

Paleoethnobotany:

Study of people and plants
in the past

Paleoethnobotany:

- What is the nature of our data?
- How do we collect it?
- What do we do with it?

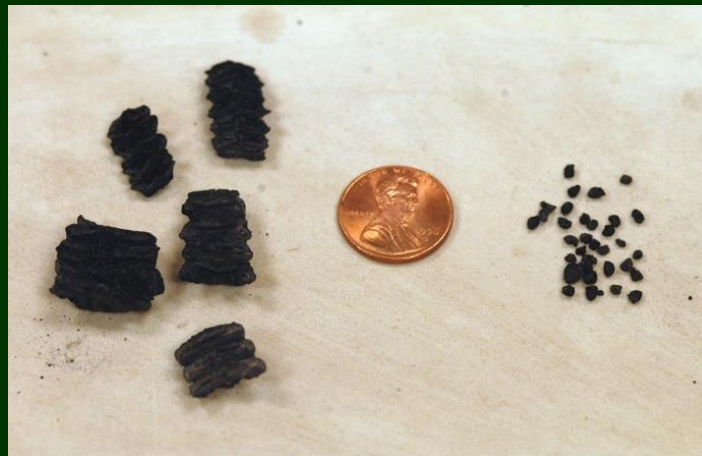
Macrobotanical Remains



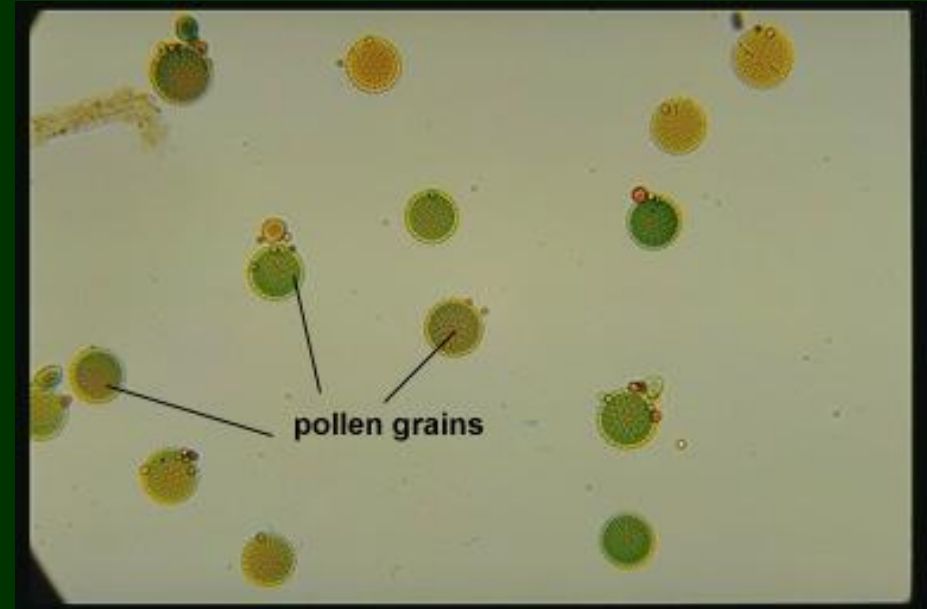
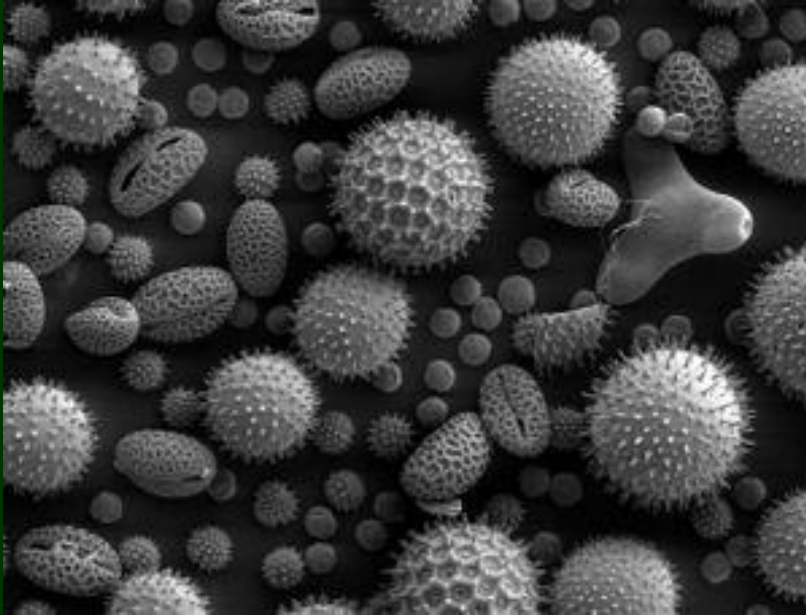
Corn cupules



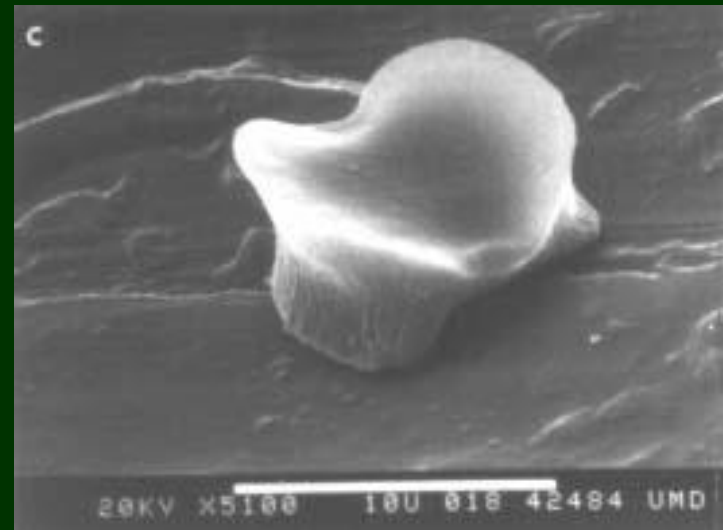
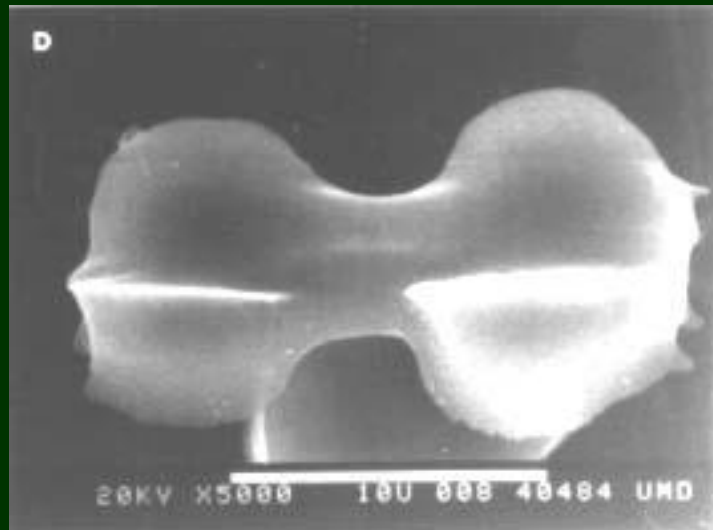
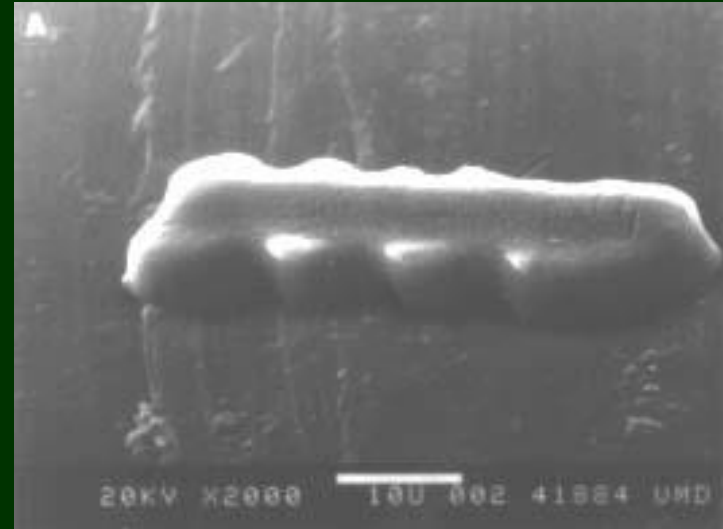
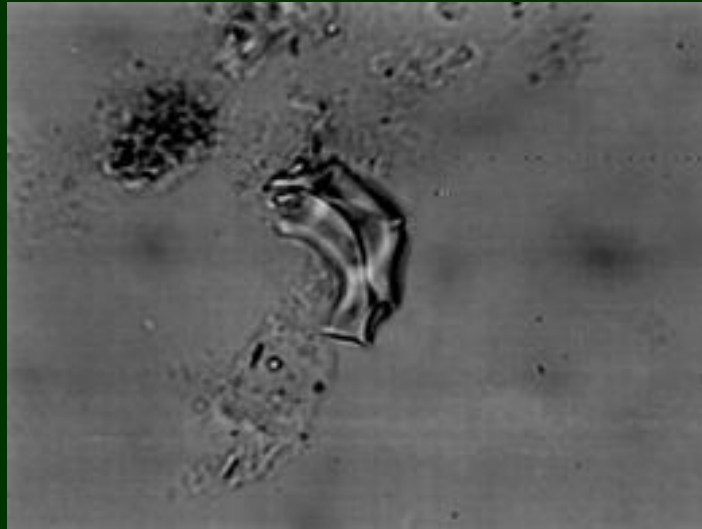
Chenopod seeds



