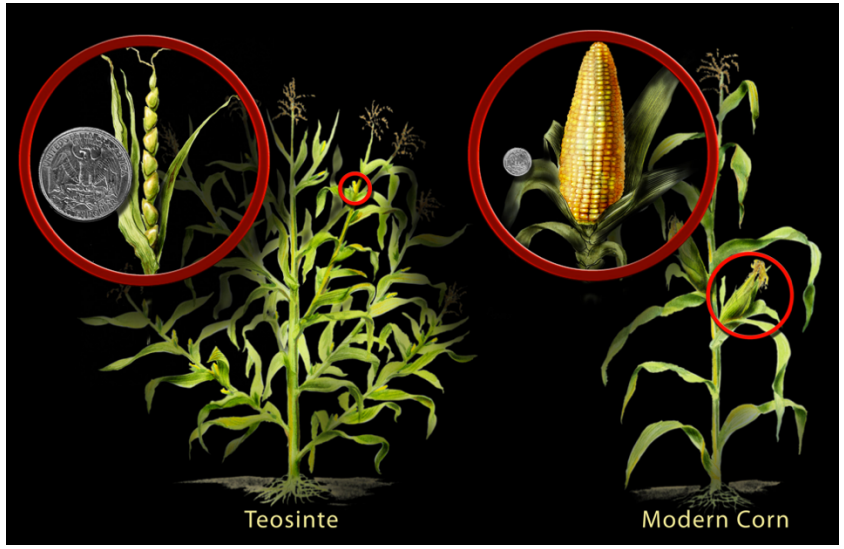
Sunflower domestication – using Cross Cutting Concepts to understand evolution, history, and culture

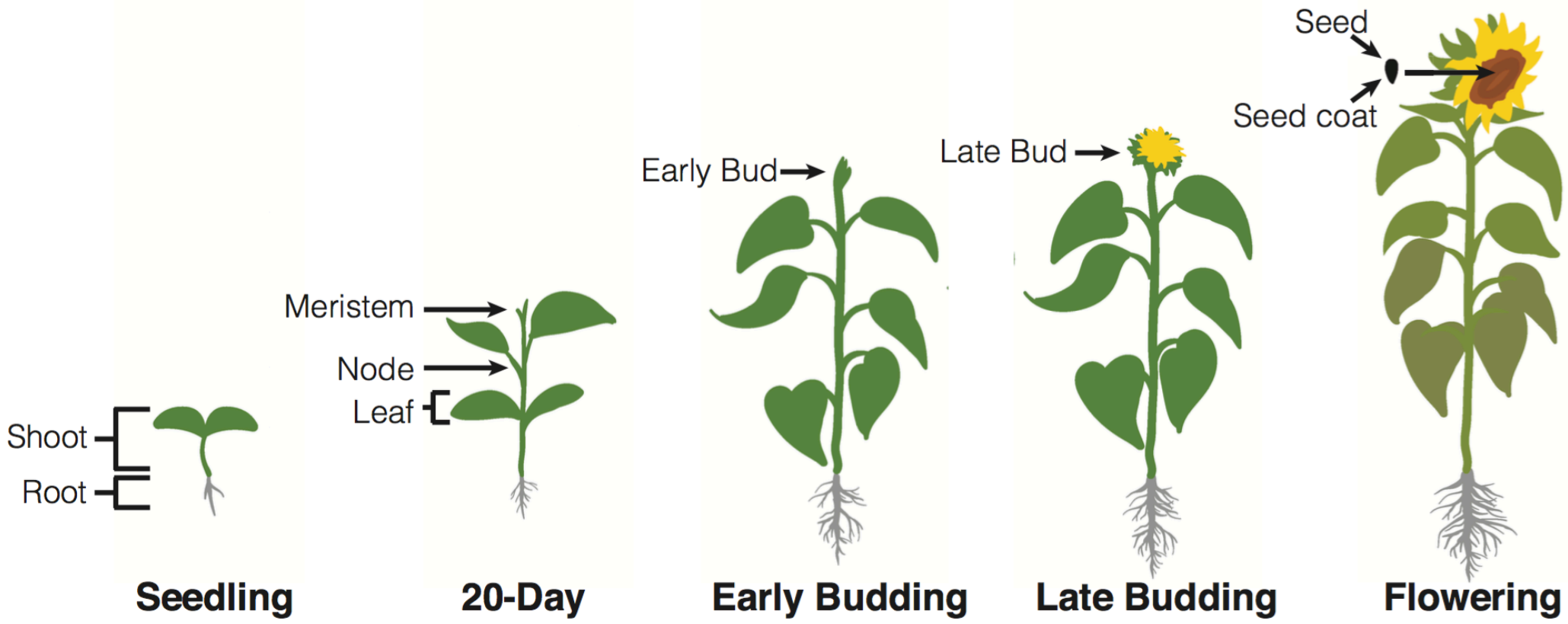
Domestication – dramatic phenotypic evolution – **Stability and change**



