DOGS AS PROXIES FOR FORAGER-FARMER INTERACTIONS ALONG THE MISSOURI RIVER, NORTH AND SOUTH DAKOTA

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1 RESEARCH QUESTION

When migrating farmers arrived at the border of North and South Dakota, how did the Indigenous forager groups of North Dakota respond?

WHAT IF WE USE DOGS AS A PROXY!?

- DOGS WERE A VALUED TOOL UNTIL REPLACED BY THE HORSE.
- USED TO HAUL FOOD, TEPEES, AND PEOPLE DURING TRAVOIS
- DOGS ATE SIMILAR FOODS TO THEIR PEOPLE AS WELL AS THEIR TRASH
- CAN SERVE AS A DIETARY SURROGATE TO PEOPLE WHICH CIRCUMVENTS THE NECESSITY OF DESTRUCTIVELY SAMPLING HUMAN REMAINS (RESTRICTED BY TABOO, RESPECT, LAWS)
- BUT:
- OTHER CANIDS AROUND THAT ARE OF SIMILAR SIZE AND MORPHOLOGY TO DOGS
- OTHER FOODS AROUND THAT PEOPLE DO NOT EAT SUCH AS SQUIRRELS, FRESH, AND HUMAN REMAINS

CAN COMPARE DOGS TO THE WILD CANIDS AND UTILIZE COMBINED METHODS TO TELL THE DIFFERENCE BETWEEN THEM

ONLY COMPARE DOGS TO OTHER DOGS AND CANIDS LOOKING FOR DIFFERENCES THROUGH TIME!

2 BACKGROUND

"For food for the puppies we cut any kind of meat into small pieces and boiled it. After a meal, scraps of cooked meat were cut up and given to them. We would feed our puppies raw meat, because if we did, they would have worms. This rule applied only to puppies; to old dogs we gave either raw or cooked meat.

Wilson 1924:200

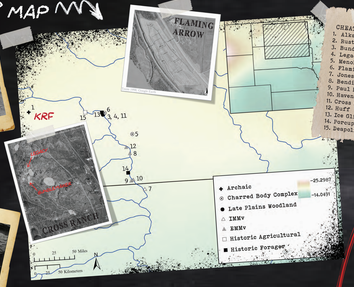
CANIDS IN THE AREA

DOG

COYOTE

WOLF

MAP



CHEAT SHEET
1. Alkali Creek
2. Buried Quarry
3. Bundlemaker
4. Legacy
5. Menoken
6. Flaming Arrow
7. Stone Village
8. Reeshah
9. Paul Brave
10. Bismarck
11. Green Ranch
12. Huff
13. Joe Gilder
14. Porcupine Creek
15. Sequoia

TIME

Archaic
- 6500 BC to AD 500
- Earliest ceramics date to this period
- No farming, only hunter-gatherers
- Climate change was the driving force; bison got smaller, droughts and volcanic eruptions caused food instability

Plains Woodland
- 500 BC to AD 1000
- Sometimes described as Archaic with pottery; in the north, Plains Woodland is characterized by the adoption of ceramics the bow and arrow
- Climate became more predictable, but still multi-decade droughts
- Extensive trade networks established

The Charred Body Complex (CBC)
- Late Plains Woodland
- AD 800-1200 (After 1000cal.BP)
- Early interaction between farmers in South Dakota and hunter-gatherers in South Dakota
- Distinct from South Dakotan Initial Middle Missouri Variant (IMMV), in North Dakota (EMMV) Extended Middle Missouri Variant (EMMV) and Terminal Middle Missouri (TMMV) Traditions, as well as from other North Dakotan Woodland Traditions
- Archaeological evidence for Late Plains and IMMV exchange of agricultural products
- Traces of ceremonial structures &c.
- Changes in settlement patterns &c. fortifications and permanent homes

