

Males and Females in Stratified Societies

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1 / 26

Genghis Khan (1162–1227 AD)



- ▶ United nomadic tribes of NE Asia
- ▶ Conquered most of Eurasia

2 / 26

The Mongol Empire



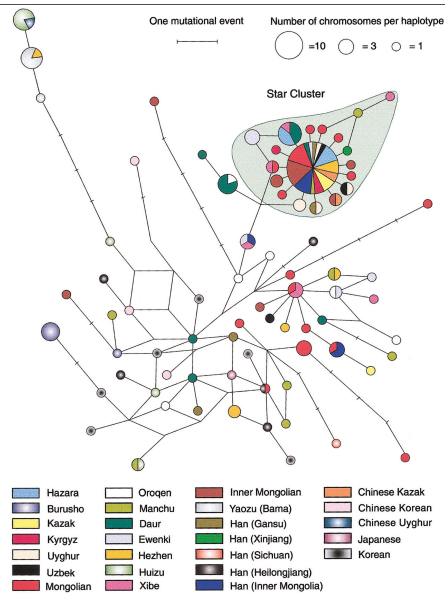
3 / 26

They [the Mongols] attacked Rus, where they made great havoc, destroying cities and fortresses and slaughtering men; and they laid siege to Kiev, the capital of Rus; after they had besieged the city for a long time, they took it and put the inhabitants to death. When we were journeying through that land we came across countless skulls and bones of dead men lying about on the ground. Kiev had been a very large and thickly populated town, but now it has been reduced almost to nothing, for there are at the present time scarce two hundred houses there and the inhabitants are kept in complete slavery. (Giovanni da Pian del Carpine, 1246)

4 / 26

Zerjal et al 2003: The genetic legacy of the Mongols

- ▶ Typed 2,123 men for ≥ 32 Y-chromosome markers.
- ▶ Most Y haplotypes occurred only once.
- ▶ A few occurred several times within a single population.
- ▶ But one cluster of haplotypes (the “star cluster”) constituted 10% of the sample, throughout the old Mongol Empire.



Each circle shows a haplotype.

Size of circle: number of men.

Color: geographic region

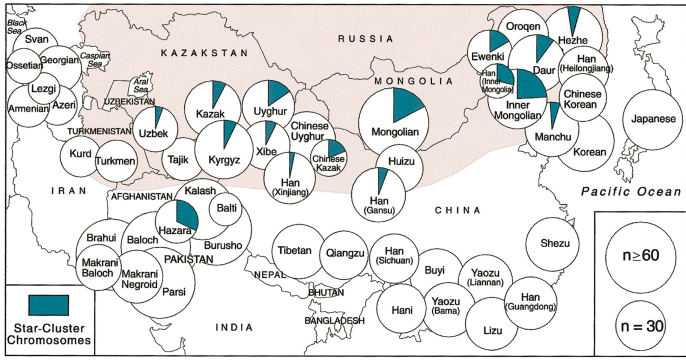
Gray shading shows star cluster.

Note its geographic distribution.

5 / 26

6 / 26

Geographic distribution of star cluster coincides with Mongol Empire—except for the Hazara



The Hazara of Pakistan

- ▶ Of Mongol descent.
- ▶ Many men claim male descent from Genghis.
- ▶ Genetics suggests they are right.

Age of star cluster

- ▶ Several methods, based on genetics, indicate an age of ~1000 years.
- ▶ Genghis was born 850 y ago.