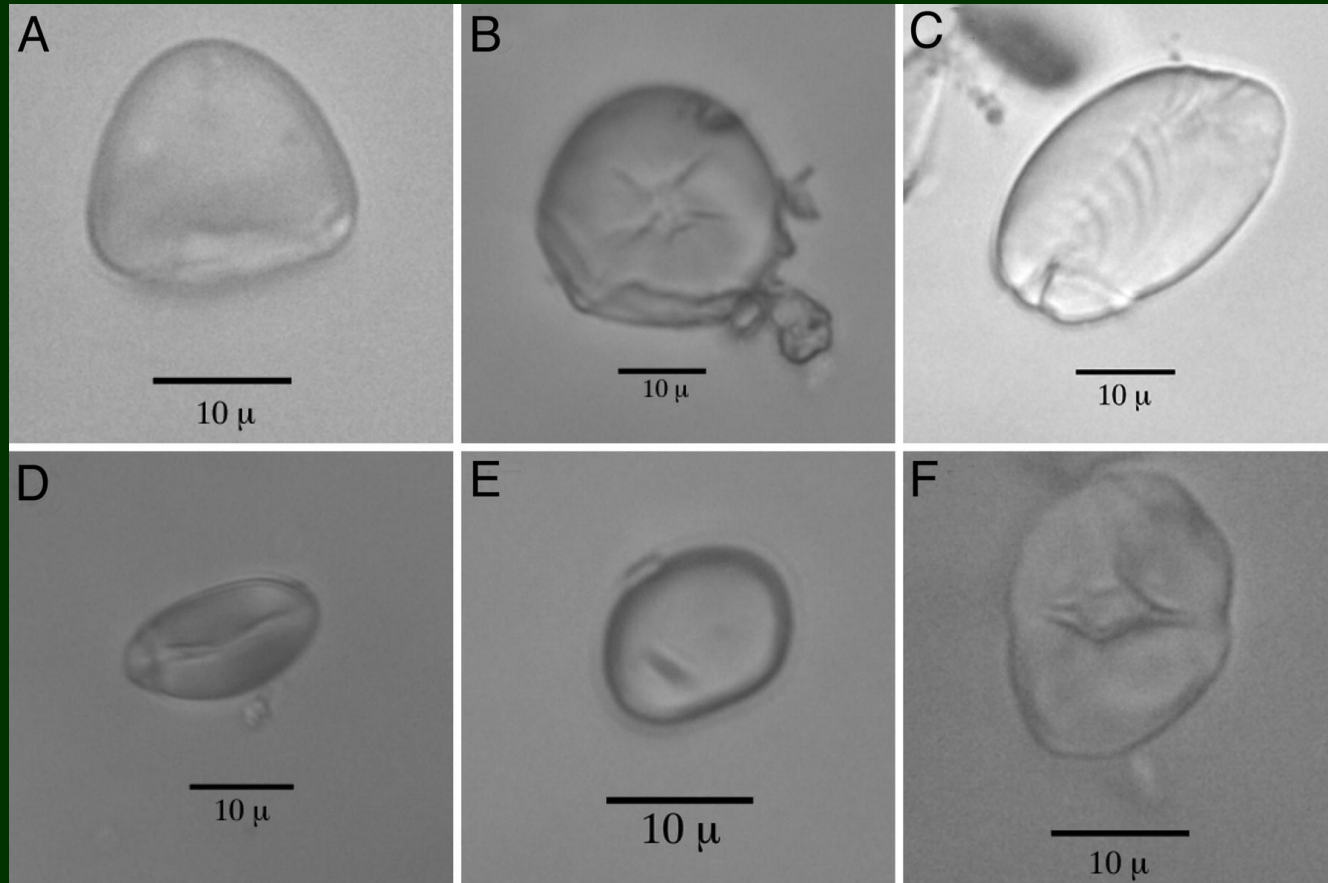
Pollen



Phytoliths



Starch Grains



How do plants enter the archaeological record?

1) People use them

- procure
- process
- prepare
- consume
- discard

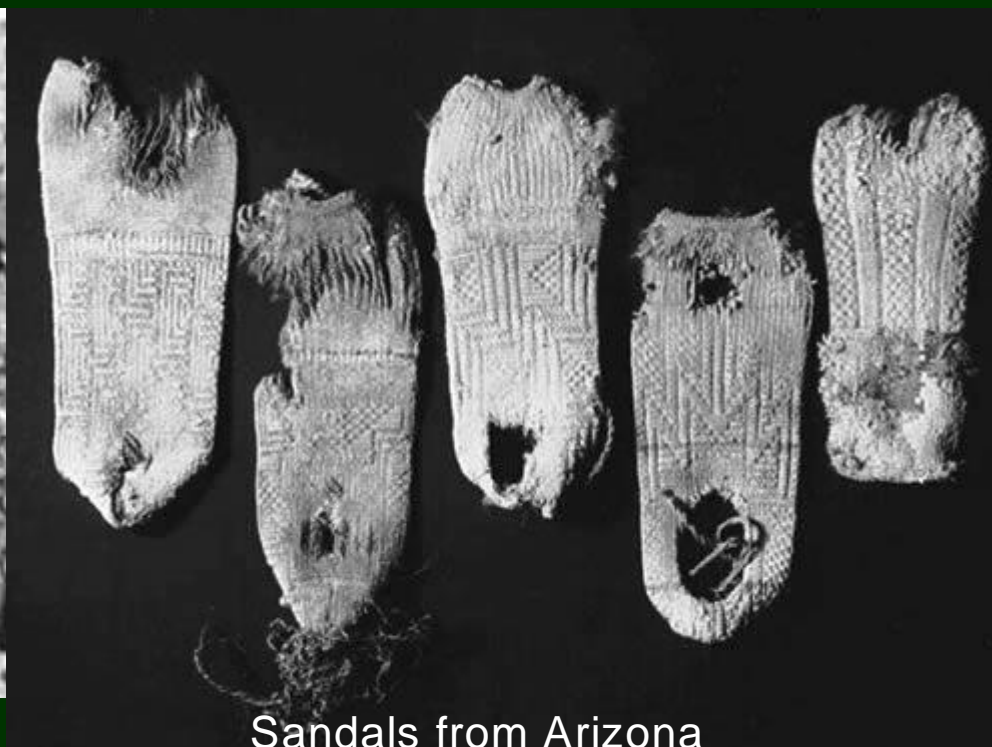
•2) They are preserved

How do we get plants from archaeological sites?

- Must be preserved: dry conditions



Sandal from Salts Cave, Kentucky



Sandals from Arizona

How do we get plants from archaeological sites?

- Must be preserved: wet conditions



5000 yr old woven mat from
Windover, Florida



Canoe from Florida

How do we get plants from archaeological sites?

- Must be preserved: carbonized



Bean



Corn cobs

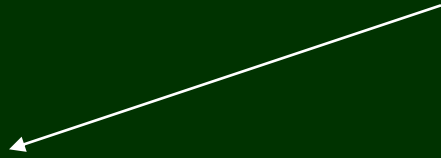
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How do we get plants from archaeological sites: preservation