Initial Middle Missouri Variant (IMMV)
- AD 1000-1200
- Extend from central South Dakota to northwest Iowa, with eastern and western variants BUT NEVER APPEARED IN NORTH DAKOTA
- Rarely occupied for more that 50 years.
- About half of IMMV sites were fortified.
- Eastern IMMV developed out Late Plains Woodland Great Oasis communities, with notable interaction in long-distance trade.
- Western IMMV sites seemingly focused trade on Knife River Flint

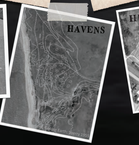
Extended Middle Missouri Variant (EMMV)
- AD 1100-1400
- Sites in North Dakota
- Coincides with the decline of IMMV and Oneota to the east
- Decline in Knife River Flint trade
- Often ringed with villages

Terminal Middle Missouri Variant (TMMV)
- AD 1500-1845
- Represented by one site, Huff
- Contraction of Middle Missouri groups into large, heavily fortified sites

Coalescent
- AD 1250-1884
- Combination of EMMV and Central Plains tradition
- Migrated along the Missouri River
- Heavily fortified villages
- Associated with the decline of Knife River Flint trade

Post-contact Coalescent and Historic Periods
- AD 1780-1862
- Mobility increased with the adoption of the horse and gun
- As trade increased, an old raiding of farming villages
- New epidemics changed community relationships and size
- Instances of community coalescence (coming together) as well as abandonment
- Farming villages were fortified along territorial borders
- Changing roles of dogs; historical records indicate periods of starvation

TRADE?



"Many women arrived with the loaded dogs, and I never saw such miserable, starved animals. They had to work every hour, and they died slowly and painfully. Yet they were clearly better off than the people who had no dogs. Out of them was born a proverb: 'Dogs are good for something, another, quite starved, fell down near the tipi.'"

Maximilian 1906 (Thwaites 1905)

"In times of scarcity the people cared for their dogs as best they could; they ate the bones that were crushed and broken in cooking and the tendons and sinews. The dogs could chew on them or them would get some food in this way."

Wilson 1924:202

Knife River Flint (KRF)

- Jet black or dark chocolate brown to gray in color
- Texture ranges from glassy to waxy
- Never found in place, but in secondary deposits such as glacials and along terraces of the Knife River in North Dakota.
- Valuable resource for chipped stone tool production

3 HYPOTHESES

WHEN FARMERS ARRIVED, FORAGERS...

H1: Rejection

Foragers rejected agriculture or maintained low-impact (i.e., incipient or non-farm) land trade relationships with early Plains Village farmers.

Unlike historic foraging communities with extensive economic relationships with farming communities, if CBC populations rejected maize farming and interaction altogether, we expect little to no maize in the dogs' diets.

It is possible that very low levels of maize use may be indicated and verified by low-impact trade encounters or ritual exchange.

There is some limited evidence for the presence of maize at CBC sites, but it is not clear if it was used for prestigious ritual or dietary purposes.

CBC dog diets match Arikara and possibly other northern Plains Woodland dogs, with little or no maize consumption.

H2: Adoption

Forager groups interacted with and were influenced by the Plains Village farmers, inspiring the independent adoption of agriculture by local Indigenous groups.

This assumes a quantifiable difference will be apparent between maize farmer and historic hunter-gatherer dog diets.

If this hypothesis is not falsified, it implies an early transition to farming by Indigenous foragers

CBC dogs diets match or closely approximate Plains Villages and Historic Agriculture sites values and differ from Archaic and other non-maize contexts.

POSSIBLE COMPLICATIONS:
- THE INTERMEDIATE THE HORSE
- DECEASED-OWNER CUT BONES
- CANINES WERE TREATED AS
- LESS PEOPLE AND PROVISIONING
- INCREASED SCAVENGING

H3: Economic Exchange

Forager groups engaged in or developed a high-impact economic relationship with Plains Village people.

These relationships were maintained, by economic exchange that was, at least partially, reliant on farming products.