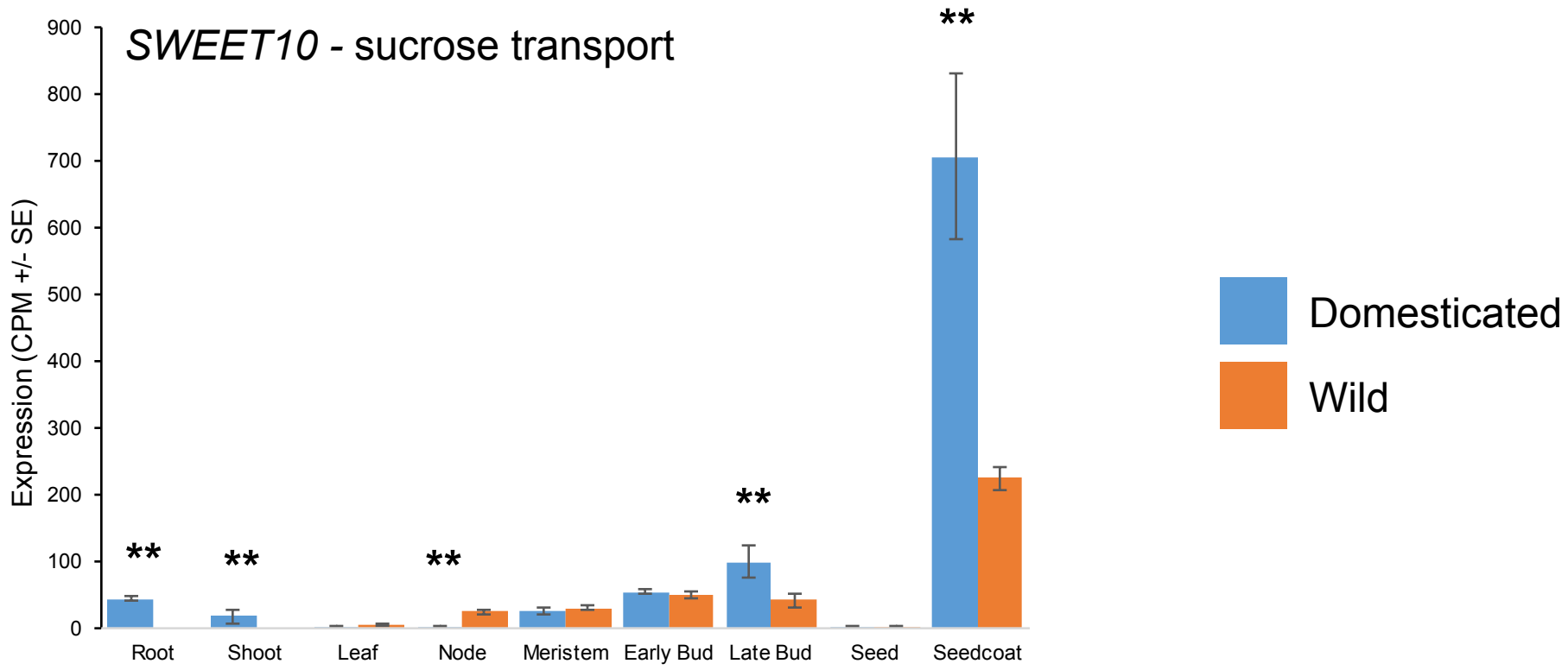
Sunflower domestication syndrome

- Loss – seed shattering, seed dormancy, branching, self-incompatibility
- Gain – larger inflorescence and seeds, increased starch and oil content in seeds

