Fish DNA Barcoding Investigation of Ambassador Wolves' Diet

Presenters: Nicaury Arnoat, Milton Baquedano, Branden Douglas, Peta Morgan, Kimberly Ramphal

University Heights High School, Bronx, NY / Mentor: Patricia Pena Carty

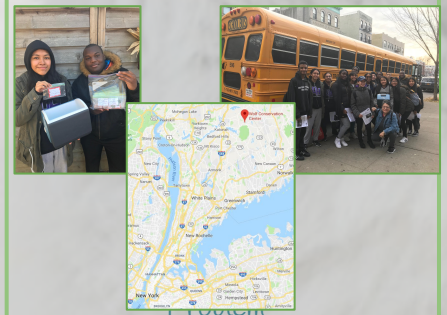
UBP 2018

CSHL Cold Spring Harbor Laboratory DNA Learning Center

Funded by the Thompson Family Foundation

Abstract

Endangered species are species that play a crucial part in the world and should therefore be protected from extinction. The ambassador wolves at the NY Wolf Conservation Center serve a vital role in educating people about the dangers that wolves face in our modern world, the value of their contributions to the ecosystems they take part in, and the incredible unique attributes these animals possess. In an effort to support the NY Wolf Conservation Center's mission and the well-being of the ambassador wolves, we employed DNA barcoding to identify the species of the fish meats in the wolves diet. We were unable to identify the species of fish being fed to the wolves from the donated meats. The lack of conclusional data is due to errors in both trial 1 and 2 in the barcoding experimental techniques. The team will continue to sequence the DNA from the remaining fish samples following PCR amplification and gel electrophoresis for positive DNA identification. These results will be shared with the Wolf Conservation Center team in order to better serve the wolves housed at their center, and ensure their optimal health and well-being.



Problem

Can we propose effective and valid suggestions for improvement to the diet of the Ambassador Wolves' cared for at the New York Wolf Conservation Center by employing DNA barcoding to sequence the fish being fed to the ambassador wolves?

Materials & Methods

- Samples were donated by the WCC team
- DNA was extracted and purified from the samples
- Polymerase Chain Reaction to amplify the DNA
- Confirm the presence of DNA through gel electrophoresis and send positive samples to lab for sequencing
- Analyze sequence data using DNA Subway

Distilled water, lysis solution, silica resin, specimen tissue samples, scalpel, wash buffer, ice, transport icebox, microcentrifuge, tube rack, microcentrifuge tubes, micropipettes and tips, permanent markers, plastic pestles, vortexer, water bath, thermometer, thermal cycler, PCR beads, primers, load dye, PCR tubes, latex gloves, masking tape, camera, UV transilluminator, eGels and powerbox kit, and computer with internet access.

Results

4 of the 4 samples were negative for DNA, and 0 samples were positive for DNA. The positive control fish sample was also negative for DNA.

Fish Samples

AMT-001
AMT-002
AMT-003
AMT-004

Ambassador Wolves

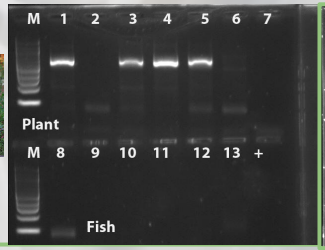
Atka *Canis lupus arctos* (wild arctic grey wolf)

Alawa-Zephier-Nikai Canis lupus irremotus (rocky mountain grey wolf)

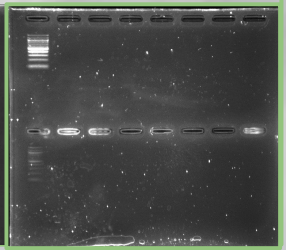
Tables & Figures

Sample Description	UBP Sample Code	DNA in tube for round 1 & 2?	PCR	DNA visible from gel electro-phoresis? Y/N
Fish 1A	AMT-001	Visible	✔	No
Fish 1B	AMT-002	Visible	✔	No
Fish 2A	AMT-004	Visible	✔	No
Fish 2B	AMT-005	Visible	✔	No

Trial 1



Trial 2



Conclusion

The results yielded no positive DNA samples, for neither the fish tissue or the positive control fish. This points to errors in the experimental procedure as carried out by our team members. We are dedicated to continuing to seek out conclusional data in this experiment in order to support the Wolf Conservation Center team in properly screening meats donated to their center for wolf consumption, proper storage techniques, and any necessary changes to their diet and/or habitat.

References

"Ambassador Wolves." *Wolf Conservation Center*, www.nywolf.org/ambassador-wolves. Web. 18 Oct. 2017.

"DNA barcoding needed to break fish black market." *Horizon: the EU Research & Innovation magazine*, horizon-magazine.eu/article/dna-barcoding-needed-break-fish-black-market_en.html. Accessed 22 Oct. 2017.

"Millions Lost Through Illegal Fishing." *Africa News Service*, 8 Sept. 2017. *Student Resources in Context*, link.galegroup.com/apps/doc/A503802193/SUIC?u=nysl_me_univhhs&xid=d0811391. Accessed 290 Oct. 2017.

National Geographic. "Endangered species." *National Geographic Society*, 9 Oct. 2012, www.nationalgeographic.org/encyclopedia/endangered-species/. Web. 18 Oct. 2017.

"The Northern Rocky Mountain Gray Wolves." *The US Dept of Justice*, www.justice.gov/enrd/northern-rocky-mountain-gray-wolves. Web. 18 Oct. 2017.

"Wolf Origins."*Wolf Country, Origins, history, evolution of the first canid*, www.wolfcountry.net/information/WolfOrigins.html. Web. 18 Oct. 2017.

"Wolves & Our Ecosystem." *Living with Wolves*, www.livingwithwolves.org/about-wolves/why-wolves-matter/. Web. 18 Oct. 2017.

Acknowledgements

Thank you Urban Barcode Project, Cold Spring Harbor Laboratory DNA Learning Center, Bronx Community College, STEP and University Heights High School.