Genghis's legacy

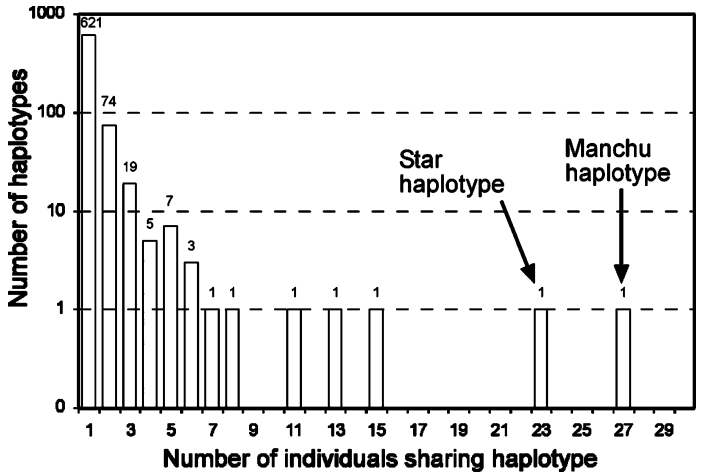
Genghis Khan and his sons had an enormous influence of the genetics of Eurasia.

His Y chromosome is carried today by ~16 million men, ~0.5% of the world's total.

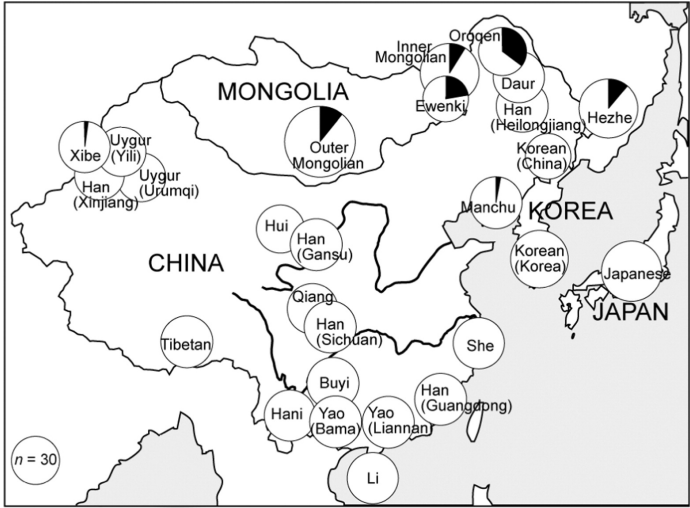
Study of Xue et al 2005

- ▶ Found another example of the same phenomenon.
- ▶ Manchu haplotype
- ▶ ~600 y old
- ▶ Throughout N China and Mongolia.
- ▶ Seems to derive from Gocangga (died 1582), the grandfather of Manchu leader Nurhaci.

Manchu haplotype even more common than Genghis's



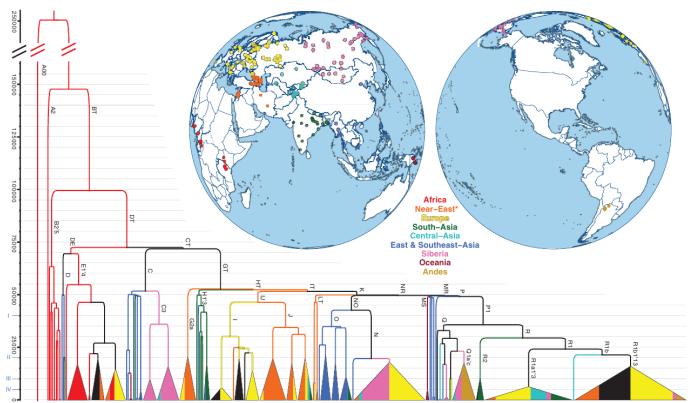
Throughout N China and Mongolia



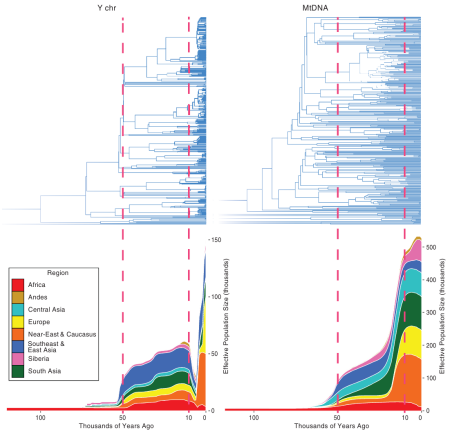
Summary

The Genghis and Manchu haplotypes reflect novel form of selection.
 Probably based on social prestige rather than biological advantage.
 Stratified societies make this possible.
 May have happened often in human history.

