• Domestication in the Americas
• Mesoamerica
  – cucurbits: Guilá Naquitz, Oaxaca 10-8 ka
  – Mesoamerican TRINITY
    • teosinte: San Andres 7.1 ka
  – Tehuacán Valley
    • Coxcatlán Rock Shelter (Phase) 7 – 5.4 ka
    • maize-beans-squash grown widely by 4.5-4 ka & settled villages common
  – Andes 10 ka; 5-4 ka
    – cucurbits; camelids-quinoa-potatoes; cotton

• American Southwest
  – turkeys
  – TRINITY earliest 4-3.5 ka
    • supplemental to hunting-gathering
  – eastern North America
    – local domesticates: goosefoot, marsh elder, gourds (oily seeds)
    – earliest maize ca. 1.7 ka
    – maize agriculture 1000 AD
  – Cahokia 900-1200 AD
    • maize-beans-squash: cultural SUPERNOVA
• Old & New Worlds

Desert Southwest
4.5-3.5 ka earliest maize
1000 AD maize-beans-squash

eastern N. America
3-1.6 ka squash/oil plants
900-1200 AD maize-beans-squash

Early Mesoamerican Sites

Mesoamerica
10 ka (cucurbits)
7.5-4.5 (maize-beans-squash)
• early domestication events:
  – cucurbits = plants of the gourd family; i.e. melons, cucumbers, squash
  • domestication in humid tropical forests by 11 ka (?)
  • Guilá Naquitz, Oaxaca, 10.75-8.67 ka
    – seeds of domestic bottle gourd and squash
    – original “interactions” with gourds as water containers?
    – seedbed tending…
      » selecting for early sprouting, also selects for larger plants and larger seeds

• the Mesoamerican TRINITY
  – maize-beans-squash
  – *Zea mays*, or maize (corn) = domestic maize
  – *Zea mexican* (“teosinte”) = wild grass progenitor of maize
    • originally thought that maize progenitor went extinct, but now demonstrated that teosinte is it
      – hybridizes (the “biological species” test)
      – few as 5 genetic mutations convert teosinte into maize…ease of domestication?
• the TRINITY: domestication and human health
  – teosinte/maize lacking in two essential amino acids!
    • lysine & tryptophan
    • maize-only diet not possible
    • beans: high in lysine
    • squash: high in tryptophan
    • eat one (maize), must eat all!
    • domestication as a group → beneficial health consequences
  – domestication w/o knowledge of amino acids?

• the TRINITY: domestication and human health
  – teosinte-beans-squash: natural ecological association
    • runner beans and squash grow naturally around the base of wild teosinte plants
    • teosinte/maize extracts nitrogen from soils; beans return nitrogen to soils
      – association helps maintain soil fertility
    • interaction with one (e.g., water containers), interaction with all?
    • easy to domesticate as a group?

Excavations at Coxcatlán, Tehuacan Valley, Mexico
Coxcatlán early maize cob

Earliest Maize Domestication 7.1 - 7.0 ka
San Andres, Tabasco, 7.1 ka proto-domesticate

“centers” of domestication
synchronous, independent origins of agriculture
Highland Andes…independent camelids: llama and alpaca < 8ka cotton: non-food! ca. 7ka potatoes: hundreds of varieties 5 ka Chenopodium: quinoa 4-5ka turkeys in American Southwest who domesticated whom? a model for dog domestication?

Desert Southwest 4.5-3.5 ka earliest maize 1000 AD maize-beans-squash eastern N. America 3-1.6 ka squash/oil plants 900-1200 AD maize-beans-squash Mesoamerica 10 ka (cucurbits) 7.5-4.5 (maize-beans-squash) Desert Southwest 4.5-3.5 ka earliest maize 1000 AD maize-beans-squash eastern N. America 3-1.6 ka squash/oil plants 900-1200 AD maize-beans-squash Mesoamerica 10 ka (cucurbits) 7.5-4.5 (maize-beans-squash)
Increasing marsh elder seed size under prehistoric human cultivation

Eastern North America
Moundbuilder Cultures 1000-600 BC
Hopewell 1-400 AD

Eastern North America -- Cahokia 900-1200 AD
Cultural SUPERNOVA with arrival of maize-beans-squash

- Old-New World Comparison
  - late Pleistocene hunter-gatherers used wild precursors to domesticates to supplement diet based on other wild foods
    - Kebaran → Old v. Ajeureado & El Riego Phase → New
  - sedentism precedes development of full domesticates and/or contributes to domestication
    - Natufian v. Coxcatlan Phase
  - full sedentism and mature agriculture provides foundation for growing social complexity