_C09, T_M3_E11, U_M3_B11 (4 Documents)
Traces
Alleles Table
Allele Size Distribution
Info
Predict Peaks
Add Peak
Predict Bins
Add Bin
Remove Bin
Export Peaks
Save
183.3
173.5
209.9
131.5
173.3
210.5
236.5
172.1
187
173.5
210.8
257.5

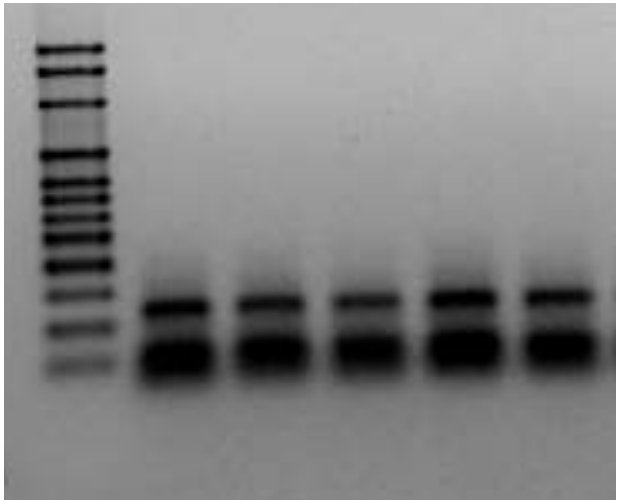
Fish Population Genetics

Fish Population Genetics



Techniques



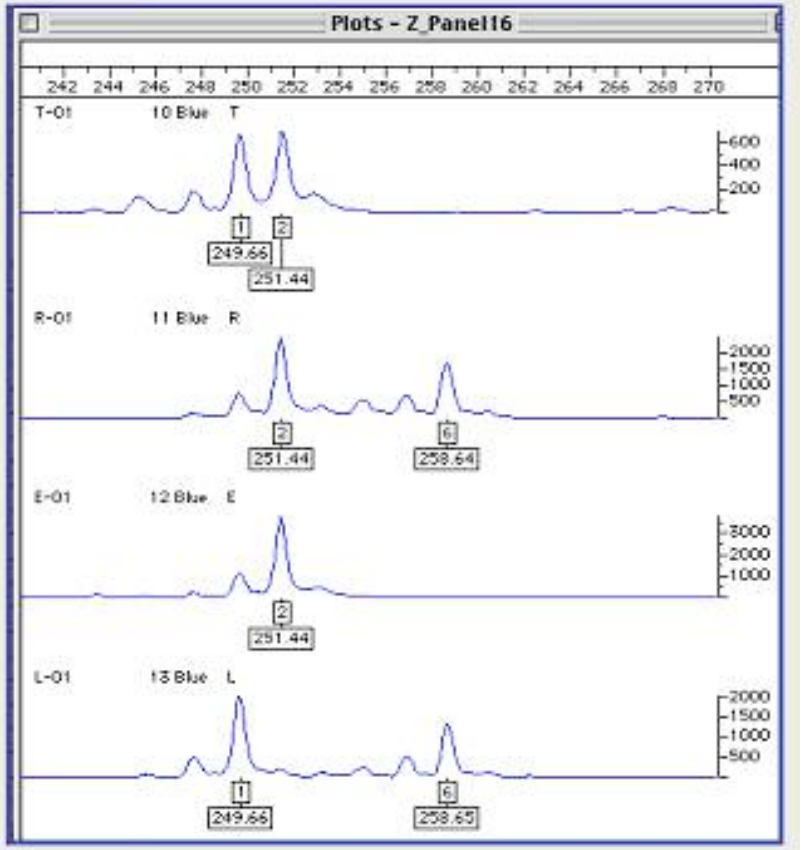


Father alleles of sizes 249.66 and 251.44 (heterozygous)