Using plant **structures/functions** to identify domestication genes

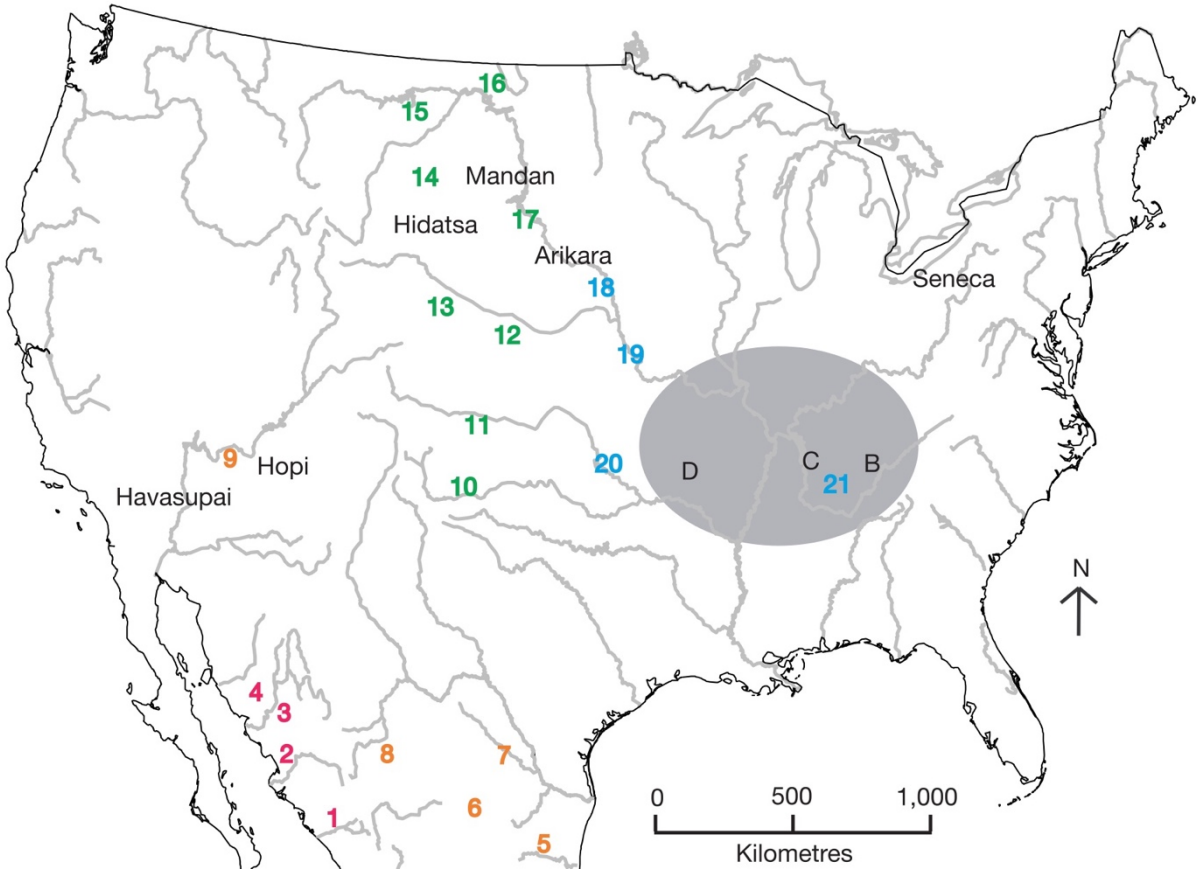


Structure and function helps identify key genes



Using **patterns** of variation in traits to study population dynamics

Early sunflower domestication



~5000 year ago

Harter *et al* 2004

Archeologists, linguists, and educators

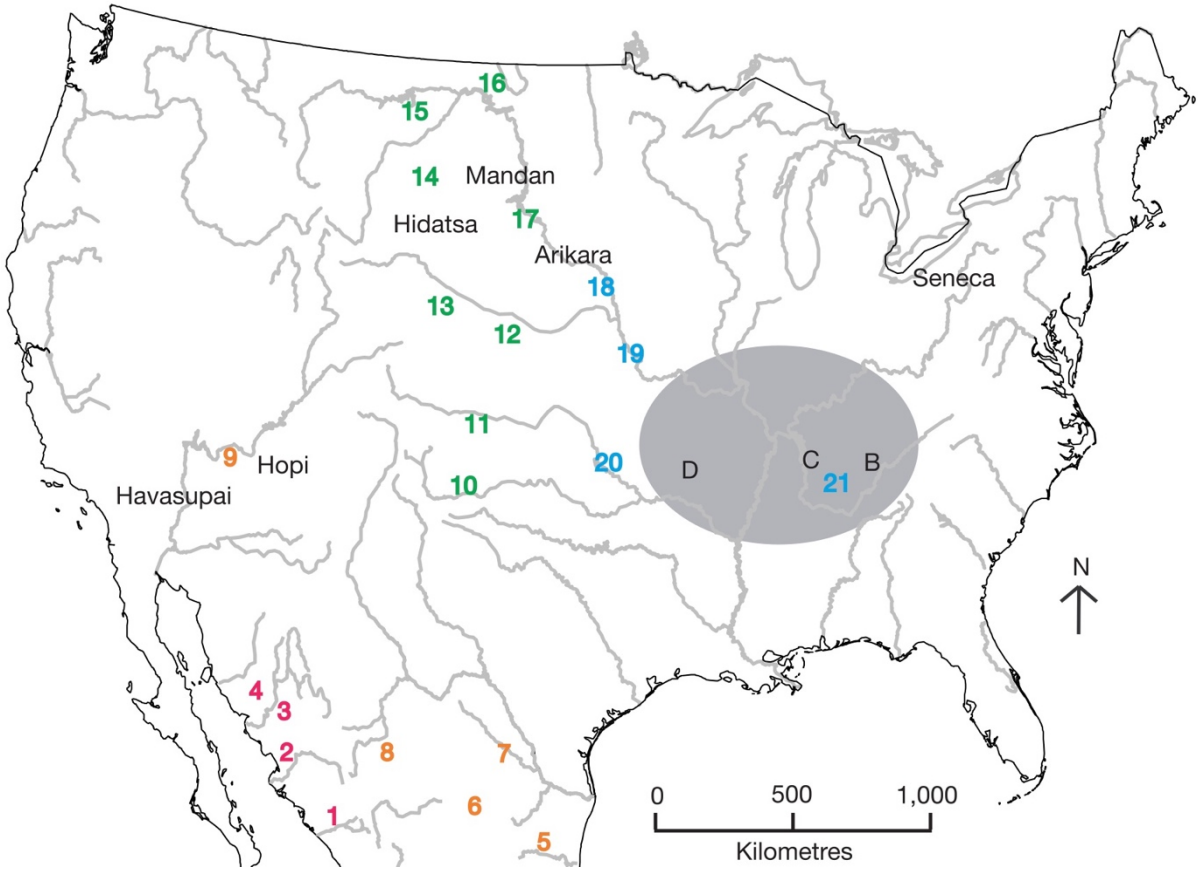
https://archeology.uark.edu/ozarkbluffshelters/