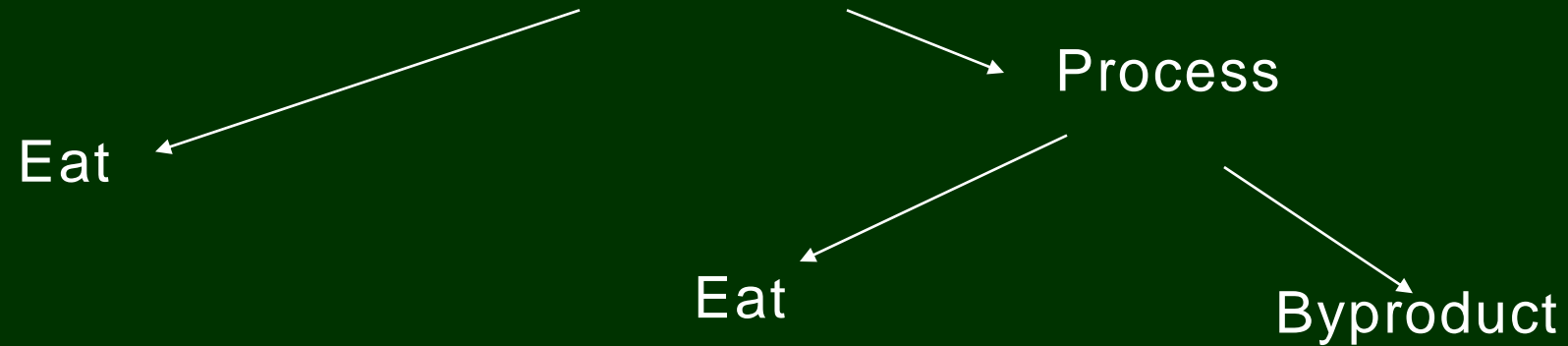
Procure: gather, harvest, purchase

Eat

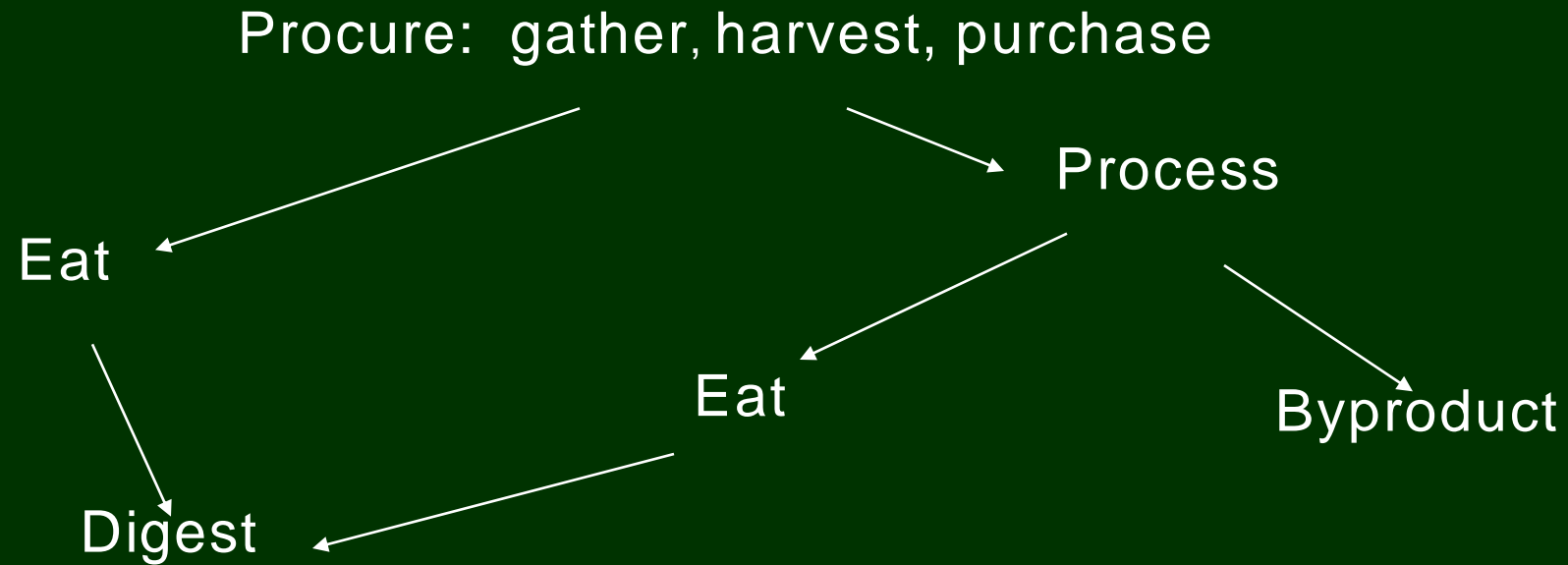


How do we get plants from archaeological sites: preservation

Procure: gather, harvest, purchase



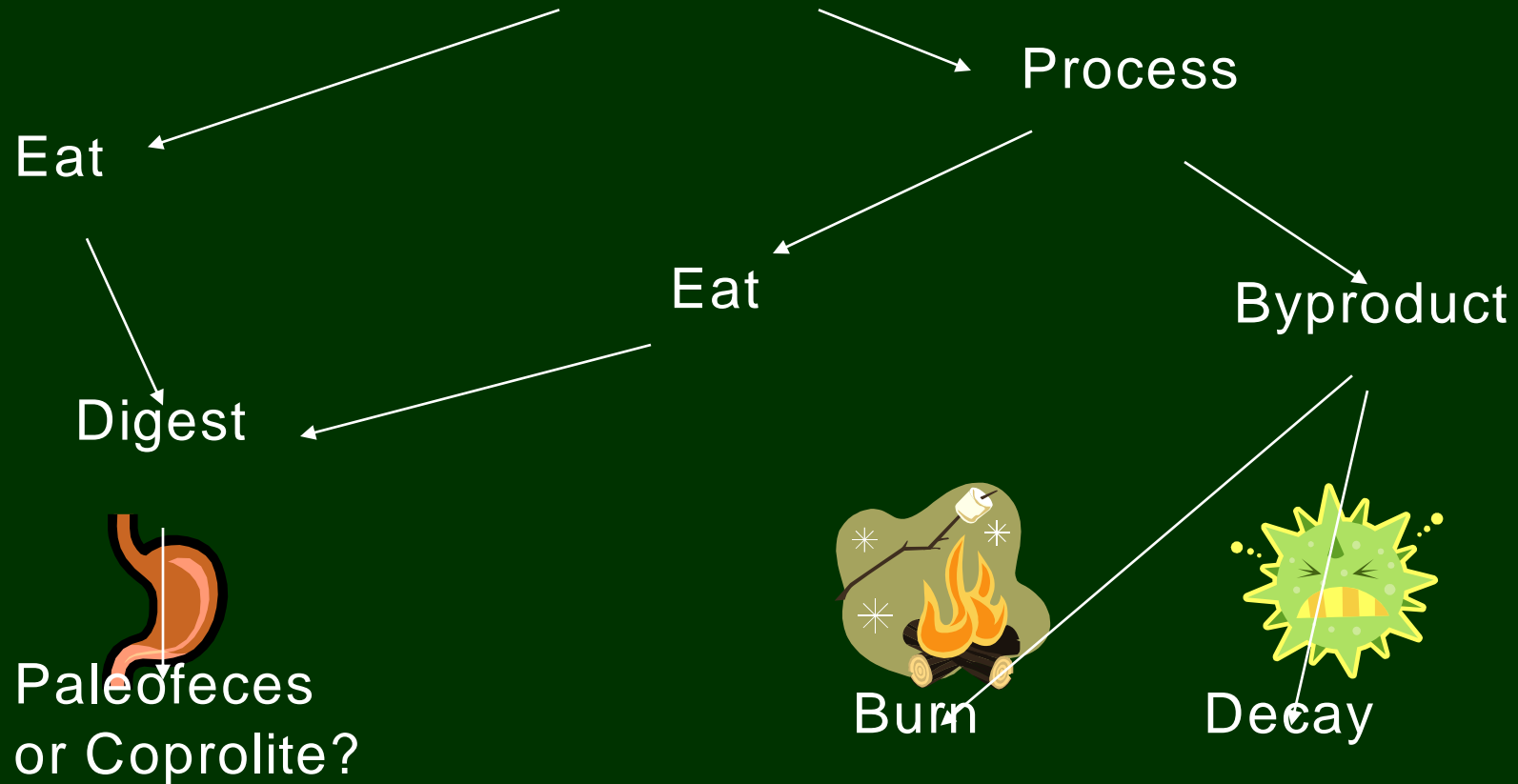
How do we get plants from archaeological sites: preservation



Paleofeces
or Coprolite?

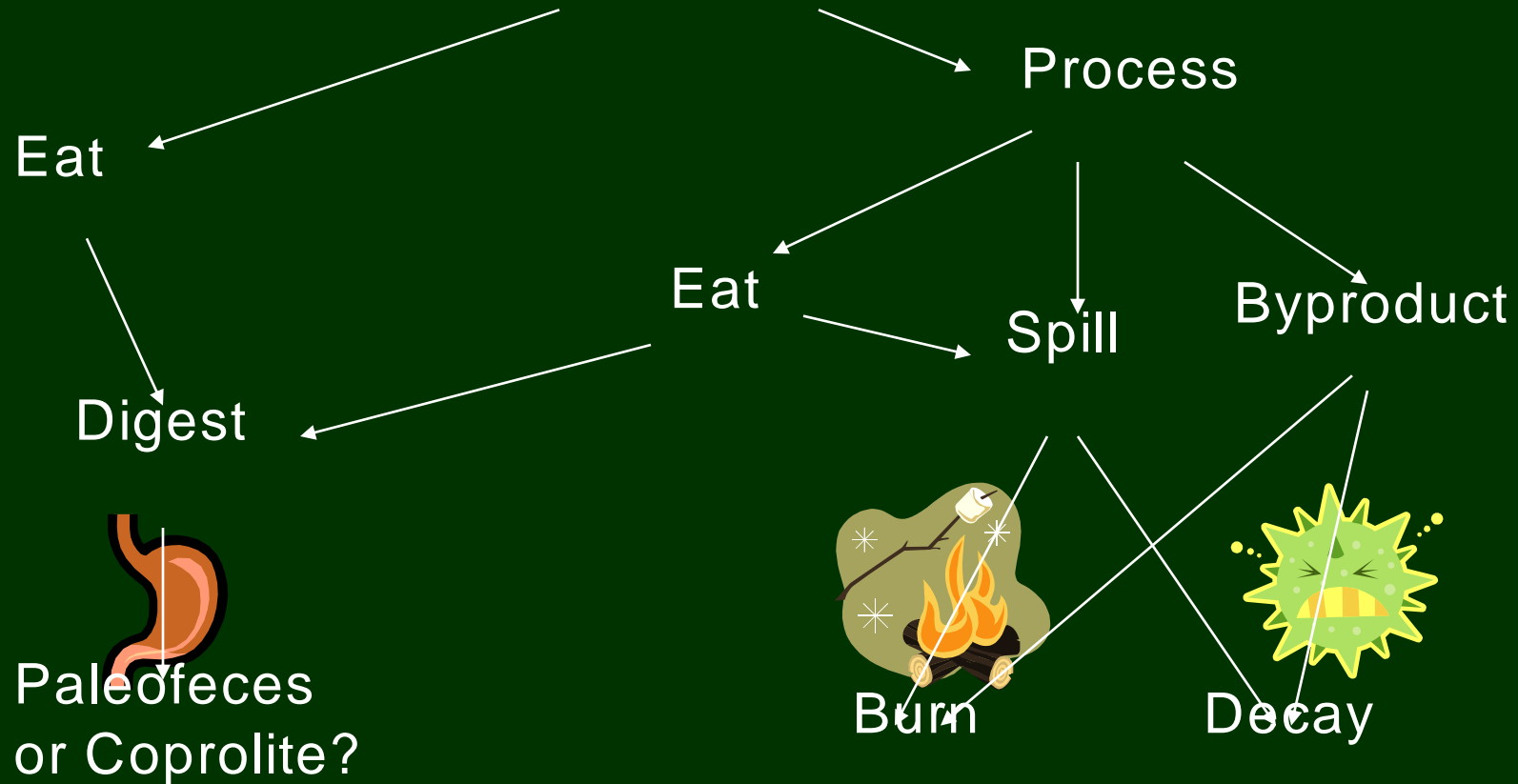
How do we get plants from archaeological sites: preservation

Procure: gather, harvest, purchase



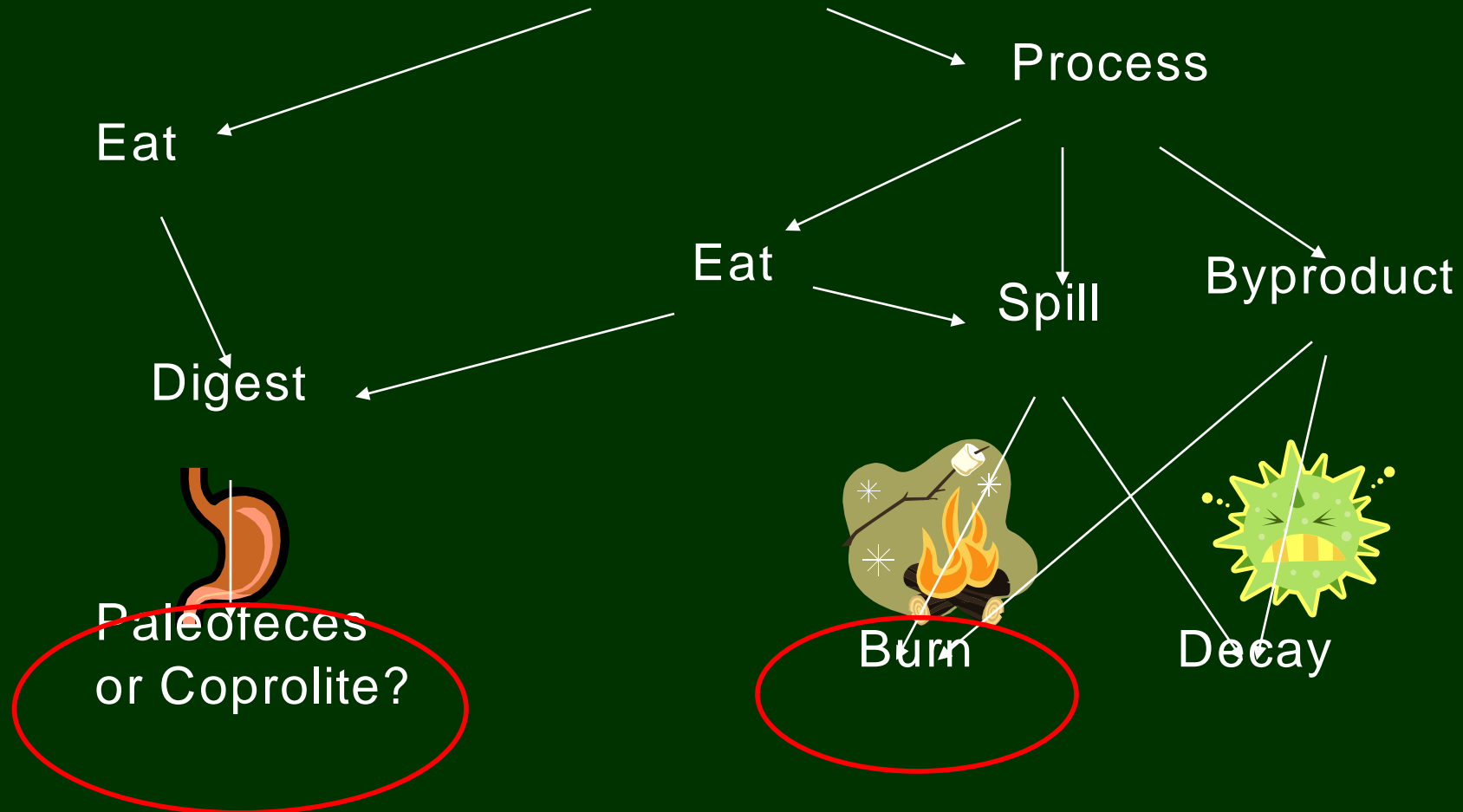
How do we get plants from archaeological sites: preservation

Procure: gather, harvest, purchase



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How do we get plants from archaeological sites: preservation

- Biases
 - Byproducts are overrepresented relative to edible portions

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 - Items that burn to ash (e.g. leaves) or unrecognizable mass (e.g. potatoes) are underrepresented

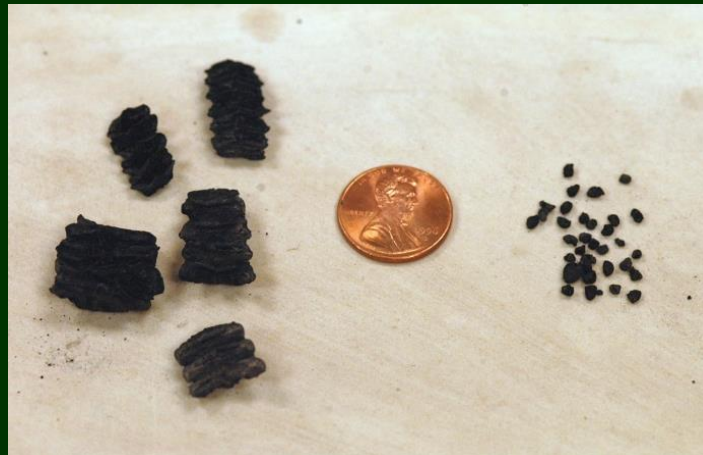
How do we get plants from archaeological sites: preservation

- Biases
 - Byproducts are overrepresented relative to edible portions
 - Items not cooked with fire are underrepresented
 - Items that burn to ash (e.g. leaves) or unrecognizable mass (e.g. potatoes) are underrepresented
 - Small, fragile items that do not easily withstand mechanical damage (e.g. freeze/thaw and recovery techniques) are underrepresented

So what are we likely to find?

