DNA tools for Vulture Management

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USDA APHIS WS NWRC

USDA United States Department of Agriculture

NWRC Wildlife Genetics

Federal agency: US Department of Agriculture/Animal Plant Health Inspection Service/Wildlife Services has an operational branch and a research branch/ National Wildlife Research Center.

Mission: is to apply scientific expertise to resolve human-wildlife conflicts while maintaining the quality of the environment shared with wildlife.

- Agriculture
- Human health and safety
- Property damage
- Invasive species
- Threatened and endangered species
- Wildlife disease
- One Health framework

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Wildlife Genetics Lab

Goal: Apply DNA technology to wildlife damage management and wildlife disease issues

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That voodoo that you do?

Markers

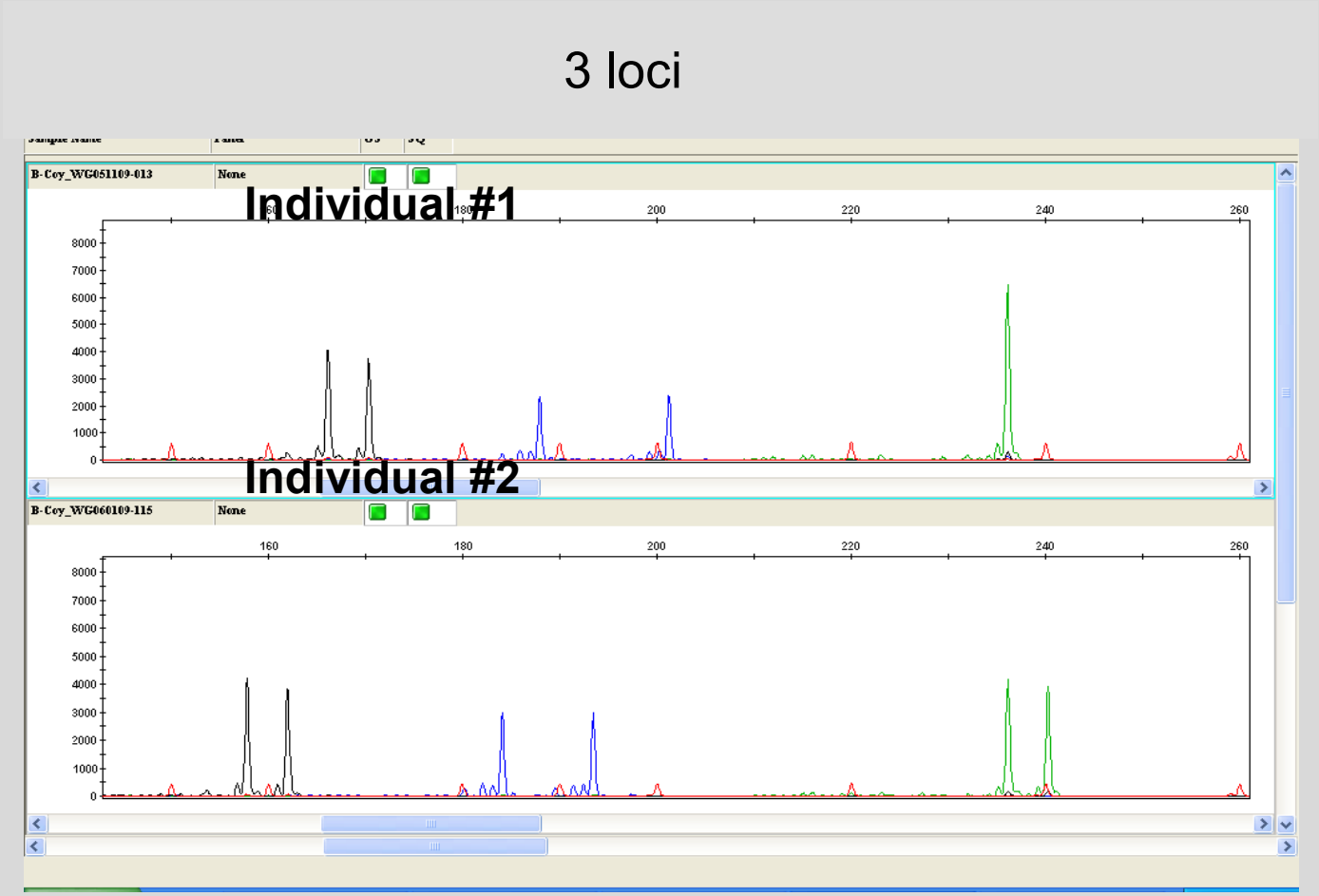
DNA Fragments –

Microsatellites (msats) – highly variable markers

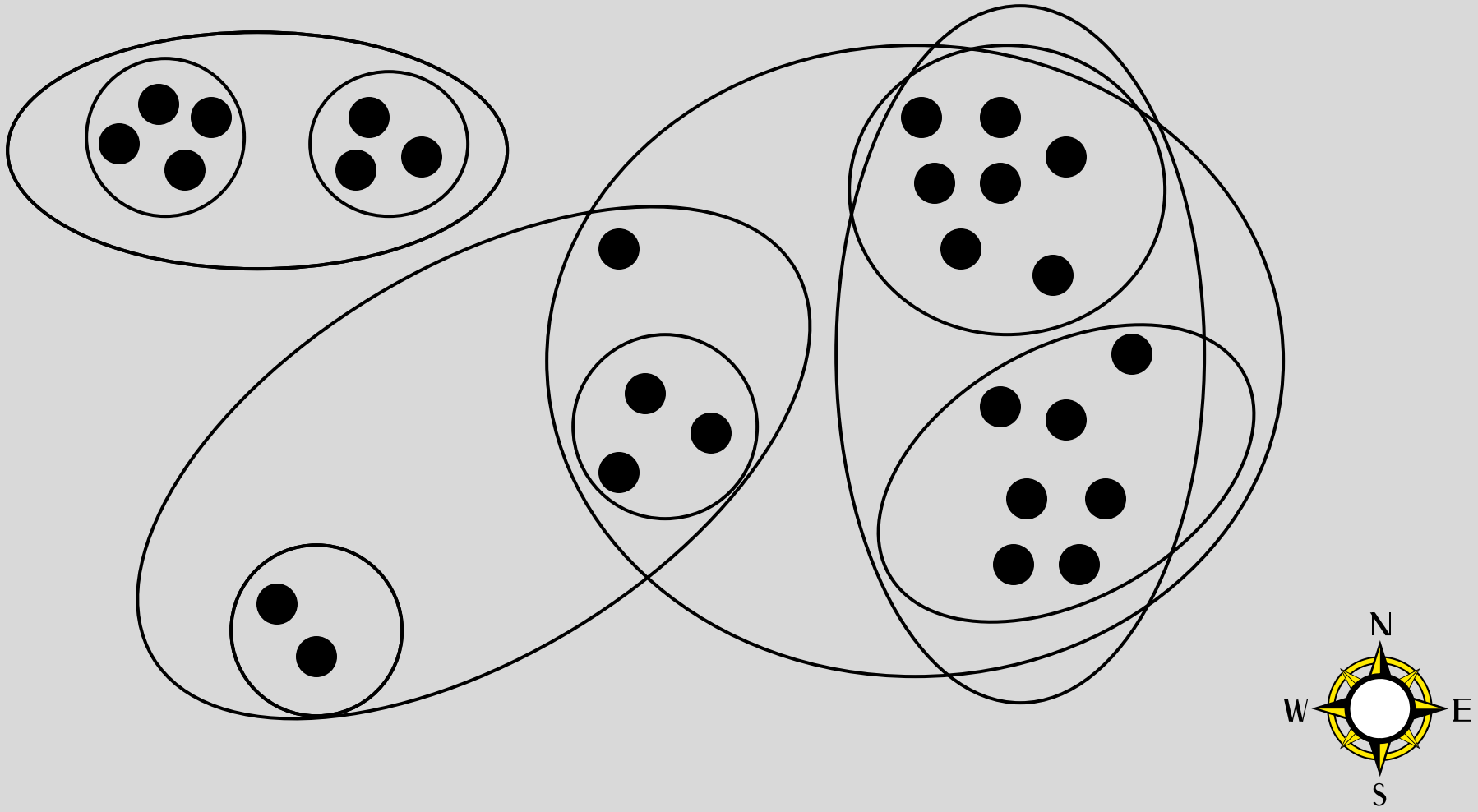
- Repeat region AGCTCGCGCGCGCGCGCGCGCGTTCACTG
- Can change between mom and offspring
- Individual ID
- Diversity between and within populations
- Genetic exchange between populations

