Plague Phylodynamics and Phylogeography

This manuscript was automatically generated on May 12, 2021.

Authors

- **Katherine Eaton**
  0000-0001-6862-7756 · ktmeaton
  McMaster Ancient DNA Center; Department of Anthropology, McMaster University

- **Leo Featherstone**
  0000-0002-8878-1758
  The Peter Doherty Institute For Infection and Immunity , University of Melbourne

- **Sebastian Duchene**
  0000-0002-2863-0907 · sebastianduchene
  The Peter Doherty Institute For Infection and Immunity , University of Melbourne

- **Hendrik Poinar**
  0000-0002-0314-4160
  McMaster Ancient DNA Center; Department of Anthropology, McMaster University

Plague Phylodynamics and Phylogeography

Concepts

- Plague
- Yersinia pestis
- Phylodynamics
- Phylogeography
- Clade

Introduction

- Introduce Plague the disease and it's impact on Human populations.
- Introduce the pathogen, Yersinia pestis, ecotypes, subspecies, ecology, distribution. Evolutionary history and mechanisms.
- Introduce the topics phylodynamics and phylogeography and what is known so far.
- Introduce the problem.

Results

Curated Dataset

- Composition: Clades, Hosts, Locations, Time Periods

Phylogeny

Phylodynamics

Y. pestis has extreme rate variation as visualized with a Root to Tip Regression. The R^2 value of 0.09 indicates a poor fit to the strict clock.

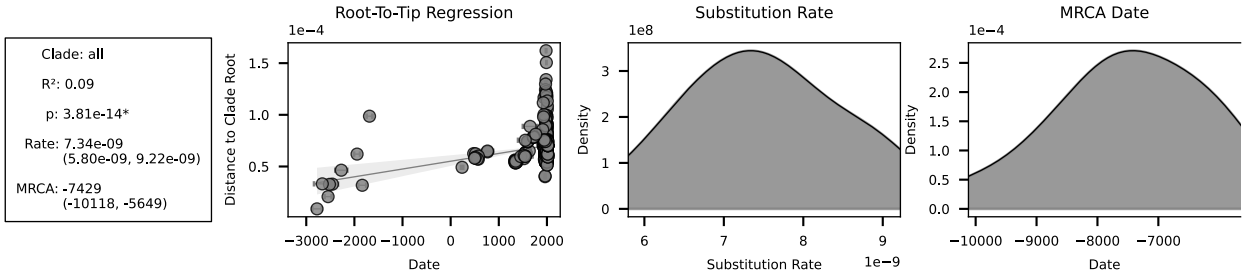

Figure 1: Root-To-Regression for All Samples

Root to Tip Regression separated by clade is more meaningful. The regression numbers don't make sense!

Table 1: Temporal signal statistics by clade

Branch	Clade	Origin	R^2	p-value	Bayes Factor	Regression Rate	BETS Rate
0	0.PRE	Ancient	0.91	1.53E-04*	99.96	6.84E-08	4.31E-08
0	0.PE	Modern	0.01	2.25E-01	35.71	1.94E-07	4.83E-09
0	0.ANT4	Ancient	0.66	7.84E-04*	24.27	2.52E-08	1.21E-08
0	0.ANT	Modern	-0.01	7.35E-01	32.89	2.73E-09	1.66E-08
1	1.ANT	Modern	0.45	2.03E-01	18.13	5.83E-08	2.19E-08
1	1.IN	Modern	0.0	3.24E-01	21.97	4.22E-08	3.42E-08
1	1.ORI	Modern	0.04	1.32E-02*	78.92	2.50E-08	5.46E-08
1	1.PRE	Ancient	0.76	1.68E-13*	4.05	6.29E-08	5.46E-08
2	2.ANT	Modern	0.05	5.96E-02	1.60		1.60E-08
2	2.MED	Modern	0.01	1.86E-01			
3	3.ANT	Modern	-0.04	4.39E-01			
4	4.ANT	Modern	-0.11	8.80E-01			
All	All	Modern+Ancient	0.09	3.81E-14			

Conclusion