Karmin et al (2015) studied 456 Y & mitochondrial chromosomes from a worldwide sample

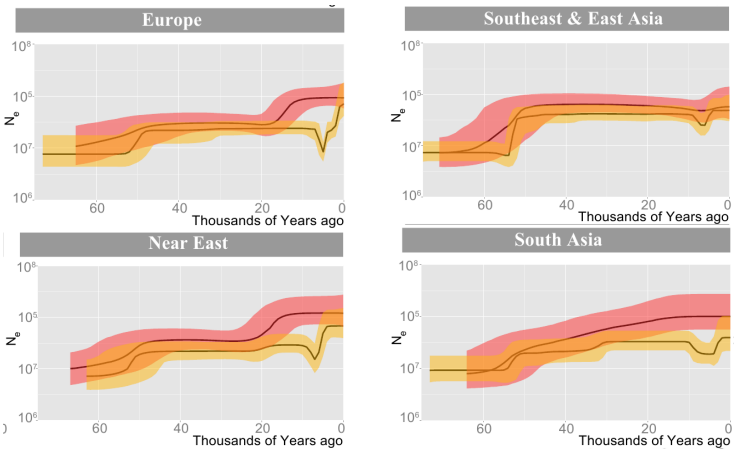


Y (left) and mtDNA (right)



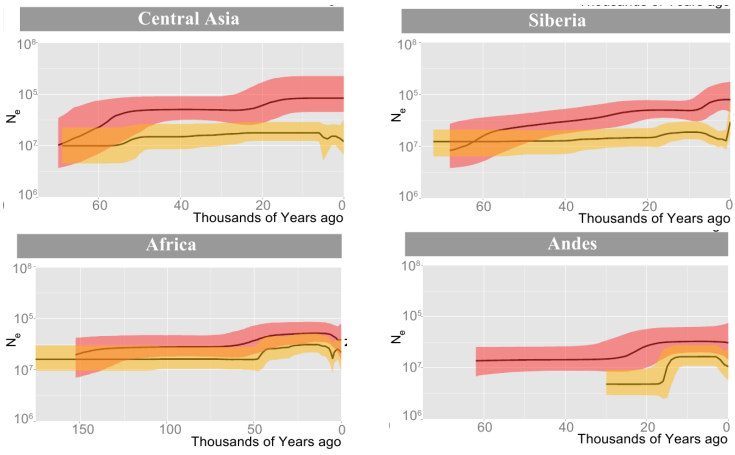
Top: gene genealogies
 Bottom: history of population size.
 Compare Y (left) and mtDNA (right)
 Male population smaller than female, especially around 5 kya.

Several Eurasian populations show similar pattern

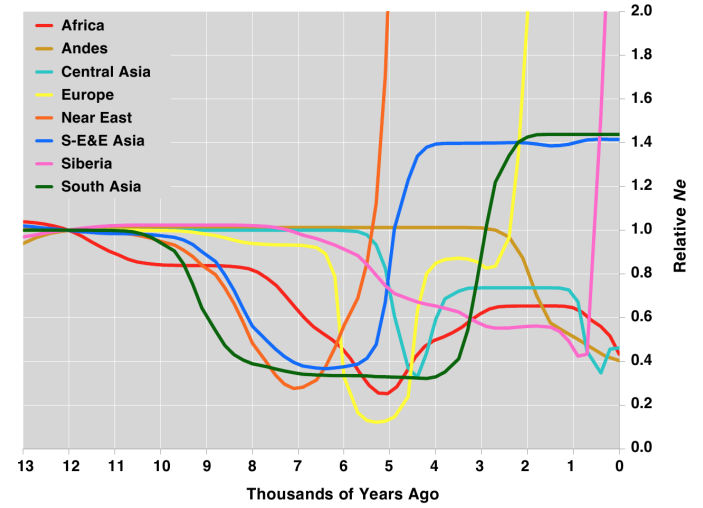


- ▶ Female population expands beginning 20–40 kya.
- ▶ Male population flat, then declines 5–10 kya.