How do we get plants from archaeological sites?

- Recovery



How do we get plants from archaeological sites?

- Recovery



How do we get plants from archaeological sites?

- Microscope analysis



How do we get plants from archaeological sites?

- Modern comparisons



Maypop (*Passiflora incarnata*)



Purslane (*Portulaca oleracea*)

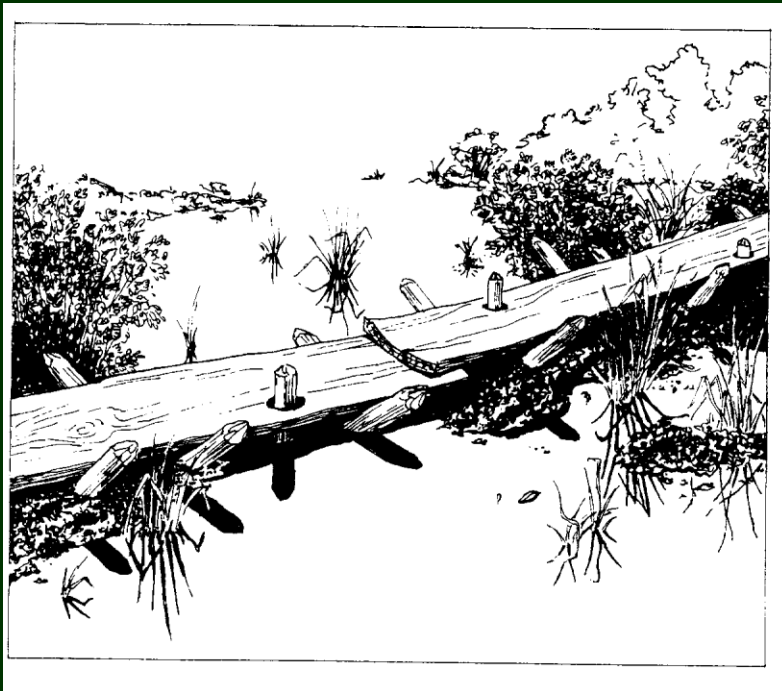
Paleoethnobotany and interpretation

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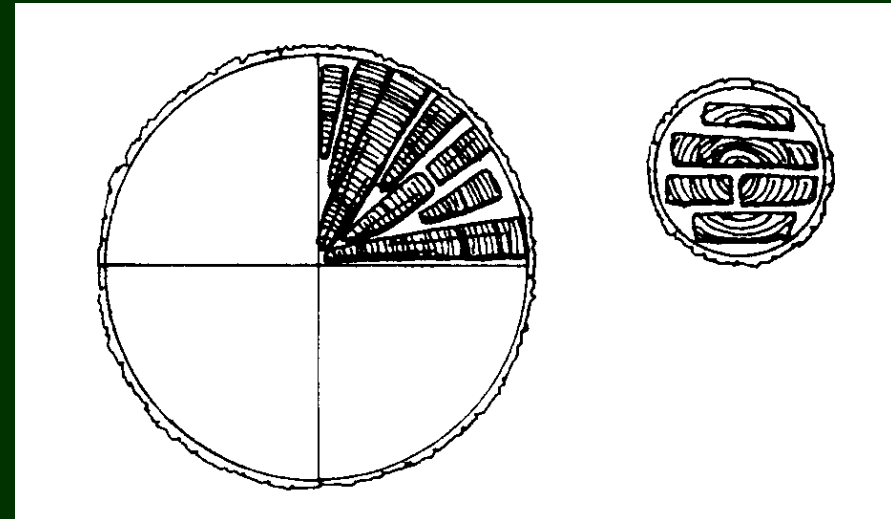
- Environmental reconstruction

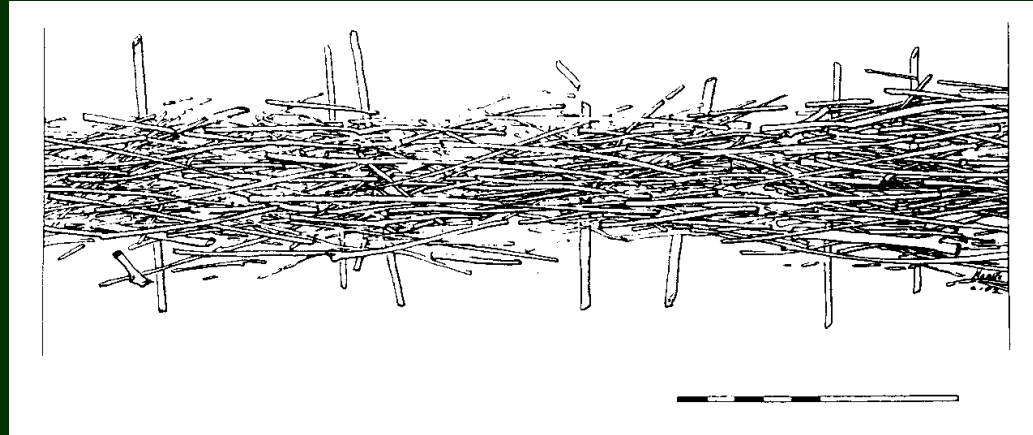
Environmental Change

- Case Study: Somerset Levels, southwest England
 - Trackways built and incorporated into a bog between 6000 and 2000 years ago

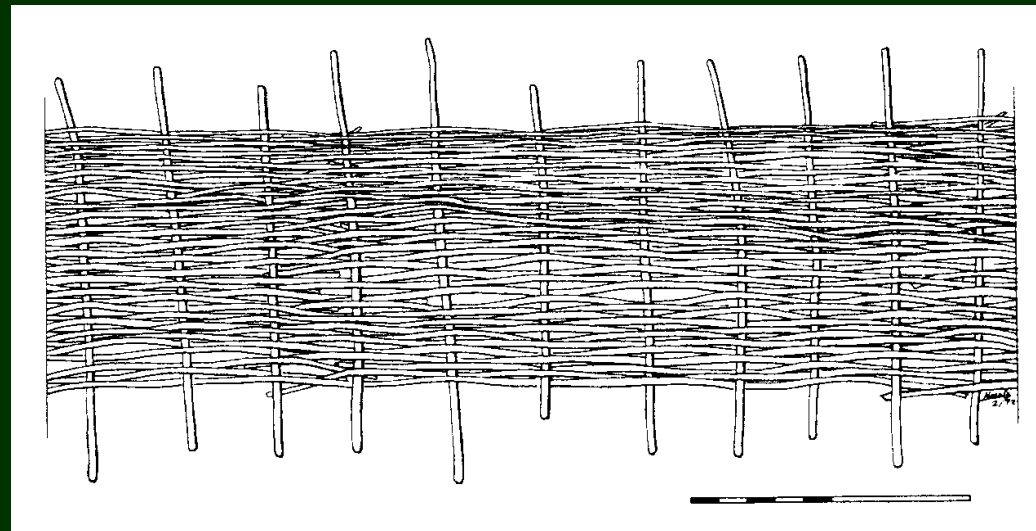


Around 5800 BP: Oak planks





By 5700 BP: Birch brushwood tracks



Around 5500-5000 BP: Coppiced hazel and elder hurdle/woven tracks

Paleoethnobotany and interpretation

- Environmental reconstruction
- Subsistence and foodways

How do plants enter the archaeological record?

1) People use them

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- consume
- store
- discard

2) They are preserved

Foodways

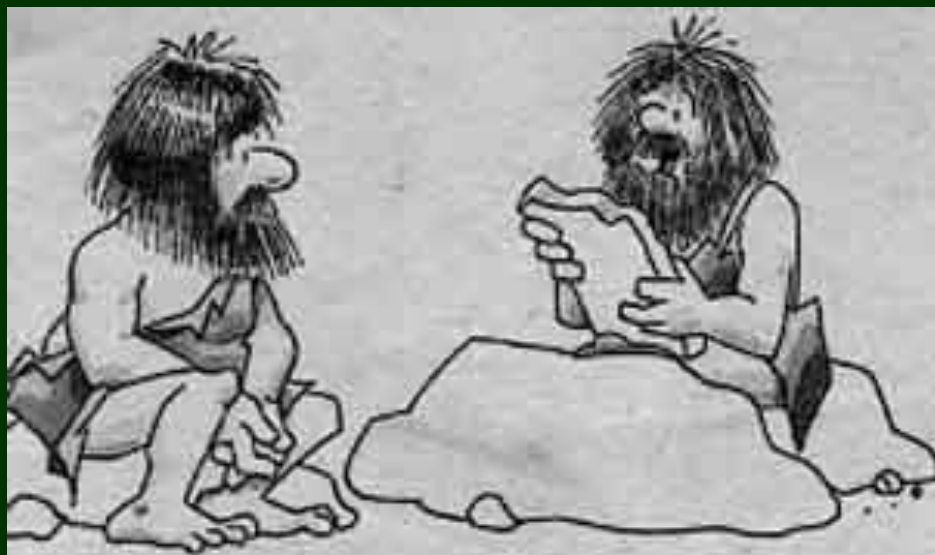
- The ways people obtain, prepare, share, store, discard, and *think about* food

Foodways

- The ways people obtain, prepare, share, store, discard, and *think about* food
- Foodways are shaped by...

Human Behavioral Ecology

- People make decisions that – *on the whole* – increase their fitness (their likelihood to survive and have children) within a particular environmental setting.



