DNA Barcoding Investigation of Ambassador Wolves' Habitat and Diet

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Abstract

Endangered species 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 plants in the wolves diet. We collected samples of plants from the ambassador's environment at conservation center. We set out to identify the species that are native or non native to the wolves natural habitat using the footlocker equipment for DNA extraction from the Harlem DNA Learning Center and suggestions were generated for the introduction of a secondary plant and bird meat species natural to Atka's intended natural environment. We hypothesize the plants are beneficial to the wolves, however there is not going to be a native species from Atka's environment, since the temperate deciduous of New York Differs from the Arctic wolves environment.

Introduction

Wolves are found all around the world, they play a crucial role in keeping our ecosystem balanced. Wolves chase primarily on large ungulates, hoofed mammals such as deer, elk and moose. By preying on the most vulnerable like diseased, young, old, weak or injured individuals, wolves help keep prey populations healthier. Predation by wolves also regulates ungulate distribution and group size, which impact overall native biodiversity. For instance, when deer and elk become too abundant for their habitat, by overgraze vegetation it can lead to habitat degradation and potentially damaging effects on other native wildlife. Wolves are found all around the world, they play a crucial role in keeping our ecosystem balanced. Wolves chase primarily on large ungulates, hoofed mammals such as deer, elk and moose. By preying on the most vulnerable like diseased, young, old, weak or injured individuals, wolves help keep prey populations healthier. Predation by wolves also regulates ungulate distribution and group size, which impact overall native biodiversity. For instance, when deer and elk become too abundant for their habitat, by overgraze vegetation it can lead to habitat degradation and potentially damaging effects on other native wildlife.

Materials & Methods

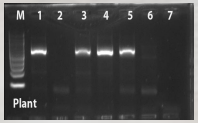
- Samples were donated by the WCC team
- DNA was extracted and purified from the samples
- Polymerase Chain Reaction to amplify the DNA
- Confirm the presence of DNA through gel electrophoresis and send positive samples to lab for sequencing
- Analyze sequence data using DNA Subway

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.

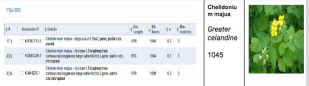
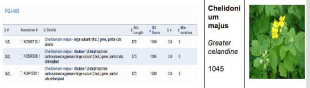
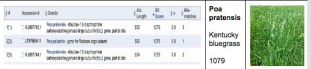
Results

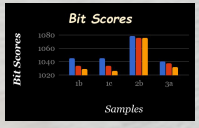
All the 3 plants samples came out positive, as did the control plant sample. The plants were identified to be celandine (herbaceous flowering perennial plant of the buttercup family) and kentucky bluegrass.

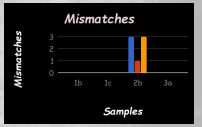
Plants Positive
FQJ-002
FQJ-003
FQJ-005
FQJ-007



Tables & Figures

Sample Description	Sample Image	UBP Sample Code	DNA Subway Blast Matches	Closest Match Species and Bit Score	Image of Closest Match
Plant Sample 1b		FQJ-002		*Chelidonium majus* *Greater celandine* 1045	
Plant Sample 1c		FQJ-003		*Chelidonium majus* *Greater celandine* 1045	
Plant Sample 2b		FQJ-005		*Poa pratensis* Kentucky bluegrass 1079	
Plant Sample 3a Positive control		FQJ-007		*Epipremnum aureum* *Pothos, Devil's Ivy* 1041	





Discussion

The plants were determined to be beneficial for the ambassador wolves' diet. We are willing to recommend to the WCC to introduce plants that are native to Atka's environment like the antarctic hair grass, or antarctic pearlwort. These recommendations were made to WCC staff in order to align his dietary options more to his intended natural environment, and therein benefit his health and well-being.

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Acknowledgments

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