

DNA evidence offers proof of North American native population decline due to arrival of Europeans

December 6 2011, by Bob Yirka

(PhysOrg.com) -- Most history books report that Native American populations in North America declined significantly after European colonizers appeared, subsequent to the “discovery” of the new world by Christopher Columbus in 1492, reducing their numbers by half or more in some cases. Most attribute this decline in population to the introduction of new diseases, primarily smallpox and warfare. To back up such claims, historians have relied on archaeological evidence and written documents by new world settlers. Up to now however, no physical evidence has been available to nail down specifics regarding population declines, such as when they actually occurred and what caused it to occur. Now however, three researchers with various backgrounds in anthropological and genome sciences have banded together to undertake a study based on mitochondrial DNA evidence, and have found, as they report in their study published in the *Proceedings of the National Academy of Sciences*, that native populations in North America did indeed decline by roughly fifty percent, some five hundred years ago.

What’s perhaps most interesting in the study, is the implication that the sudden drop in population appeared to occur almost right after the arrival of Europeans, which means before settlement began. This means that the decline would have come about almost exclusively as a result of disease sweeping naturally through native communities, rather than from warfare, or mass slaughter as some have suggested and that stories of

settlers using smallpox as a weapon may be exaggerated.

Also of interest is that the researchers found that the native population peaked some 5,000 years ago, and held steady, or even declined slightly, until the arrival of Europeans, and that the population decline that occurred was transient, meaning that it gradually rebounded as those Native Americans that survived the initial wave of smallpox passed on their hearty genes to the next generation.

The results of this research also seem to settle the argument of whether the massive loss of life due to disease was regional, as some historians have argued, or widespread as others have claimed; siding firmly with the latter.

In studying the [DNA](#), of both pre-European arrival native population samples and that of their ancestors alive today, the researchers noted that those alive today are more genetically similar to one another than were their ancestors, which suggests a population decline and then resurgence, and that is how, by backtracking, they came to conclude that the decline occurred half a century ago. The authors are quick to point out however that the margin of error in their work does allow for the possibility that the [population decline](#) occurred somewhat later than their results showed and note that further research will need to be done to create a more precise timeline of events.

More information: Native Americans experienced a strong population bottleneck coincident with European contact, *PNAS*, Published online before print December 5, 2011, [doi: 10.1073/pnas.1112563108](https://doi.org/10.1073/pnas.1112563108)

Abstract

The genetic and demographic impact of European contact with Native Americans has remained unclear despite recent interest. Whereas archeological and historical records indicate that European contact

resulted in widespread mortality from various sources, genetic studies have found little evidence of a recent contraction in Native American population size. In this study we use a large dataset including both ancient and contemporary mitochondrial DNA to construct a high-resolution portrait of the Holocene and late Pleistocene population size of indigenous Americans. Our reconstruction suggests that Native Americans suffered a significant, although transient, contraction in population size some 500 y before the present, during which female effective size was reduced by $\sim 50\%$. These results support analyses of historical records indicating that European colonization induced widespread mortality among indigenous Americans.

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