**"Very impressive...a Hunting major with a
Gathering minor."**



Central Place Foraging Theory

$$\text{return rate} = \frac{\text{energy obtained} - \text{energy spent}}{\text{time spent}}$$

varies by slope
and distance

$$r = \frac{e_{\text{obt}} - [e_{\text{handling}} + e_{\text{walking}} + e_{\text{carrying}}]}{t_{\text{handling}} + t_{\text{walking}}}$$

Ranking Return Rates, No Travel

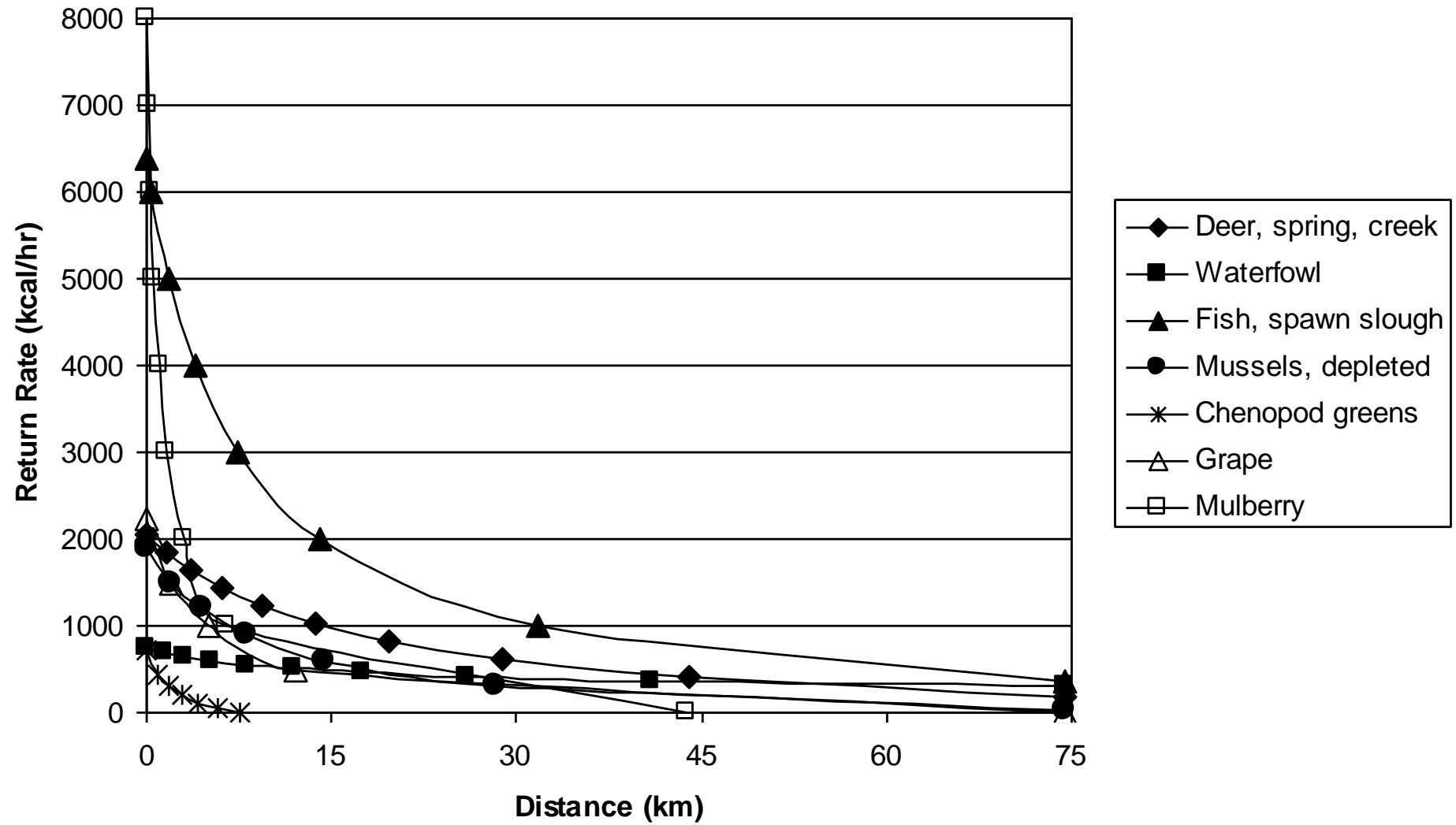
1.Mulberry	7982 kcal/hr
2.Fish, slough spawning	6378 kcal/hr
3.Deer	5613 kcal/hr
4.Fish, stream spawning	3786 kcal/hr
5.Wild turkey	3756 kcal/hr
6.Hickory	2881 kcal/hr
7.Grape	2192 kcal/hr
8.Mussels	1885 kcal/hr
9.Fish, stream	1636 kcal/hr
10.Amaranth, cut	1240 kcal/hr

11.Waterfowl	957 kcal/hr
12.Acorn	920 kcal/hr
13.Chenopod, cut	900 kcal/hr
14.Chenopod greens	715 kcal/hr
15.Squirrel	641 kcal/hr
16.Chenopod, strip	604 kcal/hr
17.Amaranth, strip	542 kcal/hr
18.Black walnut	227 kcal/hr
19.Other greens	215 kcal/hr
20.Hazelnut	186 kcal/hr

Ranking Distances of Return Rate “Half Life”

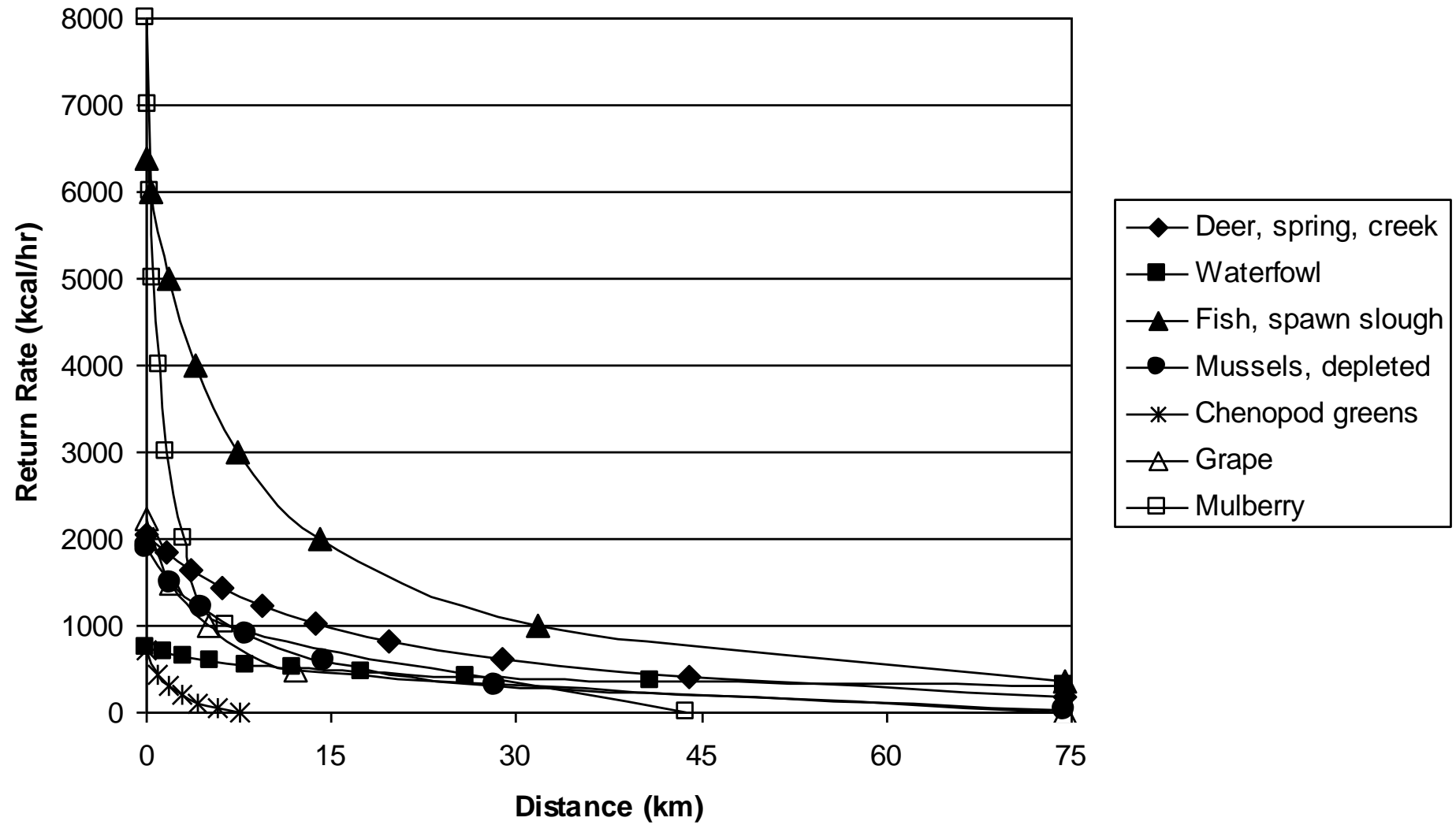
1.Squirrel	83 km
2.Chenopod, strip	58 km
3.Amaranth, strip	53 km
4.Waterfowl	42 km
5.Hickory	29 km
6.Hazel	28 km
7.Turkey	24 km
8.Acorn	20 km
9.Fish, stream	20 km
10.Black walnut	17 km

11.Deer	13 km
12.Fish, spawning stream	11 km
13.Grape	9 km
14.Mussel	8 km
15.Chenopod, cut	8 km
16.Fish, spawning slough	7 km
17.Amaranth, cut	6 km
18.Chenopod greens	3 km
19.Mulberry	3 km
20.Other greens	2 km



varies by slope
and distance

$$r = \frac{e_{\text{obt}} - [e_{\text{handling}} + e_{\text{walking}} + e_{\text{carrying}}]}{t_{\text{handling}} + t_{\text{walking}}}$$



Diet Breadth

1.Mulberry	7982 kcal/hr
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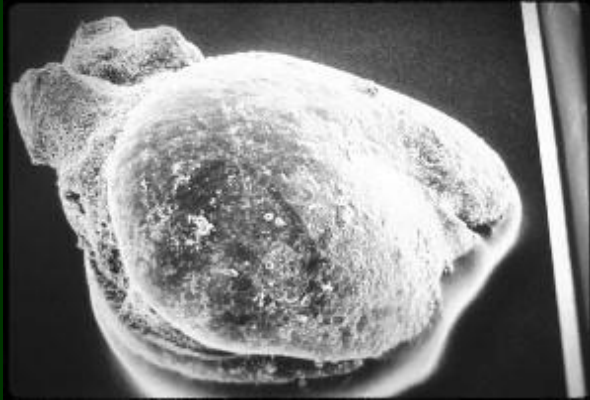
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Poplar Forest

Bowes 2011; Bowes & Trigg 2012

Period/Site	Feature	Taxonomic Richness
Early Jefferson - North Hill	1546 A-G Sub-floor pit	31
Later Jefferson - North Hill	1476 B-D Exterior pit	7
Later Jefferson - Quarter Site	829 Sub-floor pit	7
Later Jefferson - Quarter Site	1206 Structure	10
Hutter Era – Site A	ER 2352/4 Sub-floor pit	37

Process of Plant Domestication in Eastern North America



Wild Chenopod



Domesticated Chenopod
~3800 bp



Sumpweed:
Earliest domesticate ~4000 bp

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Risk and Domestication of Plants

- Why bother with low return resources?
- Instant return vs. delayed return
 - I'll give you \$100 today or \$500 in three months
 - Depends on:
 - Current conditions
 - Likelihood of benefit in three months
 - Opportunity costs

