# “Oh, Deer!”
# Seasonality and Utilization at Three Fort Ancient Sites

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## Research Questions

Fort Ancient were maize agriculturalists and the last prehistoric culture to inhabit the Middle Ohio River Valley (Griffin 1943). Surprisingly little systematic work has been undertaken on seasonality and the effects of environmental degradation, particularly regarding smaller sites. This study focuses on these issues using three sites in the Miami River Valley, near Dayton, Ohio. Two research questions framed the research:

**Do deer remains suggest fall/winter uses of smaller sites?** A common pattern among historic Native American tribes in the area was for part of the population to move to hunting camps during the winter months (Wagner 1996). If this is the case here, the smaller sites should contain mainly winter deer kills and lower utility parts as reflected in skeletal elements (i.e., leaving lower utility elements, returning with better cuts of meat).

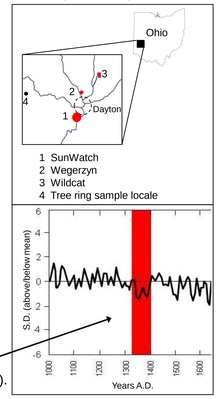
**Were drought conditions bad enough to cause changes in the pattern of deer utilization?** Deer remains from temporal contexts associated with drought conditions should reflect these tough times. During such conditions, hunters kill higher numbers of juvenile deer and utilize more lower yield body parts (Bousman 2005).

## Study Sites

**SunWatch**
A large (1.4 ha.), circular village situated on a broad floodplain near the center of the Miami River network with low acidity soils. It was occupied between A.D. 1150 and 1450; between A.D. 1150 and 1300 it was used during the warm months, and between A.D. 1300 and 1450 village-level leadership developed and the site was used on a year-round basis (Cook 2007, 2008). Sample is from (1) F2/05 (A.D. 1289) and (2) Feature Group 2.1 (ca. A.D. 1350-1400).

**Wegerzyn**
A small (0.3 ha.), circular village on a major tributary river with low acidity soils. Sample is from F1/00 and F2/00 (A.D. 1380).

**Wildcat**
A small (0.3 ha.), linear site on small intermittent stream with low acidity soils. Sample is from F3/07 (A.D. 1272).




Relative moisture derived from local tree ring sequence (red=drought) (source: Cook 1999, 2004).

## Methodology

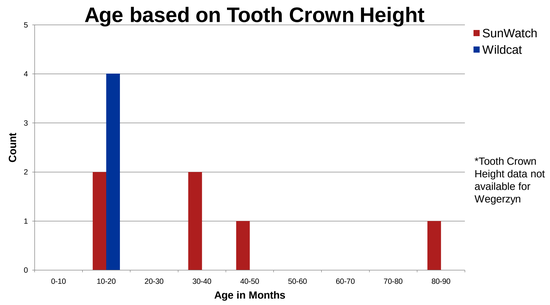
**Identification**
- Standard reference sources (Gilbert 1980; Olsen 1964) and a were used comparative collection.
- Minimum Number of Individuals (MNI) and Number of Identified Specimens (NISP) were based on Klein and Cruz-Uribe (1984).

Author in the lab.

**Aging Methods**
- Juvenile/adult determination based on predictable rates of epiphyseal closure from Purdue (1983).
- A predictable rate of wear on deer teeth allows age estimation based on crown height indices from Severinghaus (1949).

**Utility**
- The utility value of a bone reflects the associated meat or marrow. The mid-section and femora are particularly high in utility for deer.
- Element MNIs were compared with meat and marrow utility indices (from Madrigal and Zimmerman Holt 2002) to see if element abundances correlated with their utility values.

## Results




Ages from tooth crown heights show a pattern of hunting prime-age deer at SunWatch and a more juvenile intensive pattern at Wildcat.