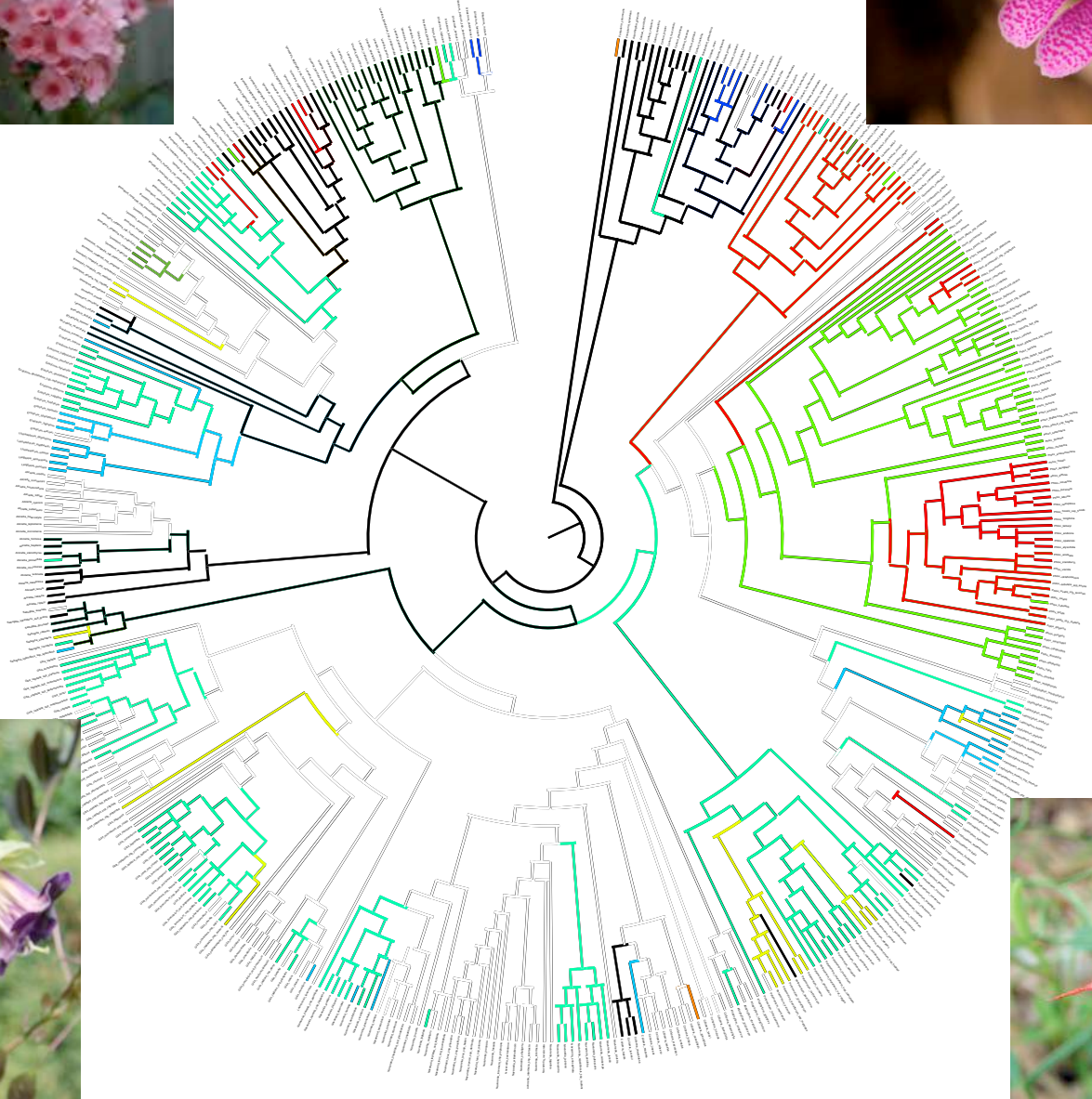
Mothers alleles of sizes 251.44 and 258.64 (heterozygous)

Child 1 alleles both of Size 251.44 (homozygous)

