

Relationships Among Alaskan *Papaver*

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Introduction

Papaver is the poppy genus in the Papaveraceae family. Poppies are primarily native to Asia and other countries in the northern hemisphere with exceptions to Southern Africa and South America (Grey-Wilson 2000). Flowers from the *Papaver* family are fairly large and brightly colored. (Grey-Wilson 2000). Traditionally, before the use of ITS, *Papavers* were placed into the *Papaver* genus according to their physical appearance. Whether the plant had hair, the length of the hair, or other physical traits contributed to the organization of the different species.

My objective was to distinguish the relationships between Alaskan poppies and other poppies around the world. I collected various samples within the *Papaver* genus for my experiment. I used ITS sequence to compare the different *Papaver* species from Alaska. ITS (internal transcribed spacer) is a non-functional region of DNA between ribosomal genes. These specific spacer sequences evolve quickly and can be found in nuclear rRNA genes of eukaryotes (Souframanien 2003) I BLASTed (Basic Local Alignment Search Tool) my sequences to find how similar my samples were to other poppies outside of Alaska. With the results from GenBank, I made a neighbor-joining phylogenetic tree showing how closely related my samples were to each other and other *Papaver* samples.

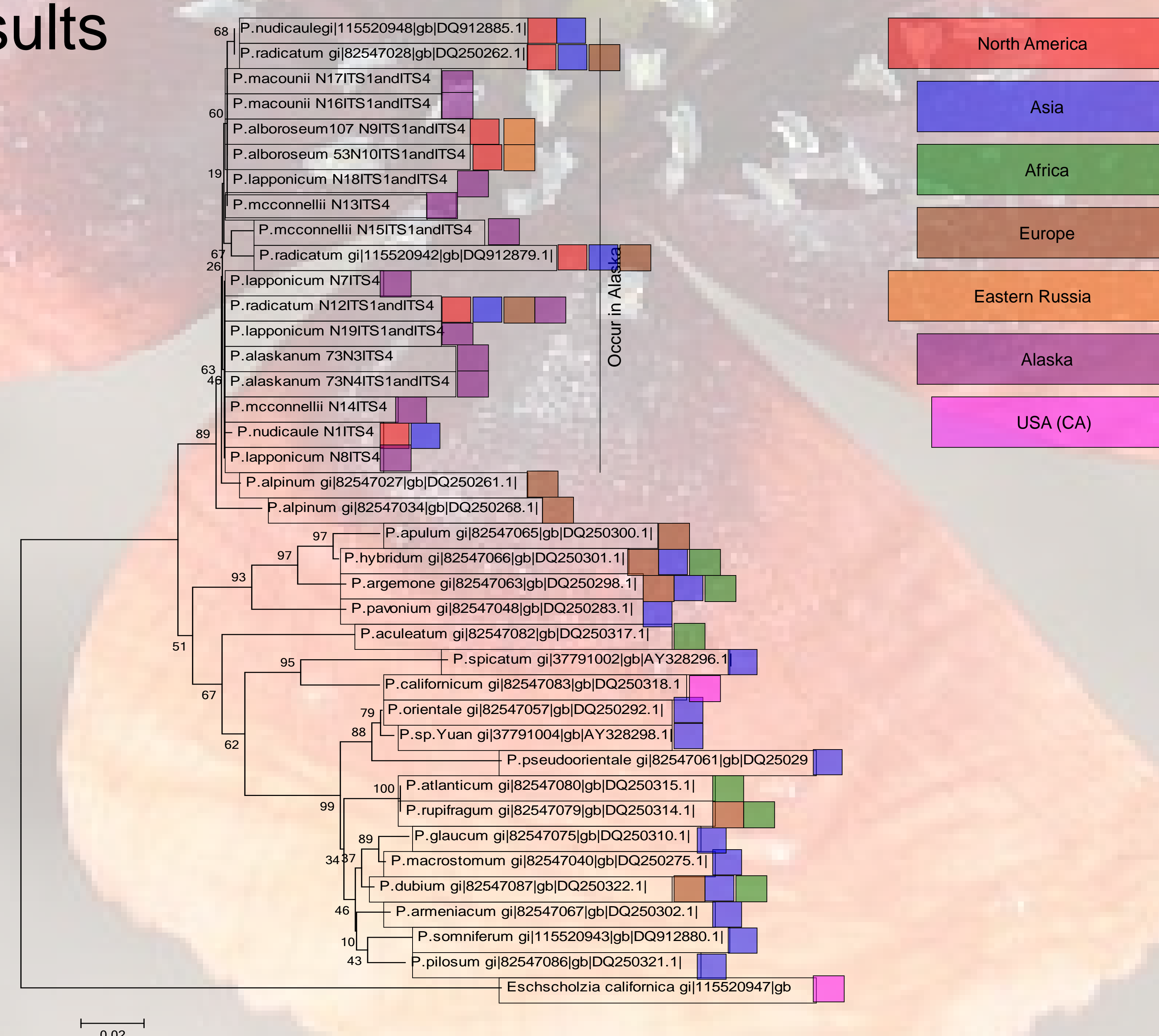
Conclusion/Discussion

These data suggest that my samples all had very similar ITS sequences. From this, we believe that the Alaskan poppies are closely related to each other. One reason that all of the Alaskan poppies have nearly the same DNA sequence could be because the Poppies in Alaska have not been separated from each other for very long. My data suggests that the closest relatives of the Alaskan poppies is *Papaver alpinum* which occurs in Europe. *Papaver californicum* and *Eschscholzia californica*, which occur in the United States, are not as closely related to Alaskan poppies. Opium poppies (*P. somniferum*) are not native to Alaska and from my results, they are distantly related. Why are there different species of *Papaver* when the sequences are very similar?

Methods

- Collected eight *Papaver* samples from greenhouse and twelve samples from the Herbarium
- DNA purification extraction using Puregene.
- Quantified DNA using Nanodrop
- PCR of ITS using primers ITS4 and ITS1-18S
- Agarose Gel to check PCR quality
- PCR Wizard Clean Up to discard nucleotides, primers, and Taq polymerase
- Quantified DNA using Nanodrop
- Cycle Sequenced PCR product using Big Dye
- Sequence Clean Up with Sephadex
- Evaporated samples with no heat
- Ran samples through ABI Capillary Sequencer to determine DNA sequence
- Used Sequencher to assemble and edit sequences
- BLASTed my sequences to find similar sequences
- Downloaded *Papaver* sequences from GenBank
- Aligned the sequences in Muscle and made a phylogenetic tree

Results



References:

Grey-Wilson, C. (2000) *Poppies* Portland, Oregon: Timber Press.

Souframanien, J. (2003) *Intraspecific variation in the internal transcribed spacer region of rDNA in black gram (Vigna mungo (L.) Hepper)*. *CURRENT SCIENCE*. 85:798-802.

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