If this hypothesis is not falsified, then this implies a delayed adoption through migration and acculturation. It would also imply that at least part of the observed historic interactions between farmers and hunter-gatherers may be deeply rooted in time.

CBC dog diets have commensalism or similar isotopic signatures to Plains Village farming dog diets, but notably different diets from Archaic and other Plains Woodland dog diets and are possibly comparable to historic hunter-gatherer community signatures.

THANK YOU
- FRED CHAPPELL
- SHERRIE LYNN
- GREGORY PAUL
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- STANLEY ARNDORF
- MARLAN SCHNEIDER
- TERRY WARD
- MICHAEL MILES
- BRIAN BARRETT
- CHRIS KEEFE
- GRAY FISHER
- KAYPE KEEP
- INDIAN VILLAGES

4 METHODS

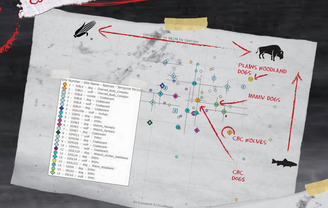
STABLE ISOTOPE ANALYSIS

CARBON: $\delta^{13}C$
- TROPICAL PLANTS PROCESS CO2 DIFFERENTLY FROM MOST PLANTS (C3) TO LIMIT EVAPORATION; THESE ARE CALLED C4 PLANTS
- THIS CAUSES A NOTABLE DIFFERENCE IN THE RATIO OF CARBON ISOTOPES IN TROPICAL PLANTS, WHICH INCLUDES MANY GRASSES BUT ALSO MAIZE CORN.
- CARBON IS IN ALL TISSUES INCLUDING BONE AND TOOTH ENAMEL BUT THE CARBON COMES FROM DIFFERENT FOODS
- CARBON ISOTOPES IN TEETH COME FROM THE WHOLE DIET (INCLUDING CARBOHYDRATES LIKE CORN)
- CARBON ISOTOPES FROM COLLAGEN IN BONE AND TOOTH ROOTS COME PRIMARILY FROM PROTEIN LIKE MEAT
- THERE TWO VALUES CAN BE COMPARED TO DISTINGUISH BETWEEN C4 FROM BISON (MEAT GRAZE) AND FROM CARBOHYDRATES

NITROGEN: $\delta^{15}N$
- NITROGEN REDUCES THROUGH TROPHIC LEVEL BUT THE FOOD WEB
- FISH HAVE MORE COMPLEX FOODWEBS THAN TERRESTRIAL ANIMALS, SO THEY ARE MORE REDUCED IN NITROGEN. MARINE FOODWEBS ARE EVEN MORE COMPLEX THAN FRESHWATER AND THE LEAST COMPLEX, SO THEY HAVE THE LOWEST NITROGEN
- NITROGEN ISOTOPES CAN BE USED TO LOOK AT THE PROTEIN INPUTS IN A DIET, BUT ALSO THE AMOUNT OF FISH IN A DIET.

Sampling Decisions
Maximized the number of samples from each site
Minimized the risk of replication in analysis.
Maintaining context and minimum number of individuals in consultation with museums and caretakers of the collections using the following:

1. Locational Similarity: All sites are found along or near the Missouri River Valley. The contiguous Arikara site of Ahlvin Creek and Buried Quarry.
2. Temporal/ Chronological Control: All specimens derive from well-dated and well-contexted contexts.
3. Collection and Specimen Availability: Specimens were suitable, available, and permission was obtained from all current agencies and institutions for destructive analysis.
4. Sampling of Individual Specimens: All faunal specimens used in this research were macroscopically documented and photographed before destructive analysis.

CBC: CHARRED BODY COMPLEX
LATE PLAINS WOODLAND
CONTEXT
MIDDLE INITIAL MISSOURI ARIKARA
NORTH DAKOTA FARMERS
MIDDLE EXTENDED MISSOURI
NORTH DAKOTA FARMERS
KRF: KNIFE RIVER FLINT

5 RESULTS