Sunflowers as a staple crop in North America

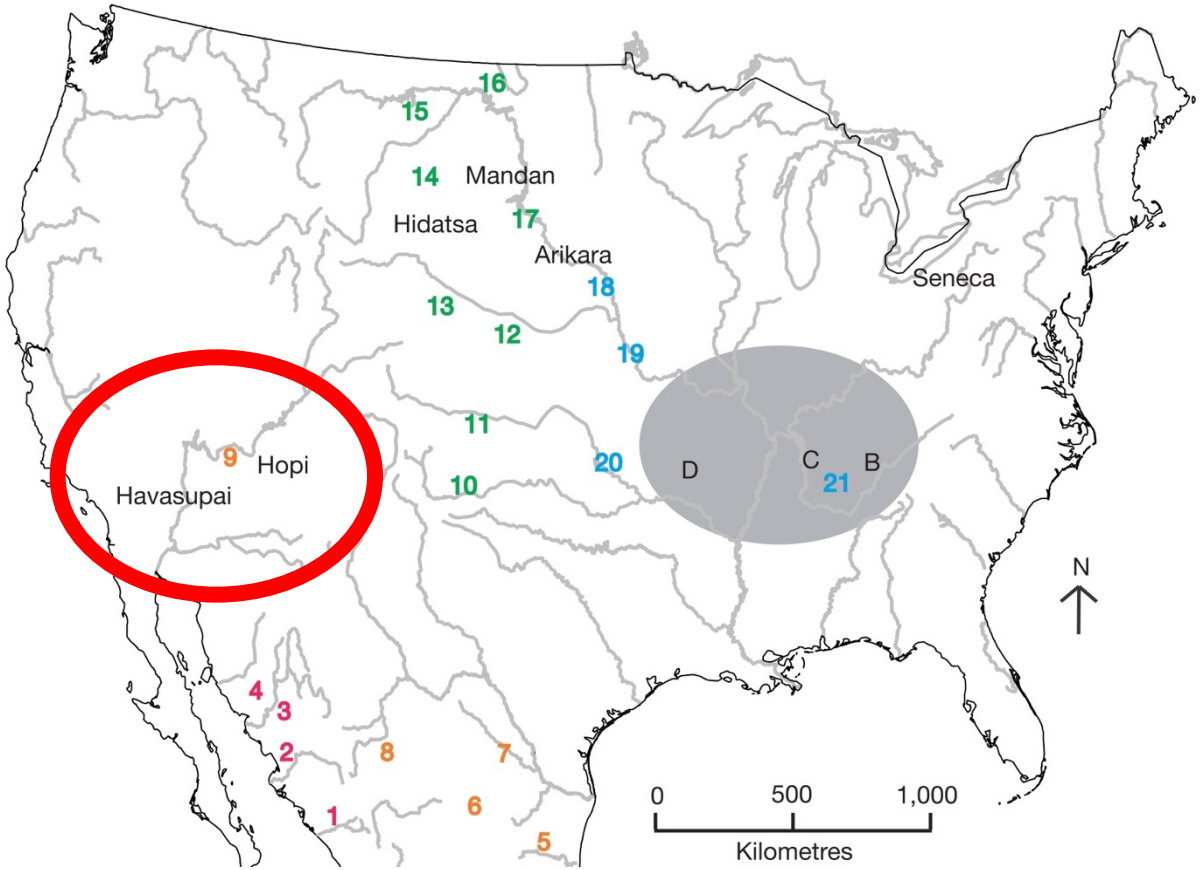
2000 BCE

Uses of the sunflower among Native Americans