Child 2 alleles of sizes 249.66 and 258.65 (heterozygous)

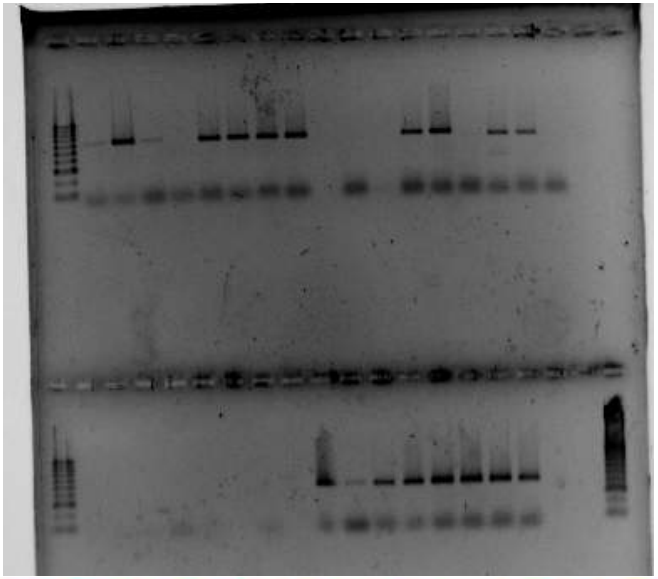


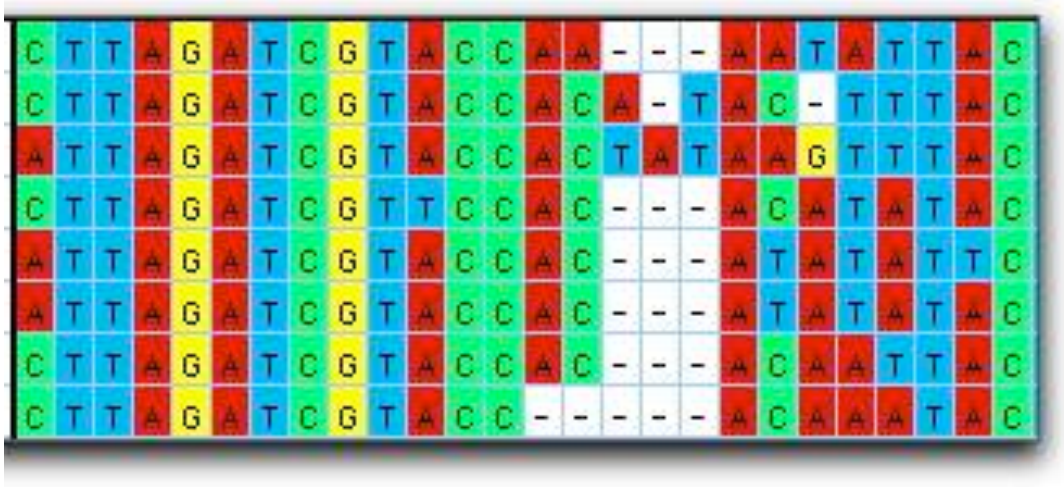
Systematics



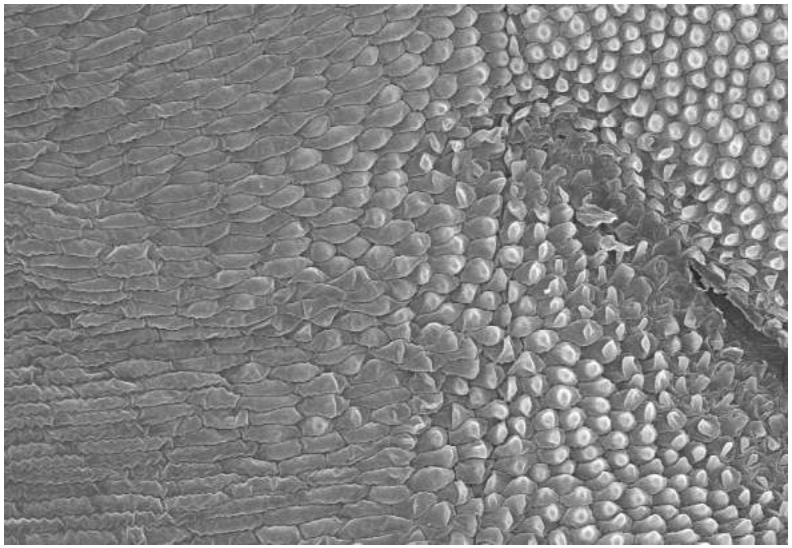
Techniques

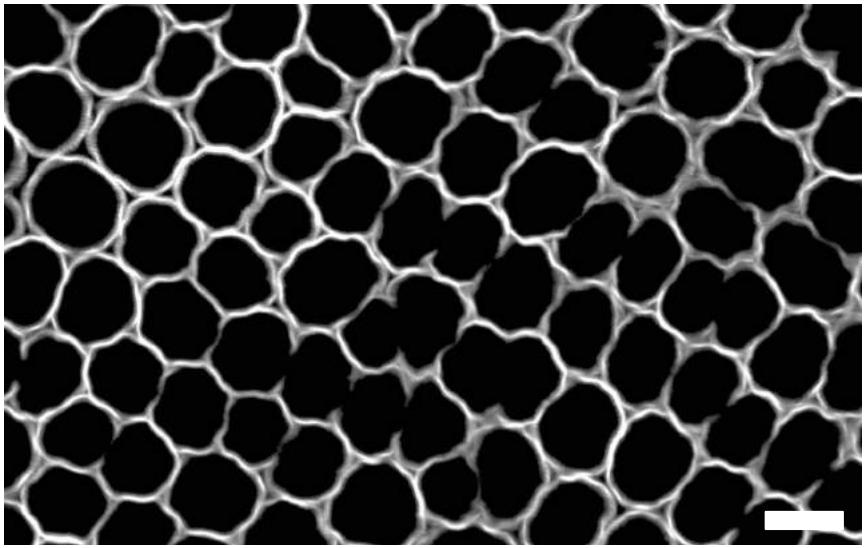

UNIVERSITY OF NORTH CAROLINA
HERBARIUM
410180
Herbarium of the University of North Carolina
NORTH CAROLINA
Montgomery County
Carya glabra (Miller) Sweet
Rich chestnut oak woods on NE-facing slope on Uwharrie River below mouth of Rollens Creek.
Elizabeth F. Wells 3008
7 June 1970