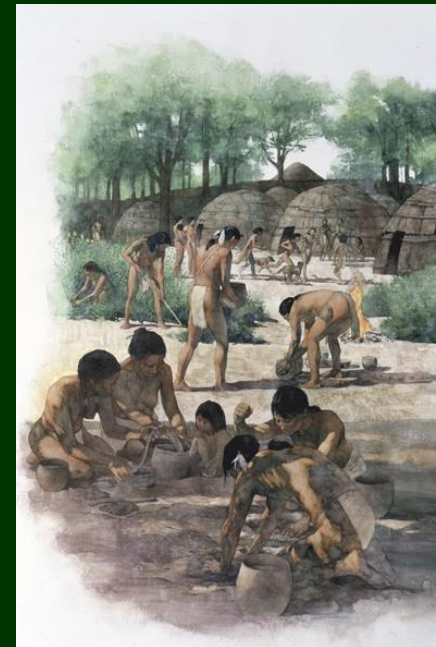
Late Archaic:

- growing population
- more neighbors = less mobility
- seed crops to reduce risk
- communal strategies



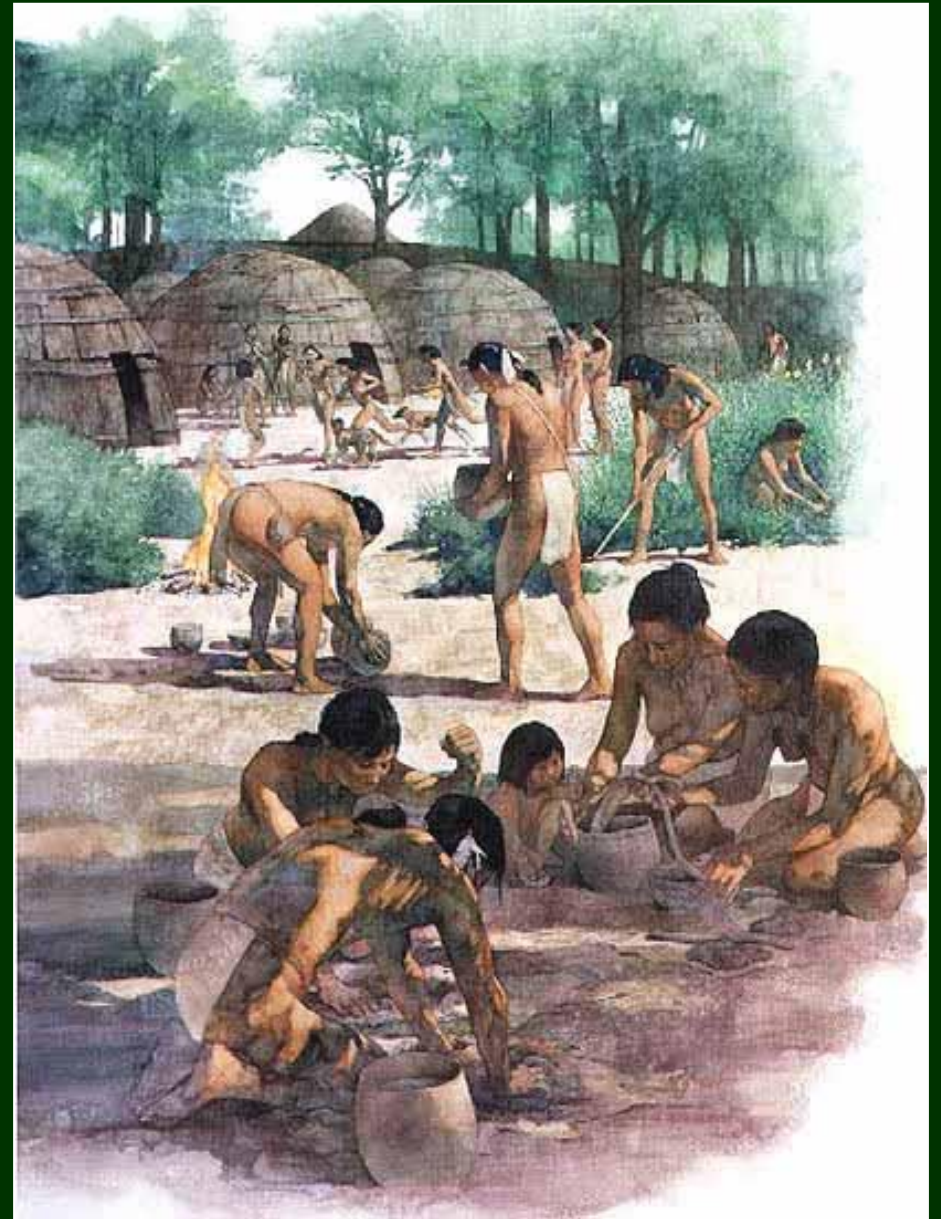
Early Woodland:

- growing population
- cultiv. plot investment = even less mobility
- seed crops to reduce risk
- household strategies



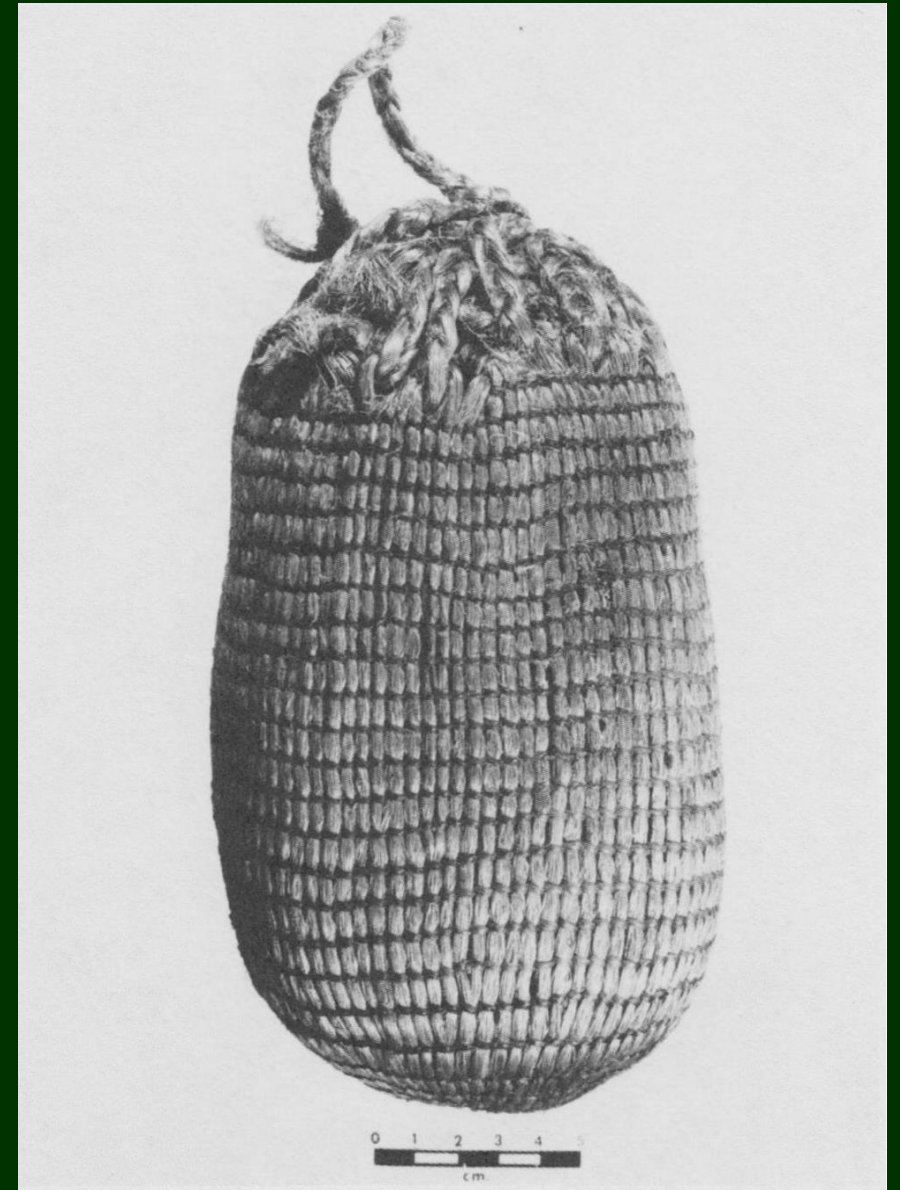
Resulting social changes:

- Intra-group
- Household
- Inter-group



“Seeds are described almost as intergenerational relatives – both as children that need nurturing and protecting, and as grandparents who contain cultural wisdom that needs guarding.”

- *Elizabeth Hoover (2019)*



ca. 2000-yr-old bag of chenopod seeds,
Edens Bluff Shelter, Arkansas

African Diaspora Crops



Poplar Forest

Bowes 2011; Bowes and Trigg 2012

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Poplar Forest

Bowes 2011

Period/Site	Feature	Taxonomic Richness	Volume of Soil Analyzed	Taxa per Liter
Early Jefferson - North Hill	1546 A-G Sub-floor pit	31	136.5 L	.23
Later Jefferson - North Hill	1476 B-D Exterior pit	7	70.5 L	.10
Later Jefferson - Quarter Site	829 Sub-floor pit	7	6 L	1.17
Later Jefferson - Quarter Site	1206 Structure	10	527 L	.02
Hutter Era - Site A	ER 2352/4 Sub-floor pit	37	150.6 L	.25