Hopi sunflower – selection in a different direction



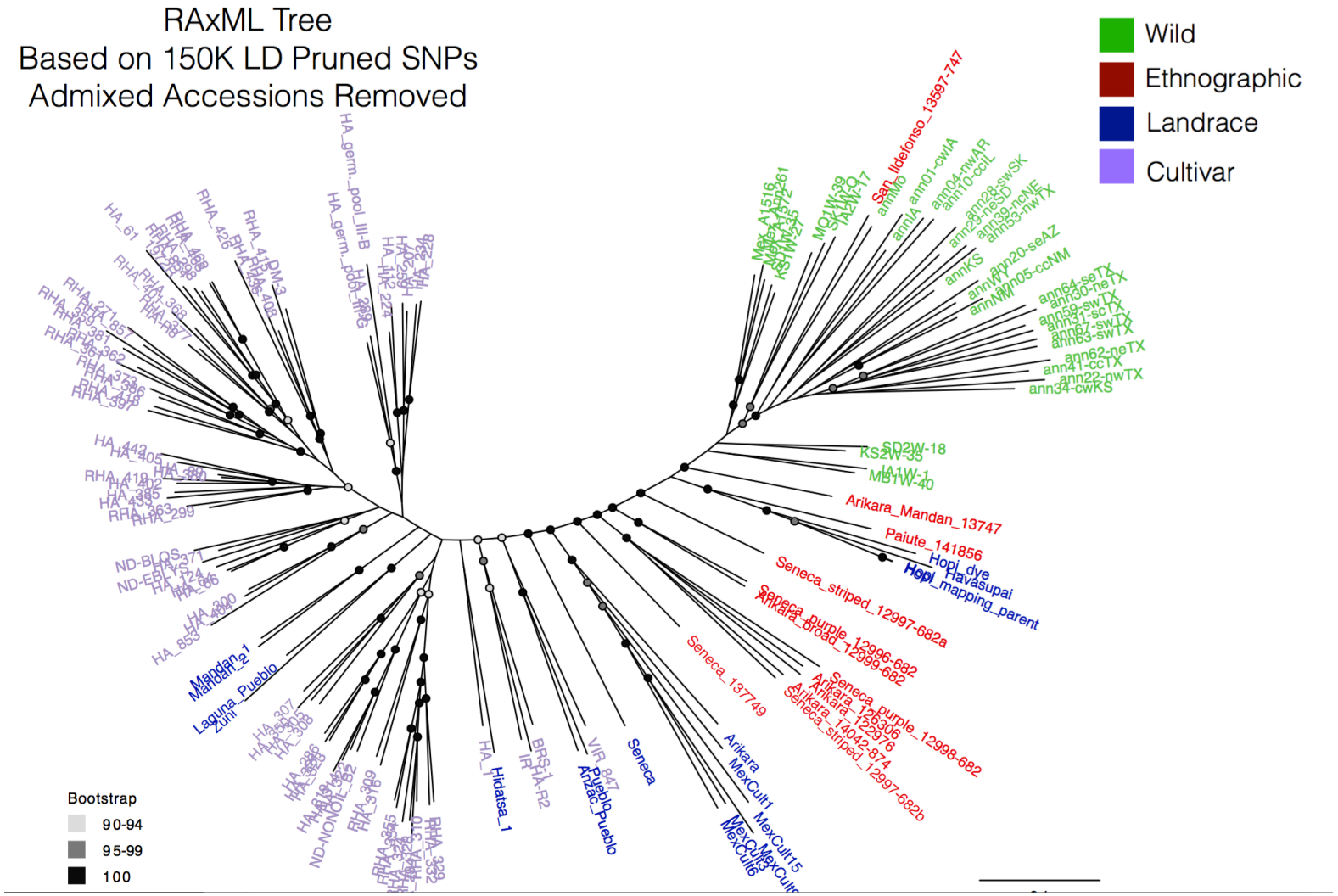
Hopi sunflower – selection in a different direction