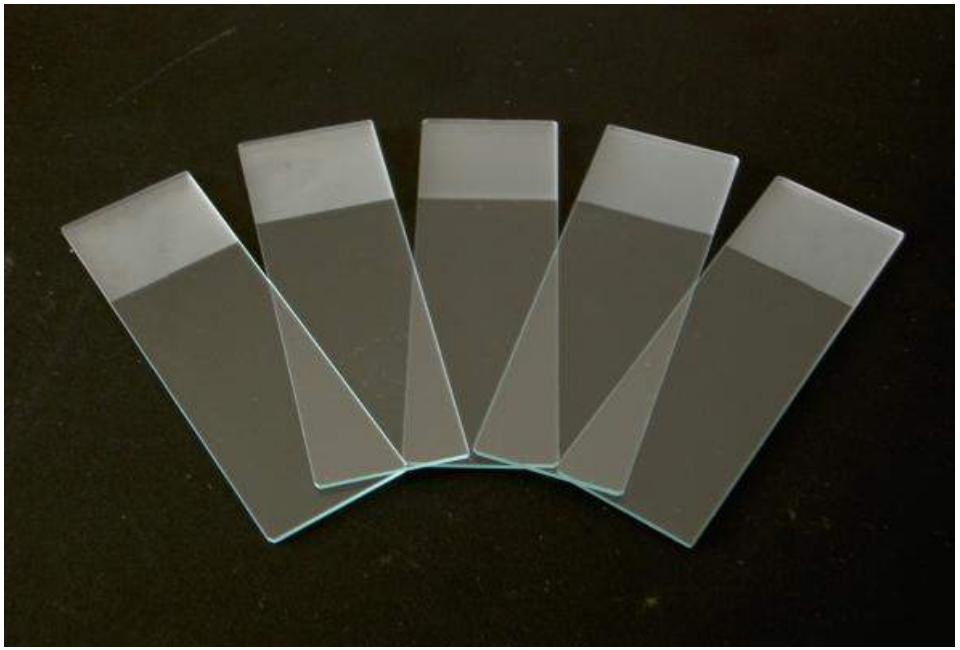


Plant/Pollinator Interactions





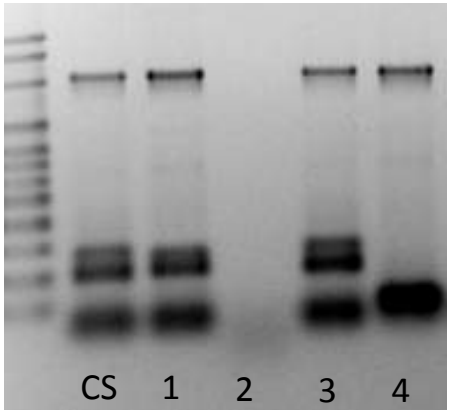
Back to fibers



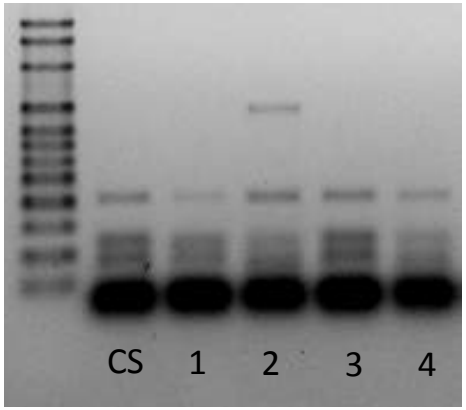
Back to the genetics

Results you may have seen

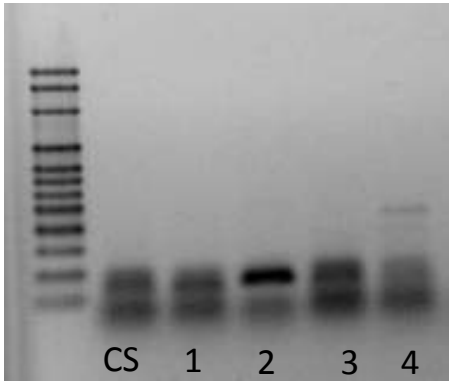
Primer 1



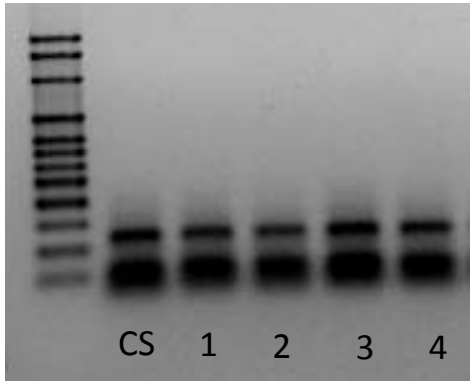
Primer 2



Primer 3



Primer 4



Overall results

Based solely on leaf morphology, who is the likely criminal?
Based solely on DNA, who is the likely criminal?
Based solely on the fiber analysis, who is the likely criminal?
Do all three pieces of evidence tell the same story? If not, how do they differ?
Based on all of the data combined, which suspect (if any) would your group charge with the crime?

Suspect 1

Suspect 2

Any final comments from the suspects?

Suspect 3

Suspect 4

Who did it and your support?

Group A:

Group B:

Group C:

Group D:

Group E:

Group F:

CSI Gainesville

THIS COULD BE YOU.

Any Questions