Temporal scale = recent

Spatial scale = small/fine



Population Genetics



= Management Units


No Motor Area
Illegal to Feed or Disturb Wildlife
Up to $5000 Fine
Warning
Vultures May Cause Damage to Vehicles

Microsatellites

11 BLVU
14 TUVU

Springer Link

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Development of microsatellite loci for two New World vultures (Cathartidae)

Darren J. Wostenberg, Jennifer A. Fike, Sara J. Oyler-McCance, Michael L. Avery & Antoinette J. Piaggio

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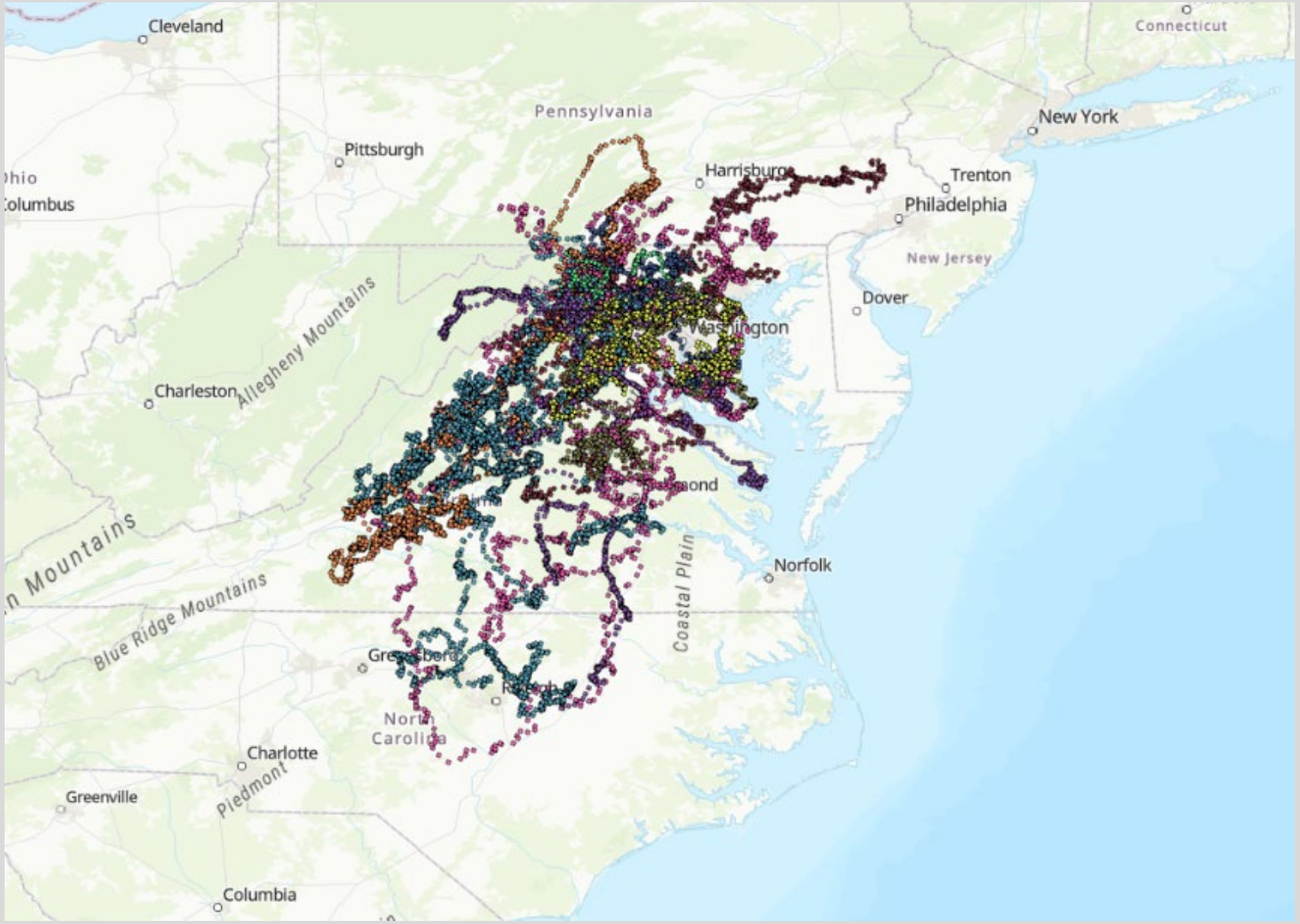
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Coastal Plain
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Greenville
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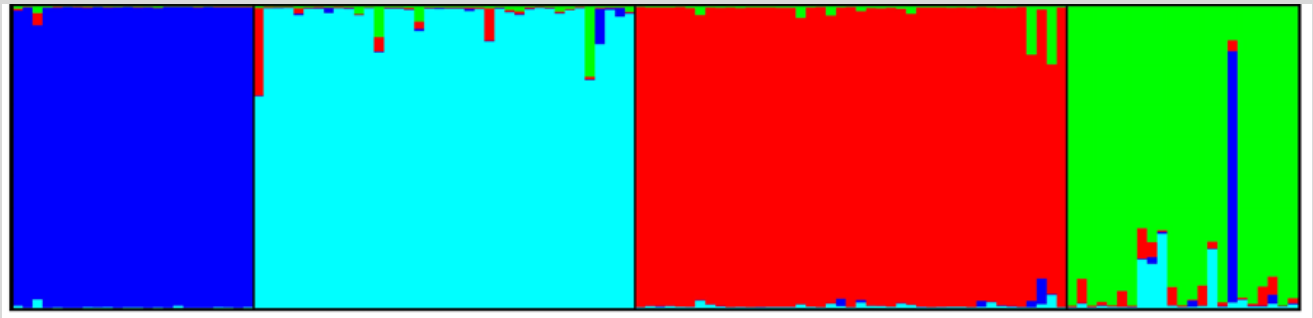
Methods