Pattern is less pronounced elsewhere



All the male populations at once



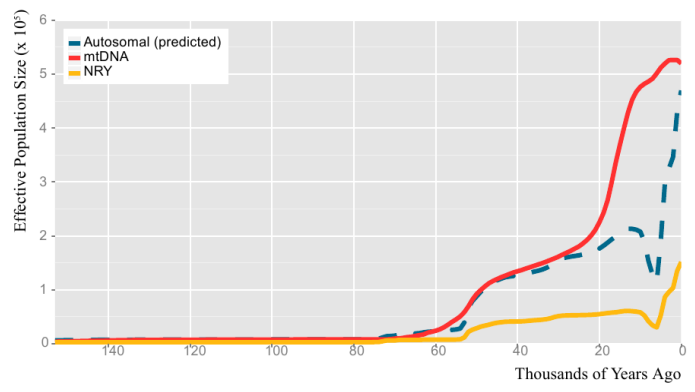
Hypothesis

Agriculture → stratified society → a few males monopolize reproduction.

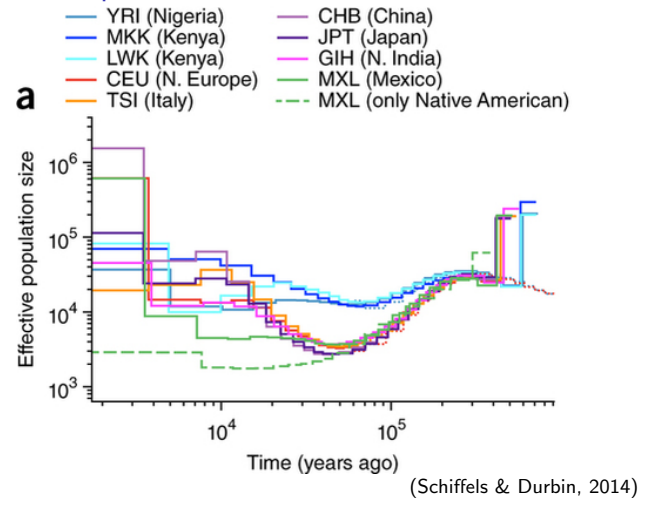
Beidha, Jordan (7200–6500 BC): stratified society?



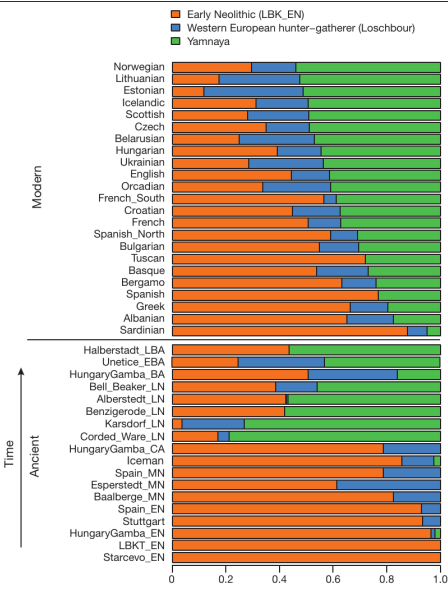
Dip in male population size implies a dip in autosomal size



But no such dip is obvious in the data



(Schiffels & Durbin, 2014)



In Europe, most yDNA came from Yamnaya, but most mtDNA came from the Middle East. (Haak et al 2015)

Maybe the yDNA and mtDNA of Karmin et al are telling us about two different populations.

Summary

- ▶ In stratified societies, a few males may have disproportionate reproductive success.
- ▶ Implies small male effective population size.
- ▶ In Eurasian populations, male population size dipped during the Neolithic.
- ▶ Maybe Neolithic populations were stratified.
- ▶ Or maybe the yDNA and mtDNA in modern populations came from different ancestral populations.