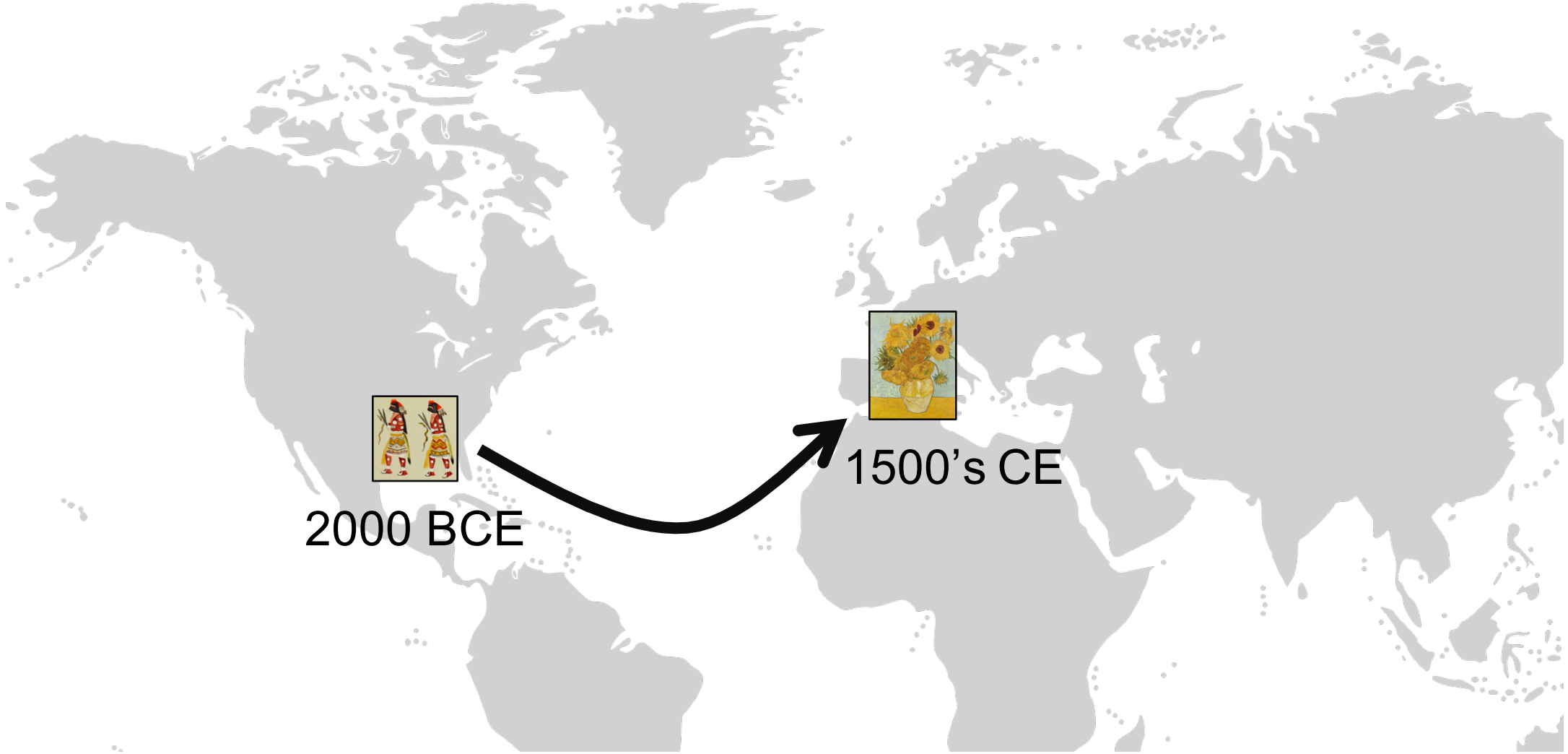
Hopi Sunflower Dye

Hopi Sunflower Dye

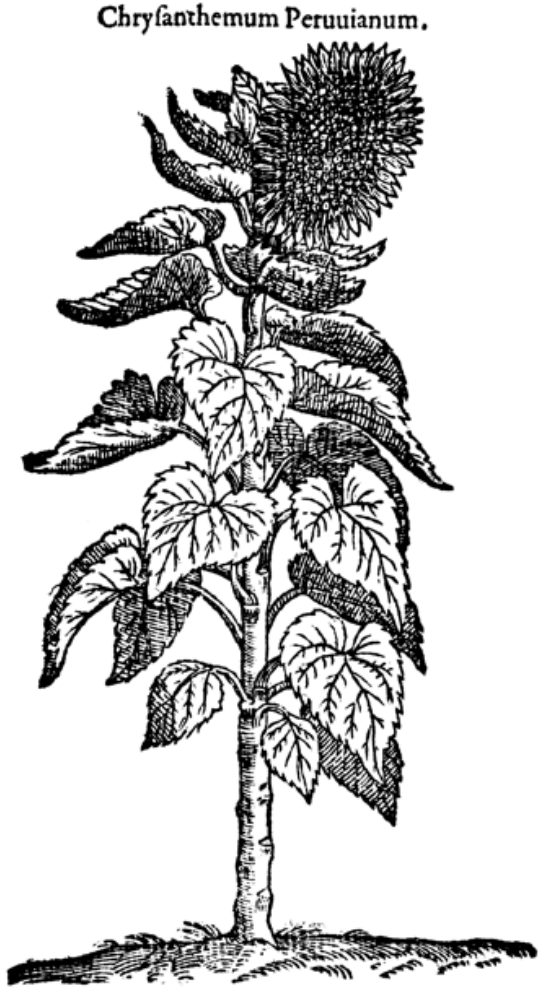
Population Genomics – using sequence **pattern** to understand history