- 200 vultures from either side of the Alleghany Mountains
- Genotype vultures – amplify microsatellite markers
- Individual ID
- Calculate relatedness
- Test for population subdivision
- Hypothesis to be tested = There is population subdivision of vultures across the Alleghany Mountains
- Implication = if population is reduced on one side it will take some time for it to fill in from the other side.
- Stand by for results



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Pellets happen

Vultures, like owls and other raptors, cast pellets of indigestible materials. We collected pellets from communal roosting sites and plan to test them for lead as well as genetic material to help determine what vultures may be feeding on. So far, we have seen fur of all varieties, bird bones, fish scales, and a rubber fishing lure in the pellets.

DNA from pellets

What we could learn from DNA shed from vultures on pellets

- Species identification/relative densities at roosts
- Sample known roosts and test for connectivity/genetic exchange on and off bases
- Individual identification
- Relatedness
- Diet - from DNA inside the pellet

- [x] Vulture DNA
- [x] Black Vulture
- [ ] Turkey Vulture

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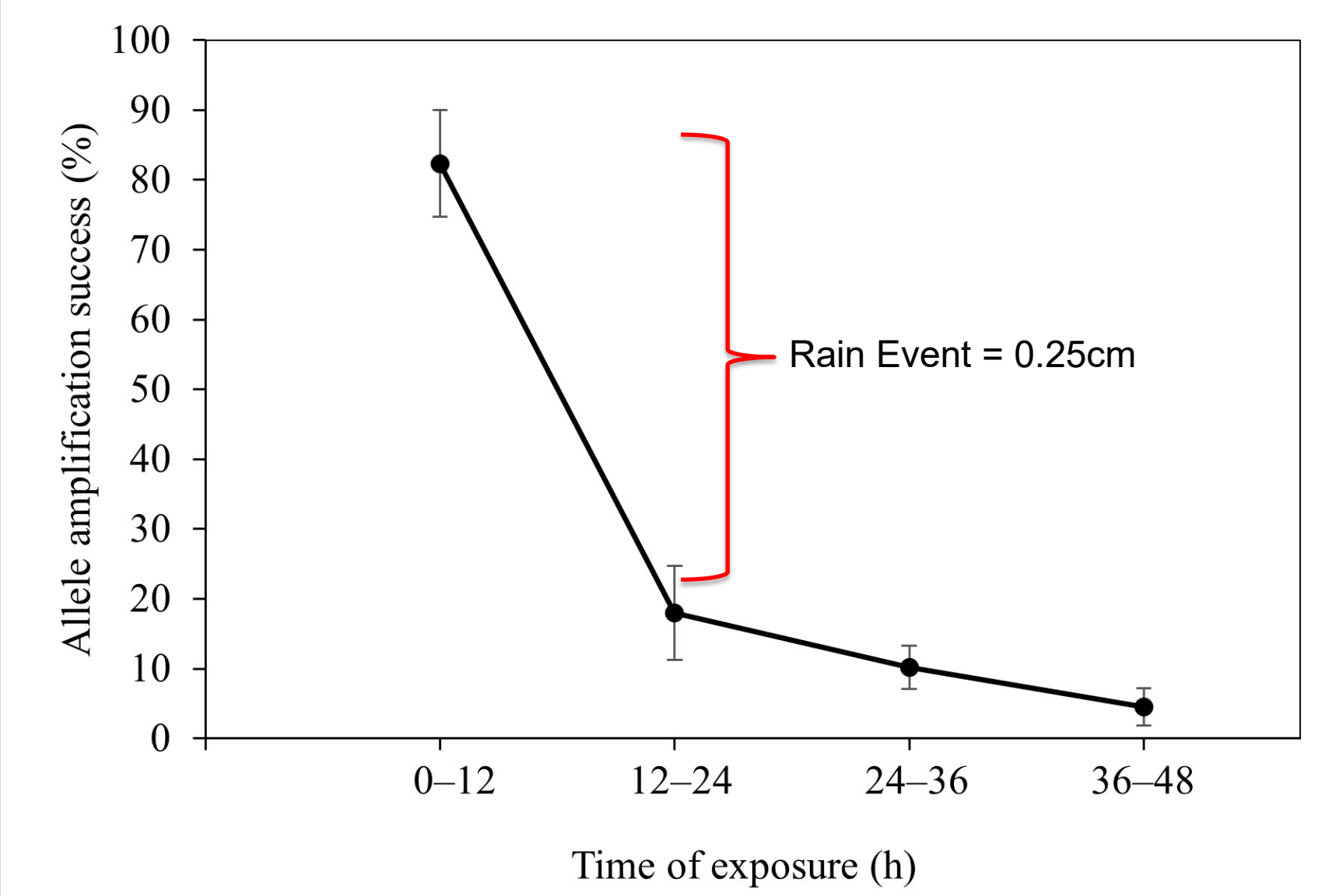
DNA Persistence


100
90
80
70
60
50
40
30
20
10
0
Allele amplification success (%)
Rain Event = 0.25cm
0–12
12–24
24–36
36–48
Time of exposure (h)

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What can this tool be used for?

- Mixed species roost?
- Relative abundance
- Relatedness among roosts or roost members
- Management units
- What diet item(s) is driving their persistence in area

Things to consider:

- Sample sizes
- Access to roost
- Getting fresh samples

Happy to discuss the application of this or any application of DNA tool! Toni.J.Piaggio@usda.gov

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Thank you, team amazing!








Questions

Camazotz