### Deer Utility Test for Meat Yield

Wildcat

| Element | MNI | Meat Yield (Kcal) |
|---|---|---|
| CE | 1 | 9658.7 |
| FE | 7 | 18404 |
| HU | 7 | 3313 |
| IN | 3 | 4811.1 |
| RI | 3 | 9867.8 |
| SC | 3 | 6644.2 |
| TH | 2 | 10694 |
| TI | 4 | 3599.2 |
| RA/UL | 6 | 1542.8 |
| | | |
| | r = | -0.038136 |

SunWatch (early)

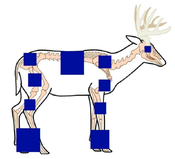
| Element | MNI | Meat Yield (Kcal) |
|---|---|---|
| CE | 4 | 9658.7 |
| FE | 10 | 18404 |
| HU | 12 | 3313 |
| IN | 7 | 4811.1 |
| RI | 8 | 9867.8 |
| SC | 11 | 6644.2 |
| TH | 5 | 10694 |
| TI | 4 | 3599.2 |
| RA/UL | 2 | 1542.8 |
| | | |
| | r = | 0.270781 |

Wegerzyn

| Element | MNI | Meat Yield (Kcal) |
|---|---|---|
| CE | 11 | 9658.7 |
| FE | 15 | 18404 |
| HU | 26 | 3313 |
| IN | 11 | 4811.1 |
| RI | 7 | 9867.8 |
| SC | 12 | 6644.2 |
| TH | 6 | 10694 |
| TI | 22 | 3599.2 |
| RA/UL | 16 | 1542.8 |
| | | |
| | r = | -0.442945 |

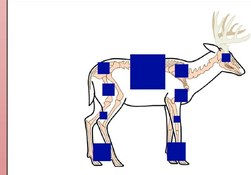
Similar tests were run for Meat Return Rate, Marrow Yield, and Marrow Return Rate with similar results.

## Results (continued)



**Wildcat A.D. 1272**

Medium Utility



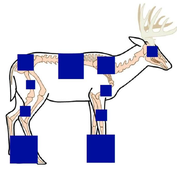
Some Young Deer (12%)



**SunWatch A.D. 1289**

High Utility

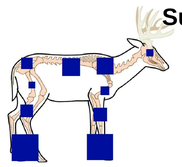
Few Young Deer (5%)



**Wegerzyn A.D. 1380**

Low Utility

Many Young Deer (22%)



**SunWatch ca. A.D. 1350-1400**

Low Utility

Many Young Deer (17%)


### Correlation Matrix for Frequency by Skeletal Area

| r | Wildcat | SunWatch | Wegerzyn | SunWatch2 |
|---|---|---|---|---|
| Wildcat | 1 | 0.762 | 0.897 | 0.777 |
| SunWatch | 0.762 | 1 | 0.613 | 0.319 |
| Wegerzyn | 0.897 | 0.613 | 1 | 0.928 |
| SunWatch2 | 0.777 | 0.319 | 0.928 | 1 |

### Chi-Square Test for Juvenile Discrepancies

- Significantly more juveniles at Wildcat than SunWatch (p=0.001).
- Significantly more juveniles at Wegerzyn than SunWatch F2/05 (p<0.0001).
- Significantly more juveniles at Wegerzyn than Wildcat (p=0.003).

## Conclusions

**Seasonal Differences?**

- The samples of teeth and unfused epiphyses did not provide strong evidence of seasonality nor year-round occupation, but the presence of individuals less than 5 months suggests both winter and summer occupation.

**No Functional Differences**

- There is no statistical correlation between MNI and meat or marrow utility at any site, which suggests that the smaller sites (Wegerzyn and Wildcat) were not functionally-distinct hunting camps.

- SunWatch (2) shows a positive correlation (r=0.928) with the Wegerzyn site, indicating that they had very similar utility patterns. The lack of distinction between the two late samples at Wegerzyn and SunWatch reveals the absence of differences in deer utilization between the larger and smaller sites.

**Environmental Stress**

- There is low utility and a high number of juveniles at Wegerzyn indicating environmental stress and a less-than-optimal hunting strategy. A group of features from the same time period at SunWatch also shows a decline in utility and significantly more juveniles than the earlier SunWatch pit (p<0.0001). Therefore, the difference between earlier and later samples is best explained due to environmental stress not differential site use.

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