Sunflowers as an ornamental garden plant



Sunflowers travel to Europe

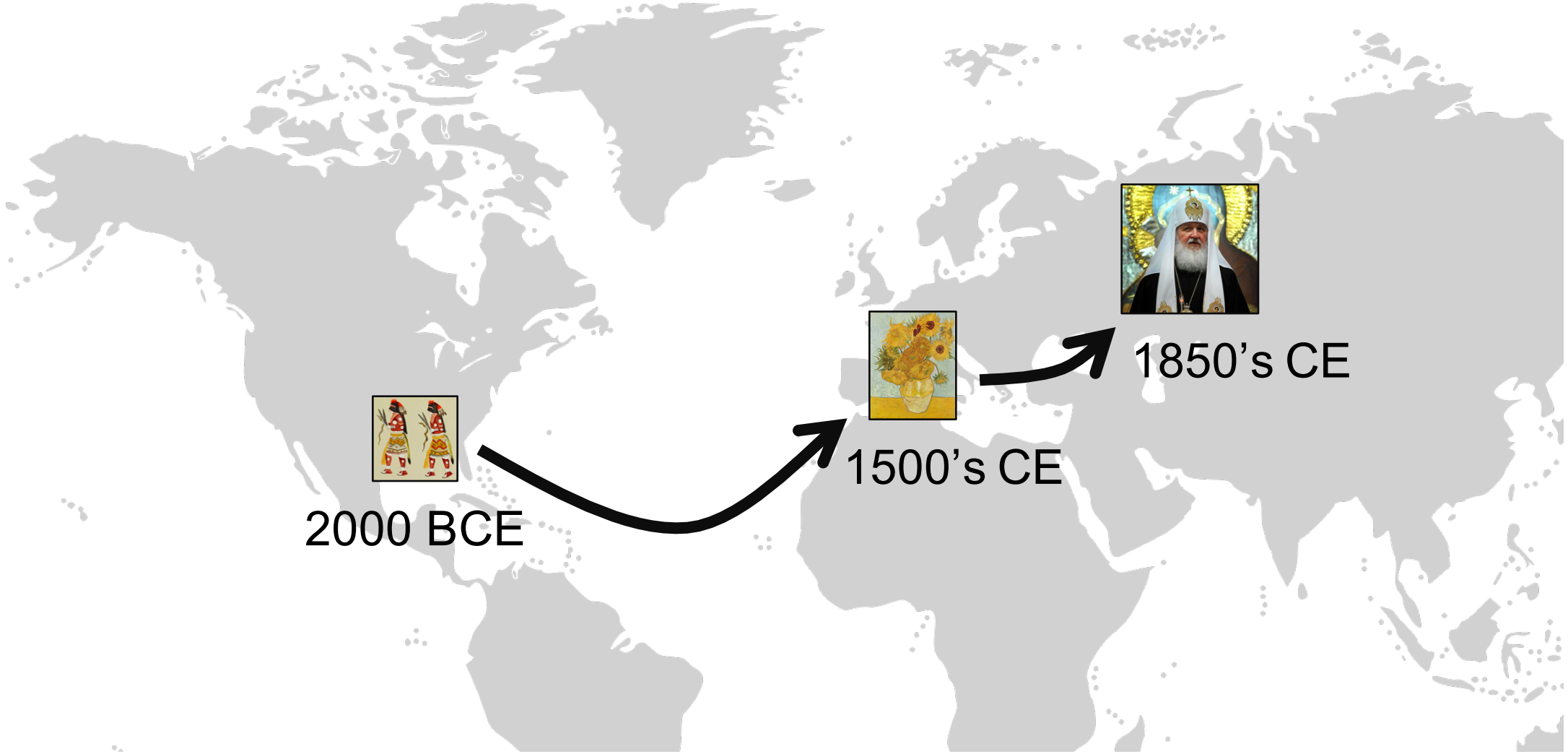


1568 – Rembet Dodoens

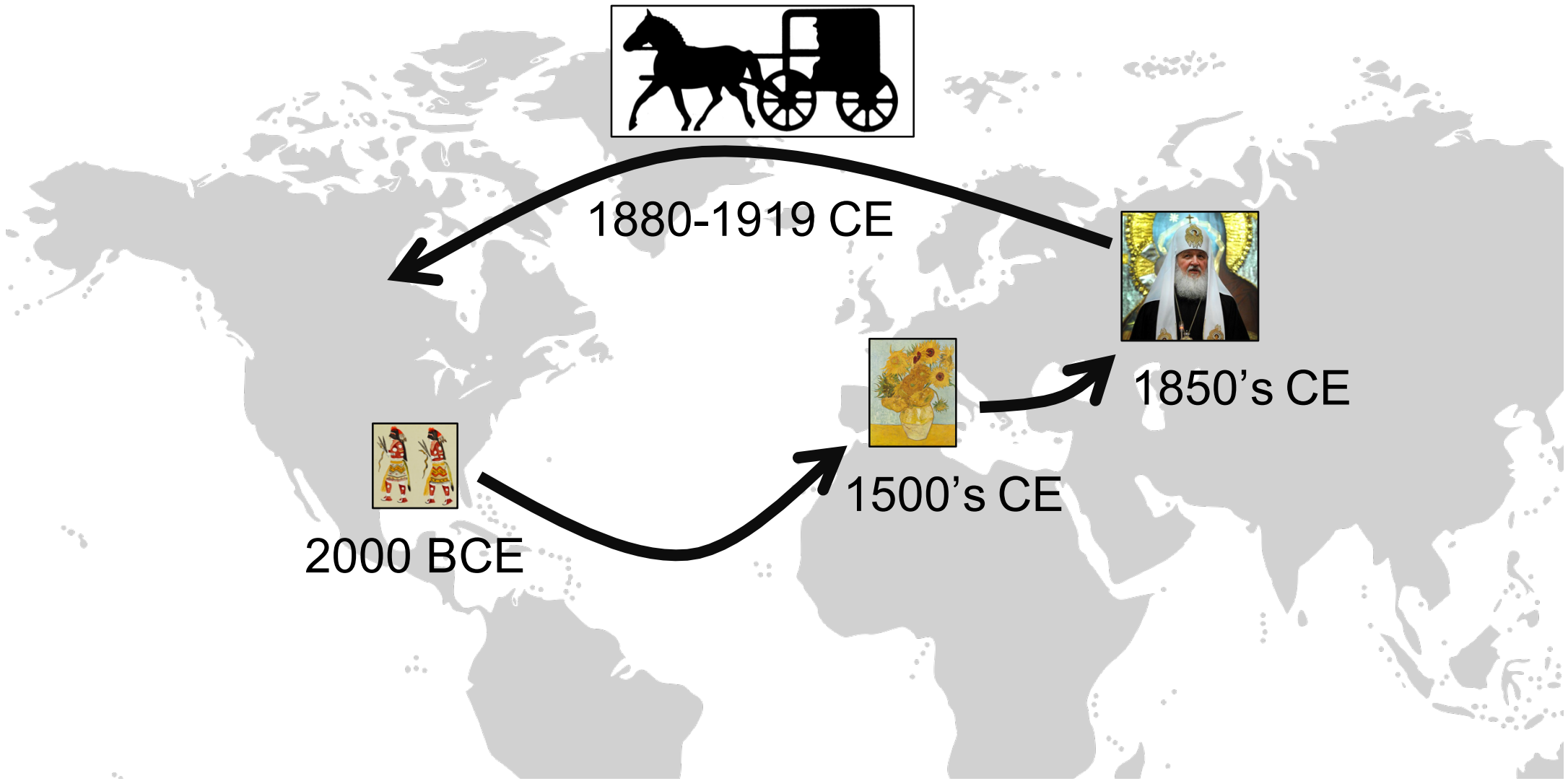
1888 - Van Gogh

1881 - Monet

The Russian Orthodox Church and religious gerrymandering