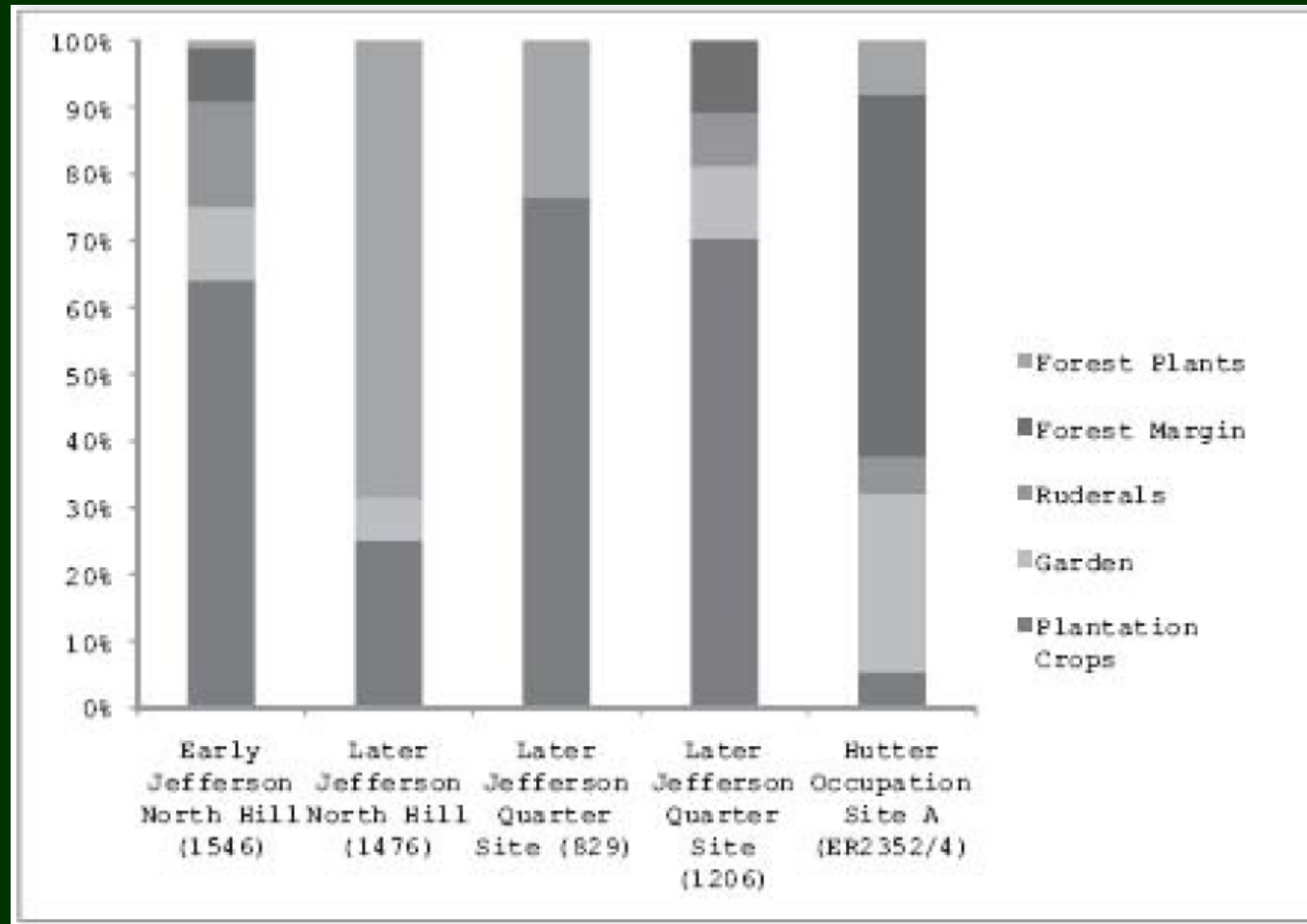
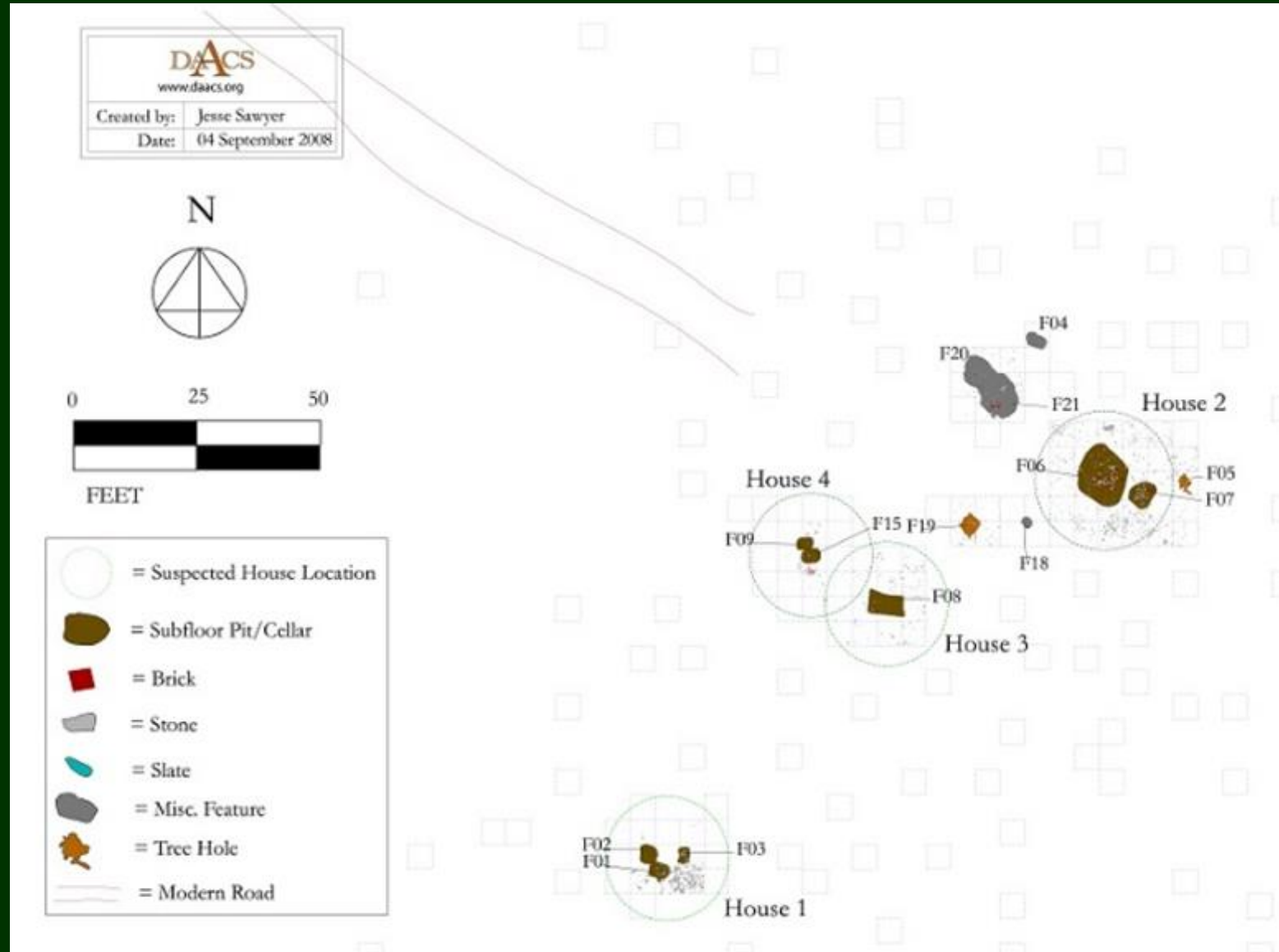
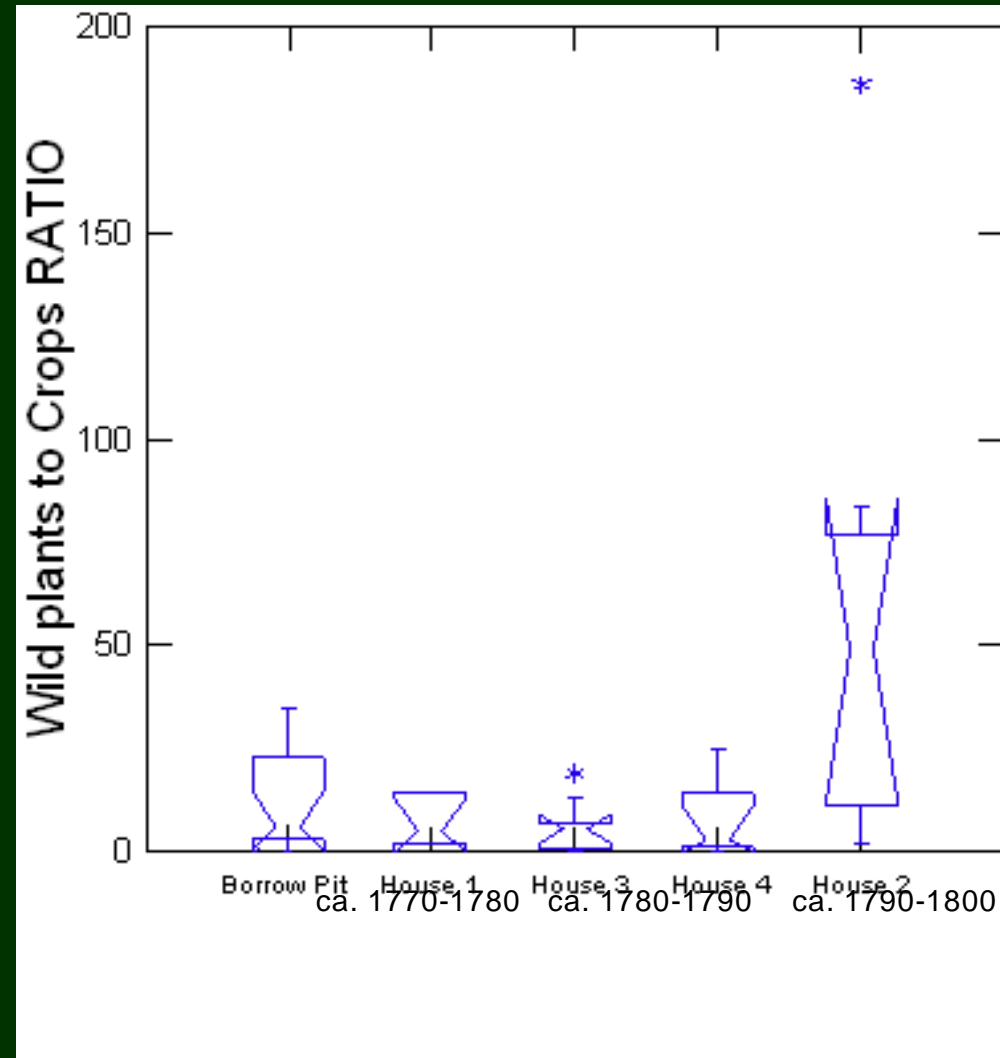


Figure 8.1. Proportion of seeds found at slave quarter sites from various habitats at Poplar Forest.

Monticello's Site 8



Change through Time



Courtesy of Stephanie Hacker (2016)