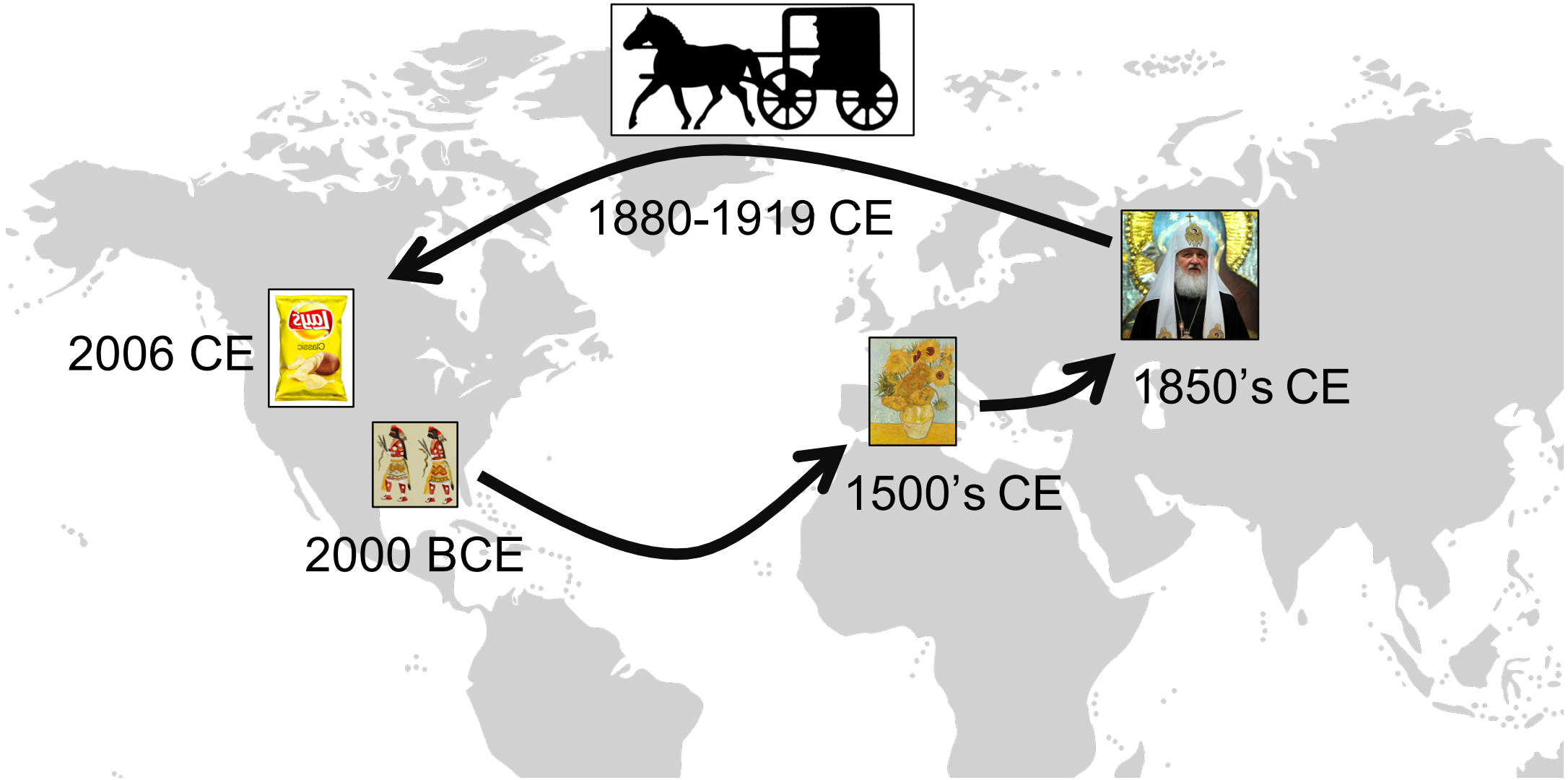


The rise of communism and religious persecution



Mennonite diaspora into Canada

Reduced fat potato chips and the rise of sunflower oil in the US



Lays Potato Chips – the rise of sunflowers in 2006