South Pavilion Kitchen

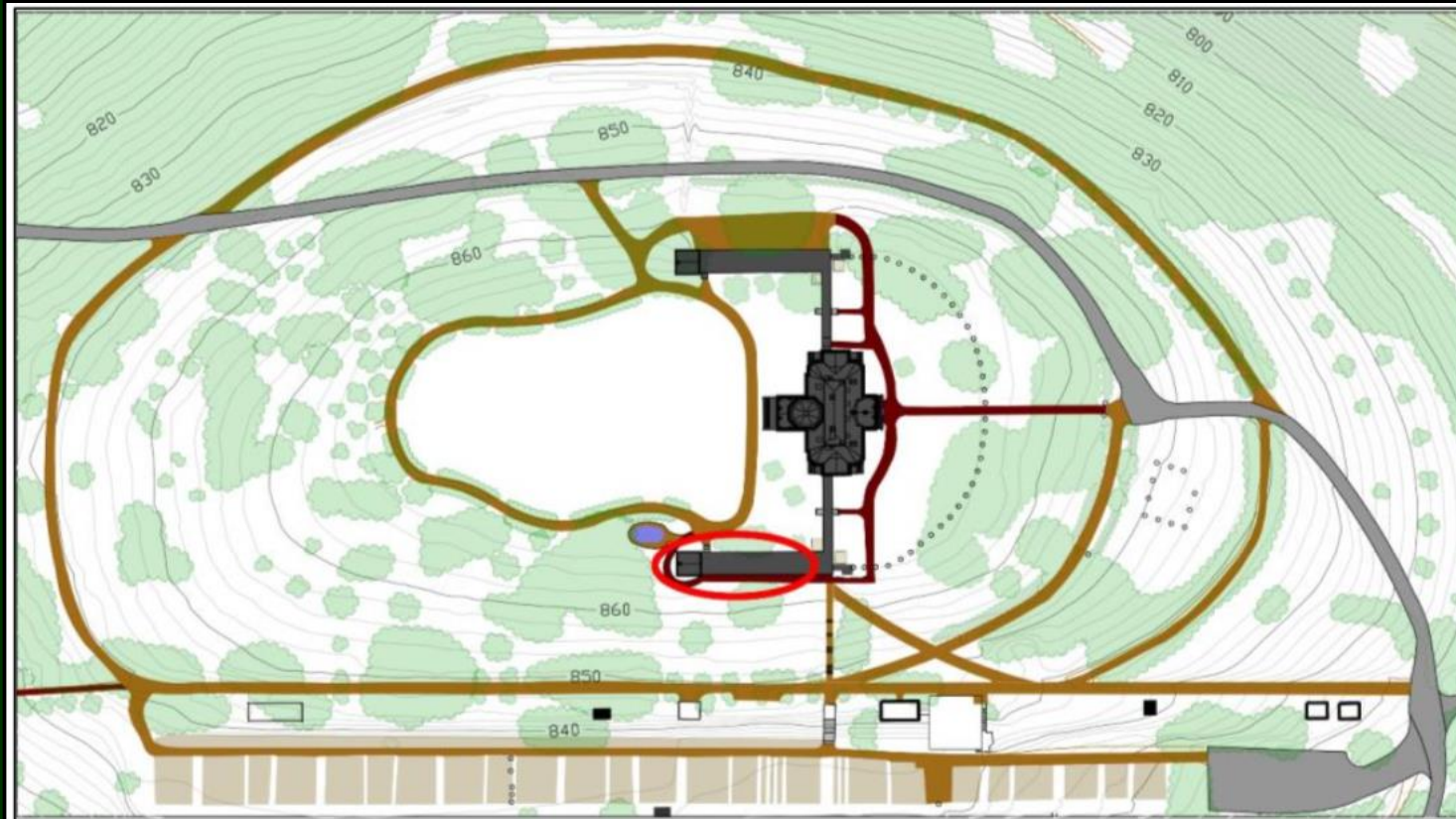
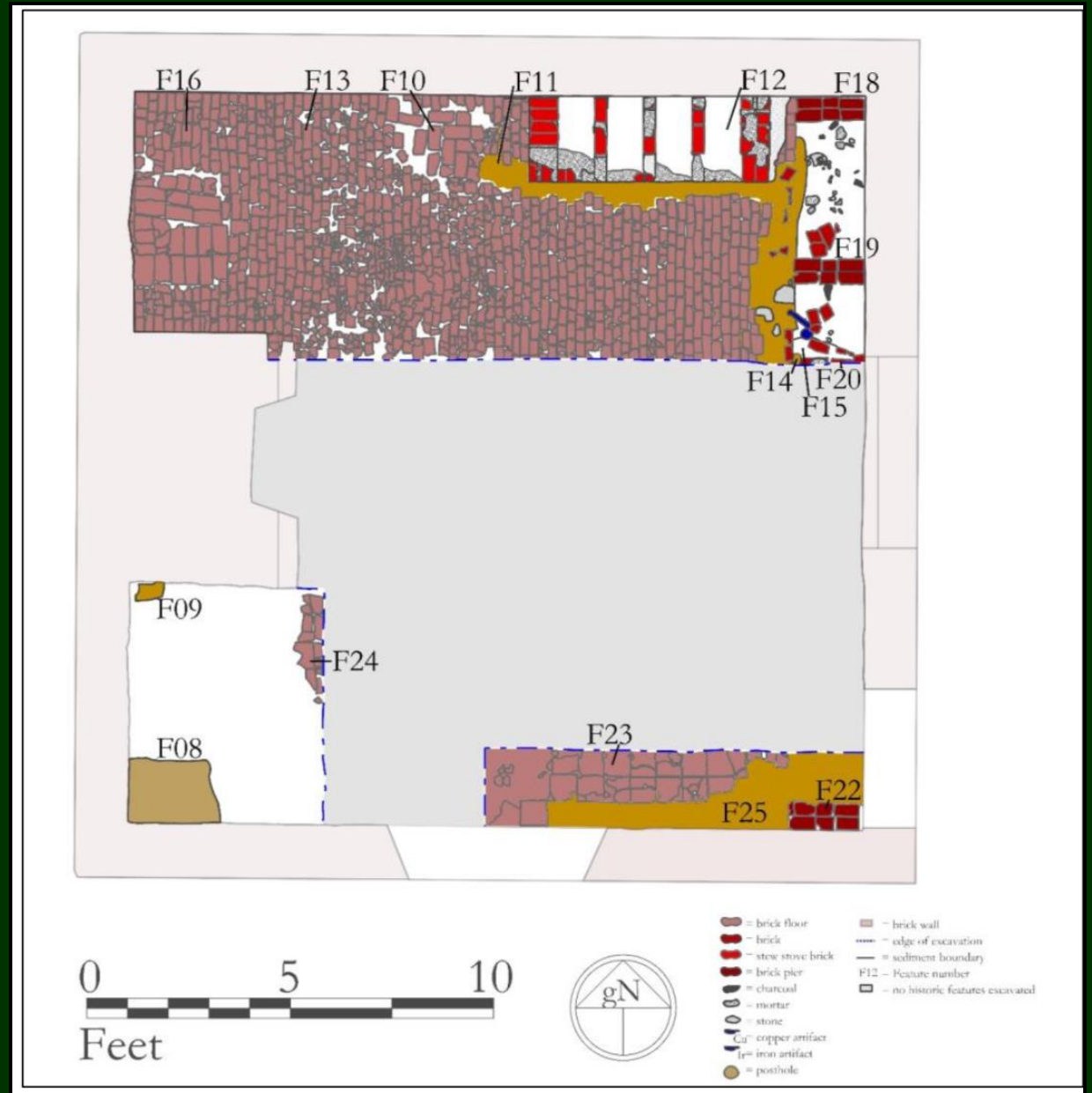


Figure 1: Monticello mountaintop with the South Pavilion and South Wing circled in red.

Stew Stoves



South Pavilion Kitchen



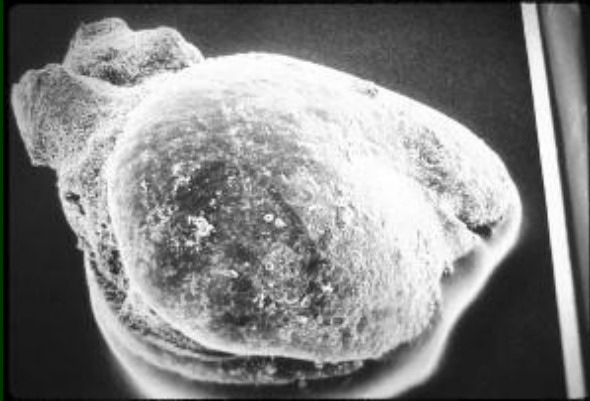


Questions?

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- Subsistence and foodways
- Environmental reconstruction
- Regional patterns and changes through time

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Sociopolitical Impacts of Corn

- Johannessen 1993

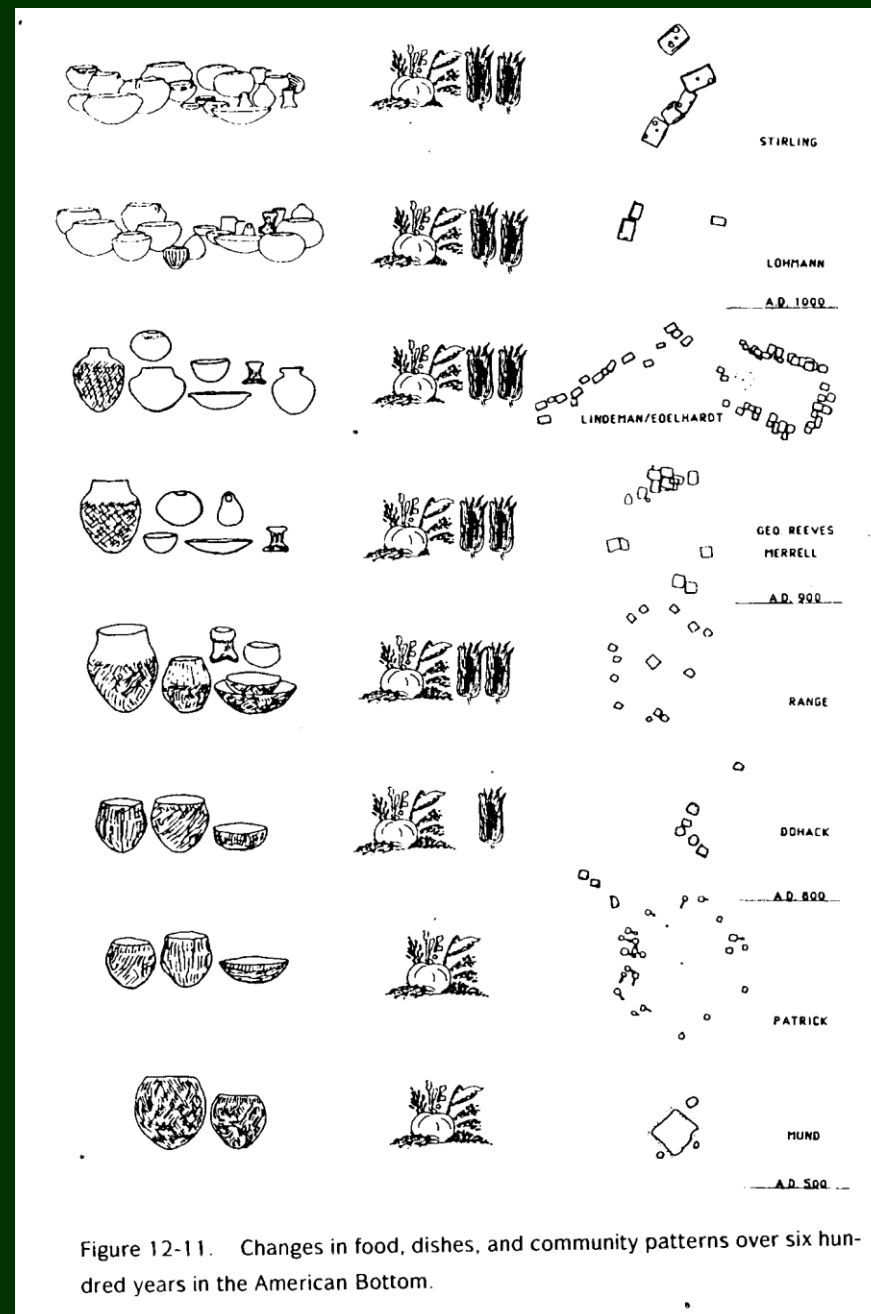


Figure 12-11. Changes in food, dishes, and community patterns over six hundred years in the American Bottom.

Paleoethnobotany and interpretation

- Subsistence and foodways
- Environmental reconstruction
- Regional patterns
- Changes through time
- Human behavioral ecology
- Social foodways

Poplar Forest

- Diet breadth
 - Nutritional adequacy?
 - Better access to wider range of foods?
 - Greater autonomy of slaves?
- Using plants for wide range of purposes